Series 23
No. 17

# Vital and Health Statistics

From the CENTERS FOR DISEASE CONTROL AND PREVENTION/National Center for Health Statistics

# Birth Expectations of Women in the United States, 1973–88

February 1995

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

CENTERS FOR DISEASE CONTROL AND PREVENTION

**Suggested citation**

Peterson, LS. Birth expectations of women in the United States: 1973–88. National Center for Health Statistics. Vital Health Stat 23(17). 1995.

**Library of Congress-in-Publication Data**

Peterson, Linda S.
Birth expectations of U.S. women: 1973 to 1988 / [by Linda S. Peterson].
p. cm. — (Vital and health statistics. Series 23, Data from the national survey of family growth; no. 17) (DHHS publication; no. (PHS) 95-1993)
"February 1995."
Includes bibliographical references.
ISBN 0-8406-0501-3
1. Fertility, Human—United States—statistics. 2. Population forecasting—United States—statistics. I. National Center for Health Statistics (U.S.) II. National Survey of Family Growth (U.S.) III. Title. IV. Series. V. Series: DHHS publication; no. (PHS) 95-1993.
[DNLM: 1. Birth Rate—United States—statistics. 2. Pregnancy— United States—statistics. 3. Family Planning—United States— statistics. 4. Population Growth—United States—statistics. W2
A N148vw no. 17 1995]
HB901.P48 1995
304.6'32'097309047—dc20
DNLM/DLC 94-33453
for Library of Congress CIP

# Vital and Health Statistics

## Birth Expectations of Women in the United States, 1973–88

Series 23:
Data From the National Survey of Family Growth
No. 17

Statistics collected in 1973, 1982, and 1988 on children ever born and future births expected are presented. The statistics are shown for women 15–44 years of age at each survey date, by age, race, and parity. The data are also shown for birth cohorts of U.S. women, as surveyed in 1973, 1982, and 1988.

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

Hyattsville, Maryland
February 1995
DHHS Publication No. (PHS) 95-1993

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### Cooperating Agencies

The National Survey of Family Growth is jointly planned and funded by the National Center for Health Statistics, the National Institute of Child Health and Human Development, and the Office of Population Affairs, all of the U.S. Department of Health and Human Services.

# Contents



### Appendixes



### Text figures



### Text tables

# Birth Expectations of Women in the United States: 1973–88

by Linda S. Peterson, M.A., Division of Vital Statistics

## Introduction

Since its inception in 1973, the National Survey of Family Growth (NSFG) has included questions on the number of births women expect to have in the future. The number of children already born to a woman plus the additional births she expects provide an estimate of the total number of births she expects to have in her lifetime. For a given population, birth expectations provide an estimate of future family size and perhaps a leading indicator of future trends in the birth rate. This report analyzes trends in the birth expectations of women in the United States based on data from three cycles of the NSFG—Cycle I (1973), Cycle III (1982), and Cycle IV (1988). Trends by age, race, parity, and marital status are presented, and the consistency of birth expectations for the same birth cohorts of women as surveyed in 1973, 1982, and 1988 is analyzed.

National data on women's birth expectations have been collected in the United States since the 1950's. It became clear at that time that traditional population projections, based mainly on current and past birth rates, did not accurately predict the ''baby boom'' that occurred in the late 1940's and 1950's. It was hoped that women's own predictions of their future fertility could be used to improve assumptions about future birth rates, and thus the accuracy of population projections (1).

Assumptions about the future fertility of U.S. women are critical to the projected size of the U.S. population. Small differences in assumed future birth rates or completed cohort fertility imply large differences in population. The latest population projections done by the Bureau of the Census illustrate their importance. As recently as 1985, the total fertility rate (TFR) in the United States was 1.84, but by 1990, it was 2.08 births per woman (table 1). Assuming that the TFR reaches 2.12 births per woman in the year 2050, the population in that year is projected at 383 million (2). Assuming instead a trend in the TFR that reaches 1.83 births per woman in the year 2050, while holding the mortality and migration assumptions constant, the population is projected at 340 million in the year 2050. Thus, a difference of only 0.3 child per woman in the assumed TFR in 60 years produces a difference of 43 million people (2).

Birth expectations were first asked of a national sample of women in 1955, and in 1960 in the Growth of American Families (GAF) studies. Subsequently, birth expectations have been collected in a variety of national surveys, including the National Fertility Studies in 1965 and 1970, the National Survey of Family Growth in 1973, 1976, 1982, and 1988, and the Census Bureau's Current Population Surveys (CPS) for most years since 1971.

Ways of using birth expectations data for predicting future birth rates has long been debated. Women do not perfectly predict their future births. According to a variety of studies, women tend to underproject or overproject their future fertility to varying degrees at the individual and aggregate levels (1,3–8). At the same time, the level and trend in birth expectations has acted as a leading indicator of a recent increase in the TFR. The relationship between birth expectations on the one hand, and past, current, and future birth rates on the other, continues to evolve as U.S. birth rates change. This report is intended to improve our understanding of the conditions under which birth expectations provide useful information for predicting future birth rates.

The author would like to thank Dr. William F. Pratt of the National Center for Health Statistics, Mr. Arthur A. Campbell of the National Institute of Child Health and Human Development, and Dr. Martin O'Connell of the U.S. Bureau of the Census, for their helpful consultation during the preparation of this report.

# Summary of principal findings

In 1988 women ages 15–44 in the United States expected an average of 2.22 total births in their lifetime, 1.22 of which were children already born and 1.00 of which was expected in the future (table 2). In 1982 women ages 15–44 had expected 2.38 total births per woman, so the average declined by 7 percent (0.16 child per woman) from 1982 to 1988. Although in 1982 the birth expectations of older women exceeded those of younger women (for example, 2.81 for women ages 40–44 compared with 2.22 for women ages 25–29), by 1988 there were no significant differences in birth expectations between any of the 5-year age groups; the averages ranged from 2.13 to 2.34 per woman (table 2).

Among ever-married women ages 15–44 at each survey date, average birth expectations were higher as might be expected. They declined from 2.80 children on average in 1973, to 2.47 in 1982 and 2.32 in 1988. The expectations of black ever-married women ages 40–44 dropped by almost two children per woman during the 1973–88 period (from 4.26 to 2.53) (table 3).

Birth expectations are usually interpreted in relation to other available fertility measures, such as completed cohort fertility or the TFR. Completed cohort fertility refers to the average number of children ever born to a birth cohort of women at the end of their childbearing years. Information on completed fertility for most women currently of reproductive age will not be available for some years, that is, until each cohort ages out of the childbearing years. On the other hand, the TFR is a measure of current fertility in a given year or other period. It is based on the age-specific birth rates for a population of women in that period.

According to the 1982 NSFG, women born during 1947–49 and in the 33–35-year-old age group in 1982 expected 2.22 births per woman over their lifetime (table 4). Based on U.S. birth registration data, it is estimated that women 40–42 years of age on January 1, 1989, will have had 2.07, 2.12, and 2.17 births per woman, respectively, upon completing their childbearing. This was between 2 and 7 percent less than the average expected by the combined cohorts about 6 years earlier (tables 1 and 4). (These estimates of completed cohort fertility have been adjusted for additional projected fertility as the women pass through their 40's, as described in footnote 2 of table 1). It is not surprising that expected fertility exceeded the estimated completed fertility for the full cohorts of women, given that the unmarried and childless women in the cohorts are likely to expect more births on average than they will eventually have (6). None of these differences, however, is statistically significant.

Also in recent years, birth expectations have exceeded the annual TFR. In 1982, when women ages 25–29 were expecting 2.22 total births on average, the TFR was only 1.83; in 1988, when women ages 25–29 were expecting 2.33 births per woman, the TFR was 1.93 (tables 1 and 2). Thus, in 1982 and in 1988 women of reproductive age were bearing children at rates that were 17 or 18 percent lower than the levels implied by the birth expectations of women ages 25–29 in those years. This divergence suggested that the TFR should rise in the future. The high level of expectations relative to the TFR and age-specific birth rates has for some time suggested that many women who delay childbearing plan to compensate for this delay later in life. In fact, the TFR for the United States did increase to over two children per woman in 1989 and 1990 (table 1), due in part to increases in the birth rates for women in their 30's and 40's (9).

All but one of the 3-year birth cohorts of white women born during the period 1944–67 reduced their birth expectations between 1982 and 1988. The reductions were small (9 percent or less), and none were statistically significant (table 3 and figure 1). This downward direction of change is consistent with findings from previous studies and may be explained by the occurrence of unforeseeable events, such as separation, divorce, infertility, or remaining single, events which would tend to depress aggregate birth expectations within cohorts of women of all marital and parity statuses over time (6).

Among birth cohorts of black women, there was less consistency in the direction of change in expectations from 1982 to 1988 than for white women, probably due in part to greater sampling variability (see appendix I, Technical notes). Birth cohorts of black women who were over age 20 in 1982 had reduced their expectations by as much as 15 percent in 1988 (table 4 and figure 2). Black teen cohorts of 1982 experienced an opposite trend, however, increasing their expectations by as much as 16 percent (2.11 to 2.45 for the 1962–64 cohort) (table 4 and figure 2). Young black cohorts started out in 1982 with low expectations relative to young white cohorts (1.95 versus 2.36 for women ages 15–17 in 1982), but then experienced an upward trend in expected births as a consequence of apparently unexpected childbearing (table 4 and figure 2). The cohort changes for black women, however, were not statistically significant.

An analysis of birth cohorts for the longer time period, 1973–88, must be restricted to ever-married women since never-married women were not interviewed in 1973. Ever-

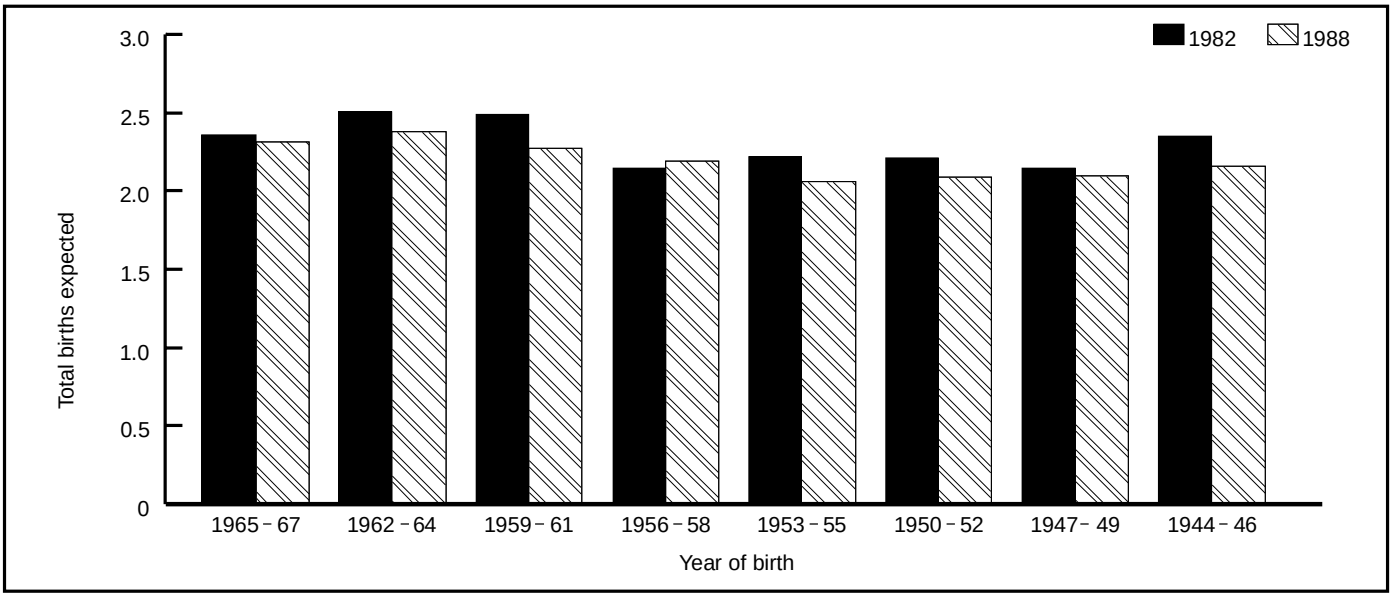



**Figure 1. Average total births expected per white woman, by year of birth: United States, 1982 and 1988**

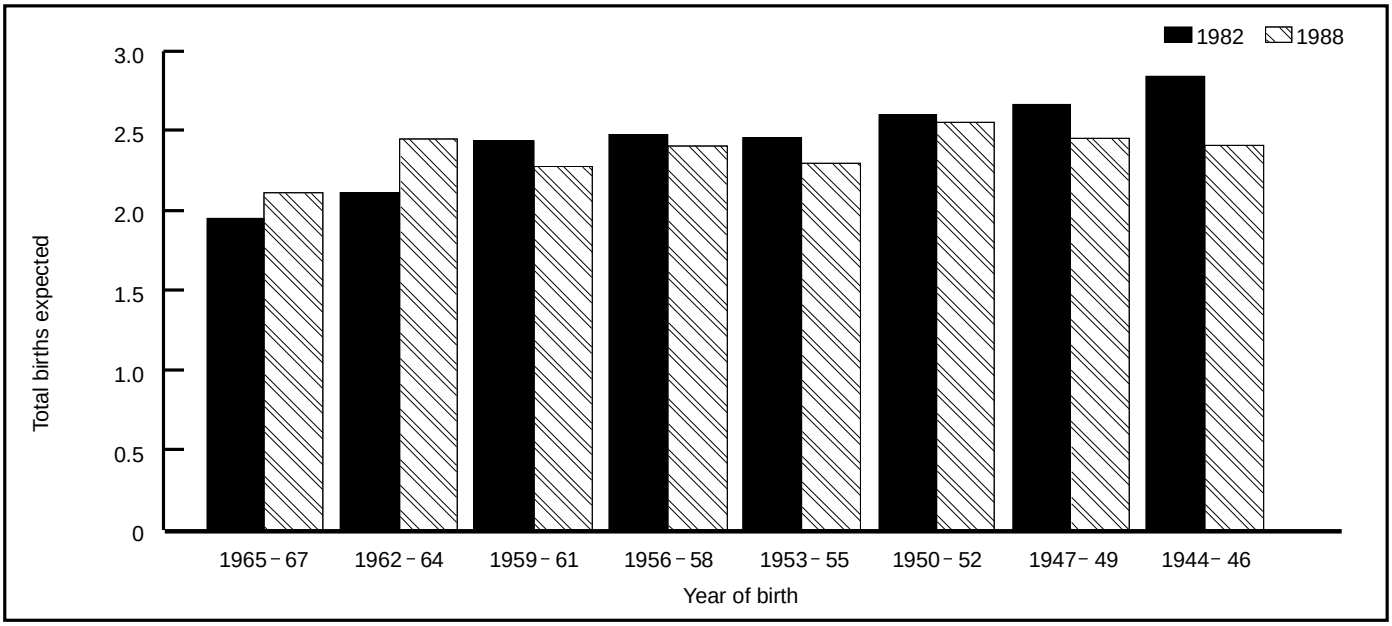



**Figure 2. Average total births expected per black woman, by year of birth: United States, 1982 and 1988**

married white women born 1944–55 revised their average expectations downward between 1973 and 1988 by an insignificant 4–7 percent (table 5). Ever-married white women born 1944–55 who had their first marriage before the 1973 survey maintained virtually the same average total births expected over a 15-year period from 1973 to 1988, in the range of 2.3 or 2.4 expected births (table 6 and figure 3). Likewise, a comparison of total expected births in 1973 and children ever born in 1988—for birth cohorts of white women who reached ages 39–41 in 1988—showed virtually no difference, controlling for the timing of first marriage. For example, white, ever-married women born 1947–49 and first married before the 1973 survey expected 2.29 total births on average in 1973 and had had an average of 2.32 children ever born by 1988 (table 6). Ever-married white women in 1973 were excellent predictors of their cohort fertility 15 years later, and they tended to achieve the births they expected. It is not possible to reliably analyze data for ever-married black women for the 15-year period, due to the small number of black women in the 1988 sample who were first married before the date of the 1973 survey.

Both in 1982 and 1988, the two-child family was by far the most popular expected family size for women ages 15–44. In 1988, 44 percent of women expected to have two children

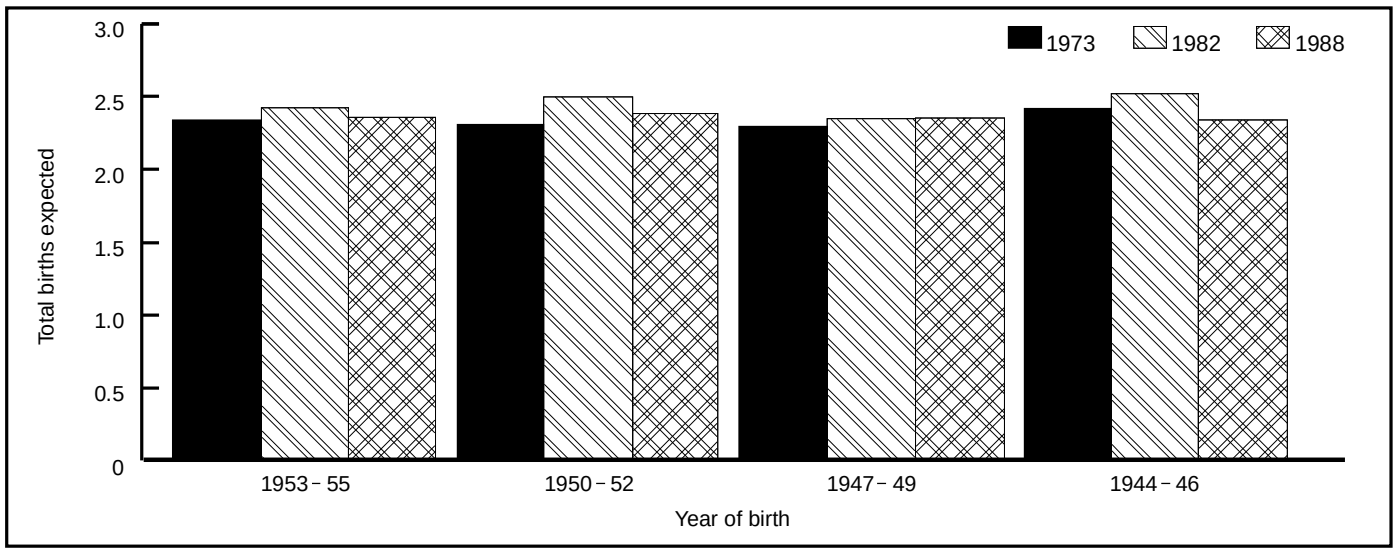



**Figure 3. Average total births expected, per ever-married white woman first married by 1973, by year of birth: United States, 1973, 1982, and 1988**

in their lifetime, and in 1982, 43 percent did (table 7). At the same time, the proportion of women expecting to remain childless increased during the period, from 7 to 9 percent, and the proportion expecting just one child increased from 12 to 14 percent, both statistically significant increases (table 7). Unmarried women, who are relatively less certain of their birth expectations (table 8), were primarily responsible for these increases (tables 9 and 10).

# Source and limitations of the data

## The National Survey of Family Growth

The findings in this report are based on data from the NSFG, conducted by the National Center for Health Statistics (NCHS), in which national samples of women 15–44 years of age were interviewed in 1973, 1982, and 1988. In this report, data are shown for Cycle I, Cycle III, and Cycle IV. In Cycle I the sample included ever-married women ages 15–44; the only never-married women included in 1973 were the small population who had their own children living with them. In Cycles III and IV the sample included all women ages 15–44, regardless of marital status, in the civilian noninstitutionalized population of the United States. Alaska and Hawaii were excluded from Cycle III but included in Cycle IV. Cycle I was based on 9,797 interviews, Cycle III on 7,969, and Cycle IV on 8,450 interviews. The interview includes information on a number of topics related to childbearing, including past and expected future births, fecundity and infertility, contraceptive use, and use of health care related to childbearing.

## Concept of birth expectations

Since its inception in 1973, the NSFG has included questions on the birth expectations of women. The questions are as follows (also see appendix III):

1. Looking to the future, do you (and your husband/cohabiting partner) intend to have a(nother) baby at some time?
2. (Not counting the bab(y/ies) you have already had), how many (more) do you (and your husband/cohabiting partner) intend to have?
3. Of course, sometimes things do not work out exactly as we intend them to, or something makes us change our minds. In your case, how sure are you (and your husband/cohabiting partner) that you will have (number/range) (more) bab(y/ies)? Would you say you are very sure or not very sure?

Those women who answered question 1 that they did not know whether they intended to have a(nother) baby, or answered question 2 that they did not know how many they intended to have, were asked these additional questions:

4. Many people aren't sure, but still have some idea about the future. As you expect things to work out for you, what is the *largest* number of (additional) babies you (and your husband/cohabiting partner) expect to have?
5. What is the *smallest* number of (additional) babies you (and your husband/cohabiting partner) expect to have?

The use of the term ''intend'' in questions 1 and 2, and of ''expect'' in questions 4 and 5 were considered to be tapping a single dimension in this series of questions, which is referred to as birth ''expectations'' throughout this report.

The number of children already born to a woman, plus the additional births she expects, if any, provide an estimate of total births she expects to have in her lifetime. If a range of expected additional births is given instead of a single number, the average of the range is used as the estimated number of additional births expected in this report unless otherwise specified. In Cycle IV of the NSFG, responses for the variable ''additional births expected'' were obtained for 8,281 of the 8,450 respondents; for the remaining 2 percent of the sample, data were imputed.

## Women's uncertainty about their birth expectations

The concept of uncertainty is important to keep in mind in interpreting aggregate birth expectations. A woman's expected family size is likely to change over her lifetime. Studies suggest that many women make decisions about fertility one birth at a time, and factors such as work, education, and changes in marital status have important effects on expected births (5,8).

Although almost all women in the NSFG do provide either a number or a range of expected births in response to the series of questions above, a large proportion are not very certain of their birth expectations. In Cycle IV, 6 percent of women ages 15–44 could not answer question 1 or 2, but when followed up with questions 4 and 5, provided a range of additional births expected (table 8). These women were clearly uncertain about their responses. Another 25 percent of women provided a number or a range in response to questions 1 and 2, but indicated in question 3 that they were ''not very sure'' about the number or range of expected births they had provided (table 8). Thus, overall, 31.5 percent of women were clearly uncertain about their future birth expectations (table 8).

Unmarried women were almost twice as likely to be uncertain about their birth expectations as married women. In 1988, 42 percent of unmarried women either indicated initially that they did not know their birth expectations (7 percent), or indicated that they were ''not very sure'' about the number they gave in response to the previous question about future births expected (35 percent, table 7). Among married women, 22 percent did not know their additional expected births (6 percent) or indicated that they were ''not very sure'' about the number they had given (16 percent) (table 8).

# Findings

## Trends, by birth cohort

Understanding patterns of change in birth expectations within cohorts of women is essential for applying birth expectations data to the projection of fertility. How consistent or stable are the aggregate birth expectations of birth cohorts of women followed over time? For six of the eight 3-year birth cohorts of women for which data are available in 1982 and 1988, average expected births declined during the period by as much as 10 percent, but most declines were by less than 5 percent (table 4). For example, women born 1953–55 expected 2.22 total births on average in 1982 and expected 2.12 (5 percent less) in 1988. None of the declines was statistically significant. In the two cohorts that showed increased expectations, the magnitude was less than 1.5 percent and not statistically significant (table 4).

The birth expectations of birth cohorts of women who were ever-married at the time of each survey have also shown high consistency in recent decades. For each of the five 3-year birth cohorts for which there are data in both 1973 and 1988 (those born 1944–58 and 15–29 years of age in 1973), average expectations were revised downward over the period, by 0.4 to 7 percent (table 5). None of the declines was statistically significant. For example, ever-married women born 1950–52 expected 2.31 total births on average in 1973 (when they were 21–23 years of age), and in 1988 ever-married women born those same years expected 2.24 total births (when they were 36–38 years of age), representing a decline of 3 percent (table 5). This reduction is not surprising, given that members of the cohorts who married for the first time later than 1973 are represented in 1988 but not in 1973, and older age at first marriage is associated with relatively lower birth expectations and fertility (6).

When the timing of first marriage is controlled for, aggregate expectations for birth cohorts in 1973 and 1988 show an even closer correspondence. When the 1982 and 1988 study populations are restricted to women who were ever-married at the time of the 1973 survey, there are no statistically significant changes within cohorts from 1973 to 1982 or from 1973 to 1988. In contrast to the downward direction of change found for full ever-married cohorts in each year (table 5), there is a pattern of slight upward change (table 6). For example, cohorts of white women born 1950–52 and 1947–49, who were 21–26 years of age in 1973, expected 2.31 and 2.29 average births in 1973, respectively, and 3 percent more in 1988 (table 6 and figure 3). This change was not statistically significant, however.

Overall, aggregate birth expectations of birth cohorts of women in the NSFG surveys are remarkably stable over time, especially after controlling for the timing of first marriage. When the timing of first marriage was controlled for, the pattern of declining cohort expectations over time disappears and women in the aggregate predict their birth expectations 15 years into the future accurately.

## Race

As just shown, birth expectations are remarkably stable for all races combined. But this stability is less apparent within race groups, especially at very young ages. In 1982, young black women just entering their childbearing years tended to have lower expectations than white women of similar age, but they also tended to revise their expectations upward over time rather than downward. For example, black women born 1965–67 and 1962–64, the youngest cohorts for which we have data in 1982, expected an average of 1.95 and 2.11 births, respectively (table 4 and figure 2). In 1988, these cohorts had revised their expectations upward to 2.11 and 2.45 births, an 8- and 16-percent increase, respectively. On the other hand, white women of the same cohorts expected 2.36 and 2.51 births in 1982, respectively, but then reduced their expectations slightly as of 1988 by 2 and 5 percent, respectively (table 4 and figure 1). These changes, however, were not statistically significant for either black or white women.

These different patterns for young white and black women may be a result of differences in the timing of childbearing. Black teenage women had a higher average number of children already born than white teenage women. In 1988 black women 15–19 years of age had had 0.21 births per woman on average compared with 0.06 average births for white women of those ages (table 2). A large proportion of births to women 15–19 years of age are unintended, 73 percent for births occurring from 1984 to 1988 (10). Young black women who have experienced unintended births may tend to state that they expect no future births, and thereby reduce the average total births expected by young black women. Birth expectations data for young black women may reflect their wish to avoid further unintended childbearing, while the birth expectations for most young white women do not reflect such experience. This hypothesis has not been tested here, however.

**Table A. Average total births expected in 1973 and average children ever born in 1982 and 1988 per ever-married woman, by year of birth: United States**

| Year of birth | 1973 | | 1982 | | 1988 | |
|---|---|---|---|---|---|---|
| | Age | Average total births expected | Age | Average children ever born | Age | Average children ever born |
| 1947–49 | 24–26 | 2.334 | 33–35 | 2.010 | 39–41 | 2.209 |
| 1944–46 | 27–29 | 2.471 | 36–38 | 2.382 | 42–44 | 2.266 |
| 1941–43 | 30–32 | 2.763 | 39–41 | 2.631 | 45–47 | . . . |
| 1938–40 | 33–35 | 2.980 | 42–44 | 2.968 | 48–50 | . . . |

**Table B. Average total births expected in 1973 and average children ever born in 1982 and 1988 per ever-married woman first married before the 1973 survey, by year of birth: United States**

| Year of birh | 1973 | | 1982 | | 1988 | |
|---|---|---|---|---|---|---|
| | Age | Average total births expected | Age | Average children ever born | Age | Average children ever born |
| 1947–49 | 24–26 | 2.334 | 33–35 | 2.238 | 39–41 | 2.364 |
| 1944–46 | 27–29 | 2.471 | 36–38 | 2.489 | 42–44 | 2.331 |
| 1941–43 | 30–32 | 2.763 | 39–41 | 2.753 | 45–47 | . . . |
| 1938–40 | 33–35 | 2.980 | 42–44 | 3.015 | 48–50 | . . . |

Although fertility trends for Hispanic women were recently projected separately from those for non-Hispanic white women and non-Hispanic black women (2), the birth expectations of Hispanic women are not analyzed separately in this report. Given the limited number of Hispanic respondents in the NSFG, it would be impossible to reliably analyze trends by birth cohort for this group at the national level. However, larger samples of Hispanic women are planned for future cycles of the NSFG.

## Children ever born at ages 39–44

How well do the aggregate birth expectations of a cohort predict its eventual completed cohort fertility? Theoretically, as women achieve greater control over fertility through the expanded use of contraception, the correspondence between women's expectations and their future children born should improve, both for individuals and in the aggregate. NSFG 1973 estimates of the average number of total births expected by female birth cohorts who were ever-married in 1973, and the eventual average number of children born to the birth cohorts toward the end of their childbearing years (39–44-year-olds), are compared in tables A and B.

Table A shows the estimates for the female populations that were ever-married at the time of each survey. The birth cohorts are not consistent in terms of the timing of first marriage. For example, cohorts of ever-married women in 1982 and 1988 would include many women who first married later than 1973 and whose fertility would tend to be lower than that of the early marriers of the same birth cohorts. Based on the populations of ever-married women at the time of each survey, the correspondence between the average number of total births expected and the eventual number of children born to the cohorts 39–44 years of age is within a 5-percent margin for the period 1973–82 and within a 9-percent margin for the 15-year period 1973–88. For example, in 1973, ever-married women born 1941–43 expected an average of 2.76 total births; in 1982, ever-married women born those same years and near the end of their childbearing years at 39–41 years of age, had borne 2.63 children per woman on average, or 5 percent less than expected. Women who were born 1947–49 and ever-married in 1973, expected 2.33 total births on average; and women born those same years and ever-married in 1988, had had 2.21 births per woman, 0.12 births per woman (5 percent) less than the expectations. Neither of these differences were statistically significant. Since fertility is not totally complete by 39–41 years of age or 42–44 years of age, the actual correspondence between predicted and completed fertility would be even closer. For all of the cohorts analyzed, more births were expected in 1973 than were eventually born to the cohorts by the later survey date. Again, this differential is not surprising, given the compositional differences of the cohorts in earlier and later years in terms of the timing of first marriage.

Table B shows the relation between expected births in 1973 and cumulative fertility at 39–41 years of age and at 42–44 years of age for birth cohorts of women who were first married in or before September 1973, the midpoint of interviewing for the 1973 survey. After thus controlling for the timing of first marriage, the 1973 cohort predictions were closer to the cumulative aggregate births at 39–41 years of age and at 42–44 years of age in 1982 and 1988. None of the differences was statistically significant. For example, ever-married women born 1947–49 expected 2.33 births on average in 1973 (24–26-year-olds), and in 1988 (39–41-year-olds) this group had had 2.36 births.

In the past, most of the analyses of the consistency of aggregate birth expectations and eventual completed fertility have been done for married women (1,3–8); few analyses have been done on women of all marital statuses combined. The

NSFG data for 1982 and 1988 represent full cohorts of U.S. women. Average total births expected by women of all marital statuses who were 33–38 years of age in 1982 and the number of children born to these cohorts as of 1988 (39–44-year-olds) are quite consistent. For example, women born 1947–49 expected in 1982, 7 percent more births than they eventually had by 1988 at 39–41 years of age (2.22 versus 2.07) (table 4). Black women born 1947–49 expected in 1982, 11 percent more total births than they eventually had at 39–41 years of age in 1988, a larger differential than the 5-percent excess births predicted by white women born those years (table 4).

This pattern whereby expectations at an earlier date tend to exceed achieved fertility at a later date, within full cohorts, is partially explained by the parity, marital, and other characteristics of the cohorts. Among young women, the larger the proportion of a cohort that is unmarried or childless, the greater is the likelihood that expectations will exceed future completed fertility. Both unmarried and married women who are childless, have in the past been found to eventually achieve only about 80 percent of the births they expected when they were 18–24 years of age (6).

The NSFG data show, however, that when the timing of first marriage is controlled for, cohorts of ever-married women have almost perfectly predicted their future fertility as much as 15 years into the future.

## Parity

How did women's orientations toward family size change in the 1980's? Is the traditional preference for two children being eroded by growing numbers of women or couples who expect just one child or none at all? The answer to the latter question is a qualified no.

The proportion of women with expectations for a two-child family did not decline during the 1980's. In 1988 as in 1982, almost one-half of all women 15–44 years of age intended to have two children in their lifetime: 43 percent in 1982 and 44 percent in 1988 (table 7). During the same period, the proportion of women expecting to remain childless increased, from 7 percent in 1982 to 9 percent in 1988, and the proportion expecting just one child increased from 12 to 14 percent. Both of these increases were statistically significant. They were offset mainly by a statistically significant decline in the proportion of women expecting four or more children, from 14 percent in 1982 to 11 percent in 1988. Although the propensity to expect a future birth declined slightly among women of each of the parity levels (0, 1, 2, and 3), from 1982 to 1988, only the decline for single-parity women was statistically significant. In 1982, 61 percent of single-parity women expected to have a future birth but in 1988 only 53 percent of single-parity women did. Thus, almost one-half of single-parity women in 1988 (47 percent) expected no more births.

While both black and white women changed their fertility orientations in the direction of smaller families, the percentage changes were larger for black women. In 1982, 36 percent of black women with one child expected no more births, but in 1988 the proportion had risen to 49 percent; and among black women with two children, the proportion expecting no more births rose from 67 percent in 1982 to 78 percent in 1988 (table 7).

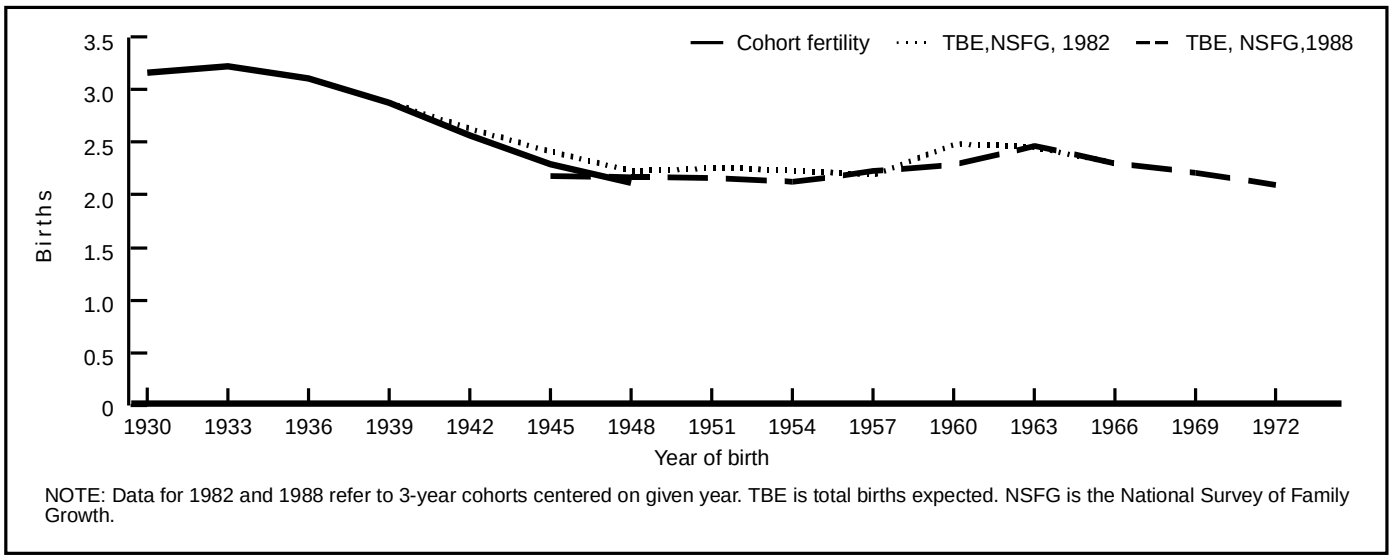
The shift in favor of smaller family size, however, was not shared equally among all marital status groups. Unmarried women (one-half of women 15–44 years in age in 1988 and 48 percent in 1982) were responsible for most of the increased expectations for both childlessness and having only one child (tables 9 and 10). Since the level of uncertainty about birth expectations is relatively high among unmarried women (table 8), the shift in favor of smaller family size must be interpreted cautiously. In general, however, the data do suggest that the prevalence of the two-child family may decline in the coming decades as more women choose to remain childless or to have just one child.

## Birth expectations, cohort fertility, and the total fertility rate

Comparisons of birth expectations data with other available fertility measures, such as completed cohort fertility or TFR's, can help demographers use birth expectations to project fertility. The TFR is a measure of current fertility and refers to a given period, often a year. It is derived by summing the age-specific birth rates for a population of women of reproductive age in the given period. Completed cohort fertility refers to the average total number of children ever born to a birth cohort of women when their childbearing is complete, for example, by age 47. The TFR, although it reflects birth rates in a given year or period, can also be interpreted as a hypothetical measure of completed fertility for a synthetic cohort of women assumed to pass through life bearing children at the age-specific rates in the given year. The trend for the United States from 1957 through 1990 appears in table 1 (9,11,12).

In 1988 women 25–29 years of age expected an average of 2.33 lifetime births (table 2). Estimated completed fertility for women ages 40, 41, and 42 on January 1, 1989, is 2.07, 2.12, and 2.17, respectively (13–17) (see note 2 of table 1 for derivation of estimates of completed cohort fertility). The expectations of young women 25–29 years of age in 1988 exceed the estimated completed fertility of women in their earliest 40's at the time by about 9 percent (the difference between 2.33 and the average of 2.07, 2.12, and 2.17, above). Taken literally, birth expectations data imply that the eventual completed cohort fertility for women born 1959–63 (25–29 years of age in 1988) will exceed the estimated levels of 2.07 to 2.17 of women born 1947–49 (table 1). Such a trend would represent a reversal of a long-term downward trend in cohort fertility. Cohort fertility historically has declined steadily, for example, from 3.11 births per woman for the cohort born in 1936 to 2.07 births per woman for the cohort born in 1949 (table 1).

A more probable scenario is that the cohort of women 25–29 years of age in 1988 will reduce their birth expectations over time, as cohorts of women of all marital statuses combined tend to do (table 4). Thus, they may ultimately bear




NOTE: Data for 1982 and 1988 refer to 3-year cohorts centered on given year. TBE is total births expected. NSFG is the National Survey of Family Growth.

**Figure 4. Average cohort fertility and average total births expected per woman by year of birth: United States**

about 9 or 10 percent fewer children than they expected when they were 25–29 years of age.

As depicted in figure 4, birth expectations provide hypothetical estimates of completed cohort fertility for birth cohorts that have not yet completed their childbearing. Average expected births for each of the 3-year birth cohorts from the 1982 and 1988 NSFG, charted next to available estimates of completed cohort fertility from the birth registration system, suggest that cohort fertility will remain around two children per woman for the next couple of decades (figure 4).

The recent birth expectations of women 25–29 years of age also have exceeded the hypothetical family size implied by the TFR. In 1988, when women 25–29 years of age expected an average of 2.33 births per woman, the TFR was only 1.93; and in 1982, the expectations of women 25–29 years of age averaged 2.22, while the TFR was only 1.83 (tables 1 and 2).

The historical differentials in levels of birth expectations and the TFR can provide insights for interpreting recent birth expectations data. There traditionally has been a difference between women's average total births expected and the TFR. In the late 1950's, when the TFR in the United States reached 3.7 births per woman, the expectations data that was available for young married women at the time indicated a lower level of anticipated future fertility, around 3.2 children per woman. Upon completing their childbearing, in fact, these young women of the 1950's did have approximately 3.2 children on average (4). Subsequently, in the 1970's, when the TFR fell to an extreme low (for example, 1.74 in 1976; table 2), birth expectations had declined also, but to a lesser degree, and they declined more slowly than the TFR (4). During the period of the late 1970's through the early 1980's, available birth expectations estimates from the CPS averaged higher than the national TFR (9,18). Based on this historical relationship between the two measures, Moore suggested in retrospect that birth expectations informed us that the total fertility rate was artificially high in the late 1950's and early 1960's and could not be sustained at that level. He also suggested that birth expectations data available in the 1970's (for example, estimates from the Current Population Survey of between 2.16 and 2.07 for 1976–79 for women 18–34 years of age (18) implied that the extremely low TFR that persisted through the 1970's (for example, ranging from 1.74 to 1.81 for 1976–79) (table 2) was temporary. He anticipated that the TFR would rise in the future to correspond more closely to average expected births (4). In the late 1980's, a rise in the TFR became perceptible (table 2).

The unusually low TFR that persisted through most of the 1970's and 1980's was a function of changes that were occurring in the age pattern of fertility. Most importantly, women who reached their late teens and 20's in the 1970's and 1980's were tending to delay both marriage and childbearing until later in their reproductive lives, relative to what women had done in the past. This tendency lowered the birth rates for women in their late teens and 20's beginning in the early 1970's (9). Secondly, many women in their 30's in the late 1970's had already experienced the traditional age pattern of childbearing whereby most of their children had been born when they were in their 20's, so their birth rates at the time were also low.

Young women's birth expectations in 1982 and 1988, which averaged above two births per woman (table 2), suggest that women who delayed childbearing fully intended to compensate later in their reproductive cycles for this delay. Clearly, some compensation is occurring, given that the rise in the TFR in 1988, 1989, and 1990 (table 1) is partially attributable to rising birth rates among women in their 30's (9). The issue of to what degree the delayers of the 1970's and 1980's will be able to fulfill their expectations later in life is a question currently under investigation (19). If the TFR persists at a level above two children per woman, then the data on birth expectations will have served their purpose—they will have predicted such a trend.

The birth expectations of women 25–29 years of age are chosen for the above comparisons with other fertility measures

for several reasons. First, a large proportion of births to this group will occur in the future, so the estimates refer mostly to future fertility and therefore warrant evaluation. At the same time, many women in this age group will have married, thereby removing some uncertainty about birth expectations associated with the never-married status (see table 8). In addition, the birth rate for women 25–29 years of age is higher than the birth rates for other 5-year age groups, and therefore has the largest impact on the level of the TFR. Women 25–29 years of age also contribute the largest portion of annual births: 31 percent of births in 1990 were to women 25–29 years of age (9).

# Data comparisons

## Comparison of the National Survey of Family Growth and Current Population Survey Estimates

Estimates of average birth expectations for U.S. women vary by data source, as a consequence of different data collection procedures and estimation methods. For example, birth expectations are asked differently in the NSFG and in the CPS. The 1988 NSFG questions are listed previously in the section, Concept of birth expectations. In the 1988 CPS, women were asked their birth expectations as follows (20):

1. Looking ahead, do you expect to have any (more) children?

   Answer: yes, no, uncertain.

If the answer to the above question was ''yes,'' the following question was asked:

2. How many (more) do you expect to have?

There are a number of differences between the CPS and NSFG data on birth expectations:

1. The CPS questions are briefer than the NSFG questions and do not ask for a range of future births expected when a respondent is uncertain.
2. The CPS questions ask how many births the woman ''expects'' rather than how many she ''intends'' to have.
3. For married or cohabiting women, the CPS questions ask about the woman's expectations alone, not her and her husband's or partner's joint expectations, as in the NSFG.
4. From the CPS, average birth expectations data are estimated using reporting women 18–34 years of age as the denominator, while in the NSFG, the denominator is all women 15–44 years of age.

In the CPS, a woman is classified as ''reporting'' if either she answered both ''yes'' to question 1 above and gave a number in question 2, or if she answered ''no'' to question 1. Reporting respondents in the 1988 CPS represented 73 percent of U.S. women 18–34 years of age (20). Nonreporters in the CPS (27 percent of U.S. women 18–34 years of age) consisted of ''uncertain'' respondents and those whose response was ''incomplete.'' The ''uncertain'' component includes those who indicated that they were uncertain about whether they expected to have a(nother) baby, or who were uncertain as to the number they expected to have (combined, about 15 percent of U.S. women). ''Incomplete'' cases were those for which the birth expectations items were incomplete for any reason, including the respondent's unavailability for the interview (about 12 percent of U.S. women) (20). In the CPS, proxy responses on the woman's birth expectations were not accepted from another household member. CPS respondents who were unavailable for the interview and could not be traced within 1 week of the interview that was conducted with a proxy respondent from their household were classified as nonreporters on birth expectations in the CPS.

By contrast, the NSFG estimates of average birth expectations refer to total U.S. women. In the NSFG, respondents who were uncertain about whether they expected any additional births, or about the number they expected, were asked to give a range—and most of them did. For those who were still uncertain, or for those who were interviewed but whose responses were incomplete, imputation was performed. Imputation was necessary for only 169 cases or 2 percent of sample women. Moreover, although the NSFG Cycle IV overall survey response rate was approximately 80 percent, the responses of available sample women on all variables, including birth expectations, were weighted for nonresponse using a complex weighting procedure designed to reduce the risk of nonresponse bias; then the responses were adjusted to CPS population controls (21,22). Thus, in the NSFG, there were no ''nonreporting'' women due to unavailability for the interview as there are in the CPS.

As a consequence of methodological differences such as those described in the preceeding text, NSFG estimates of women's average birth expectations differ from CPS estimates. They exceed CPS estimates for reporting women by 11 percent for women 18–24 years of age, 9 percent for those 25–29 years of age, and by a nonsignificant 5 percent for those 30–34 years of age (table C).

For purposes of comparison, the NSFG estimates were revised in column 2 of table C, using a derived denominator of NSFG ''reporting'' women that is as similar as possible to ''reporting'' women in the CPS. Women who initially said they were uncertain about whether they intended to have a(nother) baby were excluded from the denominator. In addition, those who expected to have a(nother) baby but were uncertain about the number they expected, were excluded. However, those who expected one or more future births, and gave a range, were retained, as was done in the CPS; and the lower bound of the range, instead of the midpoint, was taken as the number of additional births expected, as was conservatively done in the CPS (table C). In making these adjustments,

**Table C. Average total births expected per woman based on the National Survey of Family Growth and per "reporting" woman based on the Current Population Survey, for women 18–34 years of age: United States, 1988**

| Age group | Source and population: National survey of family growth — Women ages 18–34 | National survey of family growth — "Reporting" women ages 18–34[1] | Current population survey — Reporting women ages 18–34[2] |
|---|---|---|---|
| 18–24 | 2.302 | 2.228 | 2.045 |
| 25–29 | 2.334 | 2.294 | 2.116 |
| 30–34 | 2.165 | 2.109 | 2.057 |

[1]National Survey of Family Growth " reporting" women include those who initially responded yes or no regarding their intention to have a(nother) baby, and who also initially gave a number (or range) of additional births they expected to have (if more were expected). "Initially" means in response to the first two direct questions on birth expectations (see appendix III). Thus, these "reporting" women were skipped past the followup questions on "largest" and "smallest" number of births expected. These "reporters" represented 92 percent of U.S. women 18–34 years of age in 1988. For cases where a range was provided initially, that is, in response to the first two questions on birth expectations, the lower bound of the range was taken as the estimate, as is done in the Current Population Survey (CPS), in order to make this column of estimates as methodologically consistent as possible with the CPS estimates.

[2]Reporting women in the CPS are defined as those who were personally available to be interviewed, and who responded yes or no about whether they expected a(nother) birth and also provided a number or range of additional expected births. In the CPS, in 1988, 73 percent of U.S. women 18–34 years of age were classified as reporting on birth expectations (20). (See tables I, 5, 7, and C-3 in reference 20 for estimating the standard error of a fertility ratio.)

5.5 percent of U.S. women 18–34 years of age were removed from the denominator as the equivalent of "uncertain" nonreporters. Also, removing the NSFG imputed cases (2.3 percent of U.S. women 18–34 years of age) brought the NSFG proportion of U.S. women 18–34 years of age who can be categorized as nonreporters—as defined by the CPS—to 7.8 percent. This was still much lower than the 27 percent in the CPS.

Once the NSFG estimates have in this manner been made as methodologically consistent as possible with the CPS estimates (table C), the NSFG-CPS differential is narrowed but remains statistically significant for the age groups 18–24 and 25–29.

This remaining differential between the two sources is probably a function of the varying size and characteristics of the group of nonreporting women in each survey, as well as other factors such as the different wording of the questions, their relative placement on the questionnaire, and the overall content of each of the surveys. For example, the NSFG is a survey about having babies and this context may predispose women to answering questions about having additional babies in a more positive manner than does the context provided by the CPS, in which the bulk of questions relate to labor force participation.

Also, it is possible that nonreporting women in the CPS (for example, 27 percent of total women 18–34 years of age in 1988), had they reported on lifetime births expected, would have high average birth expectations relative to reporting women in the CPS. If this were true, the inclusion of a large portion of this nonreporting group in the NSFG would positively affect the NSFG estimates. It is known that the CPS sample women who were nonreporters on birth expectations are disproportionately young, single, childless, and of minority status (20). Thus, proportionately more of these groups are represented in the NSFG estimates. Further exploration of both data sources is needed to determine whether these groups have relatively high birth expectations and whether, therefore, the greater representation of these groups in the NSFG fully explains the remaining differential in average birth expectations from the two sources.

## Single number of expected births versus the midpoint of a range

The NSFG has always asked for a range of additional births expected when a woman indicates that she does not know her birth expectations. It is possible to tentatively evaluate the effect of this approach on aggregate birth expectations, based on data from Cycle I (1973). In Cycle I, women who initially reported a specific number of additional expected births, but indicated they were "not very sure" about the number, were asked the largest and smallest number of births they expected to have in the future. For example, a woman might have been asked if she intended more births, and said "yes." She was then asked how many more she intended to have, and said "two." She was then asked how sure she was that she would have two, and said "not very sure." She was then asked the largest number of additional births she expected, and answered "two." Finally, she was asked the smallest number of additional births she expected and said, "one." So her "single" number was "two" and the average of her range was (1+2)/2 = 1.5. Of the 9,797 total women in the sample, 1,143 gave both a single number and a range of expected births.

Two types of weighted estimates of average additional births expected were calculated for this group—one based on the single numbers and another based on averages of the ranges. Based on the single numbers, the group expected 1.72 additional births per woman; based on the means of the ranges, the same women expected 1.63 additional births per woman (table 11). Thus, averaging the ranges produced the lower estimate. The direction of this differential was consistent across age groups 15–19 through 40–44. The use of the lower bound of the range would further reduce the "range" estimate. Thus, among this select subsample, taking an average of the range rather than the lower bound of the range, produced an estimate closer in value to that based on the single number of expected births.

## Minimum and maximum average additional births expected

In Cycle IV of the NSFG, about 9 percent of respondents provided a range of additional births they expected, for example, ‘‘1 or 2’’ or ‘‘2 or 3,’’ either spontaneously or in response to questions 4 and 5 previously mentioned. The upper and lower bounds of the ranges of expected births may be used to produce minimum and maximum estimates of average births expected (23). Minimum and maximum estimates of average expected births for U.S. women, by age and race, appear in table 12. The differential in minimum and maximum estimates is largest for white women under age 30. For example, the estimate of average additional births expected for white women 20–24 years of age based on the minimum of the range is 1.80 compared with their maximum estimate of 1.95 future births (table 12). The estimate for white women 20–24 years of age, using the midpoint of any range given, is 1.87 (table 2).

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# List of detailed tables



**Symbols**

| | |
|---|---|
| - - - | Data not available |
| . . . | Category not applicable |
| − | Quantity zero |
| 0.0 | Quantity more than zero but less than 0.05 |
| Z | Quantity more than zero but less than 500 where numbers are rounded to thousands |
| * | Figure does not meet standards of reliability or precision (see Technical notes) |

**Table 1. Total fertility rate and estimated completed cohort fertility for women 27 years of age, by year: United States, specified years, 1957–66 and each year 1969–90**

| Year | *Total fertility rate*[1] | *Completed cohort fertility, women age 27 (and year of birth)*[2] |
|---|---|---|
| 1957 | 3.767 | 3.157 (1930) |
| 1960 | 3.654 | 3.220 (1933) |
| 1963 | 3.319 | 3.106 (1936) |
| 1966 | 2.721 | 2.876 (1939) |
| 1969 | 2.456 | 2.566 (1942) |
| 1970 | 2.480 | 2.457 (1943) |
| 1971 | 2.267 | 2.370 (1944) |
| 1972 | 2.010 | 2.289 (1945) |
| 1973 | 1.879 | 2.227 (1946) |
| 1974 | 1.835 | 2.167 (1947) |
| 1975 | 1.774 | 2.115 (1948) |
| 1976 | 1.738 | 2.067 (1949) |
| 1977 | 1.790 | . . . |
| 1978 | 1.760 | . . . |
| 1979 | 1.808 | . . . |
| 1980 | 1.840 | . . . |
| 1981 | 1.812 | . . . |
| 1982 | 1.828 | . . . |
| 1983 | 1.799 | . . . |
| 1984 | 1.807 | . . . |
| 1985 | 1.844 | . . . |
| 1986 | 1.838 | . . . |
| 1987 | 1.872 | . . . |
| 1988 | 1.934 | . . . |
| 1989 | 2.014 | . . . |
| 1990 | 2.081 | . . . |

[1]The total fertility rate is a measure of current fertility derived by summing the age-specific birth rates for a population of women of reproductive age in a given period. Data are from the *Monthly Vital Statistics Report* and *Vital Statistics of the United States* (9,11,12).

[2]Completed cohort fertility is the average number of live births to a birth cohort of women upon completion of their childbearing, for example, at age 47. This information is available in the *Vital Statistics of the United States*, table 1–19, for women who were born 1930–42 and age 27 in 1957–69 and age 47 or over as of January 1, 1989 (14–17). Completed cohort fertility was estimated for women born 1943–49 who were age 27 in 1970–76 (ages 40–46 as of January 1, 1989) and for whom the average number of live births as of age 47 is not yet known. Estimates were made by inflating the average number of live births as of January 1, 1989, to account for future childbearing. The estimates were based on the assumption that the percent of completed fertility that had been achieved at each age was constant across cohorts of women. To estimate the completed fertility of women who were 27 in 1970, their average number of live births as of January 1, 1989, (2.4574) was inflated by the ratio of the average number of live births at age 47 (2.5660) to the average number of live births at age 46 (2.5659) for women who were 1 year older (that is, women who were 27 in 1969). Estimates for the remaining cohorts were made by deriving and applying a similar inflation factor based on the estimated completed lifetime fertility of the preceding cohort. Cumulative birth rates for the cohorts born 1943–49 as of January 1, 1989, were 2.457, 2.369, 2.287, 2.223, 2.159, 2.101, and 2.044, respectively.

**Table 2. Number of women 15–44 years of age and average number of children ever born, average additional births expected, and average total births expected, by race and age: United States, 1982 and 1988**

| Race and age | 1982 | | | | 1988 | | | |
|---|---|---|---|---|---|---|---|---|
| | *Number of women in thousands* | *Average children ever born* | *Average additional births expected* | *Average total births expected* | *Number of women in thousands* | *Average children ever born* | *Average additional births expected* | *Average total births expected* |
| All women[1] | | | | | | | | |
| 15–44 years | 54,099 | 1.310 | 1.071 | 2.382 | 57,900 | 1.220 | 1.004 | 2.224 |
| 15–19 years | 9,521 | 0.097 | 2.228 | 2.330 | 9,179 | 0.083 | 2.072 | 2.155 |
| 20–24 years | 10,629 | 0.539 | 1.924 | 2.462 | 9,413 | 0.510 | 1.830 | 2.340 |
| 25–29 years | 10,263 | 1.215 | 1.000 | 2.215 | 10,796 | 1.092 | 1.242 | 2.334 |
| 30–34 years | 9,381 | 1.754 | 0.500 | 2.253 | 10,930 | 1.597 | 0.569 | 2.165 |
| 35–39 years | 7,893 | 2.211 | 0.147 | 2.359 | 9,583 | 1.933 | 0.195 | 2.128 |
| 40–44 years | 6,412 | 2.783 | *0.027 | 2.810 | 7,999 | 2.163 | 0.050 | 2.213 |
| White women | | | | | | | | |
| 15–44 years | 45,367 | 1.271 | 1.089 | 2.362 | 47,076 | 1.197 | 1.008 | 2.205 |
| 15–19 years | 7,815 | 0.079 | 2.305 | 2.388 | 7,313 | *0.059 | 2.171 | 2.230 |
| 20–24 years | 8,855 | 0.492 | 1.987 | 2,479 | 7,401 | 0.466 | 1.874 | 2.340 |
| 25–29 years | 8,569 | 1.152 | 1.033 | 2,184 | 8,672 | 1.029 | 1.263 | 2.292 |
| 30–34 years | 7,916 | 1.703 | 0.491 | 2,194 | 9,010 | 1.561 | 0.558 | 2.119 |
| 35–39 years | 6,697 | 2.168 | 0.145 | 2.313 | 7,936 | 1.885 | 0.179 | 2.064 |
| 40–44 years | 5,515 | 2.689 | *0.021 | 2.709 | 6,745 | 2.154 | *0.045 | 2.199 |
| Black women | | | | | | | | |
| 15–44 years | 6,985 | 1.598 | 0.952 | 2.553 | 7,679 | 1.418 | 0.819 | 2.237 |
| 15–19 years | 1,416 | 0.197 | 1.799 | 2.005 | 1,409 | 0.208 | 1.523 | 1.731 |
| 20–24 years | 1,472 | 0.851 | 1.491 | 2.342 | 1,364 | 0.858 | 1.374 | 2.232 |
| 25–29 years | 1,335 | 1.689 | 0.838 | 2.526 | 1,459 | 1.469 | 0.870 | 2.339 |
| 30–34 years | 1,144 | 2.142 | 0.490 | 2.631 | 1,406 | 1.819 | 0.509 | 2.328 |
| 35–39 years | 884 | 2.595 | 0.193 | 2.798 | 1,170 | 2.314 | 0.201 | 2.514 |
| 40–44 years | 734 | 3.586 | 0.081 | 3.667 | 872 | 2.315 | *0.056 | 2.372 |

[1]All women include white, black, and other races. Other races not shown separately because of small sample size.

**Table 3. Number of ever-married women 15–44 years of age and average number of children ever born, average additional births expected, and average total births expected, by race and age: United States, 1973, 1982, and 1988**

| Age and race | 1973 | | | | 1982 | | | | 1988 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of women in thousands | Average children ever born | Average additional births expected | Average total births expected | Number of women in thousands | Average children ever born | Average additional births expected | Average total births expected | Number of women in thousands | Average children ever born | Average additional births expected | Average total births expected |
| All women[1] | | | | | | | | | | | | |
| 15–44 years | 30,009 | 2.240 | 0.815 | 2.804 | 34,935 | 1.903 | 0.571 | 2.474 | 36,842 | 1.769 | 0.547 | 2.317 |
| 15–19 years | 1,074 | 0.515 | 1.925 | 2.351 | 682 | *0.652 | 1.904 | 2.557 | 340 | 0.968 | 1.454 | 2.422 |
| 20–24 years | 5,339 | 0.984 | 1.493 | 2.325 | 4,818 | 0.924 | 1.500 | 2.423 | 3,631 | 0.917 | 1.480 | 2.397 |
| 25–29 years | 6,703 | 1.670 | 0.942 | 2.434 | 7,778 | 1.465 | 0.893 | 2.358 | 7,669 | 1.343 | 1.068 | 2.411 |
| 30–34 years | 5,979 | 2.578 | 0.448 | 2.871 | 8,218 | 1.878 | 0.431 | 2.309 | 9,220 | 1.789 | 0.497 | 2.286 |
| 35–39 years | 5,339 | 3.119 | 0.217 | 3.236 | 7,349 | 2.339 | *0.110 | 2.448 | 8,581 | 2.068 | 0.153 | 2.220 |
| 40–44 years | 5,575 | 3.256 | 0.105 | 3.307 | 6,090 | 2.886 | *0.022 | 2.908 | 7,401 | 2.295 | *0.031 | 2.326 |
| White women | | | | | | | | | | | | |
| 15–44 years | 26,629 | 2.166 | 0.810 | 2.737 | 30,419 | 1.840 | 0.582 | 2.423 | 31,465 | 1.730 | 0.545 | 2.275 |
| 15–19 years | 959 | 0.471 | 1.947 | 2.340 | 622 | *0.637 | 1.963 | 2.600 | 319 | *0.966 | 1.494 | 2.460 |
| 20–24 years | 4,767 | 0.933 | 1.514 | 2.305 | 4,353 | 0.893 | 1.510 | 2.403 | 3,176 | 0.890 | 1.494 | 2.385 |
| 25–29 years | 6,019 | 1.608 | 0.939 | 2.379 | 6,719 | 1.417 | 0.918 | 2.335 | 6,546 | 1.290 | 1.052 | 2.342 |
| 30–34 years | 5,301 | 2.516 | 0.428 | 2.799 | 7,099 | 1.821 | 0.419 | 2.240 | 7,824 | 1.752 | 0.488 | 2.240 |
| 35–39 years | 4,668 | 3.060 | 0.195 | 3.167 | 6,326 | 2.288 | *0.107 | 2.395 | 7,277 | 2.024 | *0.141 | 2.165 |
| 40–44 years | 4,916 | 3.152 | 0.088 | 3.197 | 5,300 | 2.788 | *0.018 | 2.807 | 6,322 | 2.280 | *0.031 | 2.311 |
| Black women | | | | | | | | | | | | |
| 15–44 years | 3,047 | 2.922 | 0.833 | 3.404 | 3,440 | 2.493 | 0.478 | 2.971 | 3,614 | 2.109 | 0.439 | 2.548 |
| 15–19 years | 103 | 0.950 | 1.744 | 2.500 | *39 | *0.808 | *1.266 | *2.074 | *21 | *1.003 | *0.825 | *1.828 |
| 20–24 years | 547 | 1.423 | 1.272 | 2.473 | 388 | 1.352 | 1.224 | 2.576 | 322 | 1.230 | 1.295 | 2.525 |
| 25–29 years | 618 | 2.274 | 0.937 | 2.944 | 777 | 1.981 | 0.733 | 2.714 | 695 | 1.711 | 0.792 | 2.503 |
| 30–34 years | 596 | 3.177 | 0.548 | 3.488 | 851 | 2.335 | 0.462 | 2.797 | 970 | 2.040 | 0.454 | 2.495 |
| 35–39 years | 573 | 3.822 | 0.346 | 3.958 | 737 | 2.828 | *0.159 | 2.987 | 878 | 2.508 | *0.172 | 2.680 |
| 40–44 years | 610 | 4.163 | 0.264 | 4.257 | 648 | 3.718 | *0.060 | 3.778 | 728 | 2.518 | *0.014 | 2.532 |

[1]All women include white, black, and other races. Other races not shown separately because of small sample size.

**Table 4. Number of women born 1938–73 and average children ever born, average additional births expected, and average total births expected, by race and year of birth: United States, 1982 and 1988**

| Year of birth and race | 1982 | | | | | 1988 | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Number of women in thousands* | *Age* | *Average children ever born* | *Average additional births expected* | *Average total births expected* | *Number of women in thousands* | *Age* | *Average children ever born* | *Average additional births expected* | *Average total births expected* |
| All women[1] | | | | | | | | | | |
| All years | [2]53,831 | - - - | 1.302 | 1.076 | 2.379 | [2]56,690 | - - - | 1.197 | 1.025 | 2.222 |
| 1971–73 | - - - | - - - | - - - | - - - | - - - | 3,750 | 15–17 | 0.022 | 2.071 | 2.093 |
| 1968–70 | - - - | - - - | - - - | - - - | - - - | 5,805 | 18–20 | 0.136 | 2.070 | 2.206 |
| 1965–67 | 4,816 | 15–17 | 0.029 | 2.259 | 2.298 | 5,586 | 21–23 | 0.424 | 1.864 | 2.288 |
| 1962–64 | 6,933 | 18–20 | 0.184 | 2.264 | 2.449 | 6,124 | 24–26 | 0.764 | 1.695 | 2.459 |
| 1959–61 | 6,302 | 21–23 | 0.549 | 1.937 | 2.486 | 6,296 | 27–29 | 1.085 | 1.198 | 2.283 |
| 1956–58 | 5,875 | 24–26 | 0.932 | 1.257 | 2.189 | 6,652 | 30–32 | 1.480 | 0.741 | 2.221 |
| 1953–55 | 6,265 | 27–29 | 1.336 | 0.887 | 2.223 | 6,510 | 33–35 | 1.668 | 0.451 | 2.120 |
| 1950–52 | 5,589 | 30–32 | 1.645 | 0.611 | 2.257 | 5,881 | 36–38 | 1.919 | 0.236 | 2.155 |
| 1947–49 | 5,673 | 33–35 | 1.916 | 0.306 | 2.222 | 5,379 | 39–41 | 2.074 | 0.087 | 2.160 |
| 1944–46 | 4,554 | 36–38 | 2.261 | 0.143 | 2.405 | 4,709 | 42–44 | 2.113 | *0.058 | 2.171 |
| 1941–43 | 4,285 | 39–41 | 2.553 | *0.073 | 2.626 | - - - | - - - | - - - | - - - | - - - |
| 1938–40 | 3,539 | 42–44 | 2.848 | *0.025 | 2.873 | - - - | - - - | - - - | - - - | - - - |
| White women | | | | | | | | | | |
| All years | 45,118 | - - - | 1.263 | 1.095 | 2.358 | 45,976 | - - - | 1.169 | 1.032 | 2.201 |
| 1971–73 | - - - | - - - | - - - | - - - | - - - | 2,891 | 15–17 | *0.007 | 2.151 | 2.159 |
| 1968–70 | - - - | - - - | - - - | - - - | - - - | 4,749 | 18–20 | 0.100 | 2.182 | 2.282 |
| 1965–67 | 3,866 | 15–17 | *0.017 | 2.336 | 2.362 | 4,386 | 21–23 | 0.382 | 1.932 | 2.314 |
| 1962–64 | 5,836 | 18–20 | 0.154 | 2.355 | 2.509 | 4,820 | 24–26 | 0.716 | 1.662 | 2.378 |
| 1959–61 | 5,218 | 21–23 | 0.502 | 1.986 | 2.487 | 5,023 | 27–29 | 1.015 | 1.258 | 2.273 |
| 1956–58 | 4,944 | 24–26 | 0.850 | 1.292 | 2.142 | 5,559 | 30–32 | 1.434 | 0.755 | 2.189 |
| 1953–55 | 5,222 | 27–29 | 1.303 | 0.917 | 2.219 | 5,335 | 33–35 | 1.640 | 0.421 | 2.061 |
| 1950–52 | 4,681 | 30–32 | 1.596 | 0.616 | 2.212 | 4,826 | 36–38 | 1.871 | 0.218 | 2.089 |
| 1947–49 | 4,810 | 33–35 | 1.865 | 0.282 | 2.146 | 4,440 | 39–41 | 2.029 | 0.071 | 2.100 |
| 1944–46 | 3,893 | 36–38 | 2.207 | 0.143 | 2.350 | 3,946 | 42–44 | 2.099 | *0.060 | 2.159 |
| 1941–43 | 3,643 | 39–41 | 2.531 | *0.068 | 2.598 | - - - | - - - | - - - | - - - | - - - |
| 1938–40 | 3,007 | 42–44 | 2.704 | *0.020 | 2.724 | - - - | - - - | - - - | - - - | - - - |
| Black women | | | | | | | | | | |
| All years | 6,966 | - - - | 1.595 | 0.955 | 2.553 | 7,596 | - - - | 1.412 | 0.828 | 2.239 |
| 1971–73 | - - - | - - - | - - - | - - - | - - - | 595 | 15–17 | *0.073 | 1.622 | 1.695 |
| 1968–70 | - - - | - - - | - - - | - - - | - - - | 861 | 18–20 | 0.343 | 1.438 | 1.782 |
| 1965–67 | 788 | 15–17 | 0.084 | 1.851 | 1.951 | 878 | 21–23 | 0.693 | 1.421 | 2.114 |
| 1962–64 | 919 | 18–20 | 0.390 | 1.719 | 2.109 | 769 | 24–26 | 1.234 | 1.215 | 2.449 |
| 1959–61 | 848 | 21–23 | 0.862 | 1.575 | 2.437 | 903 | 27–29 | 1.421 | 0.856 | 2.276 |
| 1956–58 | 861 | 24–26 | 1.395 | 1.085 | 2.480 | 827 | 30–32 | 1.828 | 0.573 | 2.401 |
| 1953–55 | 767 | 27–29 | 1.764 | 0.700 | 2.464 | 831 | 33–35 | 1.841 | 0.452 | 2.294 |
| 1950–52 | 699 | 30–32 | 2.045 | 0.557 | 2.602 | 747 | 36–38 | 2.282 | 0.267 | 2.549 |
| 1947–49 | 648 | 33–35 | 2.286 | 0.379 | 2.665 | 622 | 39–41 | 2.382 | 0.072 | 2.453 |
| 1944–46 | 495 | 36–38 | 2.657 | 0.164 | 2.840 | 563 | 42–44 | 2.339 | *0.064 | 2.403 |
| 1941–43 | 499 | 39–41 | 2.849 | 0.130 | 2.978 | - - - | - - - | - - - | - - - | - - - |
| 1938–40 | 444 | 42–44 | 3.963 | *0.059 | 4.022 | - - - | - - - | - - - | - - - | - - - |

[1]All women include white, black, and other races. Other races not shown separately because of small sample size.

[2]These totals are less than the totals in table 1 because women who were 15 or 44 years old but were born after 1973 or before 1938 are excluded from this table.

**Table 5. Number of ever-married women born 1929–73, and average children ever born, average additional births expected, and average total births expected, by race and year of birth: United States, 1973, 1982, and 1988**

| Race and year of birth | 1973 | | | | 1982 | | | | 1988 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of women in thousands | Average children ever born | Average additional births expected | Average total births expected | Number of women in thousands | Average children ever born | Average additional births expected | Average total births expected | Number of women in thousands | Average children ever born | Average additional births expected | Average total births expected |
| All women[1] | | | | | | | | | | | | |
| All years | 29,641 | 2.227 | 0.822 | 2.797 | 34,700 | 1.894 | 0.575 | 2.469 | 35,670 | 1.750 | 0.565 | 2.315 |
| 1971–73 | --- | --- | --- | --- | --- | --- | --- | --- | *34 | *0.280 | *2.638 | *2.918 |
| 1968–70 | --- | --- | --- | --- | --- | --- | --- | --- | 373 | *0.994 | 1.336 | 2.330 |
| 1965–67 | --- | --- | --- | --- | 124 | 0.299 | 2.805 | 3.104 | 1,731 | 0.852 | 1.484 | 2.335 |
| 1962–64 | --- | --- | --- | --- | 1,109 | 0.612 | 1.826 | 2.438 | 3,538 | 1.078 | 1.448 | 2.526 |
| 1959–61 | --- | --- | --- | --- | 2,823 | 0.911 | 1.557 | 2.468 | 4,500 | 1.309 | 1.046 | 2.355 |
| 1956–58 | 171 | 0.427 | 2.000 | 2.358 | 3,911 | 1.235 | 1.125 | 2.359 | 5,468 | 1.690 | 0.659 | 2.349 |
| 1953–55 | 1,460 | 0.586 | 1.864 | 2.375 | 5,127 | 1.520 | 0.805 | 2.324 | 5,593 | 1.841 | 0.388 | 2.228 |
| 1950–52 | 3,072 | 0.909 | 1.545 | 2.313 | 4,878 | 1.818 | 0.543 | 2.360 | 5,229 | 2.056 | 0.186 | 2.242 |
| 1947–49 | 4,127 | 1.318 | 1.176 | 2.334 | 5,037 | 2.010 | 0.255 | 2.265 | 4,918 | 2.209 | 0.056 | 2.265 |
| 1944–46 | 3,906 | 1.809 | 0.849 | 2.471 | 4,235 | 2.382 | 0.116 | 2.498 | 4,285 | 2.266 | *0.035 | 2.301 |
| 1941–43 | 3,801 | 2.380 | 0.567 | 2.763 | 4,106 | 2.631 | 0.037 | 2.668 | --- | --- | --- | --- |
| 1938–40 | 3,240 | 2.801 | 0.286 | 2.980 | 3,349 | 2.968 | 0.024 | 2.993 | --- | --- | --- | --- |
| 1935–37 | 3,217 | 3.102 | 0.258 | 3.240 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1932–34 | 3,322 | 3.198 | 0.140 | 3.273 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1929–31 | 3,325 | 3.325 | 0.091 | 3.367 | --- | --- | --- | --- | --- | --- | --- | --- |
| White women | | | | | | | | | | | | |
| All years | 26,290 | 2.153 | 0.817 | 2.730 | 30,194 | 1.830 | 0.586 | 2.417 | 30,393 | 1.706 | 0.564 | 2.270 |
| 1971–73 | --- | --- | --- | --- | --- | --- | --- | --- | *34 | *0.280 | *2.638 | *2.918 |
| 1968–70 | --- | --- | --- | --- | --- | --- | --- | --- | 353 | *0.993 | 1.366 | 2.359 |
| 1965–67 | --- | --- | --- | --- | 118 | *0.302 | *2.831 | *3.133 | 1,480 | 0.847 | 1.507 | 2.354 |
| 1962–64 | --- | --- | --- | --- | 1,021 | 0.595 | 1.876 | 2.471 | 3,072 | 1.020 | 1.404 | 2.424 |
| 1959–61 | --- | --- | --- | --- | 2,532 | 0.890 | 1.553 | 2.443 | 3,815 | 1.256 | 1.059 | 2.315 |
| 1956–58 | 160 | 0.397 | 2.030 | 2.376 | 3,444 | 1.156 | 1.157 | 2.313 | 4,742 | 1.645 | 0.665 | 2.310 |
| 1953–55 | 1,294 | 0.528 | 1.874 | 2.339 | 4,452 | 1.497 | 0.825 | 2.322 | 4,722 | 1.804 | 0.367 | 2.171 |
| 1950–52 | 2,725 | 0.845 | 1.592 | 2.307 | 4,184 | 1.769 | 0.531 | 2.300 | 4,390 | 2.017 | 0.170 | 2.187 |
| 1947–49 | 3,718 | 1.271 | 1.164 | 2.292 | 4,367 | 1.940 | 0.239 | 2.179 | 4,150 | 2.157 | 0.050 | 2.207 |
| 1944–46 | 3,512 | 1.746 | 0.853 | 2.415 | 3,670 | 2.331 | 0.115 | 2.445 | 3,634 | 2.254 | *0.040 | 2.294 |
| 1941–43 | 3,369 | 2.336 | 0.540 | 2.707 | 3,528 | 2.600 | 0.034 | 2.634 | --- | --- | --- | --- |
| 1938–40 | 2,892 | 2.717 | 0.271 | 2.887 | 2,878 | 2.823 | 0.021 | 2.844 | --- | --- | --- | --- |
| 1935–37 | 2,789 | 3.068 | 0.226 | 3.191 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1932–34 | 2,911 | 3.126 | 0.125 | 3.194 | --- | --- | --- | --- | --- | --- | --- | --- |
| 1929–31 | 2,920 | 3.188 | 0.075 | 3.224 | --- | --- | --- | --- | --- | --- | --- | --- |

**Table 5. Number of ever-married women born 1929–73, and average children ever born, average additional births expected, and average total births expected, by race and year of birth: United States, 1973, 1982, and 1988—Con.**

| Race and year of birth | 1973 | | | | 1982 | | | | 1988 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of women in thousands | Average children ever born | Average additional births expected | Average total births expected | Number of women in thousands | Average children ever born | Average additional births expected | Average total births expected | Number of women in thousands | Average children ever born | Average additional births expected | Average total births expected |
| Black women | | | | | | | | | | | | |
| All years | 3,018 | 2.907 | 0.839 | 3.394 | 3,430 | 2.490 | 0.479 | 2.969 | 3,541 | 2.108 | 0.448 | 2.557 |
| 1971–73 | - - - | - - - | - - - | - - - | - - - | - - - | - - - | - - - | *– | *– | *– | *– |
| 1968–70 | - - - | - - - | - - - | - - - | - - - | - - - | - - - | - - - | *21 | *1.003 | *0.825 | *1.828 |
| 1965–67 | - - - | - - - | - - - | - - - | *3 | *0.403 | *1.791 | *2.194 | 184 | 0.993 | 1.188 | 2.181 |
| 1962–64 | - - - | - - - | - - - | - - - | 64 | 0.785 | 1.240 | 2.025 | 283 | 1.570 | 1.133 | 2.703 |
| 1959–61 | - - - | - - - | - - - | - - - | 219 | 1.294 | 1.343 | 2.637 | 432 | 1.603 | 0.862 | 2.465 |
| 1956–58 | *11 | *0.858 | *1.498 | *2.098 | 415 | 1.870 | 0.927 | 2.796 | 520 | 2.101 | 0.499 | 2.601 |
| 1953–55 | 154 | 1.095 | 1.787 | 2.711 | 473 | 1.932 | 0.666 | 2.597 | 584 | 2.059 | 0.409 | 2.468 |
| 1950–52 | 327 | 1.398 | 1.122 | 2.327 | 521 | 2.247 | 0.540 | 2.787 | 553 | 2.478 | 0.227 | 2.704 |
| 1947–49 | 391 | 1.792 | 1.260 | 2.715 | 498 | 2.496 | 0.347 | 2.844 | 498 | 2.591 | *0.063 | 2.654 |
| 1944–46 | 352 | 2.435 | 0.761 | 2.997 | 399 | 2.875 | 0.140 | 3.016 | 466 | 2.511 | *0.005 | 2.516 |
| 1941–43 | 382 | 2.856 | 0.725 | 3.269 | 434 | 3.061 | 0.077 | 3.138 | - - - | - - - | - - - | - - - |
| 1938–40 | 301 | 3.617 | 0.351 | 3.810 | 402 | 4.032 | 0.050 | 4.082 | - - - | - - - | - - - | - - - |
| 1935–37 | 366 | 3.629 | 0.362 | 3.782 | - - - | - - - | - - - | - - - | - - - | - - - | - - - | - - - |
| 1932–34 | 356 | 3.923 | 0.367 | 4.053 | - - - | - - - | - - - | - - - | - - - | - - - | - - - | - - - |
| 1929–31 | 380 | 4.425 | 0.207 | 4.497 | - - - | - - - | - - - | - - - | - - - | - - - | - - - | - - - |

[1]All women include white, black, and other races. Other races not shown separately because of small sample size.

**Table 6. Number of ever-married women born 1929–73 who were first married prior to the National Survey of Family Growth Cycle I (1973) and average children ever born, average additional births expected, and average total births expected, by race and year of birth: United States, 1973, 1982, and 1988**

| Race and year of birth | 1973 | | | | 1982[1] | | | | 1988[1] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of women in thousands | Average children ever born | Average additional births expected | Average total births expected | Number of women in thousands | Average children ever born | Average additional births expected | Average total births expected | Number of women in thousands | Average children ever born | Average additional births expected | Average total births expected |
| All races[2] | | | | | | | | | | | | |
| 1929–73 | 29,641 | 2.227 | 0.822 | 2.797 | 14,979 | 2.510 | *0.124 | 2.634 | 13,429 | 2.341 | *0.070 | 2.411 |
| 1953–55 | 1,460 | 0.586 | 1.864 | 2.375 | 1,192 | 2.070 | *0.347 | 2.417 | 1,694 | 2.267 | *0.166 | 2.434 |
| 1950–52 | 3,072 | 0.909 | 1.545 | 2.313 | 2,093 | 2.201 | *0.333 | 2.534 | 3,374 | 2.342 | *0.088 | 2.430 |
| 1947–49 | 4,127 | 1.318 | 1.176 | 2.334 | 2,862 | 2.238 | *0.140 | 2.378 | 4,071 | 2.364 | *0.035 | 2.399 |
| 1944–46 | 3,906 | 1.809 | 0.849 | 2.471 | 2,993 | 2.489 | *0.070 | 2.559 | 4,009 | 2.331 | *0.032 | 2.362 |
| 1941–43 | 3,801 | 2.380 | 0.567 | 2.763 | 3,166 | 2.753 | *0.019 | 2.771 | - - - | - - - | - - - | - - - |
| 1938–40 | 3,240 | 2.801 | 0.286 | 2.980 | 2,522 | 3.015 | *0.015 | 3.030 | - - - | - - - | - - - | - - - |
| White women | | | | | | | | | | | | |
| 1929–73 | 26,290 | 2.153 | 0.817 | 2.730 | 13,418 | 2.477 | *0.125 | 2.602 | 11,627 | 2.298 | *0.070 | 2.367 |
| 1953–55 | 1,294 | 0.528 | 1.874 | 2.339 | 1,087 | 2.070 | *0.350 | 2.420 | 1,455 | 2.194 | *0.162 | 2.356 |
| 1950–52 | 2,725 | 0.845 | 1.592 | 2.307 | 1,889 | 2.153 | *0.343 | 2.495 | 2,935 | 2.301 | *0.083 | 2.384 |
| 1947–49 | 3,718 | 1.271 | 1.164 | 2.292 | 2,557 | 2.215 | *0.132 | 2.347 | 3,531 | 2.317 | *0.035 | 2.352 |
| 1944–46 | 3,512 | 1.746 | 0.853 | 2.415 | 2,634 | 2.450 | *0.070 | 2.520 | 3,456 | 2.302 | *0.037 | 2.339 |
| 1941–43 | 3,369 | 2.336 | 0.540 | 2.707 | 2,860 | 2.761 | *0.017 | 2.778 | - - - | - - - | - - - | - - - |
| 1938–40 | 2,892 | 2.717 | 0.271 | 2.887 | 2,251 | 2.929 | *0.014 | 2.943 | - - - | - - - | - - - | - - - |
| Black women | | | | | | | | | | | | |
| 1929–73 | 3,018 | 2.907 | 0.839 | 3.394 | 1,059 | 3.015 | *0.155 | 3.170 | 1,338 | 2.692 | *0.070 | 2.762 |
| 1947–49 | 391 | 1.792 | 1.260 | 2.715 | *197 | *2.516 | *0.222 | *2.739 | 379 | 2.712 | *0.055 | 2.767 |
| 1944–46 | 352 | 2.435 | 0.761 | 2.997 | *215 | *3.013 | *0.112 | *3.125 | 418 | 2.651 | – | 2.651 |

[1]Survey respondents for 1982 and 1988 are included in the analysis if their first marriage occurred in or before September 1973, the midpoint of interviewing in Cycle I.

[2]All races include white, black, and other races. Other races not shown separately because of small sample size.

**Table 7. Number of women 15–44 years of age and percent distribution by total births expected, by race and parity: United States, 1982 and 1988**

| Race and parity | 1988 | | | | | | | 1982 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of women in thousands | Total | Total births expected | | | | | Number of women in thousands | Total | Total births expected | | | | |
| | | | 0 | 1 | 2 | 3 | 4 and over | | | 0 | 1 | 2 | 3 | 4 and over |
| All women[1] | | | | | | | | | | | | | | |
| Total | 57,900 | 100.0 | 8.7 | 14.2 | 44.3 | 21.5 | 11.3 | 54,099 | 100.0 | 7.4 | 12.1 | 43.1 | 23.2 | 14.3 |
| 0 | 25,129 | 100.0 | 20.1 | 14.3 | 44.6 | 14.1 | 6.9 | 22,941 | 100.0 | 17.5 | 13.1 | 44.4 | 16.1 | 8.9 |
| 1 | 9,906 | 100.0 | . . . | 46.7 | 37.8 | 12.3 | 3.1 | 8,979 | 100.0 | . . . | 39.3 | 44.0 | 12.3 | 4.4 |
| 2 | 13,237 | 100.0 | . . . | . . . | 80.9 | 15.1 | 4.0 | 11,645 | 100.0 | . . . | . . . | 78.7 | 16.6 | 4.7 |
| 3 | 6,188 | 100.0 | . . . | . . . | . . . | 91.2 | 8.8 | 6,499 | 100.0 | . . . | . . . | . . . | 88.9 | 11.1 |
| 4 and over | 3,440 | 100.0 | . . . | . . . | . . . | . . . | 100.0 | 4,035 | 100.0 | . . . | . . . | . . . | . . . | 100.0 |
| White women | | | | | | | | | | | | | | |
| Total | 47,076 | 100.0 | 9.2 | 13.6 | 44.6 | 22.0 | 10.7 | 45,367 | 100.0 | 7.5 | 11.8 | 43.9 | 23.2 | 13.6 |
| 0 | 20,769 | 100.0 | 20.8 | 13.3 | 44.3 | 14.8 | 6.8 | 19,720 | 100.0 | 17.3 | 12.5 | 44.6 | 16.4 | 9.2 |
| 1 | 7,720 | 100.0 | . . . | 47.0 | 37.2 | 12.4 | 3.4 | 7,191 | 100.0 | . . . | 40.3 | 43.2 | 12.0 | 4.5 |
| 2 | 10,942 | 100.0 | . . . | . . . | 81.5 | 14.7 | 3.8 | 9,963 | 100.0 | . . . | . . . | 80.2 | 15.6 | 4.1 |
| 3 | 5,110 | 100.0 | . . . | . . . | . . . | 92.1 | 7.9 | 5,417 | 100.0 | . . . | . . . | . . . | 89.7 | 10.3 |
| 4 and over | 2,535 | 100.0 | . . . | . . . | . . . | . . . | 100.0 | 3,076 | 100.0 | . . . | . . . | . . . | . . . | 100.0 |
| Black women | | | | | | | | | | | | | | |
| Total | 7,679 | 100.0 | 7.7 | 18.7 | 41.7 | 18.1 | 13.8 | 6,985 | 100.0 | 6.3 | 13.8 | 38.1 | 21.9 | 19.9 |
| 0 | 2,825 | 100.0 | 20.9 | 21.4 | 46.1 | 7.3 | 4.2 | 2,447 | 100.0 | 18.0 | 18.2 | 43.7 | 13.6 | 6.5 |
| 1 | 1,695 | 100.0 | . . . | 48.9 | 38.1 | 10.9 | *2.0 | 1,459 | 100.0 | . . . | 35.5 | 47.3 | 12.3 | 4.9 |
| 2 | 1,608 | 100.0 | . . . | . . . | 78.1 | 16.6 | 5.3 | 1,358 | 100.0 | . . . | . . . | 66.5 | 24.1 | 9.4 |
| 3 | 820 | 100.0 | . . . | . . . | . . . | 89.1 | 10.9 | 826 | 100.0 | . . . | . . . | . . . | 83.2 | 16.8 |
| 4 and over | 731 | 100.0 | . . . | . . . | . . . | . . . | 100.0 | 894 | 100.0 | . . . | . . . | . . . | . . . | 100.0 |

[1]All women include white, black, and other races. Other races not shown separately because of small sample size.

**Table 8. Number of women 15–44 years of age and percent who "didn't know" or who were "unsure" about their birth expectations, by selected characteristics: United States, 1988**

| Race, age, and parity | Total | | | Currently married | | | Not currently married | | |
|---|---|---|---|---|---|---|---|---|---|
| | Total | Percent didn't know[1] | Percent unsure[2] | Total | Percent didn't know[1] | Percent unsure[2] | Total | Percent didn't know[1] | Percent unsure[2] |
| All women[3] | 57,900 | 6.4 | 25.1 | 29,147 | 6.0 | 15.5 | 28,753 | 6.9 | 34.7 |
| **Race** | | | | | | | | | |
| White | 47,076 | 6.4 | 24.2 | 25,426 | 5.8 | 14.8 | 21,650 | 7.1 | 35.1 |
| Black | 7,679 | 5.9 | 28.0 | 2,197 | 6.7 | 18.2 | 5,482 | 5.7 | 31.9 |
| **Age** | | | | | | | | | |
| 15–19 years | 9,179 | 4.3 | 46.5 | 312 | *1.6 | 21.4 | 8,867 | 4.4 | 47.4 |
| 20–24 years | 9,413 | 5.2 | 35.7 | 3,025 | 6.0 | 31.6 | 6,388 | 4.8 | 37.7 |
| 25–29 years | 10,796 | 9.0 | 29.2 | 6,286 | 8.7 | 21.8 | 4,510 | 9.4 | 39.6 |
| 30–34 years | 10,930 | 9.7 | 20.0 | 7,361 | 8.3 | 16.6 | 3,569 | 12.5 | 27.3 |
| 35–39 years | 9,583 | 6.3 | 11.8 | 6,444 | 4.9 | 10.6 | 3,139 | 9.1 | 14.5 |
| 40–44 years | 7,999 | 2.7 | 5.1 | 5,719 | *1.7 | 3.9 | 2,280 | 5.5 | 8.3 |
| **Parity** | | | | | | | | | |
| 0 | 25,129 | 6.5 | 38.6 | 5,533 | 6.6 | 25.2 | 19,596 | 6.5 | 42.4 |
| 1 | 9,906 | 9.2 | 24.3 | 6,218 | 9.1 | 22.4 | 3,688 | 9.3 | 27.6 |
| 2 | 13,237 | 5.8 | 12.3 | 10,246 | 5.6 | 11.6 | 2,991 | 6.6 | 15.0 |
| 3 and over | 9,628 | 4.2 | 7.9 | 7,150 | 3.5 | 7.4 | 2,478 | 6.4 | 9.4 |

[1]Includes women who initially responded that they didn't know whether they intended to have a(nother) baby (appendix III, question D-25), or if they did intend to have a(nother) baby, they responded that they didn't know how many (appendix III, question D-26).

[2]Includes women who initially responded "yes" or "no" regarding their intention to have a(nother) baby (appendix III, question D-25), and initially gave a number or range of births they expected to have (appendix III, question D-26), but then when subsequently asked, indicated they were "not very sure" about their response (appendix III, question D-27).

[3]All women includes white, black, and other races. Other races not shown separately because of small sample size.

**Table 9. Number of unmarried women 15–44 years of age and percent distribution by total births expected, according to previous marital status and parity: United States, 1982 and 1988**

| Previous marital status and parity | 1988 | | | | | | | 1982 | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Number of women in thousands | Total | Total births expected | | | | | Number of women in thousands | Total | Total births expected | | | | |
| | | | 0 | 1 | 2 | 3 | 4 and over | | | 0 | 1 | 2 | 3 | 4 and over |
| Total unmarried | | | | | | | | | | | | | | |
| Total | 28,753 | 100.0 | 12.1 | 16.8 | 42.5 | 18.0 | 10.6 | 25,868 | 100.0 | 10.0 | 14.3 | 43.6 | 18.6 | 13.4 |
| 0 | 19,596 | 100.0 | 17.8 | 14.0 | 45.0 | 15.3 | 7.8 | 17,843 | 100.0 | 14.5 | 13.0 | 44.9 | 17.2 | 10.4 |
| 1 | 3,688 | 100.0 | . . . | 56.5 | 30.6 | 10.5 | *2.4 | 3,088 | 100.0 | . . . | 45.1 | 39.6 | 10.7 | *4.6 |
| 2 | 2,991 | 100.0 | . . . | . . . | 75.9 | 18.2 | 5.9 | 2,603 | 100.0 | . . . | . . . | 79.0 | 13.7 | *7.4 |
| 3 | 1,407 | 100.0 | . . . | . . . | . . . | 88.0 | 12.0 | 1,194 | 100.0 | . . . | . . . | . . . | 87.3 | *12.7 |
| 4 and over | 1,071 | 100.0 | . . . | . . . | . . . | . . . | 100.0 | 1,139 | 100.0 | . . . | . . . | . . . | . . . | 100.0 |
| Formerly married | | | | | | | | | | | | | | |
| Total | 7,695 | 100.0 | 11.5 | 21.2 | 33.4 | 20.3 | 13.6 | 6,704 | 100.0 | *6.1 | 19.2 | 37.5 | 19.0 | 18.2 |
| 0 | 1,628 | 100.0 | 54.5 | 15.3 | 20.2 | 6.9 | *3.0 | 1,148 | 100.0 | 35.4 | *27.1 | *26.5 | *6.5 | *4.6 |
| 1 | 1,946 | 100.0 | . . . | 71.0 | 22.2 | 6.1 | *0.6 | 1,667 | 100.0 | . . . | 58.5 | 30.8 | *7.4 | *3.3 |
| 2 | 2,238 | 100.0 | . . . | . . . | 80.6 | 16.1 | *3.3 | 1,997 | 100.0 | . . . | . . . | 85.0 | *9.6 | *5.4 |
| 3 | 1,088 | 100.0 | . . . | . . . | . . . | 89.6 | 10.4 | 977 | 100.0 | . . . | . . . | . . . | 90.6 | *9.4 |
| 4 and over | 797 | 100.0 | . . . | . . . | . . . | . . . | 100.0 | 915 | 100.0 | . . . | . . . | . . . | . . . | 100.0 |
| Never married | | | | | | | | | | | | | | |
| Total | 21,058 | 100.0 | 12.4 | 15.2 | 45.8 | 17.1 | 9.5 | 19,164 | 100.0 | 11.4 | 12.6 | 45.8 | 18.4 | 11.8 |
| 0 | 17,968 | 100.0 | 14.5 | 13.9 | 47.2 | 16.1 | 8.3 | 16,695 | 100.0 | 13.1 | 12.0 | 46.1 | 18.0 | 10.8 |
| 1 | 1,742 | 100.0 | . . . | 40.3 | 39.8 | 15.4 | *4.4 | 1,422 | 100.0 | . . . | 29.4 | 49.9 | 14.5 | *6.2 |
| 2 | 754 | 100.0 | . . . | . . . | 61.9 | 24.7 | *13.4 | 606 | 100.0 | . . . | . . . | 59.1 | 27.1 | *13.8 |
| 3 and over | 594 | 100.0 | . . . | . . . | . . . | 44.3 | 55.7 | 441 | 100.0 | . . . | . . . | . . . | 35.6 | 64.4 |

**Table 10. Number of currently married women 15–44 years of age and percent distribution by total births expected, according to parity: United States, 1973, 1982, and 1988**

| Year and parity | Number of women in thousands | Total | Total births expected | | | | |
|---|---|---|---|---|---|---|---|
| | | | 0 | 1 | 2 | 3 | 4 and over |
| 1988: | | | | | | | |
| Total | 29,147 | 100.0 | 5.3 | 11.6 | 46.2 | 24.9 | 12.0 |
| 0 | 5,533 | 100.0 | 28.0 | 15.1 | 43.4 | 10.0 | 3.5 |
| 1 | 6,218 | 100.0 | . . . | 41.0 | 42.2 | 13.4 | 3.4 |
| 2 | 10,246 | 100.0 | . . . | . . . | 82.3 | 14.2 | 3.5 |
| 3 | 4,781 | 100.0 | . . . | . . . | . . . | 92.1 | 7.9 |
| 4 and over | 2,369 | 100.0 | . . . | . . . | . . . | . . . | 100.0 |
| 1982: | | | | | | | |
| Total | 28,231 | 100.0 | 5.0 | 10.0 | 42.5 | 27.4 | 15.1 |
| 0 | 5,098 | 100.0 | 27.7 | 13.8 | 42.6 | 12.4 | *3.6 |
| 1 | 5,891 | 100.0 | . . . | 36.2 | 46.3 | 13.2 | *4.2 |
| 2 | 9,042 | 100.0 | . . . | . . . | 78.6 | 17.4 | *4.0 |
| 3 | 5,305 | 100.0 | . . . | . . . | . . . | 89.3 | 10.7 |
| 4 and over | 2,896 | 100.0 | . . . | . . . | . . . | . . . | 100.0 |
| 1973: | | | | | | | |
| Total | 26,240 | 100.0 | 3.5 | 9.0 | 40.0 | 24.8 | 22.6 |
| 0 | 4,689 | 100.0 | 19.8 | 14.2 | 51.4 | 10.3 | 4.3 |
| 1 | 5,000 | 100.0 | . . . | 34.0 | 50.9 | 11.5 | 3.7 |
| 2 | 7,054 | 100.0 | . . . | . . . | 78.7 | 16.3 | 5.0 |
| 3 | 4,723 | 100.0 | . . . | . . . | . . . | 91.3 | 8.7 |
| 4 and over | 4,773 | 100.0 | . . . | . . . | . . . | . . . | 100.0 |

**Table 11. Number of National Survey of Family Growth sample respondents who gave both a single number and a range of additional expected births and weighted average additional births expected per woman, based on the midpoint of the range, according to the single number: United States, 1973**

| Age group | Number of sample women | Average additional births expected per range[1] | Average additional births expected per number[2] |
|---|---|---|---|
| 15–44 years | 1,143 | 1.631 | 1.724 |
| 15–19 years | 145 | 2.197 | 2.252 |
| 20–24 years | 420 | 1.858 | 1.887 |
| 25–29 years | 304 | 1.452 | 1.589 |
| 30–34 years | 166 | 1.232 | 1.391 |
| 35–39 years | 76 | 1.227 | 1.342 |
| 40–44 years | 32 | 1.212 | 1.456 |

[1]Averages are calculated based on the midpoint of the range of additional births expected.

[2]Averages are calculated based on the point estimate of additional births expected.

**Table 12. Low and high estimates of average additional births expected and average total births expected using the lower and upper bounds of any given ranges, by race and age: United States, 1988**

| Age and race | Low[1] | | High[2] | |
|---|---|---|---|---|
| | Average additional births expected | Average total births expected | Average additional births expected | Average total births expected |
| **All races** | | | | |
| Total[3] | 0.964 | 2.184 | 1.044 | 2.264 |
| 15–19 years | 1.984 | 2.067 | 2.160 | 2.243 |
| 20–24 years | 1.754 | 2.264 | 1.907 | 2.416 |
| 25–29 years | 1.194 | 2.286 | 1.289 | 2.382 |
| 30–34 years | 0.549 | 2.146 | 0.589 | 2.185 |
| 35–39 years | 0.192 | 2.124 | 0.199 | 2.131 |
| 40–44 years | 0.049 | 2.212 | 0.050 | 2.214 |
| **White women** | | | | |
| Total | 0.966 | 2.163 | 1.050 | 2.247 |
| 15–19 years | 2.067 | 2.126 | 2.275 | 2.334 |
| 20–24 years | 1.795 | 2.261 | 1.953 | 2.419 |
| 25–29 years | 1.213 | 2.242 | 1.313 | 2.342 |
| 30–34 years | 0.541 | 2.102 | 0.574 | 2.136 |
| 35–39 years | 0.175 | 2.060 | 0.183 | 2.068 |
| 40–44 years | *0.044 | 2.198 | *0.046 | 2.200 |
| **Black women** | | | | |
| Total | 0.803 | 2.221 | 0.835 | 2.253 |
| 15–19 years | 1.503 | 1.711 | 1.544 | 1.752 |
| 20–24 years | 1.338 | 2.195 | 1.410 | 2.268 |
| 25–29 years | 0.847 | 2.316 | 0.892 | 2.361 |
| 30–34 years | 0.504 | 2.322 | 0.514 | 2.333 |
| 35–39 years | 0.199 | 2.513 | 0.203 | 2.516 |
| 40–44 years | *0.056 | 2.372 | *0.056 | 2.372 |

[1]Low estimates are derived from the number of children ever born and the number of additional births expected, or in cases where a range was given, the lower bound of the range.
[2]High estimates are derived from the number of children ever born and the number of additional births expected, or in cases where a range was given, the upper bound of the range.
[3]Total includes white, black, and other races. Other races not shown separately because of small sample size.

NOTE: The base populations for these rates appear in table 2.

# Appendixes

## Contents



### Appendix tables

# Appendix I
# Technical notes

## Background

This report is one of a series based on the National Survey of Family Growth (NSFG), conducted by the National Center for Health Statistics (NCHS). The NSFG was designed to provide data on fertility, contraception, infertility, and other aspects of maternal and infant health related to childbearing.

The NSFG is a periodic survey based on personal interviews with a nationwide sample of women. The NSFG has been conducted four times—in 1973, 1976, 1982, and 1988. The present report is based on Cycles I, III, and IV of the NSFG. Interviewing for Cycle I was conducted in 1973 under contract by the National Opinion Research Center. Interviewing for Cycles II, III, and IV was conducted under contract by Westat, Inc., in 1976, 1982, and 1988, respectively.

For Cycle IV, personal (face-to-face) interviews were conducted between January and August 1988, with a national sample of 8,450 women who were 15–44 years of age as of March 15, 1988, in the civilian noninstitutionalized population of the United States. (For the first time in 1988, Alaska and Hawaii were included in the sample.) In 1982, interviews were conducted with 7,969 women 15–44 years of age from the civilian noninstitutionalized population of the conterminous United States. In 1973, interviews were conducted with 9,797 women 15–44 years of age who were currently married or previously married. The only never-married women included in 1973 were the small proportion who had children of their own living with them. A detailed report on Cycle IV is contained in reference 21. A detailed description of the methods and procedures used for previous NSFG cycles can be found in references 24–26. This appendix presents a summary of the more important technical aspects of the 1988 NSFG.

In Cycle IV, interviews were conducted with 8,450 women, including 2,771 black women, 5,354 white women, and 325 women of other races. The interviews were conducted by trained female interviewers in respondents' homes and lasted an average of 70 minutes. The interview focused on the woman's pregnancy history; her past and current use of contraceptives; her physical ability to bear children (including surgical sterilization and infertility); expectations for having children in the future; use of medical services for birth control, infertility, and prenatal care; and a wide range of social, economic, and demographic characteristics.

## Statistical design

The NSFG is based on a multistage area probability sample. Black households were sampled at higher rates than other households so that reliable estimates of statistics could be presented separately for black women. In addition, the sample was designed to provide reliable estimates for each of the four major geographic regions of the United States. The sample was not large enough to produce estimates for individual States, counties, or other local areas.

The 8,450 women interviewed for the 1988 NSFG were drawn from households in which someone had already been interviewed for another NCHS survey, the National Health Interview Survey (NHIS), between October 1985 and March 1987. The NHIS is a continuous survey of the civilian noninstitutionalized population of the United States in which data are collected for each household member on disabilities, health conditions, doctor visits, hospitalizations, and other health-related topics.

NCHS provided computer files to Westat, Inc., of households that participated in the NHIS, along with information on addresses and household composition. Households were included if a member had been interviewed between October 1985 and March 1987, inclusively. Westat, Inc., selected the NSFG sample of households from 156 of the 198 primary sampling units (PSU's) in the NHIS design. (A PSU is a county or group of contiguous counties. The sampled PSU's were located in nearly every State and included all of the largest metropolitan areas in the United States, as determined by the 1980 Census.) In comparison, Cycle III was confined to 79 PSU's. The increased dispersion of the sample resulted in smaller sampling errors in 1988 than in 1982.

The first step was to select households, and the second was to select women from those households. No more than one woman was selected per household. Within each selected household, all eligible women had an equal probability of selection for the NSFG. Interviewers were trained to trace the woman to her new address if she had moved since her household's participation in the NHIS. After locating a sampled woman, the interviewer conducted a brief ''screener'' interview to ascertain that she was indeed eligible for the NSFG.

The NSFG is designed to provide national estimates of the number of women with particular characteristics—for example, the number using oral contraceptives or the number

who are infertile. In order to make such estimates, each sample case (woman) must be assigned a ''sampling weight,'' simply a multiplier that is the number of women in the population that she represents. In the 1988 NSFG, the final weights ranged from 197 to 54,997 and averaged about 6,852. They were derived by using four basic steps:

- Inflation by the reciprocal of the probability of selection—The probability of selection is the product of the probabilities of selection of the PSU, segment, household, and sample person within the household. This weight is called the baseweight, or $W_0$. For example, if the probability of selection is 1 in 5,000, then $W_0$ is 5,000.
- Trimming—About 100 cases in the 1988 NSFG had extremely large baseweights (largest $W_0$ was greater than 50,000). In previous cycles, these large weights were left alone but they could have large effects on estimates, particularly among smaller categories of variables. To reduce this problem, these large baseweights in Cycle IV were trimmed to a maximum value of 8,000 for black women (about four times the average $W_0$ for black women) and 19,000 for women who were not black (about three times their average $W_0$). The trimmed weight is called $W_1$. Trimming reduced the total weighted numbers to less than the 57.9 million U.S. women who were known to be 15–44 years of age in 1988. These $W_1$ weights underwent up to two more iterations of trimming to yield the reduced, trimmed weights ($W_3$).
- Nonresponse adjustment—For Cycle IV, 51 nonresponse adjustment cells were identified, based on extensive analysis of response rates using variables available from the NHIS (15). The trimmed weights were adjusted for nonresponse using the cell-specific ratio of the weighted sum of all cases to the weighted sum of all completed cases (ratio-adjusted). These new weights were called ''nonresponse adjusted weights'' ($W_4$).
- Post-stratification by marital status, age, parity, and race—The weights were then ratio-adjusted within each of a 74-cell matrix of categories of age (15–17, 18–19, 20–24, 25–29, 30–34, 35–39, 40–44), by race (black versus nonblack), by marital status (ever-married versus never-married), and by parity (0, 1, 2, 3, 4 and over). The control totals for each of these 74 cells were obtained from the June 1988 Current Population Survey (CPS), conducted by the U.S. Bureau of the Census.

The effect of this ratio adjustment process was to make the sample more closely representative of the civilian noninstitutionalized population of women 15–44 years of age in the United States. The final ''post-stratification'' yielded weights ($W_5$), which reduced the sample variances of the estimates for most statistics.

Estimates of weighted numbers shown in the tables of this report were rounded to the nearest thousand. Aggregate weights and percents may not add to the total because of this rounding.

## Measurement process

Field operations for Cycle IV were carried out by Westat, Inc., under contract with NCHS; these operations included interviewing a few hundred women in a practice survey, called a ''Pretest''; selecting the sample; interviewing women in the main survey; and performing specified quality control checks on the completed questionnaires. Interviewers, all of whom were female, were trained for 1 week before field work. The first five interviews completed by each interviewer were reviewed; after a high level of quality was achieved by an interviewer, this review was reduced to a sample of questionnaires, unless an unacceptable level of error was found. A 10-percent sample of respondents were recontacted by telephone to verify that the interview had taken place and that certain key items had been accurately recorded.

A portion of the questionnaire used for this report is reproduced in appendix III. Two forms of the questionnaire were used, one for women 15–24 years of age and one for women 25–44. The questionnaire for women 15–24 included a few additional items that referred to early experiences that women over 25 could not be expected to remember accurately.

## Data reduction and quality control

The responses of each woman to the interview questions were translated into predetermined numerical codes (that is, they were coded) and these code numbers were recorded on computer tapes (that is, they were keyed). The first few questionnaires coded by each coder were checked completely; after an acceptable level of quality was reached, verification of coding was performed on a systematic sample of each coder's questionnaires. The data were edited by computer to identify inconsistencies between responses as well as code numbers not allowed in the coding scheme; these errors were corrected.

Missing data on the variables used in this report were imputed to provide consistent national estimates. (To speed release of the public-use computer tape, however, not all variables on the computer tape were imputed.)

## Reliability of estimates

Because the statistics presented in this report are based on a sample, they may differ somewhat from the figures that would have been obtained had a complete census been taken using the same questionnaires, instructions, interviewing personnel, and field procedures. This chance difference between sample results and a complete count is referred to as sampling error.

Sampling error is measured by a statistic called the standard error of estimate. The chances are about 68 in 100 that an estimate from the sample will differ from a complete count by less than the standard error. The chances are about 95 in 100 that the difference between the sample estimate and a complete count will be less than twice the standard error. The relative standard error (RSE), or coefficient of variation, of an estimate is obtained by dividing the standard error of the estimate by the estimate itself and is expressed as a percent of the estimate. Percents that have a relative standard error of more than 30 percent are considered unreliable.

## Estimation of standard errors

Because of the complex multistage design of the NSFG sample, conventional formulas for calculating sampling errors are inapplicable. Standard errors were, therefore, estimated empirically by using a technique known as balanced half-sample replication. This technique produces highly reliable, unbiased estimates of sampling errors. Its application to the NSFG has been described elsewhere (21).

Because it would be prohibitively expensive and cumbersome to estimate and publish a standard error for each percent or other statistic by this technique, standard errors were computed for selected statistics and population subgroups that were chosen to represent a wide variety of demographic characteristics and a wide variation in the size of the estimates themselves. Curves were then fitted to the RSE estimates (ratio of the standard error to the estimate itself) for numbers of women according to the model

$$\text{RSE}\ (N') = (A + B/N')^{1/2}$$

where $N'$ is the number of women and $A$ and $B$ are the parameters whose estimates determine the shape of the curve. Separate curves were fitted for women of all races combined and nonblack women and for black women, because a different sampling rate was used for black women. Selected estimates of $A$ and $B$ are shown in table I.

To calculate the estimated standard error or RSE of an aggregate or percent, the appropriate estimates of $A$ and $B$ are used in the equations:

$$\begin{aligned}
\text{RSE}_{N'} &= (A + B/N')^{1/2} \\
SE_{N'} &= (A + B/N')^{1/2}\ (N') \\
\text{RSE}_{P'} &= \{\ [\ (B/P')\ (100–P')\ ]\ /\ X'\ )\ \}^{1/2} \\
\text{SE}_{P'} &= \{\ [\ (B*P')\ (100–P')\ ]\ /\ X'\ )\ \}^{1/2}
\end{aligned}$$

where

$N'$ = number of women
$P'$ = percent
$X'$ = number of women in denominator of percent
SE = standard error
RSE = relative standard error

Tables II–X show some illustrative standard errors of aggregates, percents, and rates for women from Cycles I, III, and IV of the NSFG.

## Testing differences

The standard error of a difference between two comparative statistics, such as the proportion of white women expecting no births compared with the proportion of black women expecting no births, is approximately the square root of the sum of the squares of the standard errors of the statistics considered separately, or calculated by the formula: if

$$d = P'_1 - P'_2$$

then

$$S_d = \sqrt{[(P'_1)^2\ (\text{RSE}_{p'1})^2 + (P'_2)^2\ (\text{RSE}_{p'2})^2]}$$

where $P'_1$ is the estimated percent for one group and $P'_2$ is the estimated percent for the other group, and $\text{RSE}_{p'_1}$ and $\text{RSE}_{p'_2}$ are the relative standard errors of $P'_1$ and $P'_2$. This formula will represent the actual standard error quite accurately for the difference between separate and uncorrelated characteristics, although it is only an approximation in most other cases.

**Table I. Estimated standard error parameters for percentages of total or total nonblack women and black women: 1988**

| Characteristic | Estimated parameters | |
|---|---|---|
| | *a* | *b* |
| All races and total nonblack | –0.00018 | 10,738 |
| Black | –0.000626 | 5,181 |

**Table II. Approximate relative standard errors and standard errors for estimated number of total or nonblack women: National Survey of Family Growth, 1988**

| Size of estimate | Relative standard error in percent | Standard error |
|---|---|---|
| 100,000 | 32.0 | 32,000 |
| 250,000 | 20.4 | 51,000 |
| 500,000 | 14.4 | 72,000 |
| 1,000,000 | 10.2 | 102,000 |
| 5,000,000 | 4.4 | 221,000 |
| 10,000,000 | 3.0 | 298,000 |
| 20,000,000 | 1.9 | 377,000 |
| 30,000,000 | 1.3 | 400,000 |
| 50,000,000 | 0.6 | 294,000 |
| 58,000,000 | 0.2 | 131,000 |

**Table III. Approximate relative standard errors and standard errors for estimated number of black women: National Survey of Family Growth, 1988**

| Size of estimate | Relative standard error in percent | Standard error |
|---|---|---|
| 100,000 | 22.0 | 22,000 |
| 250,000 | 14.0 | 35,000 |
| 500,000 | 9.8 | 49,000 |
| 1,000,000 | 6.7 | 67,000 |
| 5,000,000 | 2.0 | 101,000 |
| 7,500,000 | 0.8 | 60,000 |

**Table IV. Estimated standard errors of percents of total or total nonblack women: National Survey of Family Growth, 1988**

| 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 |

**Table V. Estimated standard errors of the ratio of total births expected per 1,000 women: National Survey of Family Growth, 1988**

| Base of ratio | Estimated ratio | | | | |
|---|---|---|---|---|---|
| | 1,000 | 2,000 | 3,000 | 4,000 | 5,000 |
| 100,000 | 407 | 576 | 705 | 814 | 910 |
| 200,000 | 288 | 407 | 498 | 575 | 642 |
| 500,000 | 182 | 257 | 314 | 362 | 404 |
| 1,000,000 | 128 | 181 | 221 | 255 | 284 |
| 2,000,000 | 91 | 127 | 155 | 178 | 198 |
| 5,000,000 | 57 | 79 | 95 | 108 | 119 |
| 10,000,000 | 40 | 54 | 64 | 71 | 76 |
| 20,000,000 | 27 | 36 | 40 | 41 | 41 |

**Table VI. Estimated standard errors of the ratio of total births expected per 1,000 black women: National Survey of Family Growth, 1988**

| Base of ratio | Estimated ratio | | | | |
|---|---|---|---|---|---|
| | 1,000 | 2,000 | 3,000 | 4,000 | 5,000 |
| 500,000 | 120 | 169 | 206 | 237 | 264 |
| 1,000,000 | 85 | 119 | 144 | 165 | 183 |
| 2,000,000 | 59 | 82 | 99 | 112 | 123 |
| 5,000,000 | 37 | 49 | 57 | 62 | 65 |
| 9,000,000 | 26 | 34 | 37 | 36 | 32 |

A difference among comparable proportions or other statistics from two or more subgroups is considered to be statistically significant when a difference of that size or larger would be expected by chance in fewer than 5 percent of repeated samples of the same size and type, if no true difference existed in the populations sampled (also known as type I error or $\alpha$ level). Such a difference would be statistically significant at the 0.05 level. By this criterion, if the observed difference or a larger one could be expected by chance in more than 5 percent of repeated samples, then one cannot be sufficiently confident to conclude that a real difference exists between the populations. When an observed difference is large enough to be statistically significant, the true difference in the population is estimated to lie between the observed difference plus or minus two standard errors of that difference in 95 of 100 samples.

Although the 5-percent criterion is conventionally applied, it is in a sense arbitrary; depending on the purpose of the particular comparison, a different level of significance may be more useful. For greater confidence, one would test for significance at the 0.01 (1 percent) level, but if one can accept a 10-percent chance of concluding a difference exists when there actually is none in the population, a test of significance at the 10-percent level would be appropriate.

The term ''similar,'' as used in this report, means that any observed difference between two estimates being compared is not statistically significant, but terms such as ''greater,'' ''less,'' ''larger,'' and ''smaller'' indicate that the observed differences are statistically significant at the 0.05 level using a two-tailed normal deviate test (z-test) with 39 degrees of freedom. Statements about differences that are qualified in some way (as by the phrases ''the data suggest'' and ''some evidence'') indicate that the difference is significant at the 0.10 level but not at the 0.05 level.

When a substantial difference that is observed is found not to be statistically significant, one should not conclude that no difference exists but simply that such a difference cannot be established with 95-percent confidence from this sample. This is especially important for estimates based on smaller subgroups of women, such as Hispanic women or teenagers. Furthermore, lack of comment in the text about any two statistics does not mean that the difference was tested and found not to be significant.

The number of replicates in the balanced half-sample replication design minus one (99 in Cycle IV) can reasonably be used as an estimate of the number of degrees of freedom.

For example, in 1988, 16.4 percent of white women and 22.1 percent of black women had had just one live birth. To

**Table VII. Estimates of standard errors of percents of total or total nonblack women: National Survey of Family Growth, 1982**

| 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 | 6.5 | 10.1 | 13.8 | 18.5 | 21.2 | 22.6 | 23.1 |
| 500,000 | 2.9 | 4.5 | 6.2 | 8.3 | 9.5 | 10.1 | 10.3 |
| 1,000,000 | 2.0 | 3.2 | 4.4 | 5.8 | 6.7 | 7.2 | 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 VIII. Estimated standard errors of the ratio of total births expected per 1,000 women: National Survey of Family Growth, 1982**

| Base of ratio | Estimated ratio | | | | |
|---|---|---|---|---|---|
| | 1,000 | 2,000 | 3,000 | 4,000 | 5,000 |
| 200,000 | 381 | 539 | 660 | 761 | 851 |
| 500,000 | 241 | 340 | 417 | 481 | 537 |
| 1,000,000 | 170 | 240 | 294 | 339 | 378 |
| 2,000,000 | 120 | 169 | 207 | 238 | 265 |
| 5,000,000 | 76 | 106 | 129 | 147 | 163 |
| 10,000,000 | 53 | 74 | 88 | 100 | 110 |
| 20,000,000 | 37 | 50 | 59 | 65 | 69 |

**Table IX. Estimated standard errors of the ratio of total births expected per 1,000 black women: National Survey of Family Growth, 1982**

| Base of ratio | Estimated ratio | | | | |
|---|---|---|---|---|---|
| | 1,000 | 2,000 | 3,000 | 4,000 | 5,000 |
| 500,000 | 140 | 197 | 240 | 275 | 306 |
| 1,000,000 | 98 | 138 | 167 | 190 | 210 |
| 2,000,000 | 69 | 95 | 114 | 128 | 139 |
| 5,000,000 | 42 | 56 | 63 | 67 | 67 |
| 9,000,000 | 30 | 37 | 37 | 31 | 11 |

**Table X. Estimated standard errors of the ratio of total births expected per 1,000 women: National Survey of Family Growth, 1973**

| Base of ratio | Estimated ratio | | | | |
|---|---|---|---|---|---|
| | 1,000 | 2,000 | 3,000 | 4,000 | 5,000 |
| 20,000 | 232 | 531 | 826 | 1,121 | 1,416 |
| 50,000 | 147 | 336 | 523 | 709 | 896 |
| 100,000 | 104 | 238 | 370 | 502 | 634 |
| 200,000 | 74 | 168 | 262 | 355 | 448 |
| 500,000 | 47 | 107 | 166 | 225 | 284 |
| 1,000,000 | 33 | 76 | 118 | 160 | 202 |
| 2,000,000 | 24 | 54 | 84 | 114 | 144 |
| 5,000,000 | 16 | 35 | 54 | 74 | 93 |
| 10,000,000 | 12 | 26 | 40 | 54 | 68 |
| 20,000,000 | 9 | 20 | 30 | 41 | 51 |

test this racial difference at the 0.05 level of significance, compute

$$t = \frac{22.1 - 16.4}{[(22.1)^2 \, RSE^2_{(22.1)} + (16.4)^2 \, RSE^2_{(16.4)}]}$$

RSE's are computed using the appropriate values for *B* from table I:

$$RSE_{(22.1)} = \sqrt{\frac{5{,}181 \times (100-22.1)}{(22.1) \times 7{,}679{,}000}}$$

$$= 0.049$$

and

$$RSE_{(16.4)} = \sqrt{\frac{10{,}738 \times (100-16.4)}{(16.4) \times 47{,}076{,}000}}$$

$$= 0.034.$$

Thus

$$t = \frac{22.1-16.4}{(22.1)^2 \times (0.049)^2 + (16.4)^2 \times (0.034)^2}$$

$$= 4.68$$

The two-tailed critical value for a normal statistic and a significance level of 0.05 is 1.96. Therefore, the difference is significant at the 5-percent level.

## Nonsampling error

Although sampling error affects the reliability (that is, precision, repeatability) of survey estimates, nonsampling error may introduce bias (that is, inaccuracy). The results of any survey are subject to at least four types of nonsampling error, including interview nonresponse; nonresponse to individual questions or items within the interview; inconsistency of responses to questions; and error of recording, coding, and keying by survey personnel.

To minimize nonsampling error, stringent quality control procedures were introduced at every stage of the survey, including a check on completeness of the household listing; extensive training and practice of interviewers; editing of questionnaires by the interviewers' supervisors; short verification interviews with a subsample of respondents; verification of coding and editing; independent coding of a sample of questionnaires by NCHS; keypunch verification; and an extensive computer ''cleaning'' to check for inconsistent responses, missing data, and invalid codes. A detailed description of some of these procedures follows; others were discussed previously.

## Interview nonresponse

Interview nonresponse means that no part of an interview was obtained. This is conventionally measured by response rates. Nonresponse to the NHIS was 4 percent, for a response rate of 96 percent. Among this 96 percent, 82.5 percent of eligible women responded to the NSFG, for a compound response rate of 79 percent. Nonresponse did vary by certain characteristics of the woman but the wealth of information in the NHIS allowed adjustments to be made for nonresponse. This nonresponse and the procedures used to adjust for it are described in detail in references 21 and 22.

## Item nonresponse

Item nonresponse may have occurred when a respondent refused to answer a question, when she did not know the answer to a question, when the question was erroneously skipped or the answer was not recorded by the interviewer, or when the answer could not be coded. The rate of nonresponse to individual questions was very low in Cycle IV, as it was in Cycle III. Some examples of item nonresponse from among a total of 8,450 respondents are as follows: religion, 25 cases and occupation, 17 cases. The items with the most nonresponse were family income (from which poverty-level income was derived), with 893 cases, and age (date) of first intercourse, with 458 missing cases.

In the 1988 NSFG, 201 items were forced to be complete; missing data for these variables were imputed. Of these 201 items, 173 imputed items with imputation flags exist on the public-use tape. For 116 of these 173, less than 1 percent of the cases required imputation; for 39, 1–5 percent; for 13, 5–10 percent; and for only 5, 10–11 percent. For those few items for which the proportion of cases imputed was high, this fact is noted in the appropriate section of the definitions. This report only used NSFG variables with imputed missing data.

As with all survey data, responses to the NSFG were subject to deliberate misreporting by the respondent. Such misreporting cannot be detected directly, but it can be detected indirectly by the extensive computer ''cleaning'' and editing procedures used in the NSFG.

# Appendix II
# Definition of terms

*Additional births expected*—The number of children a woman expects to give birth to in the future, including a current pregnancy if applicable. Women who were sterile or married to sterile men were classified as expecting zero additional births. Those physically able to have births were asked whether they, and their current husband or partner if applicable, intended to have any babies in the future, and, if so, how many. Women who did not know whether they intended any future births, or who did not know a particular number they intended to have, were asked for the smallest and largest numbers they expected to have. The estimate of additional births expected in those cases is an average of the smallest and largest numbers given.

*Age*—In Cycle IV, age is classified by the age of the respondent in completed years as of March 15, 1988, the approximate midpoint of interviewing. In Cycles I and III, age is classified by the age of the respondent as of the date of the interview.

*Cohort*—A group of persons who experience the same significant event in a particular time period. For example, a birth cohort may be those born in 1942 or in 1940–44; a marriage cohort would be those married in a given year or group of years.

*Cohort fertility*—Refers to the birth rates of a birth cohort of women, that is, a group of women who all were born in a particular time period, for example, in 1942 or 1940–44. The term ''cohort fertility'' may be used to refer to completed cohort fertility.

*Completed cohort fertility*—Refers to the average total number of children born to a birth cohort of women when their childbearing is completed, for example, at ages 47 or older.

*Fertility*—The childbearing performance of individuals, couples, groups, or populations—that is, the number of births they have.

*Marital status*—In the NSFG, persons were classified by marital status as married, widowed, divorced, separated, or never married. Ever married refers to women who are married, or have been married at some time in their lives—that is, women whose marital status is currently married, separated, divorced, or widowed. In Cycle I, which was mainly a survey of ever-married women, those who reported themselves as married or as informally married, such as living with a partner or common law spouse, were classified as currently married. It is possible that some of these were never formally married, but nonetheless are considered ''ever married'' for purposes of this report. In Cycle I, the informally married comprised only 1.5 percent of total respondents, and 2 percent of currently married respondents. In Cycles III and IV, surveys of women of all marital statuses, those who reported themselves as ''not married, but living with a partner or boyfriend'' were classified according to their legal marital status, that is, widowed, divorced, separated, or never married. In all cycles, women who were married but separated from their spouses were classified as separated if the reason for the separation was marital discord; otherwise, they were classified as currently married.

*Lifetime births expected*—See total births expected.

*Parity*—This refers to the number of live births the woman has had. For example, a woman classified as ''parity 0'' has never had a live birth. ''Parity 1 or more'' means that she has had one or more live births. Children ever born is also known as ''parity.''

*Race*—Race refers to the race of the woman interviewed and is reported as black, white, or other. In the 1988 and 1982 NSFG, race was classified according to the woman's own report of the race that best described her. In 1973, race was based on interviewer observation.

*Synthetic cohort*—A hypothetical cohort of persons that is represented when data for a year or other brief period are treated as though they relate to a single cohort. For example, the total fertility rate, which summarizes the age-specific birth rates for a population of women in a given year, may be assumed to represent the average total children born per woman for a synthetic cohort of women that passed through life bearing children at the given rates.

*Total births expected*—The number of children a woman expects to have by the time she completes her childbearing. Total births expected is the sum of the number of children ever born and the number of additional births expected.

*Total fertility rate (TFR)*—A measure of fertility that summarizes the rate of childbearing in a given period of time, often a year. It is derived by summing the age-specific birth rates for a population of women in the given period. The TFR is also a hypothetical measure of completed fertility for a synthetic cohort of women assumed to pass through life bearing children according to the age-specific birth rates in the given period. Thus, the TFR may be interpreted as the average number of lifetime births women may be expected to have if they bore children at the rates that women of all ages did in the given year or other period.

# Appendix III
# Items on the 1988 National Survey of Family Growth questionnaire related to birth expectations

## NOT CURRENTLY PREGNANT

Knowing the number of children women have now and the number they expect to have in the future is important in understanding how our population will grow. It is impossible to look into the future and know exactly how things will turn out, but we often have some ideas about what we intend to do.

D-25. Looking to the future, do you (and your husband/partner) intend to have a(nother) baby at some time?

Yes . . . . . 1 (D-26)
No . . . . . 2 (D-27)
(Husband/partner)/R disagree . . . . . 3 (D-28)
DK, up to God, etc.. . . . . 8 (D-28) 24

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D-26. (Not counting the _____ baby/ies you have already had), how many (more) do you (and your husband/partner) intend to have?
No. of live births

_____ (D-27) 25-26
NUMBER OR RANGE
Don't know . . . . . 98 (D-28)

D-27. Of course, sometimes things do not work out exactly as we intend them to, or something makes us change our minds. In your case, how sure are you (and your husband/partner) that you will have (no/NUMBER OR RANGE FROM D-26) (more) bab(y/ies)? Would you say you are very sure or not very sure?

Very sure. . . . . 1 } (BOX 45) 27
Not very sure. . . . . 2 }

---

D-28. Many people aren't sure, but still have some idea about the future. As you expect things to work out for you, what is the largest number of (additional) babies you (and your husband/partner) expect to have?

None . . . . . 00 (D-39)
NUMBER _____ (D-29)
Don't know . . . . . 98 (BOX 45) 28-29

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D-29. What is the smallest number of (additional) babies you (and your husband/partner) expect to have?

NUMBER _____
Don't know . . . . . 98 30-31

---

BOX 45. DOES R INTEND TO HAVE (MORE) BABIES? (SEE D-25 OR D-28)

YES. . . . . 1 (D-30)
NO . . . . . 2 (D-39)
DON'T KNOW . . . . . 8 (D-39) 32

---

D-30. When do you expect to have your (first/next) child; that is, in how many years?

_____ 33-34
NUMBER OR RANGE

Knowing the number of children women have now and the number they expect to have in the future is important in understanding how our population will grow. It is impossible to look into the future and know exactly how things will turn out, but we often have some ideas about what we intend to do.

D-32. Looking to the future, do you (and your husband/partner) intend to have another baby after this one is born?

Yes . . . . . 1 (D-33)
No . . . . . 2 (D-34)
(Husband/partner)/R disagree . . . . . 3 (D-35)
DK, up to God, etc.. . . . . 8 (D-35) 37

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D-33. Not counting your current pregnancy (and the _____ bab(y/ies) you have already had), how many more do you (and your husband/partner) intend to have?
No. of live births

_____ (D-34) 38-39
NUMBER OR RANGE
Don't know . . . . . 98 (D-35)

---

D-34. Of course, sometimes things do not work out exactly as we intend them to, or something makes us change our minds. In your case, how sure are you (and your husband/partner) that you will have (no/NUMBER OR RANGE FROM D-33) more bab(y/ies)? Would you say you are very sure or not very sure?

Very sure . . . . . 1
Not very sure . . . . . 2 } (BOX 46) 40

D-35. Many people aren't sure, but still have some idea about the future. As you expect things to work out for you, what is the largest number of additional babies you (and your husband/partner) expect to have after this one is born?

None . . . . . 00 (D-39)
NUMBER _____ (D-36)
Don't know . . . . . 98 (BOX 46) 41-42

---

D-36. What is the smallest number of additional babies you (and your husband/partner) expect to have after this one is born?

NUMBER _____
Don't know . . . . . 98 43-44

---

BOX 46. DOES R INTEND TO HAVE MORE BABIES? (SEE D-32 OR D-35)

YES. . . . . 1 (D-37)
NO . . . . . 2 (D-39)
DON'T KNOW . . . . . 8 (D-39) 45

---

D-37. Not counting your current pregnancy, when do you expect to have your next child; that is, in how many years?

_____ 46-47
NUMBER OR RANGE