VOLUME II. SUBJECT REPORTS

Series PC(2) Final Reports

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* Report in preparation.

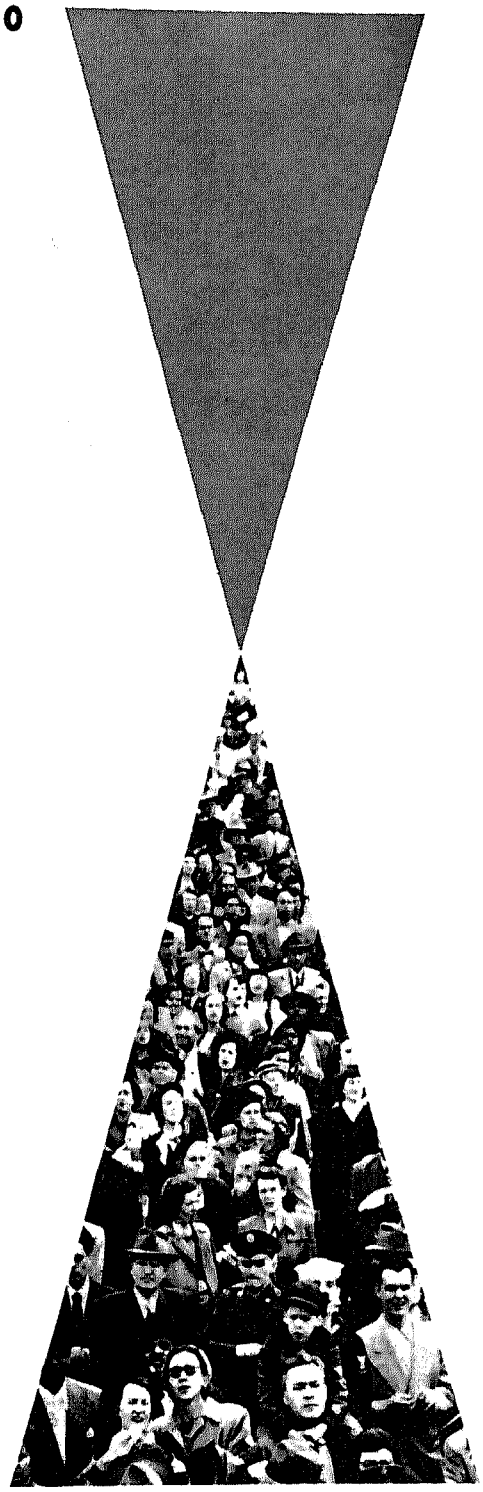
U.S. CENSUS OF POPULATION: 1960

Final Report PC(2)–3B

SUBJECT REPORTS

Childspacing

Spacing of Successive Births to Women, by Age, Duration of Marriage, and Other Characteristics



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PREFACE

This report presents statistics from the 1960 Census of Population on the fertility and childspacing of birth and marriage cohorts of women in the United States by demographic, social, and economic characteristics of the women and their families. The statistics provide a basis for the study of the contributions of different groups to population growth. Legal provision for this Census, which was conducted as of April 1, 1960, was made in the Act of Congress of August 31, 1954 (amended August 1957), which codified Title 13 United States Code.

The major portion of the information compiled from the 1960 Census of Population appears in Volume I, Characteristics of the Population, which contains data for the United States, States and counties and their urban and rural parts, cities, minor civil divisions, etc. The present report is part of Volume II, Subject Reports, and is designated as PC(2)-3B. A list of the Volume II Subject Reports appears on the inside of the front cover. A summary description of all the final reports of the 1960 Population Census appears on page IV.

ACKNOWLEDGMENTS

Wilson H. Grabill, Chief, and Maria Davidson of the Fertility Statistics Branch, assisted by Robert Parke, Jr., and Jerry T. Jennings planned this report and developed its content under the general direction of Paul C. Glick, Assistant Chief (Social Statistics Programs), Population Division. Henry S. Shryock, Assistant Chief (Program Development), and David L. Kaplan, Assistant Chief (Methods Development), made important contributions in the planning and development of the entire series of Subject Reports. For the present report, John C. Beresford provided liaison with the operations staff, Elizabeth A. Larmon assisted in the preparation of the introductory text, and Louise L. Douglas performed the technical editorial work. Lidia R. Walters reviewed the tables and the text of the report for consistency and accuracy. The procedures for compiling the data were devised by William Buell of the Systems Division, Bureau of the Census and by Robert L. Bassett and Mark Eagleton of the Stanford University School of Medicine. Important contributions were also made by Catherine M. Neafsey and Alfonso E. Episcopo of the Systems Division. The sampling materials were prepared by Robert Hanson and Anthony Turner of the Statistical Methods Division.

The census program was designed in consultation with a number of advisory committees and many individuals in order to maximize the usefulness of the data. Among the groups organized for this purpose were the Technical Advisory Committee for the 1960 Population Census, the Council of Population and Housing Census Users, and the Federal Agency Population and Housing Census Council (sponsored by the U.S. Bureau of the Budget). The persons who served with these groups represented a wide range of interest in the census program; their affiliations included universities, private industry, research organizations, labor groups, Federal agencies, State and local governments, and professional associations.

A substantial part of the data processing on which this report is based was conducted under the terms of a cooperative agreement with the Stanford University School of Medicine, Department of Genetics. Major support for the project (see Bodmer, W. F. and Lederberg, J., 1966, "Census data for studies of genetic demography," Proc. 3rd Int. Cong. Genetics (Chicago) 459-471) was provided by the National Institute of Child Health and Human Development, U.S. Public Health Service (Research Grant HD 00045-01). The final stages of tabulation for publication were financed by a grant from Syntax Laboratories, Inc. The Stanford University computer facilities utilized for the project were also aided by support from the National Science Foundation. Tabulation of the data on childspacing in relation to occupation was made possible, in part, by funds provided by the U.S. Department of Labor.

August 1968.

FINAL REPORTS OF THE 1960 CENSUS OF POPULATION

The final reports of the 1960 Population Census are arranged in three volumes and a joint Population-Housing series of census tract reports. The 1960 Population Census publication program also includes preliminary, advance, and supplementary reports, certain evaluation, procedural, and administrative reports, and graphic summaries. After publication, copies of all reports are available for examination or purchase at any U.S. Department of Commerce Field Office.

Certain types of unpublished statistics are available for the cost of preparing a copy of the data. Also, under certain conditions, special tabulations of the 1960 Census data can be prepared on a reimbursable basis. In addition, there are available for purchase magnetic tapes and punchcards containing 1960 Census information on the characteristics on a one-in-a-thousand and a one-in-ten-thousand sample of the population of the United States. Confidentiality of the information, as required by law, has been maintained by the omission of certain identification items. Further information about any of these materials can be obtained by writing to the Chief, Population Division, Bureau of the Census, Washington, D.C., 20233.

Volume I. Characteristics of the Population. This volume consists of separate reports for the United States, each of the 50 States, the District of Columbia, Puerto Rico, Guam, Virgin Islands, American Samoa, and Canal Zone. For each of these 57 areas, the data were first issued in four separate paper-bound "chapters," designated as PC(1)-A, B, C, and D. (For Guam, Virgin Islands, American Samoa, and Canal Zone, the material normally contained in chapters B, C, and D are included in chapter B.) For library and general reference use, the paper-bound reports have been assembled and reissued in buckram-bound books identified as Parts A and 1 to 57 of Volume I.

Series PC(1)-1A to 57A: Chapter A. Number of Inhabitants. These reports contain final population counts for States and counties and their urban and rural parts, and for standard metropolitan statistical areas, urbanized areas, all incorporated places, unincorporated places of 1,000 inhabitants or more, and minor civil divisions.

Series PC(1)-1B to 57B: Chapter B. General Population Characteristics. These reports present statistics on sex, age, marital status, color or race, and relationship to head of household for States and counties and their urban and rural parts, and for standard metropolitan statistical areas, urbanized areas, places of 1,000 inhabitants or more, and minor civil divisions.

Series PC(1)-1C to 53C: Chapter C. General Social and Economic Characteristics. These reports cover the subjects of nativity and parentage, State of birth, country of origin of the foreign stock, mother tongue, place of residence in 1955, year moved into present house, school enrollment by level and type, years of school completed, families and their composition, fertility, veteran status, employment status, weeks worked in 1959, year last worked, occupation group, industry group, class of worker, place of work, means of transportation to work, and income of persons and families. Each subject is shown for some or all of the following areas: States and counties and their urban, rural-nonfarm, and rural-farm parts, standard metropolitan statistical areas, urbanized areas, and urban places.

Series PC(1)-1D to 53D: Chapter D. Detailed Characteristics. These reports present most of the subjects covered in chapter C, above, cross-classified by age, color, and other characteristics. There is also included additional information on families, as well as data on single years of age, detailed occupation, and detailed industry. Each subject is shown for some or all of the following areas: States and their urban, rural-nonfarm, and rural-farm parts; and large counties, cities, and standard metropolitan statistical areas.

Volume I, Part A: Number of Inhabitants. This is a compendium of the 57 chapter A reports, i.e., PC(1)-1A to 57A.

Volume I, Parts 1 to 57: Characteristics of the Population. The 57 parts relate respectively to the United States, each of the 50 States, District of Columbia, Puerto Rico, Guam, Virgin Islands, American Samoa, and Canal Zone. Each part contains the data previously published in the four chapters A, B, C, and D, and is in the form of a separate, buckram-bound book. Parts 54, 55, 56, and 57--for Guam, Virgin Islands, American Samoa, and Canal Zone, respectively--are bound in a single book.

Volume II (Series PC(2) reports). Subject Reports. Each report in this volume concentrates on a particular subject. Detailed information and cross-relationships are generally provided on a national and regional level; in a few reports data for States or standard metropolitan statistical areas are also shown. Among the characteristics covered are ethnic origin and race, fertility, families, migration, education, employment, unemployment, occupation, industry, and income. There is also a report on the geographic distribution and characteristics of inmates of institutions. A list of reports is given on the inside of the front cover.

Volume III (Series PC(3) reports). Selected Area Reports. Four of the reports in this volume present selected characteristics of the population for State economic areas, for standard metropolitan statistical areas, and according to the size and type of place where the individual resided. A fifth report provides data on the social and economic characteristics of Americans overseas.

Series PHC(1). Census Tract Reports. These reports present information on both population and housing subjects. There is one report for each of 180 tracted areas in the United States and Puerto Rico. The population subjects include age, race, marital status, country of origin of the foreign stock, relationship to head of household, school enrollment, years of school completed, place of residence in 1955, employment status, occupation group, industry group, place of work, means of transportation to work, and income of families, as well as certain characteristics of the nonwhite population in selected tracts. The housing subjects include tenure, color of head of household, vacancy status, condition and plumbing facilities, number of rooms, number of bathrooms, number of housing units in structure, year structure built, basement, heating equipment, number of persons in unit, persons per room, year household head moved into unit, automobiles available, value of property, and gross and contract rent, as well as certain characteristics of housing units with nonwhite household head for selected tracts. In addition, for selected tracts these reports contain data on certain population and housing subjects for persons of Puerto Rican birth or parentage and for white persons with Spanish surname. (This series is the same as the tract reports listed in the publication program for the 1960 Census of Housing.)

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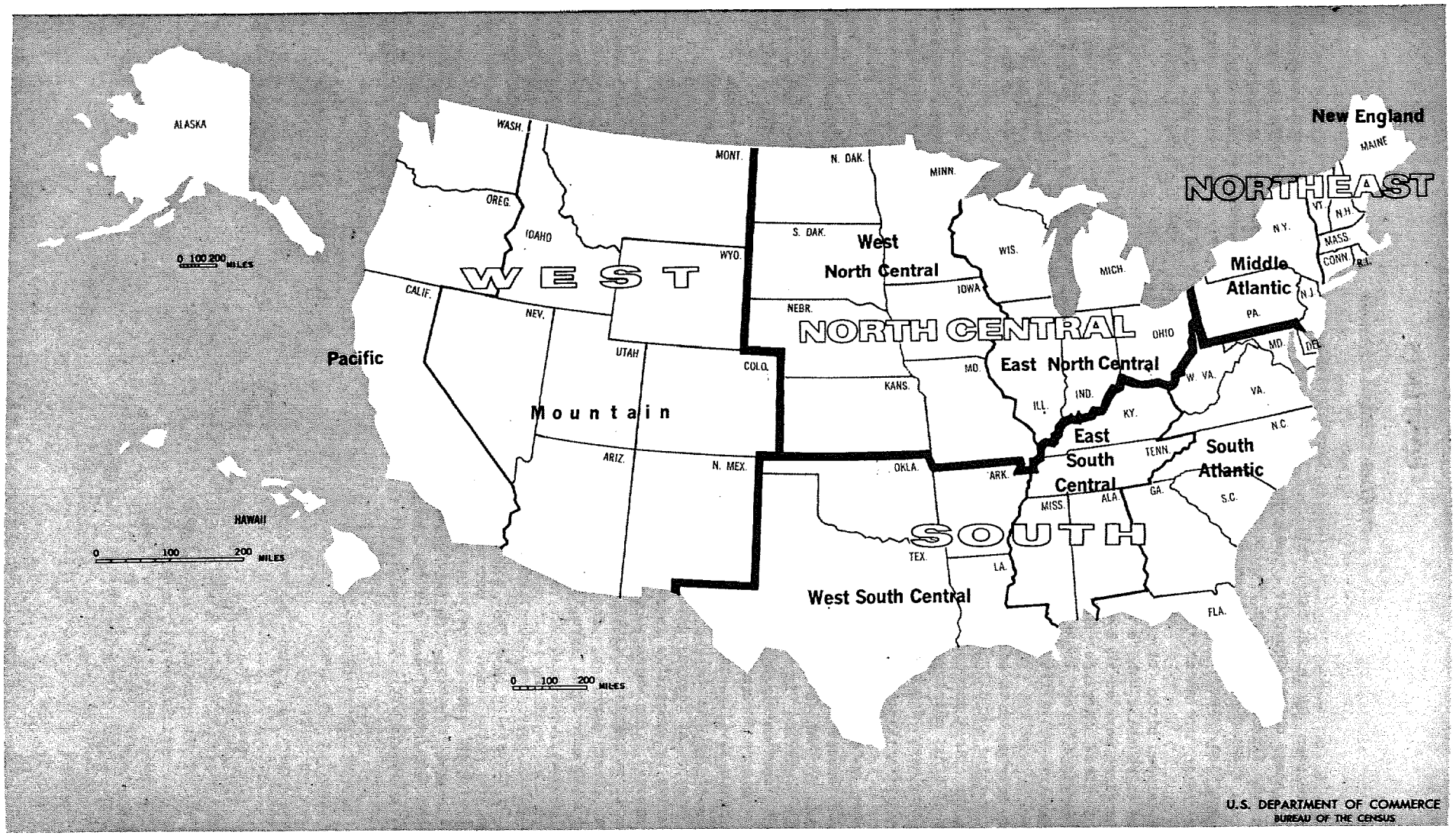
REGIONS AND GEOGRAPHIC DIVISIONS OF THE UNITED STATES



Childspacing

GENERAL

This report presents national statistics on births to women by successive ages and successive intervals since marriage, on intervals between births, and on birth rates for past years. Some regional statistics are also presented, notably for the South. The data are shown by demographic, social, and economic characteristics of women and their families. Among the characteristics shown are color, marital status, age at first marriage, education, and labor force participation of women, and occupation and income of the husband. The statistics are based on a 5-percent sample of the population enumerated in the Eighteenth Decennial Census of Population, taken as of April 1, 1960.

The tabulations are based on the fertility histories of women as obtained from reported birth dates of their children who were present in the home and from estimates of birth dates for those children who had died or left home. In order to keep the number of children with estimated birth dates to a reasonably small proportion of all children ever born, the data in this report are generally limited to women who were not so old or married so long that many of their children had grown up and left home. In an effort to simplify the editing and processing problems, a few further restrictions were employed. Hence, the numbers of women by age in 1960 or by date of marriage as shown in the present report are slightly below those of women of comparable age or date of marriage as shown in other reports of the 1960 Census. This fact does not seriously limit the usefulness of the present data for demographic analysis.

RELATED MATERIALS

1960 Census reports.--Statistics on women by number of children ever born and by number of own children under 5 years old are presented in chapters C and D of 1960 Census of Population, Volume I, Characteristics of the Population, for States, urban and rural, for counties, and for urban places of 10,000 or more. Extensive data on fertility by social and economic characteristics of women appear in the Series PC(2)-3A report Women by Number of Children Ever Born and in the forthcoming Series PC(2)-3C report Women by Children Under 5 Years Old. Those reports present fertility data as of the time of the census rather than longitudinal data as in the present report. Other Series PC(2) reports with some data on fertility presented in relation to the main subject are the reports on socioeconomic status, the labor reserve, and employment status and work experience. Series PC(3) reports with some data on fertility are those on State economic areas, size of place, standard metropolitan statistical areas, and type of place.

1950 Census reports.--The report 1950 Census of Population, Volume IV, Special Reports, Part 5, chapter C, Fertility, presented national statistics on number of children ever born and on number of own children under 5 years old, for women by age, color, marital status, and urban-rural residence, in relation to duration of marriage, labor force status of the woman, years of school completed by the woman, and major occupation group of husband in the experienced civilian labor force. The report also presented data on children ever born for States and their urban and rural parts, and for persons of Spanish surname in five Southwestern States. An appendix presented material on quality of data.

Additional material on children ever born by duration of marriage was presented in 1950 Census of Population, Series PC-14, No. 22.

Current Population Reports.--Data on fertility are occasionally published in Current Population Reports, Series P-20, usually at 2- or 3-year intervals. These data are based on the Current Population Survey, a monthly sample of households. For example, the report Series P-20, No. 108, "Marriage, Fertility, and Childspacing: August 1959," presents data on number of children ever born and also data on cumulative fertility at successive ages and marriage durations of cohorts of women in past years, derived from data on date of birth of each child and date of woman's first marriage.

AVAILABILITY OF UNPUBLISHED DATA

During test runs of tabulations for the present report, data were obtained for white women in the Northeast Region, in detail corresponding to the contents of about half of the tables in the present report. They can be made available for the cost of editing and processing. Requests for unpublished data, giving a specific description of the figures desired, may be made by writing to the Chief, Population Division, Bureau of the Census, Washington, D.C. 20233. Inquiries concerning unpublished data should be transmitted to the Bureau as soon as possible because such materials are not maintained indefinitely.

DEFINITIONS AND EXPLANATIONS

Some of the definitions used in 1960 differ from those used in 1950. These changes were made after consultation with users of census data in order to improve the statistics, even though it was recognized that comparability would be affected. The definitions and explanations should be interpreted in the context of the 1960 Censuses, in which data were collected by a combination of self-enumeration, direct interview, and observation by the enumerator.

The definitions below are consistent with the instructions given to the enumerator. As in all surveys, there were some failures to execute the instructions exactly. Through the forms distributed to households, the respondents were given explanations of some of the questions more uniformly than would have been given in direct interviews. Nevertheless, it was not feasible to give the full instructions to the respondents, and some erroneous replies have undoubtedly gone undetected.

More complete discussions of the definitions of population and housing items are given in 1960 Census of Population, Volume I, Characteristics of the Population, Part 1, United States Summary, and each of the State parts.

CHILDSPACING

The term "childspacing" refers, in general, to the timing of births to women. It refers to the interval between marriage of a woman and the birth of a child, to the intervals between births of her successive children, to births by successive ages or successive marriage durations of the woman, and to other types of data that directly or indirectly bear on changes in the timing or spacing of births. The childspacing data are retrospective in nature, whereas other decennial census reports present fertility data as of the census date rather than for successive past points in time.

The data on childspacing are based on the woman's birth date and marriage date and on the birth dates of her children born alive. For example, the age of a woman at the birth of her first child is obtained by subtraction of her birth date from that of the first child, and the interval between her first marriage and the first child is obtained by subtraction of the marriage date from the first child's birth date. The marriage date of the woman and the birth dates of children present in the home were based on direct questions asked in the census. The birth dates of children absent from home or deceased were estimated as explained in the section on "Allocation of birth dates for children absent from home."

Allocation of birth dates for children absent from home.--Birth dates were available for own children of the woman who were present in the home, but, to obtain a complete birth roster, they were estimated (allocated) for children who had died or left home. The birth rosters were derived only for women ever married who were either (1) 14 to 40 years old at the time of the 1960 Census or (2) first married in 1940 or later. The intention was to eliminate women who were so old or had been married so long that most of their children had grown up and left home. However, data for women 35 to 40 years old in 1960 or first married in 1940 to 1944 were purposely included even though it was realized that a considerable proportion of those women would have at least one child absent from home. Women never married were treated as childless for purposes of this report, but the data for women ever married include some illegitimate births.

The allocations of birth dates for children absent from home involved several steps. First, the number of absent children was determined by subtraction of the number of the woman's own children present in the home from the number of her children ever born. (In the relatively few cases, amounting to less than one percent, where adoptions or stepchildren caused the number of own children present to exceed the number of children ever born to a woman, data for the oldest children were dropped to make the remaining children present equal to the number of children ever born, for purposes of the birth roster.) Second, allocations were made of the positions of the absent children, if any, as being born before, between, or after children who were present. Third, an allocation was made of the spacing of each absent child in relation to a prior child or to the date the mother married, and that spacing was added to the date of the prior event to obtain a birth date for the absent child.

The allocations of positions and spacing in the second and third steps cited above were based largely on distributions obtained from the August 1959 Current Population Survey. That survey obtained birth dates (and hence spacing) for both present and absent children ever born to women in a sample of about 35,000 households, and information on whether each child was present or absent. Deceased children were counted as "absent." The allocation tables developed from the 1959 survey for use with the 1960 Census childspacing edits were many and complex, and in some instances were based on few observations. The allocation tables were specific for color and parity of the woman and the interval since marriage or the birth of a previous child. The allocation tables were based on 1959 survey data for women who had at least one child absent from home.

If the tabulations for the present report had been limited to data for women with all their children ever born present in the home, the results would have been somewhat selective of white women, women with few children, and women with recent births or delayed childbearing. Even though the allocations of birth dates for children absent from home were subject to some error, these allocations made a considerable improvement in the quality of the data over what would have been obtained had the data been limited to women with all their children present.

Table A presents a summary of data on the proportion of allocations for children absent from home. Many of the women with children absent had other children who were present so that the proportion of children with allocated birth dates is much less than the proportion of women who had absent children. Thus a woman with two children present and one child absent needed an allocation of birth date for only one-third of her children but she contributed in her entirety to the proportion of women with at least one absent child.

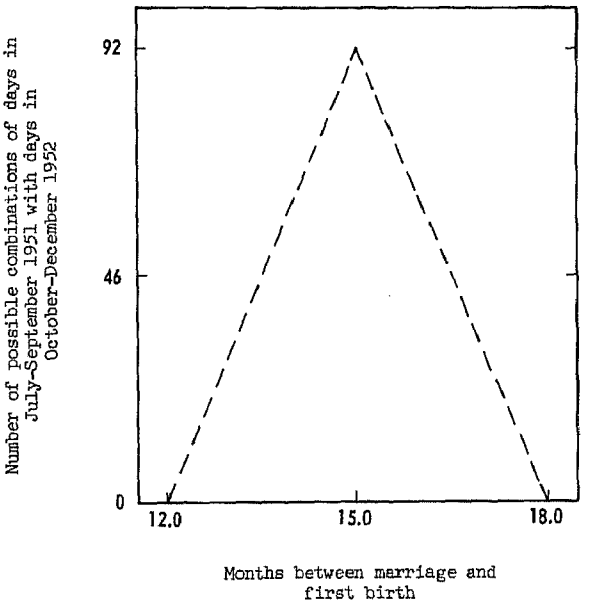
Table A.--PROPORTION OF CHILDREN EVER BORN WITH BIRTH DATE ALLOCATED, BY COLOR AND AGE OF MOTHER, FOR THE UNITED STATES: 1960

Color and age of mother	Mothers ever married with one or more children ever born			Children ever born		
	Total	With at least one child absent		Total	With birth date allocated	
		Number	Percent of total		Number	Percent of total
WHITE						
15 to 19 years	468,904	70,020	14.9	604,477	86,734	14.3
20 to 24 years	2,567,890	234,162	9.1	4,654,035	319,161	6.9
25 to 29 years	3,772,061	347,655	9.2	9,320,430	519,007	5.6
30 to 34 years	4,486,961	506,607	11.3	12,701,477	768,623	6.1
35 to 39 years	4,793,523	991,439	20.7	13,988,828	1,549,832	11.1
NONWHITE						
15 to 19 years	89,423	26,149	29.2	140,345	35,557	25.3
20 to 24 years	348,986	89,840	25.7	826,017	147,222	17.8
25 to 29 years	485,764	129,780	26.7	1,558,261	234,919	15.1
30 to 34 years	536,369	162,019	30.2	1,989,573	311,620	15.7
35 to 39 years	511,421	223,904	43.8	1,971,720	447,806	22.7

Source: Derived from table 42.

Calendar quarters and intervals between dates.--In the tape files used for tabulation of 1960 Census data, dates of birth and dates of first marriage are coded in terms of the calendar quarter (January-March, April-June, July-September, October-December) and the year. The month and day of the event are not available. The effect of using calendar quarters on the measurement of intervals between events is illustrated by the following example:

Suppose that a group of women married for the first time in July-September 1951 and that each of these women had a first child in October-December 1952. There are 5 calendar quarters in all between the two dates. If the 5 calendar quarters are multiplied by 3 months per quarter, the result is an estimated average spacing of 15 months. The true average spacing depends on how the women and their children are distributed within the two periods. If the women and their children are evenly distributed, then half of the women would have a spacing between marriage and first birth of less than 15.0 months and half of more than 15.0 months. The largest number of combinations of a day in the marriage period with a day in the first-birth period would be associated with a spacing exactly 15.0 months from the marriage day.[1] There would be progressively fewer combinations for successive exact spacings on either side of the peak value of 15.0 months. Half of all possible combinations would fall in a range of 27 days on either side of the median spacing of 15.0 months. The general nature of the distribution is illustrated by the following sketch:



The above example serves several purposes. First, it illustrates the characteristics of the data that are obtained when one date expressed in calendar quarter and year is subtracted from another date expressed in calendar quarter and year. The result is a spacing interval that for a large group of women tends to correspond to the exact average spacing that might be figured from two dates in terms of day, month, and year. In the example, the 15 months is used to mean exactly 15.0 months, not to an interval such as the "15th month." Within the two calendar quarters, the possible combinations of pairs of days are such that there is much concentration on intervals close to 15.0

[1] For each of the 92 days in the marriage period (July-September 1951), a day in the birth period (October-December 1952) can be found that is exactly 15.0 months later. But there are only 91 possible combinations that yield an exact spacing of 1 day less than 15.0 months. There are only 90 combinations that yield an exact spacing of 2 days less than 15.0 months, and so on to a minimum of only one possible combination for the shortest interval of 12 months. On the other side of the midpoint of exactly 15.0 months, there are only 91 possible combinations that yield an exact spacing of 1 day more than 15.0 months, 90 that yield a spacing of 2 days more, and so on down to one combination for the longest possible interval of 18 months.

months and very little chance of extreme errors of as much as 3 months on either side of the 15.0 months midpoint. This concentration means that even if the distribution of a large group of women is moderately skewed, the difference computed from calendar quarters and years should still come close to representing the average spacing interval for the group. Second, the example provides an indirect justification for showing the average interval between events in terms of months, as given in some tables of this report, where this average was obtained by multiplying the average difference in calendar quarters by 3 months per quarter. Third, the example provides a rationale for a half-and-half apportionment of births by certain kinds of spacing detail discussed in the next section.

Anniversary quarters, midpoints of age and parity progressions.--In the present report, women born in a specified calendar quarter were tabulated as being at the start of age "n" when they were in the anniversary quarter "n" years later. For example, women born in July-September 1920 were tabulated as being at the start of age 30 in July-September 1950. In tables showing numbers of women of a given parity at the start of a specified year after marriage, the women were tabulated in the manner just described; however, the births of their children were tabulated differently. Half of the births occurring in an anniversary quarter were tabulated as occurring in the woman's age or marriage duration that ended in that quarter and half as occurring in the age or marriage duration that began in that calendar quarter. By way of illustration, half of the first births in April-June 1958 to mothers first married in April-June 1956 were tabulated as occurring in the second year after marriage and half as occurring at the start of the third year after marriage.

In tables showing parity progressions of women, all of which involved women of a given parity at the start of an age or marriage duration, only those births during a year of age or marriage duration were counted which advanced the woman to the next parity. Thus, in the case of a woman who was childless at the start of an age and who had twins during that age, only the first child was counted. The same woman was treated as being of two-parity status at the start of the next age and thus never qualified for inclusion in a table for women of one parity at the start of an age. Similarly, in tables showing women of given parities at the start of each marriage duration those with children born before marriage were included in the proper parity at the time of their first marriage.

Some tables present data on births cumulated through the midpoint of successive years of age for a birth cohort of women. This procedure yields data similar to information on children ever born to women by single years of age. On the average, women in a single year of age at a survey date are about half way through that age.

In the cumulations of births, one-half of those occurring in calendar quarters in which the mother reached the midpoint of a year of age were tabulated as occurring before the midpoint age and one-half as occurring after the midpoint age.

Some tables show the average number of months between births. These data were obtained by first computing the average number of calendar quarters between births and then by multiplying that average by 3 months per quarter.

Data on cumulated births of each birth order by successive ages or marriage durations of cohorts of women cannot be readily differenced and interpolated in a manner that will yield data comparable to those shown in parity-progression tables.

Adjustment of data for the part of a cohort that has not completed a stated age or marriage interval.--In tables showing cumulative fertility data, births have been adjusted for the part of a cohort that had not reached the midpoint of a stated age or marriage interval by the time of the 1960 Census. Such data are footnoted in the tables to indicate that they have been adjusted. In order to keep the computer programing reasonably simple, arithmetic proportions, which are approximately correct, were used for the adjustment. These proportions were obtained in the manner illustrated by the following example:

For women born in the 5-year period from 1925 to 1929, 20 calendar quarters of birth dates were available in the census records--from January-March 1925 to October-December 1929. It was assumed, for the purpose of computing adjustment proportions, that the women were evenly distributed within the 5-year period. Thus, 20 quarters could be taken as representing all possible birthdates from the midpoint of one single year of age to the next single year of age. Of the 20 calendar quarters available, all were sufficiently distant from the 1960 Census date (April 1, 1960) for all women to reach the midpoint of age 30. Each calendar quarter was compared with the April 1, 1960, Census date and given a weight of "1" if it represented attainment of the midpoint of each age, and each was given an appropriate fractional weight if it represented partial experience between the midpoints of one age and the next age. The weights for the 20 calendar quarters were then summed within each desired age interval. For each desired age interval, the adjustment proportion was the ratio of 20 quarters (representing full experience) to the sum of the weights (representing partial experience) for that age interval. The adjustment proportions were applied to uncumulated data on births. Cumulations of births were made after the births were adjusted.

Own children.--The number of own children living with a woman and the birth dates of those children were determined by a computer examination of the records for every member of the household in which the woman lived. The own children comprise sons and daughters of the woman, excluding insofar as possible for purposes of the present report, any children she has adopted and her stepchildren. Adopted children and stepchildren were partly eliminated from data on own children by a procedure that dropped data for the oldest children when the number of own children present exceeded the number of children ever born to the woman. Less than one percent of the women had more children present than children ever born. A combination of

various kinds of evidence[2] indicates that roughly 3 percent of the remaining own children are stepchildren and adopted children.

Children ever born.--The number of children ever born includes children born to the woman before her present marriage, children no longer living, and children away from home, as well as children borne by the woman who were still living in the home. Although the question on children ever born was asked only of women reported as having been married, the data are not limited to legitimate births.

COMPARABILITY AND QUALITY OF DATA

Coverage, and comparability with other 1960 Census reports.--As explained in the section on "Collection and processing of data," certain records were deleted during the editing and tabulation of the child-spacing data. Some of the deleted records represented errors of response or of coding that could not readily be corrected without a further complication of already complex editing procedures. The majority of the deletions occurred, however, through minor errors in programming procedures that were discovered too late for repair. Because of the deletions, the numbers of women shown in the present report are smaller than those expected from a full sample and, therefore, are not strictly comparable with those shown in other reports of the 1960 Census. As shown in table B, the shortages amount to about one percent for white women at ages over 24 and to about four percent for nonwhite women of this age range. The shortages are larger for women under age 25 for reasons explained in the section on "Collection and processing of data."

Table B.--ESTIMATED SHORTAGE OF WOMEN 15 TO 39 YEARS OLD IN THE PRESENT REPORT RESULTING FROM PROCESSING ERRORS BY AGE, COLOR, AND YEAR OF BIRTH OF WOMAN, FOR THE UNITED STATES: 1960

(Based on 5-percent sample)

Subject	White			Nonwhite		
	Expected number of women	Tabulated for present report	Percent under-represented	Expected number of women	Tabulated for present report	Percent under-represented
ALL WOMEN						
Born in 1940 to 1944	5,725,549	5,200,114	-9.2	809,947	712,629	-12.0
Born in 1935 to 1939	4,810,408	4,662,149	-3.1	689,152	641,526	-6.9
Born in 1930 to 1934	4,847,559	4,791,230	-1.2	705,229	680,480	-3.5
Born in 1925 to 1929	5,402,607	5,333,940	-1.3	727,618	702,892	-3.4
Born in 1920 to 1924	5,719,828	5,691,335	-0.5	703,939	686,156	-2.5
WOMEN EVER MARRIED WITH ONE OR MORE CHILDREN EVER BORN						
15 to 19 years	497,444	468,904	-5.7	98,771	89,423	-9.5
20 to 24 years	2,619,287	2,567,890	-2.0	366,660	348,986	-4.8
25 to 29 years	3,825,131	3,772,061	-1.4	506,250	485,764	-4.0
30 to 34 years	4,539,755	4,486,961	-1.2	555,747	536,369	-3.5
35 to 39 years	4,843,340	4,793,523	-1.0	526,642	511,421	-2.9

Source: Expected numbers of women derived from 1960 Census of Population, Final report PC(2)-3A, Women by Number of Children Ever Born, tables 2 to 5. Tabulated numbers from tables 19, 20, and 42 of present report.

The effect of the shortages in numbers of women on the birth rates depends on the relative fertility of the women in the deleted records and of the women in the remaining records. At ages under 25, the remaining records were somewhat selective of women ever married with one or more children ever born. This fact can be seen indirectly from table B by comparing the percent underrepresented for all women born in 1940 to 1944 with the percent underrepresented for approximately the same cohort (i.e., women 15 to 19 years old in 1960) who were ever married and had one or more children ever born; and by comparing data for other cohorts in a similar manner. At ages 15-19 and 20-24, the percent underrepresented is higher for all women than for the mothers ever married, reflecting the effect of relatively fewer deletions for mothers ever married than for other women. At ages 25-29 and above, there is little selective effect.

Table C presents rates of children ever born per 1,000 women, by age, as obtained from tabulations for the present report and as obtained from another report of the 1960 Census. The close agreement of the rates from the two sources of data indicates that the deletions had little effect on rates of children ever born.

[2] According to Vital Statistics of the United States, 1967, p. 309, the annual number of legal adoptions for children of all ages in the United States varied from 85,000 in 1952 to 107,000 in 1960, during which period there were roughly 4,000,000 annual births. Sometimes these adoptions were by the new husband of a woman who had remarried and involved the natural children of the woman.

From table 39 of the present report, it can be determined that among white women first married in 1940 to 1944 and with husband present in 1960, 5.8 percent were living with a husband who had been married more than once. This implies that the remaining 94.2 percent of the women were unlikely to have stepchildren, but some of the other 5.8 percent also may have had no stepchildren. A Current Population Survey made in April 1948 found that among men 14 years old and over remarried less than one year with current wife present, only 25 percent had own children under 18 years old present. Some of those children may have been the wife's natural children, not her stepchildren. If the 5.8-percent figure cited from table 39 is multiplied by the 25-percent figure from the 1948 CPS, the result, 1.5 percent, would represent an overstatement of the proportion of women who had stepchildren living with them.

Table C.--COMPARISON OF DATA IN THE PRESENT REPORT AND REPORT PC(2)-3A--CHILDREN EVER BORN PER 1,000 WOMEN 15 TO 39 YEARS OLD AND PER 1,000 MOTHERS, BY COLOR, AND AGE OF WOMAN, FOR THE UNITED STATES: 1960

(Based on 5-percent sample)

Color and age of woman	All women		Women ever married with one or more children ever born	
	Present report	Report PC(2)-3A	Present report	Report PC(2)-3A
WHITE				
15 to 19 years	116	117	1,289	1,353
20 to 24 years	998	993	1,812	1,826
25 to 29 years	1,945	1,960	2,471	2,477
30 to 34 years	2,381	2,398	2,831	2,837
35 to 39 years	2,458	2,471	2,918	2,925
NONWHITE				
15 to 19 years	197	202	1,569	1,676
20 to 24 years	1,288	1,288	2,367	2,421
25 to 29 years	2,290	2,333	3,208	3,242
30 to 34 years	2,831	2,852	3,709	3,735
35 to 39 years	2,874	2,902	3,855	3,888

Current Population Survey.--Data on childspacing derived from the 1960 Census have a high degree of comparability with data on fertility histories occasionally obtained in the Current Population Survey (CPS). However, the CPS obtains information on the month of birth instead of the calendar quarter, thereby enabling more precise measurements of childspacing intervals than are possible from the 1960 Census data. Also, information on birth dates is obtained in the CPS for children who have died or left home, as well as for children present, whereas birth dates for absent children are estimated for the 1960 Census childspacing tabulations. Therefore, there is no technical need in the CPS to eliminate from the tabulations women who are so old or have been married so long that many of their children have grown up and left home. The proportion of nonresponses to questions on children ever born and on characteristics of women is smaller in the CPS than in a decennial census. On the other hand, the CPS data on childspacing are based on samples of only 35,000 households (August 1959 CPS) or 50,000 households (June 1965 CPS), and therefore are subject to considerably greater sampling variability than the decennial census data. The 1960 Census data in several ways have a wider coverage of persons in group quarters, including inmates of institutions, than the CPS data. This is one reason why the proportion of women ever married tends to be a little higher in the CPS than in a decennial census. Illustrative comparisons of data from the August 1959 CPS with data from the present report are presented in table D.

Rounding of rates, percentages, and adjusted figures.--The usual practice of the Bureau of the Census is to present rates and percentages that are rounded upward in the last digit shown if the next digit would be 5 or more. However, the tabulation program used for the present report in many instances presents rates and percentages that are not rounded up.

Table D.--PERCENT EVER MARRIED AND NUMBER OF CHILDREN EVER BORN PER 1,000 WOMEN BY SUCCESSIVE AGES OF WOMEN FOR WHITE WOMEN BORN IN 1925 TO 1929, FOR THE UNITED STATES: 1960 CENSUS AND AUGUST 1959 CURRENT POPULATION SURVEY

(Data tallied to midpoint of successive ages. Census data based on 5-percent sample. Current Population Survey (CPS) data based on sample of about 35,000 households)

Age	Percent ever married		Children ever born per 1,000 women	
	Census	CPS	Census	CPS
15 years	2.1	1.9	8	5
16 years	5.3	5.1	22	16
17 years	11.1	10.5	50	40
18 years	20.7	20.4	103	94
19 years	32.9	33.5	193	175
20 years	45.6	46.2	322	300
21 years	57.5	57.8	483	468
22 years	67.1	68.1	662	638
23 years	73.9	76.5	849	838
24 years	78.8	82.0	1,041	1,042
25 years	82.4	86.0	1,235	1,258
26 years	85.0	88.4	1,424	1,477
27 years	86.9	90.0	1,606	1,667
28 years	88.4	91.1	1,778	1,853
29 years	89.6	92.3	1,936	2,035
30 years	90.5	[1]93.2	2,082	[1]2,192

[1] Data adjusted for the part of the cohort that has not attained the midpoint of the stated age.

Source: Census data from table 19 of this report. CPS data from Current Population Reports, Series P-20, No. 108, "Marriage, Fertility, and Childspacing: August 1959," tables 5 and 7.

In tables presenting cumulated births adjusted for the part of a cohort that has not reached an age or marriage duration, certain group totals were independently adjusted, with the result that data by some characteristics, e.g., detailed marital status, add to a total that differs slightly from the independently adjusted group total.

URBAN-RURAL RESIDENCE

In general, the urban population comprises all persons living in urbanized areas and in places of 2,500 inhabitants or more outside urbanized areas. More specifically, according to the definition adopted for use in the 1960 Census, the urban population comprises all persons living in (a) places of 2,500 inhabitants or more incorporated as cities, boroughs, villages, and towns (except towns in New England, New York, and Wisconsin); (b) the densely settled urban fringe, whether incorporated or unincorporated, of urbanized areas; (c) towns in New England and townships in New Jersey and Pennsylvania which contain no incorporated municipalities as subdivisions and have either 25,000 inhabitants or more or a population of 2,500 to 25,000 and a density of 1,500 persons or more per square mile; (d) counties in States other than the New England States, New Jersey, and Pennsylvania that have no incorporated municipalities within their boundaries and have a density of 1,500 persons or more per square mile; and (e) unincorporated places of 2,500 inhabitants or more. The population not classified as urban constitutes the rural population.

FARM-NONFARM RESIDENCE

The rural population is subdivided into the rural-farm population, which comprises all rural residents living on farms, and the rural-nonfarm population, which comprises the remaining rural population. In the 1960 Census, the farm population consists of persons living in rural territory on places of 10 or more acres from which sales of farm products amounted to $50 or more in 1959 or on places of less than 10 acres from which sales of farm products amounted to $250 or more in 1959. All persons living in group quarters are classified as nonfarm except the relatively few living in workers' quarters (including quarters for migratory agricultural workers) that are located on a farm or ranch.

CENTRAL CITIES OF URBANIZED AREAS

An urbanized area contains at least one city of 50,000 inhabitants or more in 1960 and the surrounding settled incorporated places and unincorporated areas that meet certain criteria relating to population density or land use. Persons residing in urbanized areas are included in the urban population. In this report, data are shown for the total urban population and for central cities of urbanized areas. The largest city in an urbanized area is always a central city. An additional city may be classified as a central city on the basis of its size in relation to that of the largest city.

AGE

The age classification is based on the age of the person in completed years, as determined from the reply to a question on month and year of birth.

COLOR

The term "color" refers to the division of population into two groups, white and nonwhite. The color group designated as "nonwhite" consists of such races as the Negro, American Indian, Japanese, Chinese, Filipino, Korean, Hawaiian, Asian Indian, Eskimo, Aleut, and Malayan races. Persons of Mexican birth or ancestry who are not definitely of Indian or other nonwhite race are classified as white.

YEARS OF SCHOOL COMPLETED

The data on years of school completed were derived from the answers to the two questions: (a) "What is the highest grade (or year) of regular school he has ever attended?" and (b) "Did he finish this grade (or year)?" Enumerators were instructed to obtain the approximate equivalent grade in the American school system for persons whose highest grade of attendance was in a foreign school system, whose highest level of attendance was in an ungraded school, whose highest level of schooling was measured by "readers," or whose training by a tutor was regarded as qualifying under the "regular" school definition. Persons were to answer "No" to the second question if they were attending school, had completed only part of a grade before they dropped out, or failed to pass the last grade attended.

The number in each category of highest grade of school completed represents the combination of (a) persons who reported that they had attended the indicated grade and finished it, and (b) those who had attended the next higher grade but had not finished it.

The questions on educational attainment applied only to progress in "regular" schools. Regular schooling is that which may advance a person toward an elementary school certificate or high school diploma, or a college, university, or professional degree. Schooling that was not obtained in a regular school and schooling from a tutor or through correspondence courses were counted only if the credits obtained were regarded as transferable to a school in the regular school system. Schooling which is generally regarded as not regular includes that which is given in nursery schools, in specialized vocational, trade, or business schools; in on-the-job training; and through correspondence courses.

Elementary school, as defined here, includes grades 1 to 8, and high school includes grades 9 to 12. College includes junior or community colleges, regular 4-year colleges, and graduate or professional schools.

MARITAL STATUS AND WHETHER MARRIED MORE THAN ONCE

This classification refers to the marital status of the person at the time of enumeration. Persons classified as "married" comprise, therefore, both those who have been married only once and those who remarried after having been widowed or divorced. Persons reported as separated (either legally separated or otherwise absent from the spouse because of marital discord) are classified as a subcategory of married persons with spouse absent. The enumerators were instructed to report persons in common-law marriages as married and persons whose only marriage had been annulled as single. Persons "ever married" are those in the categories married (including separated), widowed, and divorced.

A married woman with "husband present" is a woman whose husband was enumerated as a member of the same household even though he may have been temporarily absent on business or vacation, visiting, in a hospital, etc., at the time of enumeration. Women classified as "married, husband absent" include both those who are separated and those with their husband absent for other reasons.

Whether or not the woman was married more than once was determined by a direct question for all women ever married.

YEAR OF FIRST MARRIAGE, YEARS SINCE FIRST MARRIAGE, AND AGE AT FIRST MARRIAGE

In the 1960 Census, persons in the sample who had ever been married were asked the date of their first marriage; this information was tabulated in terms of

year or quarter and year. Thus, direct information was obtained for this report on year of first marriage for persons married (including separated), widowed, or divorced. All women who first married in the same period may be regarded as members of the same marriage cohort.

The number of years since the woman's first marriage was derived for successively later dates by subtraction of the date of first marriage from each later date and represents the interval in completed years since first marriage.

Age at first marriage was derived by subtraction of the date of first marriage from the woman's birth date, and represents age in completed years at first marriage.

YEARS SINCE REMARRIAGE

The number of years since remarriage of a woman was determined only for remarried women living with a husband married once. The husband's date of first marriage was the remarriage date for the woman. The procedure was otherwise similar to that given in the section for years since first marriage.

EMPLOYMENT STATUS

The data on employment status relate to the calendar week prior to the date on which the respondents filled their Household Questionnaires or were interviewed by enumerators. This week is not the same for all respondents because not all persons were enumerated during the same week.

Employed persons comprise all civilians 14 years old and over who were either (a) "at work"--those who did any work for pay or profit, or worked without pay for 15 hours or more on a family farm or in a family business; or (b) were "with a job but not at work"--those who did not work and were not looking for work but had a job or business from which they were temporarily absent because of bad weather, industrial dispute, vacation, illness, or other personal reasons.

Persons are classified as unemployed if they were 14 years old and over and not "at work" but looking for work. A person is considered as looking for work not only if he actually tried to find work but also if he had made such efforts recently (i.e., within the past 60 days) and was awaiting the results of these efforts. Persons waiting to be called back to a job from which they had been laid off or furloughed are also counted as unemployed.

The "civilian labor force" includes all persons classified as employed or unemployed, as described above. The "labor force" also includes members of the Armed Forces (persons on active duty with the United States Army, Air Force, Navy, Marine Corps, or Coast Guard).

Persons "not in the labor force" comprise all those 14 years old and over who are not classified as members of the labor force, including persons doing only incidental unpaid family work (less than 15 hours during the week).

WEEKS WORKED IN 1959

The data on weeks worked in 1959 pertain to the number of different weeks during 1959 in which a person did any work for pay or profit (including paid vacation and sick leave) or worked without pay on a family farm or in a family business. Weeks of active service in the Armed Forces are also included.

YEAR LAST WORKED

The "year last worked" pertains to the most recent year in which a person did any work for pay or profit, or worked without pay on a family farm or in a family business. Active service in the Armed Forces is also included.

OCCUPATION

The data on occupation in this report are for employed persons and refer to the job held during the week for which employment status was reported. For persons employed at two or more jobs, the data refer to the job at which the person worked the greatest number of hours. The occupation statistics presented here are based on the detailed system developed for the 1960 Census; see 1960 Census of Population, Classified Index of Occupations and Industries, U.S. Government Printing Office, Washington, D.C., 1960.

INCOME IN 1959

Information on income for the calendar year 1959 was requested from all persons 14 years old and over in the sample. "Total income" is the sum of amounts reported separately for wage or salary income, self-employment income, and other income. Wage or salary income is defined as the total money earnings received for work performed as an employee. It represents the amount received before deductions for personal income taxes, Social Security, bond purchases, union dues, etc. Self-employment income is defined as net money income (gross receipts minus operating expenses) from a business, farm, or professional enterprise in which the person was engaged on his own account. Other income includes money income received from such sources as net rents, interest, dividends, Social Security benefits, pensions, veterans' payments, unemployment insurance, and public assistance or other governmental payments, and periodic receipts from insurance policies or annuities. Not included as income are money received from the sale of property (unless the recipient was engaged in the business of selling such property), the value of income "in kind," withdrawals of bank deposits, money borrowed, tax refunds, and gifts and lump-sum inheritances or insurance payments.

In the statistics on family income, the combined incomes of all members of each family are treated as a single amount. Although the time period covered by the income statistics is the calendar year 1959, the composition of families refers to the time of enumeration. For most of the families, however, the income reported was received by persons who were members of the family throughout 1959.

COLLECTION AND PROCESSING OF DATA

COLLECTION OF DATA

Several enumeration forms were used to collect the information for the 1960 Census of Population. A few days before the census date, the Post Office Department delivered an Advance Census Report (ACR) to households on postal delivery routes. This form contained questions which were to be answered for every person and every housing unit. Household members were requested to fill the ACR and have it ready for the enumerator. The census enumerator recorded this information on a form specially designed for electronic data processing by FOSDIC (Film Optical Sensing Device for Input to Computer). The information was either transcribed from the ACR to the complete-count FOSDIC schedule or entered on this schedule during direct interview.

Additional questions on social, demographic, and economic characteristics were asked at one-fourth of the households. In the densely populated areas, the enumerator left a Household Questionnaire to be completed by all occupants of these sample housing units. The completed questionnaire was mailed to the local census office and the information was transcribed from the Household Questionnaire to a sample FOSDIC schedule. When the Household Questionnaire was not returned or was returned without having been completed, the enumerator collected the missing information by personal visit or by telephone and entered it directly on the sample FOSDIC schedule. In the remaining areas, when the enumerator picked up the ACR, he obtained all the information by direct interview and recorded it directly on the sample FOSDIC schedule.

Soon after the enumerator started work, his schedules were examined in a formal field review. This operation was designed to assure at an early stage of the work that the enumerator was performing his duties properly and had corrected any errors he had made.

More detailed descriptions of the 1960 Census procedures in the collection and processing of the data are given in reports entitled United States Censuses of Population and Housing, 1960: Principal Data Collection Forms and Procedures, 1961; and Processing the Data, 1962, U.S. Government Printing Office, Washington, D.C. 20402.

MANUAL EDITING AND CODING

After the FOSDIC forms had been checked for completeness in the field, they were sent to a central processing office for manual editing and coding and for microfilming. Except where some special problems arose, there was no manual coding of the FOSDIC forms for complete-count data. On the sample forms, the manual operation was limited to those items where coding required the reading of written entries and therefore could not be done effectively by machine. The coding clerks converted the written entries to codes by marking the appropriate circles on the FOSDIC schedules and at the same time were able to correct obviously wrong entries and sometimes supply missing information.

ELECTRONIC PROCESSING

After the enumerators and coders recorded the information by marking the appropriate circles, the schedules were microfilmed. The information on the microfilm was then read by FOSDIC, which converted the markings to signals on magnetic tape. The tape, in turn, was processed in an electronic computer, which was used extensively to edit and tabulate the data and to produce the publication tables.

EDITING

For a majority of items, nonresponses and inconsistencies were eliminated by using the computer to assign entries and correct inconsistencies. In general, few assignments or corrections were required, although the amount varied by subject and by enumerator.

The assignment of an acceptable entry by machine was based on related information reported for the person or on information reported for a similar person in the immediate neighborhood. For example, in the assignment of age in the complete-count tabulations, the computer stored reported ages of persons by sex, color or race, household relationship, and marital status; each stored age was retained in the computer only until a succeeding person having the same characteristics and having age reported was processed through the computer; this stored age was assigned to the next person whose age was unknown and who otherwise had the same characteristics. This procedure insured that the distribution of ages assigned by the computer for persons of a given set of characteristics would correspond closely to the reported age distribution of such persons as obtained in the current census.

The extent of the allocations for nonresponse or for inconsistency is shown for the United States and for States, places of 10,000 inhabitants or more, and other areas in appendix tables in chapters B, C, and D of 1960 Census of Population, Volume I, Characteristics of the Population.

Specific tolerances were established for the number of computer allocations acceptable for a given area. If the number was beyond tolerance, the data were rejected and the original schedules were reexamined to determine the source of the error. Correction and reprocessing were undertaken as necessary and feasible.

DELETION OF RECORDS

The data in the present report are limited to women who at the time of the 1960 Census were in one of three groups: (1) never married, age 14 and over; (2) ever married, under age 41, regardless of the date of first marriage; (3) ever married, age 41 and above, but first married in 1940 or later. These groups were adequate for reconstructing marriage rates for years from 1940 on, and also for determining the retrospective fertility of women who at the 1960 Census date were not so old or long married that many of their children had grown up and left home.

To simplify the processing procedures, records for women in groups (2) and (3) were purposely deleted if they indicated that the woman had even one child present who was born before the women was 14 years old, that the woman was married before age 14,[3] or that the woman had an improbably large number of children ever born for her age. It was expected that about one percent of the records for groups (2) and (3) would be deleted for the reasons just stated. But, through programming errors, additional records were inadvertently deleted, and this situation was not discovered until all tabulations had been made. The magnitude of the deletions (from all sources combined) can be determined from table B.

ACCURACY OF THE DATA

Human and mechanical errors occur in any mass statistical operation such as a decennial census. Such errors include failure to obtain required information from respondents, obtaining inconsistent information, recording information in the wrong place or incorrectly, or otherwise producing inconsistencies between entries on interrelated items on the field documents. Sampling biases occur because some of the enumerators fail to follow the sampling instructions. Clerical coding and editing errors occur, as well as errors in the electronic processing operation.

Careful efforts are made in every census to keep the errors in each step at an acceptably low level. Review of the enumerator's work, verification of manual coding and editing, checking of tabulated figures, and ratio estimation of sample data to control totals from the complete count reduce the effects of the errors in the census data.

In a few instances, this report shows numbers of women that vary from table to table by relatively small amounts. For example, table 3 shows 18,700,334 white single women age 14 to 17 for the 5-year period 1955 to 1959. The data by single calendar years in table 1 for the same 5-year period yield a total of 18,718,691 women. Although the difference of 18,357 seems large as an absolute number, it is a relatively small proportion of the total number of women 14 to 17 years old. Differences of this type came from variations between the tabulation procedures used in preparing different tables in the report. Table 3 was tallied by an iterative (loop) procedure for single women which (logically) was to conclude with the calendar year in which the woman first married, but which actually permitted a slight overcount of single women.

Tables 19 and 24 illustrate other differences between tables. The tables present data for identical cohorts of women for the United States, but table 24 shows about one percent more cumulated births at successive ages than does table 19. These discrepancies arose because of minor differences in the procedures used for tabulating births. For example, in table 19 half of the births that occurred in the calendar quarter in which a woman reached the midpoint of the age were tabulated as occurring before the midpoint of the age and half were tabulated as occurring after the midpoint. In table 24, all such births were counted as occurring before the midpoint of an age.

Some innovations in the 1960 Censuses reduced errors in processing and others produced a more consistent quality of editing. The elimination of the card-punching operation removed one important source of error. The extensive use of electronic equipment insured a more uniform and more flexible edit than could have been accomplished manually or by less intricate mechanical equipment. It is believed that the use of electronic equipment in the 1960 Censuses has improved the quality of the editing compared with that of earlier censuses but, at the same time, it has introduced an element of difference in the statistics.

Evaluative material on accuracy of some of the population characteristics used in this report can be found in Evaluation and Research Program of the U.S. Censuses of Population and Housing, 1960, report numbers 4, 5, and 6. A report entitled The Post-Enumeration Survey: 1950, Technical Paper No. 4, presents evaluative material on the 1950 Census.

SAMPLE DESIGN AND SAMPLING VARIABILITY

SAMPLE DESIGN

For persons in housing units at the time of the 1960 Census, the sampling unit was the housing unit and all its occupants; for persons in group quarters, it was the person. On the first visit to an address, the enumerator assigned a sample key letter (A, B, C, or D) to each housing unit sequentially in the order in which he first visited the units, whether or not he completed an interview. Each enumerator was given a random key letter to start his assignment, and the order of canvassing was indicated in advance, although these instructions allowed some latitude in the order of visiting addresses. Each housing unit to which the key letter "A" was assigned was designated as a sample unit, and all persons enumerated in the unit were included in the sample. In every group quarters, the sample consisted of every fourth person in the order listed. The 1960 statistics in this report are based on a subsample of one-fifth of the original 25-percent sample schedules. The subsample was selected on the computer, using a stratified systematic sample design. The strata were made up as follows: For persons in regular housing units there were 36 strata, i.e., 9 household size groups by 2 tenure groups by 2 color groups; for persons in group quarters, there were 2 strata, i.e., the 2 color groups.

Although the sampling procedure did not automatically insure an exact 5-percent sample of persons, the sample design was unbiased. Generally, for large areas, the deviation from the estimated sample size was found to be quite small. Biases may have arisen, however, when the enumerator failed to follow his listing and sampling instructions exactly.

[3] The deleting of records for women married before age 14 was intended to eliminate the very few such cases that escaped a reassignment of marriage date during the preparation of all 1960 Census tape files.

Table E compares rates of children ever born per 1,000 women ever married from the 5-percent sample with corresponding statistics from the 25-percent sample presented in Volume I of the 1960 Census of Population. Differences in this table reflect primarily sampling error.

Table E.--COMPARISON OF 25-PERCENT AND 5-PERCENT SAMPLE DATA FOR WOMEN 15 TO 39 YEARS OLD, EVER MARRIED, AND CHILDREN EVER BORN PER 1,000 WOMEN, BY AGE AND COLOR, FOR THE UNITED STATES: 1960

Age and color of woman	Women ever married		Children ever born per 1,000 women ever married	
	25-percent sample	5-percent sample	25-percent sample	5-percent sample
WHITE				
15 to 19 years.....	927,390	927,745	729	725
20 to 24 years.....	3,501,515	3,490,391	1,370	1,370
25 to 29 years.....	4,367,223	4,363,765	2,171	2,171
30 to 34 years.....	5,027,100	5,023,379	2,559	2,564
35 to 39 years.....	5,372,979	5,396,254	2,629	2,625
NONWHITE				
15 to 19 years.....	132,467	132,762	1,234	1,247
20 to 24 years.....	450,800	444,037	1,992	1,999
25 to 29 years.....	587,767	592,345	2,766	2,771
30 to 34 years.....	661,407	657,809	3,138	3,155
35 to 39 years.....	656,033	652,506	3,147	3,138

RATIO ESTIMATION

The statistics based on the 5-percent sample of the 1960 Census returns are estimates that have been developed through the use of a ratio estimation procedure. This procedure was carried out for each of the following 44 groups of persons in each of the sample weighting areas:[4]

Group	Sex, color, and age	Relationship and tenure
	Male white:	
1	Under 5	
2	5 to 13	
3	14 to 24	Head of owner household
4	14 to 24	Head of renter household
5	14 to 24	Not head of household
6-8	25 to 44	Same groups as age group 14 to 24
9-11	45 and over	Same groups as age group 14 to 24
	Male nonwhite:	
12-22	Same groups as male white	
	Female white:	
23-33	Same groups as male white	
	Female nonwhite:	
34-44	Same groups as male white	

The sample weighting areas were defined as those areas within a State consisting of central cities of urbanized areas, the remaining portion of urbanized areas not in central cities, urban places not in urbanized areas, or rural areas.[5]

For each of the 44 groups, the ratio of the complete count to the sample count of the population in the group was determined. Each specific sample person in the group was assigned an integral weight so that the sum of the weights would equal the complete count for the group. For example, if the ratio for a group was 20.1, one-tenth of the persons (selected at random) within the group were assigned a weight of 21, and the remaining nine-tenths a weight of 20. The use of such a combination of integral weights rather than a single fractional weight was adopted to avoid the complications involved in rounding in the final tables. In order to control a potential bias in the estimates, where there were fewer than 275 persons in the complete count in a group, or where the resulting weight was over 80, groups were combined in a specific order to satisfy both of these two conditions.

These ratio estimates reduce the component of sampling error arising from the variation in the size of household and achieve some of the gains of stratification in the selection of the sample, with the strata being the groups for which separate ratio estimates are computed. The net effect is a reduction in the sampling error of most statistics below what would be obtained by weighting the results of the 5-percent sample by a uniform factor of twenty. The reduction in sampling error will be trivial for some items and substantial for others. A byproduct of this estimation procedure, in general, is that estimates for this sample are generally consistent with the complete count with respect to the total population and for the subdivisions used as groups in the estimation procedure.

SAMPLING VARIABILITY

The figures from the 5-percent sample tabulations are subject to sampling variability, which can be estimated roughly from the standard errors shown in tables F, G, and H.

These tables do not reflect the effect of response variance, processing variance, or bias arising in the collection, processing, and estimation steps. Estimates of the magnitude of some of these factors in the total error are being evaluated and are being published in reports in Series ER 60, Evaluation and Research Program of the U.S. Censuses of Population and Housing: 1960. The chances are about two out of three that the difference due to sampling variability between an estimate and the figure that would have been obtained from a complete count of the population is less than the standard error. The chances are about 19 out of 20 that the difference is less than twice

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[4] Estimates of characteristics from the sample for a given area are produced using the formula:

$$x' = \sum_{i=1}^{44} \frac{x_i}{y_i} Y_i$$

where x' is the estimate of the characteristic for the area obtained through the use of the ratio estimation procedure,
x_i is the count of sample persons with the characteristic for the area in one (i) of the 44 groups,
y_i is the count of all sample persons for the area in the same one of the 44 groups, and
Y_i is the count of persons in the complete count for the area in the same one of the 44 groups.

[5] For the definitions of urbanized area and urban place, see 1960 Census of Population, Volume I, Characteristics of the Population, Part 1, United States Summary.

the standard error and about 99 out of 100 that it is less than 2½ times the standard error. The amount by which the estimated standard error must be multiplied to obtain other odds deemed more appropriate can be found in most statistical textbooks.

Table F shows rough standard errors of estimated numbers up to 50,000. The relative sampling errors of larger estimated numbers are somewhat smaller than for 50,000. For estimated numbers above 50,000, however, the nonsampling errors, e.g., response errors and processing errors, may have an increasingly important effect on the total error. Table G shows rough standard errors of data in the form of percentages. Linear interpolation in tables F and G will provide approximate results that are satisfactory for most purposes.

The sampling variability of the number of children ever born per 1,000 women depends on the variability of the distribution on which the rate is based, the size of the sample, the sample design (for example, the use of households as the sampling unit) and the use of ratio estimates. Rough estimates of standard errors for rates of children ever born per 1,000 ever-married women are presented in table H. The estimates are approximations that involved a number of simplifying assumptions such as the use of regression equations. If a closer approximation to the standard error of the rate of children ever born is needed, it can be calculated using the following equation:

$$\sigma_{1,000_{\bar{x}}} = \frac{R}{N}\sqrt{\sum n^2 X_n - \frac{\left(\sum nX_n\right)^2}{N}}$$

Where $\sigma_{1,000_{\bar{x}}}$ is the standard error of a fertility ratio per 1,000 women ($1,000_{\bar{x}}$).

R is a constant which depends on the proportion of the population in the sample. Use R = 4,400 for 5-percent sample data.

n is specific number of children ever born (n = 0, 1, 2, 3, etc.)

X_n is number of women in the inflated sample who have borne n children.

N is total number of women $= \sum_{n=0}^{n=12+} X_n$

The use of the equation will provide a closer approximation to the standard error of a rate of children ever born than the use of table H. Table H was prepared using this formula and also a regression function relating the distribution of women with 0, 1, 2, etc., children to the total number of children ever born. In any specific case, this regression function is only an approximation.

Illustration: Table 20 shows a rate of 1,931 children ever born per 1,000 women by age 28 for 702,892 nonwhite women who were born in 1925 to 1929. Table 20 is based on a 5-percent sample, and table H shows that for an estimate of 1,931 children ever born per 1,000 women when the universe is 702,892 women, a rough approximation to the standard error is about 7 per 1,000. This means that the chances are about 2 out of 3 that a complete census result would not differ by more than 7 from the estimated rate of 1,931 children per 1,000 women. It also follows that there is only about 1 chance in 100 that a complete count could differ by as much as 18--that is, by about 2½ times the number estimated from table H.

For a further discussion of the sampling variability and of the method for obtaining standard errors of differences between two estimates, see Volume I, Characteristics of the Population.

Table F.--ROUGH APPROXIMATION TO STANDARD ERROR OF ESTIMATED NUMBER

(Range of 2 chances out of 3)

Estimated number[1]	Standard error	Estimated number[1]	Standard error
50	30	5,000	280
100	40	10,000	390
250	60	15,000	480
500	90	25,000	620
1,000	120	50,000	880
2,500	200		

[1] To determine the standard errors of data in tables 3 through 18, follow the instructions given later in this section on sampling variability.

Table G.--ROUGH APPROXIMATION TO STANDARD ERROR OF ESTIMATED PERCENTAGE

(Range of 2 chances out of 3)

Estimated percentage	Base of percentage[1]					
	500	1,000	2,500	10,000	25,000	100,000
2 or 98	3.3	2.3	1.3	0.8	0.3	0.3
5 or 95	5.0	4.0	2.3	1.0	0.5	0.3
10 or 90	7.0	5.0	3.0	1.5	0.8	0.5
25 or 75	10.0	6.8	3.8	1.8	1.0	0.5
50	11.0	7.8	4.0	2.0	1.3	0.8

[1] To determine the standard errors of data in tables 3 through 18, follow the instructions given later in this section on sampling variability.

Table H.--STANDARD ERROR OF NUMBER OF CHILDREN EVER BORN PER 1,000 WOMEN

(Range of 2 chances out of 3)

Number of women[1]	Number of children ever born per 1,000 women								
	500	1,000	1,500	2,000	2,500	3,000	3,500	4,000	4,500
1,000	90	141	174	220	276	307	348	389	438
2,500	54	90	120	151	182	210	233	259	282
10,000	26	44	61	74	90	102	118	128	141
25,000	18	31	41	49	59	67	72	82	87
100,000	8	15	20	23	28	31	36	41	44
500,000	5	5	8	10	13	15	15	18	20
1,000,000	3	3	5	5	8	8	10	10	13

[1] To determine the standard errors of data in tables 3 through 18, follow the instructions given later in this section on sampling variability.

Special instructions for determining the standard errors of data in tables 3 through 18.--In the preparation of tables 3 through 18, data were tallied separately for each calendar year and then combined into totals for a 5-year period. Data for a given woman were tallied for a table cell for as many of the 5 years as she qualified for, which means that a given woman may be represented anywhere from 1 to 5 times. The tables of standard errors (tables F, G, and H) are designed for data in which each woman in the sample is represented only once. They may be used without modification for those types of data in tables 3 through 18 that are of such a nature that the woman could have been counted only once, as explained in subsection A below. Special procedures are necessary, as explained in subsection B, for those data in tables 3 through 18 where a given woman may be represented several times in the 5-year period.

A. Data involving single counts of woman.--Examples of one count per woman are data on first marriages occurring in a 5-year period and data on third births occurring in a 5-year period. A given woman can have only one first marriage, only one third child. Another example consists of data for women married less than one year--a given woman can be of that marriage duration only once as of January 1 of some year in a 5-year reference period. Wherever the data in tables 3 through 18 are of such a nature that the event could have occurred only once to a woman, the tables of standard errors may be used without modification. This rule applies to absolute numbers of events occurring in a 5-year period. It applies also to rates when the base of the rate consists of women who could have been counted only once, as in the case of women married less than 1 year as of January 1 of any year within a 5-year period.

B. Data involving multiple counting of women.--As stated above, data were tallied for each calendar year separately and then combined into totals for a 5-year period. For example, a woman age 14 on January 1, 1955, was counted at age 14 for that date, again at age 15 for January 1, 1956, and again at each later age on January 1 of 1957 through 1959. During the whole 5-year reference period, 1955 to 1959, the woman was counted four times for the broad age group 14-17 shown in table 3 and once for the broad age group 18-19. In contrast, a woman age 14 on January 1, 1959, qualified only once for age group 14-17 in the 5-year reference period. Similarly, other age groups of women shown in tables 3 through 18 involved women who were in the broad age group for varying numbers of years during the 5-year reference period.

Rough approximations to the average number of times women were counted as being in a broad age group during a 5-year reference period can be obtained from arithmetic proportions figured on the assumption that there are equal numbers of women in each single-year-of-age cohort. Data of this type appear in table I, in the column "All women." These rough approximations are useful for approximating the standard errors of data involving women of all marital classes, as explained below. However, many of the data on tables 3 through 18 are for women ever married who were of a specified parity and age as of January 1 of each year within a 5-year reference period. Women were counted as many times as they met the specifications. Table I also presents rough approximations to the average number of times women ever married were counted in a broad age group during a 5-year reference period. These rough approximations were developed from a model based on 1960 Census data for women ever married by single years of age. Because they are not specific for parity, the rough approximations tend to overstate slightly the average number of times women ever married were counted in tables 3 through 18.

Table I.--AVERAGE NUMBER OF TIMES WOMEN IN A 5-YEAR PERIOD ARE COUNTED, BY AGE AT THE BEGINNING OF EACH YEAR WITHIN THE 5-YEAR PERIOD

Age of woman	All women	Ever-married women
14 years and over	4.8	4.8
14 to 17 years	2.5	1.6
18 and 19 years	1.7	1.5
20 and 21 years	1.7	1.6
22 to 24 years	2.1	1.9
45 years and over	4.7	4.7
5-year age groups	2.8	2.8
10-year age groups	3.6	[1]3.6

[1] Exception: use 2.9 for ever-married women 15 to 24 years old.

When using data from tables 3 through 18 that involve multiple counting of women, the general procedures for figuring the standard errors are as follows:

1. Standard error of an absolute number: Divide the number from tables 3 through 18 by the appropriate factor from table I to obtain an estimate of the unduplicated count of women. Read the standard error of the unduplicated number from table F. Multiply the standard error of the unduplicated number from table F by the same factor from table I to obtain the standard error of the number from tables 3 through 18.

Illustration: Table 4 shows 5,565 white women in 1955-1959 were age 20-21, childless at 7 or more years since first marriage. The standard error of the 5,565 is figured first by dividing 5,565 by the factor of 1.6 shown in table I for women ever married age 20-21. The result of the first step is an estimate of 3,478 for an unduplicated count of women. Interpolation in table F shows that the standard error of an unduplicated number of 3,478 is approximately 231. Finally, the figure of 231 is multiplied by the same factor of 1.6 from table I, producing 370, the desired standard error of 5,565.

2. Standard error of a percentage where the base of the percentage is from tables 3 through 18: Divide the base of the percentage by the corresponding factor from table I to obtain an estimate of an unduplicated count of women for the base. Determine the standard error of the percentage from table G, using the estimated unduplicated number as the base. The result is the desired standard error of the percentage in tables 3 through 18.

3. Standard error of a fertility rate from tables 3 through 18: The procedure is the same as given above for the standard error of a percentage, except that table H is used instead of table G.