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2003

NATALITY

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Introduction

This Technical Appendix, published by the Centers for Disease Control and Prevention's National Center for Health Statistics (NCHS), is reprinted from "Vital Statistics of the United States, 2003, Volume I, Natality" [1]. Reference will be made to the "1999 Technical Appendix" for historical context and a more lengthy discussion of some variables, and the quality and completeness of the birth data [2]. This report supplements the "Technical Notes" section of "Births: Final data for 2003" [3] and is recommended for use with the public-use file for 2003 births, available on CD-ROM from NCHS [4], and the tabulated data of "Vital Statistics of the United States, 2003 Volume I , Natality" [1].

Definition of Live Birth

Every product of conception that gives a sign of life after birth, regardless of the length of the pregnancy, is considered a live birth. This concept is included in the definition set forth by the World Health Organization in 1950 [5]. A slightly expanded definition of live birth was recommended by the 1992 revision of the Model State Vital Statistics Act and Regulations [6], based on recommendations of a 1988 working group formed by the American Academy of Pediatrics and the American College of Obstetricians and Gynecologists [7] and is consistent with that currently used by the WHO in the ICD-10 [8] and the United Nations**:**

> "Live birth" means the complete expulsion or extraction from its mother of a product of human conception, irrespective of the duration of pregnancy, which, after such expulsion or extraction, breathes, or shows any other evidence of life, such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles, whether or not the umbilical cord has been cut or the placenta is attached. Heartbeats are to be distinguished from transient cardiac contractions; respirations are to be distinguished from fleeting respiratory efforts or gasps.

This definition distinguishes in precise terms a live birth from a fetal death [9]. Forty-eight registration areas use definitions of live births similar to this definition; five areas use a shortened definition; four have no formal definition of live birth. [10]. All States require the reporting of live births regardless of length of gestation or birth weight.

History of Birth-Registration Area

Currently the birth-registration system of the United States covers the 50 States, the District of Columbia, the independent registration area of New York City, and Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands (referred to as Northern Marianas). However, in the statistical tabulations, "United States" refers only to the aggregate of the 50 States (including New York City) and the District of Columbia. Information on the history and development of the birth-registration area is available elsewhere [2].

Sources of Data

Natality statistics

Since 1985, natality statistics for all States and the District of Columbia have been based on information from the total file of records. The information is received on electronic files consisting of individual records processed by the States, the District of Columbia, New York City, Puerto Rico, the Virgin Islands, American Samoa, and the Northern Marianas. NCHS receives these files from the registration offices of all States, the two cities and four territories through the Vital Statistics Cooperative Program. Information for Guam is obtained from paper copies of original birth certificates which is coded and keyed by NCHS. Data from American Samoa first became available in 1997; data from the Northern Marianas in 1998.

U.S. natality data are limited to births occurring within the United States, including those occurring to U.S. residents and nonresidents. Births to nonresidents of the United States have been excluded from all tabulations by place of residence beginning in 1970 (for further discussion see "Classification by occurrence and residence"). Births occurring to U.S. citizens outside the United States are not included in any tabulation in this report. Data for Puerto Rico, the Virgin Islands, Guam, American Samoa, and the

Northern Marianas are limited to births registered in these areas.

Standard certificates of live birth

The U.S. Standard Certificate of Live Birth, issued by the U.S. Department of Health and Human Services, has served for many years as the principal means for attaining uniformity in the content of the documents used to collect information on births in the United States. Every 10-15 years, the basic process of collecting birth and death information is revised. It has been modified in each State to the extent required by the particular State's needs or by special provisions of the State's vital statistics law. However, most State certificates conform closely in content to the standard certificate.

2003 revision — In 2003, a revised U.S. Standard Certificate of Live Birth was adopted, with initial implementation in two states (Pennsylvania and Washington). Full implementation in all States will be phased in over several years. The 2003 revision is described in detail in documents available on the Internet. [11,12].

There are numerous new items on the 2003 certificate (receipt of WIC food, receipt of fertility therapy, infections during pregnancy, maternal morbidity, breast feeding, etc.) and modifications of old items (ability to capture multiple race, levels of smoking, history of prenatal care, components of the Body Mass Index, onset of labor, etc.). A forthcoming report will present information on the new data items.

A key aspect of the 2003 Revision of the United States Standard Certificate has been the re-engineering in the data collection and transmission system. The intent of the re-engineering is to improve data quality, speed of data collection and transmission, and to enhance standardization of the 2003 Revision. This effort is described in a document [13] available on the Internet. Data will be obtained from two sources: the Mother's Worksheet and the Facility Worksheet. In the Mother's Worksheet, data are directly obtained from the mother and include such data as race, Hispanic origin, educational attainment, WIC participation, etc. In the Facility Worksheet, data are obtained directly from medical records of the mother and infant with items such as date of last menstrual period, risk factors, method of delivery, etc. To assist hospital staff in completing the Facility Worksheet, a comprehensive instruction manual was developed: *Guide to Completing the Facility Worksheets for the Certificate of Live Birth and Report of Fetal Death (2003 Revision)* [14].

It is expected that each state will employ software to conform to national standards in order to record, in electronic media, data gathered in either electronic or paper worksheets. A number of features are integral to this software. There are automatic edits at the time of data entry to permit immediate modification of data and tracking of modifications.

1989 revision—Effective January 1, 1989, a revised U.S. Standard Certificate of Live Birth (figure 4-A) replaced the 1978 revision. This revision provided a wide variety of new information on maternal and infant health characteristics, representing a significant departure from previous versions in both content and format. The most significant format change was the use of checkboxes to obtain detailed medical and health information about the mother and child. Details of the nature and content of the 1989 revision are available in the Technical Appendix to the Natality file [2].

The medical and health check boxes -- Both the 1989 and 2003 Standard Certificates of Live Birth use a checkbox format for collecting much of the medical and health information available on the birth certificate. This information includes items on medical risk factors, obstetric procedures, complications of labor and/or delivery, abnormal conditions of the newborn, and congenital anomalies of the child. However, a number of individual checkbox items included on the 1989 certificate were dropped from the revised certificate in 2003. In addition, definitions for some items were modified for the 2003 revision resulting in data which are not comparable across revisions. Tables in the 2003 final natality report [3] are footnoted to identify reporting areas for the specific checkboxes: see tables 26-28, 36-37, 42, and 48-49.

The 2003 Natality Data File

The 2003 data file consists of data items from the 1989 Revision of the U.S. Standard Certificate of Live Birth used by 48 states and the District of Columbia. It also includes considerable data from two States, Pennsylvania and Washington, which implemented the 2003 revision of the U.S. Standard Certificate of Live Birth. Where comparable, data from Pennsylvania and Washington are combined with data from the remaining 48 states and the District of Columbia. Where data for the 1989 and 2003 certificate revisions are not comparable (e.g., educational attainment of the mother), data

for Pennsylvania and Washington are excluded from the national totals for 2003.

One of the principal values of vital statistics data is realized through the presentation of rates that are computed by relating the vital events of a class to the population of a similarly defined class. Vital statistics and population statistics, therefore, must be tabulated in comparable groups. Even when the variables common to both, such as geographic area, age, race, and sex, have been similarly classified and tabulated, significant discrepancies may result from differences between the enumeration method of obtaining population data and the registration method of obtaining vital statistics data.

The general rules used to classify live births by parental characteristics are set forth in "Vital Statistics Classification and Coding Instructions for Live Birth Records, 1999–2001," *NCHS Instruction Manual*, Part 3a [15]. (Information in this manual is applicable to the 2003 data). This material is incorporated in the basic file layout on the CD-ROM [4]. The instruction materials are for States to use in coding the data items; they do not include any NCHS recodes. Therefore, the file layout is a better source of information on the code structure because it provides the exact codes and recodes that are available. Classification of certain important items is discussed in the following pages. Information on the completeness of reporting of birth certificate data is shown in table A, which presents a listing of items and the percentage of records that were not stated for each State, Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Northern Marianas.

Occurrence and residence

In tabulations by place of residence, births occurring within the United States to U.S. citizens and to resident aliens are allocated to the usual place of residence of the mother in the United States, as reported on the birth certificate. Beginning in 1970, births to nonresidents of the United States occurring in the United States are excluded from these tabulations. Births to U.S. residents occurring outside this country are not included in tabulations by place of residence.

The total count of births for the United States by place of residence and by place of occurrence will not be identical. Births to nonresidents of the United States are included in data by place of occurrence but excluded from data by place of residence, as previously indicated. See table B for the number of births by residence and occurrence

for the 50 States and the District of Columbia for 2003.

Residence error—A nationwide test of birth-registration completeness in 1950 provided measures of residence error for natality statistics. According to the 1950 test (which has not been repeated), errors in residence reporting for the country as a whole tend to overstate the number of births to residents of urban areas and to understate the number of births to residents of other areas [16]. Recent experience demonstrates that this is still a concern based on anecdotal evidence from the States. This tendency has assumed special importance because of a concomitant development—the increased utilization of hospitals in cities by residents of nearby places—with the result that a number of births are erroneously reported as having occurred to residents of urban areas. Another factor that contributes to this overstatement of urban births is the customary practice of using city addresses for persons living outside the city limits. Residence error should be taken into consideration in interpreting data for small areas and for cities. Both birth and infant mortality patterns can be affected.

Incomplete residence—Beginning in 1973 where only the State of residence is reported with no city or county specified and the State named is different from the State of occurrence, the birth is allocated to the largest city of the State of residence. Before 1973, such births were classified according to the exact place of occurrence.

Geographic classification

The rules followed in the classification of geographic areas for live births are contained in the instruction manual mentioned previously. The geographic code structure for the 2003 file is given in two manuals, "Vital Records Geographic Classification, 2003," and "Vital Records Geographic Classification, 2004. Federal Information Processing Standards (FIPS)." *NCHS Instruction Manual, Part 8*, [17] and [18]. The geographic code structure on the 2003 file is based on results of the 2000 Census of Population.

United States— In the statistical tabulations, "United States" refers only to the aggregate of the 50 States and the District of Columbia. Alaska has been included in the U.S. tabulations since 1959 and Hawaii since 1960.

Details of the classification of births for metropolitan statistical areas, metropolitan and nonmetropolitan counties, and population size groups for cities and

urban places are presented elsewhere [2].

Places with a population of less than 100,000 are not separately identified on the public-use file because of confidentiality limitations.

Demographic Characteristics

Hispanic origin, and race

Hispanic origin—Hispanic origin and race are reported independently on the birth certificate. Data for Hispanic subgroups are shown in most cases for four specific groups: Mexican, Puerto Rican, Cuban, Central and South American; and an additional subgroup: "Other and unknown Hispanic." More specific Hispanic origin information for the "Other and unknown Hispanic" category is not available. In tabulations of birth data by race only, data for persons of Hispanic origin are included in the data for each race group according to the mother's reported race. The category "white" comprises births reported as white and births where race, as distinguished from Hispanic origin, is reported as Hispanic. In tabulations of birth data by race and Hispanic origin, data for persons of Hispanic origin are not further classified by race because the vast majority of births to Hispanic women (97 percent in 2003) are reported as white. In many of our tabulations, data for non-Hispanic persons are classified according to the race of the mother because there are substantial differences in fertility and maternal and infant health between Hispanic and non-Hispanic white women. The percentage of birth records for which Hispanic origin of either parent was not reported in 2003 is shown by State in table A. A recode variable is available that provides cross tabulations of race by Hispanic origin.

The 1989 and 2003 revisions of the U.S. Standard Certificate of Live Births include items to identify the Hispanic origin of the parents. All 50 States, the District of Columbia, the Virgin Islands, and Guam reported Hispanic origin of the parents for 2003.

In computing birth and fertility rates for the Hispanic population, births with origin of mother not stated are included with non-Hispanic births rather than being distributed. Thus, rates for the Hispanic population are underestimates of the true rates to the extent that the births with Hispanic origin of mother not stated (0.7 percent in 2003) were actually to Hispanic mothers [19]. The population with origin not stated was imputed. The effect on the rates is believed to be small. The percentage of birth records

for which Hispanic origin of either parent was not reported in 2003 is shown by State in table A.

Single, Multiple and "Bridged" race of mother and father—In 1997, the Office of Management and Budget (OMB) issued ''Revisions to the Standards for the Classification of Federal Data on Race and Ethnicity'' which revised the ''1977 Statistical Policy Directive 15, Race and Ethnic Standards for Federal Statistics and Administrative Reporting'' [20,21,22]. These documents specify guidelines for collection, tabulation, and presentation of race and ethnicity data within the Federal statistical system. The 1997 revised standards incorporated two major changes designed to reflect the changing racial profile of the United States. First, the revision increased from four to five the minimum set of categories to be used by Federal agencies for identification of race. The 1977 standards required Federal agencies to report race-specific tabulations using a minimum set of four single-race categories: American Indian or Alaska Native (AIAN), Asian or Pacific Islander (API), Black, and White. The five categories for race specified in the 1997 standards are: American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, and White. The revised standards called for reporting of Asians separately from Native Hawaiians or Other Pacific Islanders. Collection of additional detail on race and ethnicity is permitted, as before, so long as the additional categories can be aggregated into the minimum categories. The revised standards also require Federal data collection programs to allow respondents to select *one or more race categories*.

For the 2000 decennial census, the U.S. Census Bureau collected race and ethnicity data in accordance with the 1997 revised standards. However, the National Vital Statistics System, which is based on data collected by the States, will not be fully compliant with the new standards until all of the States revise their birth certificates to reflect the new standards. Thus, beginning with the 2000 data year, the numerators (births) for birth rates are incompatible with the denominators (populations) (see "Population denominators"). In order to compute rates, it is necessary to ''bridge'' population data for multiple-race persons to single-race categories. This has been done for birth rates by race presented in this report. Once all States revise their birth registration systems to be compliant with the 1997 OMB standards, the use of ''bridged''

populations can be discontinued.

Beginning with 2003 data year, multiple-race was reported by Pennsylvania and Washington, which used the 2003 revision of the U.S. Standard Certificate of Live Birth, as well as by California, Hawaii, Ohio (for births occurring in December only), and Utah, which used the 1989 revision of the U.S. Standard Certificate of Live Birth. These 6 States, which account for 20.7 percent of births in the U.S. in 2003, reported 2.5 percent of mothers as multiracial, with levels varying from 0.6 percent (Ohio) to 33.4 percent (Hawaii).

Data from the vital records of the remaining 44 States and the District of Columbia followed the 1977 OMB standards in which a single race is reported [20,21]. In addition, these areas also report the minimum set of four races as stipulated in the 1977 standards [20], compared with the minimum of five races for the 1997 [21] standards.

In order to provide uniformity and comparability of the data during the transition period, before multiple-race data are available for all reporting areas, it is necessary to "bridge" the responses of those who reported more than one race to a single-race. The bridging procedure for multiple-race mothers and fathers is based on the procedure used to bridge the multiracial population estimates (see "Population denominators") [22,23]. Multiple-race is imputed to a single race (one of the following: AIAN, API, Black, or White) according to the combination of races, Hispanic origin, sex, and age indicated on the birth certificate of the mother or father. The imputation procedure is described in detail elsewhere [24,25].

As noted previously, the bridging procedure imputes multiple-race of mothers to one of the four minimum races stipulated in the 1977 OMB standards, that is, AIAN, API, Black, or White. Mothers of a specified Asian or Pacific Islander subgroup (that is, Chinese, Japanese, Hawaiian, or Filipino) in combination with another race (that is, AIAN, Black, and/or White) or another API subgroup cannot be imputed to a single API subgroup. API mothers are disproportionately represented in the 6 States reporting multiple-race (44 percent in 2003.) For the report "Births: Final Data for 2003", data are not shown for the specified API subgroups because the bridging technique cannot be applied in this detail [3, 22, 23]. However, data for the API subgroups, reported alone or

in combination with other races and/or API subgroups, are available in the 2003 Natality public-use data file. In addition, a report on births in 2003 to multiple-race women, which will include births to single- and multiple-race women of the API subgroups, is forthcoming.

Race of mother is reported by 44 States and the District of Columbia in at least eight single-race categories: White, Black, American Indian or Alaska Native, Chinese, Japanese, Hawaiian, Filipino, and "other Asian or Pacific Islander" (API). Of these, 8 States (Illinois, Minnesota, Missouri, New Jersey, New York, Texas, Virginia, and West Virginia) report data on the expanded API subgroups included in the "other API category" (Asian Indian, Korean, Samoan, Vietnamese, Guamanian, and remaining API). Finally, 6 States which report multiple-race data (California, Hawaii, Ohio, Pennsylvania, Utah, and Washington) report a minimum of fourteen categories (White, Black, American Indian or Alaska Native, Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, other Asian, Hawaiian, Guamanian, Samoan, and other Pacific Islander). For this report, as discussed above, the multiple-race combinations (for example, White and AIAN or Black and Chinese) were bridged to one of four broad categories (bridged White, bridged Black, bridged AIAN, and bridged API). Detailed data on race (single or multiple) as reported in these six States are available on the 2003 natality public use file.

In 2003, race of mother was not reported for 0.5 percent of births. In these cases, if the race of the father was known, the race of the father was assigned to the mother. When information was not available for either parent, the race of the mother was imputed according to the specific race of the mother on the preceding record with a known race of mother. This was necessary for just 0.4 percent of births in 2003.

Beginning with the 1989 data year, NCHS started tabulating its birth data primarily by race of the mother. In 1988 and prior years, births were tabulated by the race of the child, which was determined from the race of the parents as entered on the birth certificate. The reasons for this change are summarized in the 1999 Technical Appendix [2]. Trend data by race shown in this report are by race of mother for all years beginning with the 1980 data year. Text references to white births and white mothers or black births and black mothers are used interchangeably for ease in writing.

Age of mother

Beginning in 1989 a "Date of birth" item on the birth certificate replaced the "Age (at time of this birth)" item. Not all States revised this item, and, therefore, the age of mother either is derived from the reported month and year of birth or coded as stated on the certificate. In 2003 age of mother was reported directly by five States (Kentucky, Nevada, North Dakota, Virginia, and Wyoming) and American Samoa. From 1964 to 1996, births reported to occur to mothers younger than age 10 or older than age 49 years had age imputed according to the age of mother from the previous record with the same race and total birth order (total of live births and fetal deaths). Beginning in 1997, age of mother is imputed for ages 9 years or under and 55 years and over. A review and verification of unedited birth data for 1996 showed that the vast majority of births reported as occurring to women aged 50 years and older were to women aged 50-54 years. The numbers of births to women aged 50-54 years are too small for computing age-specific birth rates. These births have been included with births to women aged 45-49 years for computing birth rates. [2].

Age–specific birth rates are based on populations of women by age, prepared by the U.S. Census Bureau. In census years the decennial census counts are used. In intercensal years, estimates of the population of women by age are published by the U.S. Census Bureau in *Current Population Reports*. The 2000 Census of Population derived age in completed years as of April 1, 2000, from responses to questions on age at last birthday and month and year of birth, with the latter given preference. In the 1960, 1970, 1980, and 1990 Census of Population, age was also derived from month and year of birth. Age in completed years was asked in censuses before 1960. This was nearly the equivalent of the former birth certificate question, which the 1950 test of matched birth and census records confirms by showing a high degree of consistency in reporting age in these two sources [26]. More recently, reporting of maternal age on the birth certificate was compared with reporting of age in a survey of women who had recently given birth. Reporting of age was very consistent between the two sources [27].

Median age of mother—Median age is the value that divides an age distribution into two equal parts, one-half of the values being less and one-half being greater. Median ages of mothers for 1960 to the present have been computed from birth rates for 5–year

age groups rather than from birth frequencies. This method eliminates the effects of changes in the age composition of the childbearing population over time. Changes in the median ages from year to year can thus be attributed solely to changes in the age–specific birth rates. Trend data on the median age is shown in table 1-5 of "Vital Statistics of the United States, 2000, Volume 1, Natality**"** [28], which is available on the Internet at**:** http://www.cdc.gov/nchs/datawh/statab/unpubd/natality/natab2000.htm

Not stated age or date of birth of mother— In 2003 age of mother was not reported on 0.01 percent of the records. Beginning in 1964 birth records with date of birth of mother and/or age of mother not stated have had age imputed according to the age of mother from the previous birth record of the same race and total-birth order (total of fetal deaths and live births). (See *NCHS Instruction Manual*, Part 12, page 9) [29]. Editing procedures for 1963 and earlier years are described elsewhere [2].

Age of father

Age of father is derived from the reported date of birth or coded as stated on the birth certificate. If the age is under 10 years, it is considered not stated and grouped with those cases for which age is not stated on the certificate. Information on age of father is often missing on birth certificates of children born to unmarried mothers, greatly inflating the number in the "Not stated" category in all tabulations by age of father. In computing birth rates by age of father, births tabulated as age of father not stated are distributed in the same proportions as births with known age within each 5–year-age classification of the mother. This procedure is followed because, while father's age is missing on 13 percent of the birth certificates in 2003, one-quarter of these were on records where the mother is a teenager. This distribution procedure is done separately by race. The resulting distributions are summed to form a composite frequency distribution that is the basis for computing birth rates by age of father. This procedure avoids the distortion in rates that would result if the relationship between age of mother and age of father were disregarded. Births with age of father not stated are distributed only for rates, not for frequency tabulations [3].

Live-birth order and parity

Live-birth order and parity classifications refer to the total number of live births the mother has had including the 2003 birth. Fetal deaths are excluded.

Live-birth order indicates what number the present birth represents; for example, a baby born to a mother who has had two previous live births (even if one or both are not now living) has a live-birth order of three. Parity indicates how many live births a mother has had. Before delivery a mother having her first baby has a parity of zero, and a mother having her third baby has a parity of two. After delivery the mother of a baby who is a first live birth has a parity of one, and the mother of a baby who is a third live birth has a parity of three.

Live-birth order and parity are determined from two items on the birth certificate, "Live births now living" and "Live births now dead." Editing procedures for live birth order are summarized elsewhere [2, 29].

Not stated birth order—All births tabulated in the "Not stated birth order" category are excluded from the computation of percentages. In computing birth rates by live-birth order, births tabulated as birth order not stated are distributed in the same proportion as births of known live-birth order.

Marital status

National estimates of births to unmarried women are based on two methods of determining marital status. For 1994 through 1996 birth certificates in 45 States and the District of Columbia included a question about the mother's marital status. For the other States, marital status is inferred from information on the birth certificate. Beginning in 1997, the marital status of women giving birth in California and Nevada was determined by a direct question in the birth registration process. New York City also changed its procedures for inferring marital status in 1997. Beginning June 15, 1998, Connecticut discontinued inferring the mother's marital status and added a direct question on mother's marital status to the State's birth certificate.

In the two States (Michigan and New York) which used inferential procedures to compile birth statistics by marital status in 2003, a birth is inferred as nonmarital if either of these factors, listed in priority-of-use order, is present: a paternity acknowledgment was received or the father's name is missing. In recent years, a number of States have extended their efforts to identify the fathers when the parents are not married in order to enforce child support obligations. The presence of a paternity acknowledgment, therefore, is the most reliable indicator that the birth is nonmarital in the States not

reporting this information directly; this is now the key indicator in the nonreporting States. Details of the changes in reporting procedures and the impact of the procedures on the data are described in previous reports [30, 31].

The mother's marital status was not reported in 2003 on 0.04 percent of the birth records in the 48 States and the District of Columbia where this information is obtained by a direct question. Marital status was imputed for these records. If status was unknown and the father's age was known, then the mother was considered married. If the status was unknown, and the father's age unknown, then the mother was considered unmarried. This represents a change from the procedures in effect for 2002 and previous years. Prior to 2003, marital status for records with marital status not reported was imputed as "married". Because of the small number of records affected (834 births in 2003), the change in imputation procedures had essentially no impact on measures of nonmarital births.

When births to unmarried women are reported as second or higher order births, it is not known whether the mother was married or unmarried when the previous deliveries occurred because her marital status at the time of these earlier births is not available from the birth record.

Educational attainment

National data on educational attainment are currently available only for the mother [2]**.** Beginning in 1995, NCHS discontinued collecting information on the educational attainment of the father.

The educational attainment of the mother is defined as the number of years of school completed. Only those years completed in regular schools are counted, that is, a formal educational system of public schools or the equivalent in accredited private or parochial schools. Business or trade schools, such as beauty and barber schools, are not considered regular schools for the purposes of this item. No attempt has been made to convert years of school completed in foreign school systems, ungraded school systems, and so forth, to equivalent grades in the American school system. Such entries are included in the "Not stated" category.

Women who have completed only a partial year in high school or college are

tabulated as having completed the highest preceding grade. For those certificates on which a specific degree is stated, years of school completed is coded to the level at which the degree is most commonly attained; for example, women reporting B.A., A.B., or B.S. degrees are considered to have completed 16 years of school.

Education not stated—The "Not stated" category includes all records for which there is no information on years of school completed as well as all records for which the information provided is not compatible with coding specifications. Births tabulated as education not stated are excluded from the computations of percentages.

The 2003 data in "Births: Final Data for 2003" [3] exclude information on mother's educational attainment for Pennsylvania and Washington. The 1989 and 2003 certificate items on educational attainment are too dissimilar for these data to be reliably combined. The 1989 certificate item asks for the highest grade completed, whereas the 2003 certificate item asks for the highest degree or level of school completed (e.g., high school diploma, bachelor degree, etc.). See new educational attainment item in the 2003 US Standard Birth Certification [12]. The data for Pennsylvania and Washington are included on the public use file [4].

Maternal and Infant Health Characteristics

Weight gain during pregnancy

Weight gain is reported in pounds. A loss of weight is reported as zero gain. Computations of median weight gain were based on ungrouped data. This information is presented for 49 States and the District of Columbia. California did not report weight gain information.

The 1989 revision of the birth certificate included a question "weight gained during pregnancy ____ lbs." Pennsylvania and Washington employed the new question from the 2003 Revised Certificate. The 2003 Revised Certificate asked for more detailed information on weight gain. It asked for both the pre-pregnancy weight of the mother and her weight at delivery. As well, it recorded her height. Thus the revised certificate has the information needed (height and pre-pregnancy weight) to calculate the Body Mass Index. Pennsylvania and Washington's data from the revised certificate was combined with the data based on the 1989 revision to produce tabulations on median

weight gain and percent distributions of weight gain.

Medical risk factors for this pregnancy

Sixteen medical risks which can affect pregnancy outcome are separately identified on the 1989 Certificate of Live Birth. The format allows for the designation of more than one risk factor and includes a choice of "None." Accordingly, if the item is not completed, it is classified as not stated. These risks and reporting areas are shown in table 26 of the 2003 natality final report [3].

Definitions adapted and abbreviated from a set of definitions compiled by a committee of Federal and State health statistics officials for the Association for Vital Records and Health Statistics are available elsewhere [3]. Definitions of factors included in the 2003 revision are presented in the detailed guide for use in completing facility worksheets for the 2003 Revision [14].

Tobacco use during pregnancy

The checkbox format allows for classification of a mother as a smoker or drinker during pregnancy and for reporting the average number of cigarettes smoked per day or drinks consumed per week. Procedures for determining the consistency between smoking and/or drinking status and the quantity of cigarettes or drinks reported are described elsewhere [2].

Information on *whether or not the mother smoked* during pregnancy is available for all reporting areas except California, (figure 4-A). California did not report this item; Pennsylvania and Washington implemented the revised 2003 birth certificate which asks for the number of cigarettes smoked at different intervals before and during the pregnancy. In comparison, the 1989 standard certificate asked for "Tobacco use during pregnancy," "yes/no," and the average number of cigarettes per day with no specificity on timing during pregnancy. The areas reporting whether or not the mother smoked during pregnancy based on the 1989 question comprise 81 percent of U.S. births in 2003.

Vermont — The birth certificate in use in Vermont since 2000 includes the tobacco use questions that are on the 2003 revision of the birth certificate. The Vermont Health Department has translated the information collected to a format consistent with the 1989 question, and therefore Vermont data are included in the reporting area.

Data on the *number of cigarettes smoked daily* were available in a comparable

format for 44 states, the District of Columbia, and New York City. Indiana and New York State (except for New York City), Pennsylvania, South Dakota, and Washington reported the number of cigarettes smoked in a format that was not comparable with the 1989 revision of the U.S. Standard Certificate of Live Birth, used by other reporting areas. California did not collect this information. The areas reporting the number of cigarettes smoked comprised 76 percent of U.S. births in 2003.

Alcohol use during pregnancy

Alcohol use during pregnancy is a major, independent risk factor and it is implicated as well in delayed infant and child development [32, 33].

Data on alcohol use are not collected on the birth certificates of California, Pennsylvania or Washington. The areas reporting alcohol use accounted for 81 percent of U.S. births in 2003.

Unfortunately, alcohol use is substantially underreported on the birth certificate, compared with data collected in nationally representative surveys of pregnant women. Only 0.7 percent of women giving birth in 2003 reported alcohol use during pregnancy, down from 0.8 percent in 2002 for the same reporting area (data for 2003 shown in the 2003 natality final report [3] tables 24 and 25).

The birth certificate question on alcohol use from the 1989 revision is evidently not sensitive enough to measure this behavior accurately. The question's wording as well as the lack of specific time reference for the birth certificate questions are probable factors contributing to the underreporting. In addition, the stigma of maternal alcohol use likely contributes to the underreporting [34, 35].

Prenatal care

Month of pregnancy prenatal care began **—** Information on prenatal care is collected by all reporting areas. However, the questions on the 1989 and 2003 revisions differ substantially, as do the likely sources of the data. Thus, tabulations of prenatal care in "Births: Final Data for 2003**"** [3] exclude data for Pennsylvania and Washington. Data for the latter two States are available on the public use data file [4]. In the 2003 revision, the timing of the prenatal care item was modified to "Date of first prenatal visit" from "Month prenatal care began." In addition, the 2003 revision process resulted in the recommendation that information on prenatal care be gathered from the prenatal care or

medical records whereas the 1989 revision did not recommend a source for this data. See tables 24, 25, 33-35 in the 2003 natality final report [3].

If the name of the month is entered for this item, instead of first, second, third, and so forth, the month of pregnancy in which prenatal care began is determined from the month named and the month last normal menses began. For these births, if the date last normal menses began is not stated, the month of pregnancy in which prenatal care began is tabulated as not stated

Number of prenatal visits — tabulations of the number of prenatal visits were presented for the first time in 1972. Beginning in 1989 these data were collected from the birth certificates of all States. Percentage distributions and the median number of prenatal visits exclude births to mothers who had no prenatal care. See table 35 in the 2003 natality final report [3].

Obstetric procedures

This item includes six specific obstetric procedures on the 1989 revision of the birth certificate in use by 48 states and the District of Columbia in 2003. Table 36 of the 2003 natality final report [3] provides data for the six procedures and the reporting areas for each item. Birth records with "Obstetric procedures" left blank are considered not stated. Definitions adapted and abbreviated from a set of definitions compiled by a committee of Federal and State health statistics officials for the National Association for Public Health Statistics and Information Systems (NAPHSIS), formerly the Association for Vital Records and Health Statistics, are available elsewhere [3]. Additional definitions are included in the detailed facility worksheet guide [14].

Complications of labor and of delivery

The checkbox format allows for the selection of 15 specific complications on the 1989 revised certificate, and for the designation of more than one complication where appropriate. The complication rates for each procedure and the respective reporting area are given in table 37 in the 2003 natality final report [3]. A choice of "None" is also included. Accordingly, if the item is not completed, it is classified as not stated. Definitions adapted and abbreviated from a set of definitions compiled by a committee of Federal and State health statistics officials are available elsewhere [3]. Here, too, see the detailed facility worksheet guide [14].

Place of delivery and attendant at birth

The 1989 revision of the U.S. Standard Certificate of Live Birth included separate categories for freestanding birthing centers, the mother's residence, and clinic or doctor's office as the place of birth. Beginning in 1989 births occurring in clinics and in birthing centers not attached to a hospital are classified as “Not in hospital.” This change in classification may account in part for the lower proportion of “In hospital” births compared with previous years. (The change in classification of clinics should have minor impact because comparatively few births occur in these facilities, but the effect of any change in classification of freestanding birthing centers is unknown.)

Beginning in 1975 the attendant at birth and place of delivery items were coded independently, primarily to permit the identification of the person in attendance at hospital deliveries. Additional information on these items is presented elsewhere [2].

Babies born on the way to or on arrival at the hospital are classified as having been born in the hospital. This may account for some of the hospital births not delivered by physicians or midwives. The “Not in hospital” category includes births for which no information is reported on place of birth.

In 2000 Illinois started collecting data on certified nurse-midwives (CNM) and making corrections for “Other midwife” and “Other” categories. Data for earlier years were incomplete for Illinois births. As a result, the number of CNMs has significantly increased while the number of “Other midwife” deliveries has sharply decreased compared to earlier years.

Procedures in some hospitals may require that a physician be listed as the attendant for every birth and that a physician sign each birth certificate, even if the birth is attended by a midwife and no physician is physically present. Therefore, the number of live births attended by midwives may be understated in some areas.

Method of delivery

The 1989 Revision of the Live Birth Certificate contains a checkbox for method of delivery. Choices include vaginal delivery, with the additional options of forceps, vacuum, and vaginal birth after previous cesarean section (VBAC), as well as a choice of primary or repeat cesarean. When only forceps, vacuum, or VBAC is checked, a vaginal

birth is assumed. In 2003 this information was collected from the *two* revisions of birth certificates of all States and the District of Columbia.

Despite substantive changes between the 1989 and 2003 revisions of the birth certificate to the method of delivery item, data for revised and unrevised states are combined for all national figures given. The total numbers and percents of vaginal and cesarean deliveries appear to be very consistent between revisions. However, information on whether the delivery is a VBAC, primary cesarean, or repeat cesarean appears to be less comparable. This is because of wording and formatting changes designed to collect data on whether the mother had a previous cesarean delivery. The new format includes a direct question on whether the mother had had a previous cesarean delivery whereas the old did not. In brief, revised data for Pennsylvania and Washington show higher- than- expected VBAC and primary cesarean rates, and lower- than-expected repeat cesarean rates. These slight incongruities for Pennsylvania and Washington data have no appreciable impact on national rates and are included in national figures shown for 2003. However, measures which incorporate these data to compare changes across revisions for individual States should be interpreted with caution.

Several rates are computed for method of delivery. The overall cesarean section rate or total cesarean rate is computed as the proportion of all births that were delivered by cesarean section. The primary cesarean rate is a measure that relates the number of women having a primary cesarean birth to all women giving birth who have never had a cesarean delivery. The denominator for this rate is the sum of women with a vaginal birth excluding VBACs and women with a primary cesarean birth. The VBAC delivery rate is computed by relating all VBAC deliveries to the sum of VBAC and repeat cesarean deliveries, that is, to women with a previous cesarean section. VBAC rates are computed for first births because the rates are computed based on previous pregnancies, not just live births.

Period of gestation

The period of gestation is defined as beginning with the first day of the last normal menstrual period (LMP) and ending with the day of the birth. The LMP is used as the initial date because it can be more accurately determined than the date of conception,

which usually occurs 2 weeks after the LMP. LMP measurement is subject to error for several reasons, including imperfect maternal recall or misidentification of the LMP because of post-conception bleeding, delayed ovulation, or intervening early miscarriage.

Births occurring before 37 completed weeks of gestation are considered to be preterm or premature for purposes of classification. At 37–41 weeks gestation, births are considered to be term, and at 42 completed weeks and over, post-term. These distinctions are according to the ICD–9 and ICD–10 [8] definitions.

Before 1981, the period of gestation was computed only when there was a valid month, day, and year of LMP. However, length of gestation could not be determined from a substantial number of live-birth certificates each year because the day of LMP was missing. Beginning in 1981, weeks of gestation have been imputed for records with missing day of LMP when there is a valid month and year. The imputation procedure and its effect on the data are described elsewhere [2,36]. But reporting problems for this item persist and may occur more frequently among some subpopulations and among births with shorter gestations. Changes in reporting of this measure over time have apparently affected trends in preterm birth rates, particularly by race [37].

The 1989 revision of the U.S. Standard Certificate of Live Birth includes an item, “Clinical estimate of gestation” that is being compared with length of gestation computed from the LMP date when the latter appears to be inconsistent with birthweight. This is done for normal weight births of apparently short gestations and very low birthweight births reported to be full term. The procedures are described in the *NCHS Instruction Manual*, Part 12, pp. 33-35 [29]. It is used by all states except California. The clinical estimate was also used if the LMP date was not reported.

The period of gestation for 4.6 percent of the births in 2003 was based on the clinical estimate of gestation. For 97 percent of these records, the clinical estimate was used because the LMP date was not reported. For the remaining 3 percent, the clinical estimate was used because it was compatible with the reported birthweight, whereas the LMP-based gestation was not. In cases where the reported birthweight was inconsistent with both the LMP-computed gestation and the clinical estimate of gestation, the LMP-computed gestation was used and birthweight was reclassified as "not stated." This was necessary for 247 births or 0.006 percent of all birth records in 2003. The levels of the

adjustments in 2003 data were similar to those for earlier years [38]. Despite these edits, substantial incongruities in these data persist; research is ongoing to address these data deficiencies.

Birthweight

In some areas birthweight is reported in pounds and ounces rather than in grams. However, the metric system has been used in tabulating and presenting the statistics to facilitate comparison with data published by other groups. The categories for birthweight were changed in 1979 to be consistent with the recommendations in the *International Classification of Diseases, Ninth Revision* (ICD–9) and remain the same for the *International Classification of Diseases, Tenth Revision* (ICD–10) [8]. The categories in gram intervals and their equivalents in pounds and ounces are as follows:

Less than 500 grams = 1 lb 1 oz or less
500–999 grams = 1 lb 2 oz–2 lb 3 oz
1,000–1,499 grams = 2 lb 4 oz–3 lb 4 oz
1,500–1,999 grams = 3 lb 5 oz–4 lb 6 oz
2,000–2,499 grams = 4 lb 7 oz–5 lb 8 oz
2,500–2,999 grams = 5 lb 9 oz–6 lb 9 oz
3,000–3,499 grams = 6 lb 10 oz–7 lb 11 oz
3,500–3,999 grams = 7 lb 12 oz–8 lb 13 oz
4,000–4,499 grams = 8 lb l4 oz–9 lb l4 oz
4,500–4,999 grams = 9 lb 15 oz–11 lb 0 oz
5,000 grams or more = 11 lb l oz or more

ICD–9 and ICD–10 define low birthweight as less than 2,500 grams. This is a shift of 1 gram from the previous criterion of 2,500 grams or less, which was recommended by the American Academy of Pediatrics in 1935 and adopted in 1948 by the World Health Organization in the *International Lists of Diseases and Causes of Death, Sixth Revision*.

After data classified by pounds and ounces are converted to grams, median weights are computed and rounded before publication. To establish the continuity of class intervals needed to convert pounds and ounces to grams, the end points of these intervals are assumed to be half an ounce less at the lower end and half an ounce more at the upper end. For example, 2 lb 4 oz–3 lb 4 oz is interpreted as 2 lb 3 ½ oz–3 lb 4 ½ oz. Births for which birth weights are not reported are excluded from the computation of percentages

and medians.

Apgar score

The 1– and 5–minute Apgar scores were added to the U.S. Standard Certificate of Live Birth in 1978 to evaluate the condition of the newborn infant at 1 and 5 minutes after birth. The Apgar score is a useful measure of the need for resuscitation and a predictor of the infant's chances of surviving the first year of life. It is a summary measure of the infant's condition based on heart rate, respiratory effort, muscle tone, reflex irritability, and color. Each of these factors is given a score of 0, 1, or 2; the sum of these 5 values is the Apgar score, which ranges from 0 to 10. A score of 10 is optimum, and a low score raises some concerns about the potential survival and subsequent health of the infant. Beginning in 1995, NCHS collected information only on the 5–minute Apgar score. Since 1991, the reporting area for the 5–minute Apgar score has been comprised of 48 States and the District of Columbia, accounting for 77.5 percent of all births in the United States in 2003. California and Texas did not collect information on Apgar scores on their birth certificates.

Plurality

In this file plurality is classified as single, twin, triplet, quadruplet, and quintuplet and higher order. Records for which plurality is unknown are imputed as singletons. This occurred for 0.002 percent of all records for 2003. Each record in the natality file represents an individual birth. For example, a record coded as a twin represents one birth in a twin delivery. Pairs or sets of twins or higher order multiple births are not identified in this file. The Matched Multiple Birth File 1995-2000 includes information on sets of twin, triplet and quadruplets, thus allowing for the analysis of characteristics of sets of births and fetal deaths in multiple deliveries.

Abnormal conditions of the newborn

This item provides information on eight specific abnormal conditions included in the 1989 revised birth certificate. More than one abnormal condition may be reported for a given birth or “None” may be selected. If the item is not completed it is tabulated as not stated. Rates for abnormal conditions of the newborn, as well as reporting areas for each condition, are given in table 48 of the report: “Births: Final Data for 2003” [3].

Definitions adapted and abbreviated from a set of definitions compiled by a

committee of Federal and State health statistics are available elsewhere [3]. Again, see the detailed facility worksheet guide [14].

Congenital anomalies of the child

The data provided in this item relate to 21 specific anomalies or anomaly groups collected on the 1989 revised birth certificate. The checkbox format allows for the identification of more than one anomaly including a choice of "None" should no anomalies be evident. The "not stated" category includes birth records for which the item is not completed.

It is well documented that congenital anomalies, except for the most visible and most severe, are incompletely reported on birth certificates [39]. The completeness of reporting specific anomalies depends on how easily they are recognized in the short time between birth and birth-registration. Table 49 of the 2003 natality final report [3] provides rates for each anomaly (or anomaly group) as well as describing the respective reporting area. Definitions adapted and abbreviated from a set of definitions compiled by a committee of Federal and State health statistics officials are available elsewhere [3]. Also, see the detailed facility worksheet guide [14].

Quality of Data

Although vital statistics data are useful for a variety of administrative and scientific purposes, they cannot be correctly interpreted unless various qualifying factors and methods of classification are taken into account. The factors to be considered depend on the specific purposes for which the data are to be used. It is not feasible to discuss all the pertinent factors in the use of vital statistics tabulations, but some of the more important ones should be mentioned.

Most of the factors limiting the use of data arise from imperfections in the original records or from the impracticability of tabulating these data in very detailed categories. These limitations should not be ignored, but their existence does not lessen the value of the data for most general purposes.

Completeness of registration

It is estimated that more than 99 percent of all births occurring in the United States in 2003 were registered. These estimates are based on the results of a national

1964–68 test of birth-registration completeness according to place of delivery (in or out of hospital) and race (white and non-white). This test has not been conducted more recently. A detailed discussion of the method and results of the 1964–68 birth-registration test is available [40]. Information on procedures for adjusting births for underregistration (for cohort fertility tables) is presented elsewhere [2].

Completeness of reporting

Interpretation of these data must include evaluation of item completeness. The "Not stated" percentage is one measure of the quality of the data. Completeness of reporting varies among items and States. See table A for the percentage of birth records on which specified items were not stated. Data users should note that levels of incomplete or inaccurate reporting for some of the items are quite high in some States. The 2003 data for Alaska and Rhode Island are of particular concern.

Quality control procedures

As electronic files are received at NCHS, they are automatically checked for completeness, individual item code validity, and unacceptable inconsistencies between data items. The registration area is notified of any problems. In addition, NCHS staff reviews the files on an ongoing basis to detect problems in overall quality such as inadequate reporting for certain items, failure to follow NCHS coding rules, and systems and software errors. Traditionally, quality assurance procedures were limited to the review and analysis of differences between NCHS and registration area code assignments for a small sample of records. In recent years, as electronic birth registration became prevalent, this procedure was augmented by analyses of year-to-year and area-to-area variations in the data. These analyses are based on preliminary tabulations of the data that are cumulated by State on a year-to-date basis each month. NCHS investigates all differences that are judged to have consequences for quality and completeness. In the review process, statistical tests are used to call initial attention to differences for possible followup. As necessary, registration areas are informed of differences encountered in the tables and asked to verify the counts or to determine the nature of the differences. Missing records (except those permanently voided) and other problems detected by NCHS are resolved, and corrections are transmitted to NCHS in the same manner as for those corrections identified by the registration area.

Computation of Rates and Other Measures

Population bases

Estimation by age, sex, race and Hispanic origin—Birth and fertility rates for 2003 shown in tables 1, 3–6, 8, 9, 13, 14, A, B, and C in the report: "Births: Final Data for 2003" [3] are 2000 census-based post-censal estimates, as of July 1, 2003. These populations are shown in tables 4-2 and 4-3. The population estimates have been provided by the U.S. Census Bureau [41] and are based on the 2000 census counts by age, sex, race, and Hispanic origin, which have been modified to be consistent with Office of Management and Budget racial categories as of 1977 and historical categories for birth data. The modification procedures are described in detail elsewhere [22, 23, 42].

Birth and fertility rates by State shown in table 10 of the report: "Births: Final Data for 2003" [3] use 2000 census-based State-level post-censal population estimates provided by the U.S. Census Bureau [41]. Rates by State shown in this report may differ from rates computed on the basis of other population estimates. Birth and fertility rates by month shown in table 15 of the 2003 natality final report [3] are based on monthly population estimates also based on the 2003 estimates. Rates for unmarried women shown in tables 17 and 18 of the 2003 natality final report [3] are based on distributions of the population by marital status as of March 2003 as reported by the U.S. Census Bureau in the March Current Population Survey (CPS) [43], which have been adjusted to July 2003 population levels [41] by the Division of Vital Statistics, NCHS [3,31]. Birth and fertility rates for the Hispanic population, shown in tables 6, 8, 9, and 14 of the 2003 natality final report [3], are based on estimates of the total Hispanic population as of July 1, 2003 [41]. Rates for Hispanic subgroups are based on special population estimates that are presented in table 4-3. Information about allocation to Hispanic subgroups is presented elsewhere [41, 44].

The populations by race used in this report were produced under a collaborative arrangement with the U.S. Census Bureau and are 2000 census-based post-censual estimates. Reflecting the new guidelines issued in 1997 by the Office of Management and Budget (OMB), the 2000 census included an option for individuals to report more than one race as appropriate for themselves and household members [21]. In addition,

the 1997 OMB guidelines called for reporting of Asian persons separately from Native Hawaiians or other Pacific Islanders. In the earlier 1977 OMB guidelines, data for Asian or Pacific Islander persons were collected as a single group [20]. Except for six States, birth certificates currently report only one race for each parent in the categories specified in the 1977 OMB guidelines (see "Hispanic origin, race and national origin"). In addition, birth certificate data do not report Asians separately from Native Hawaiians or other Pacific Islanders. Thus, birth certificate data by race (the numerators for birth and fertility rates) currently are incompatible with the population data collected in the 2000 census (the denominators for the rates).

To produce birth and fertility rates for 1991 through 2003, it was necessary to ''bridge'' the population data for multiple race persons back to single race categories. In addition, the post-censal estimates were modified to be consistent with the 1977 OMB racial categories, that is, to report the data for Asian persons and Native Hawaiians or other Pacific Islanders as a combined category Asian or Pacific Islanders [45, 46]. The procedures used to produce the ''bridged'' populations are described in separate publications [22, 23]. Beginning with births occurring in 2003, several States began reporting multiple race data. Once all States revise their birth certificates to be compliant with the 1997 OMB standards, the use of ''bridged'' populations can be discontinued.

Populations used to calculate the rates for 1991–99 are based on population estimates as of July 1 of each year and were produced by the U.S. Census Bureau, with support from the National Cancer Institute [22, 41, 46, 47] These intercensal population estimates for 1991-99 are revised based on the April 1, 2000 Census. The rates for 1990 and 2000 are based on populations from the censuses in those years as of April 1.

Readers should keep in mind that the population data used to compile birth and fertility rates by race and ethnicity shown in this report are based on special estimation procedures, and are not actual counts. This is the case even for the 2000 populations that are based on the 2000 census. As a result, the estimation procedures used to develop these populations may contain some errors. Smaller populations, for example, American Indians, are likely to be affected much more than larger populations by potential measurement error [22]. While the nature and magnitude of error is unknown, the potential for error should be kept in mind when evaluating trends and differentials.

As more accurate information becomes available, further revisions of the estimates may be necessary. Additional information on the revised populations is available at: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm .

Residential population base— Birth rates for the United States, individual States, and metropolitan areas are based on the total resident populations of the respective areas (table 4-4). Except as noted these populations exclude the Armed Forces abroad but include the Armed Forces stationed in each area. The residential population of the birth- and death-registration States for 1900–1932 and for the United States for 1900–2003 is shown in table 4-1. In addition, the population including Armed Forces abroad is shown for the United States. Table D shows the sources for these populations. A detailed discussion of historical population bases is presented elsewhere [2].

Small populations as denominators— An asterisk (*) is shown in place of any derived rate based on fewer than 20 births in the numerator, or a population denominator of less than 50 (unweighted) for decennial years and 75,000 (weighted) for all other years for the Hispanic subgroups. Rates based on populations below these minimum levels lack sufficient reliability for analytic purposes.

Net census undercounts and overcounts— Studies conducted by the U.S. Census Bureau indicate that some age, race, and sex groups are more completely enumerated than others. Census miscounts can have consequences for vital statistics measures. For example, an adjustment to increase the population denominator would result in a smaller rate compared to the unadjusted rate. A more detailed discussion of census undercounts and overcounts can be found in the "1999 Technical Appendix" [2]. Adjusted rates for 2000 can be computed by multiplying the reported rates by ratios from the 2000 census-level population adjusted for the estimated age-specific census over- and undercounts, which are shown in table E.

Cohort fertility tables

The various fertility measures shown for cohorts of women are computed from births adjusted for underregistration and population estimates corrected for under enumeration and misstatement of age. Data published after 1974 use revised population estimates prepared by the U.S. Census Bureau and have been expanded to include data

for the two major racial groups. Heuser [48] has prepared a detailed description of the methods used in deriving these measures as well as more detailed data for earlier years. The series of cohort fertility tables is currently being revised to incorporate rates for black women and the revised intercensal population estimates of the 1990s. Tables for the most currently-available years are available at http://www.cdc.gov/nchs/datawh/statab/unpubd/natality/natab99.htm .

Parity distribution—The percentage distribution of women by parity (number of children ever born alive to mother) is derived from cumulative birth rates by order of birth. The percentage of 0-parity women is found by subtracting the cumulative first birth rate from 1,000 and dividing by 10. The proportions of women at parities one through six are found from the following formula:

Percent at N parity = ((cum. rate, order N)-(cum. rate, order N + 1))/10

The percentage of women at seventh and higher parities is found by dividing the cumulative rate for seventh-order births by 10.

Birth probabilities—Birth probabilities indicate the likelihood that a woman of a certain parity and age at the beginning of the year will have a child during the year. Birth probabilities differ from central birth rates in that the denominator for birth probabilities is specific for parity as well as for age.

Total fertility rates

The total fertility rate is the sum of the birth rates by age of mother (in 5–year age groups) multiplied by 5. It is an age–adjusted rate because it is based on the assumption that there is the same number of women in each age group. The rate of 2,043 in 2003, for example, means that if a hypothetical group of 1,000 women were to have the same birth rates in each age group that were observed in the actual childbearing population in 2003, they would have a total of 2,043 children by the time they reached the end of the reproductive period (taken here to be age 50 years), assuming that all of the women survived to that age.

Seasonal adjustment of rates

The seasonally adjusted birth and fertility rates are computed from the X–11 variant of Census Method II [49]. This method, used since 1964, differs slightly from the U.S. Bureau of Labor Statistics (BLS) Seasonal Factor Method, which was used for *Vital*

Statistics of the United States, 1964. The fundamental technique is the same in that it is an adaptation of the ratio-to-moving-average method. Before 1964, the method of seasonal adjustment was based on the X–9 variant and other variants of Census Method II. A comparison of the Census Method II with the BLS Seasonal Factor Method shows the differences in the seasonal patterns of births to be negligible.

Computations of percentages, percentage distributions, and medians

Births for which a particular characteristic is unknown were subtracted from the figures for total births that were used as denominators before percentages, percentage distributions, and medians were computed. The percentage of records with missing information for each item is shown by State in table A. The median number of prenatal visits also excludes births to mothers who had no prenatal care. Computations of the median years of school completed and the median number of prenatal visits were based on ungrouped data. The median age of mother is computed from birth rates in 5–year age groups, which eliminates the effects of changes in the age composition of the childbearing population over time. An asterisk is shown in place of any derived statistic based on fewer than 20 births in the numerator or denominator.

Computation of Measures of Variability

Random variation and significance testing for natality data

This detailed discussion of random variation and significance testing for natality data is similar to that in the "Technical Notes" of "Births: Final data for 2003**"** [3]. The number of births reported for an area is essentially a complete count, because more than 99 percent of all births are registered. Although this number is not subject to sampling error, it may be affected by nonsampling errors such as mistakes in recording the mother's residence or age during the registration process.

When the number of births is used for analytic purposes (that is, for the comparison of numbers, rates, and percents over time, for different areas, or between different groups), the number of events that *actually* occurred can be thought of as one outcome in a large series of possible results that *could have* occurred under the same (or similar) circumstances. When considered in this way, the number of births is subject to random variation and a probable range of values estimated from the actual figures,

according to certain statistical assumptions.

The confidence interval is the range of values for the number of births, birth rates, or percent of births that you could expect in 95 out of 100 cases. The confidence limits are the end points of this range of values (the highest and lowest values). Confidence limits tell you how much the number of events or rates could vary under the same (or similar) circumstances.

Confidence limits for numbers, rates, and percents can be estimated from the actual number of vital events. Procedures differ for rates and percents and also differ depending on the number of births on which these statistics are based. Below are detailed procedures and examples for each type of case.

When the number of vital events is large, the distribution is assumed to follow a normal distribution (where the relative standard error is small). When the number of events is small and the probability of the event is small, the distribution is assumed to follow a Poisson probability distribution. Considerable caution should be observed in interpreting the occurrence of infrequent events.

95-percent confidence limits for numbers less than 100 -- When the number of births is less than 100 and the rate is small, the data are assumed to follow a Poisson probability distribution [50]. Confidence limits are estimated using the following formulas:

$$\text{Lower limit} = B \times L$$

$$\text{Upper limit} = B \times U$$

where:

B	=	number of births
L	=	the value in table C that corresponds to the number B
U	=	the value in table C that corresponds to the number B

Example

Suppose that the number of first births to American Indian women 40-44 years of age was 47. The confidence limits for this number would be:

$$\text{Lower limit} = 47 \times 0.73476$$
$$= 35$$

$$\text{Upper limit} = 47 \times 1.32979$$
$$= 63$$

This means that the chances are 95 out of 100 that the actual number of first births to American Indian women 40-44 years of age would lie between 35 and 63.

95-percent confidence limits for numbers of 100 or more — When the number of events is greater than 100, the data are assumed to approximate a normal distribution. Formulas for 95-percent confidence limits are:

$$\text{Lower limit} = B - \left(1.96 \times \sqrt{B}\right)$$

$$\text{Upper limit} = B + \left(1.96 \times \sqrt{B}\right)$$

where:

B = number of births

Example

Suppose that the number of first births to white women 40-44 years of age was 14,108. The 95-percent confidence limits for this number would be:

$$\text{Lower limit} = 14{,}108 - \left(1.96 \times \sqrt{14{,}108}\right)$$
$$= 14{,}108 - 233$$
$$= 13{,}875$$

$$\text{Lower limit} = 14{,}108 + \left(1.96 \times \sqrt{14{,}108}\right)$$
$$= 14{,}108 + 233$$
$$= 14{,}341$$

This means that the chances are 95 out of 100 that the actual number of first births to white women 40-44 years of age would fall between 13,875 and 14,341.

Computing confidence intervals for rates -- The same statistical assumptions can be used to estimate the variability in birth rates. Again, one formula is used for rates based on numbers of events less than 100, and another formula for rates based on numbers of 100 or greater. For our purposes, assume that the denominators of these rates (the population estimates) have no error. While this assumption is technically correct *only* for denominators based on the census that occurs every 10 years, the error in intercensal population estimates is usually small, difficult to measure, and therefore not considered. (See, however, earlier discussion of population denominators in the section on "population bases".)

95-percent confidence limits for rates based on fewer than 100 events — As stated earlier, when the number of events in the numerator is less than 20 (or the population denominator is less than 50 for decennial years and 75,000 for all other years for an estimated subgroups), an asterisk (*) is shown in place of the rate because there were too few births or the population is too small to compute a statistically reliable rate. When the number of events in the numerator is greater than 20 but less than 100 (and the population denominator for the subgroups is above the minimum), the confidence interval for a rate can be estimated using the two formulas which follow and the values in table C .

$$\text{Lower limit} = R \times L$$

$$\text{Upper limit} = R \times U$$

where:

R = birth rate

L = the value in table C that corresponds to the number of events B

U = the value in table C that corresponds to the number of events B

Example

Suppose that the first birth rate for American Indian women 40-44 years of age was 0.50 per thousand, based on 47 births in the numerator. Using table C:

$$\text{Lower limit} = 0.50 \times 0.73476$$
$$= 0.37$$

$$\text{Upper limit} = 0.50 \times 1.32979$$
$$= 0.66$$

This means that the chances are 95 out of 100 that the actual first birth rate for American Indian women 40-44 years of age would be between 0.37 and 0.66.

95-percent confidence limits for rates when the numerator is 100 or more -- In this case, use the following formula for the birth rate R based on the number of births *B*:

$$\text{Lower limit} = R - \left(1.96 \times \left(R / \sqrt{B}\right)\right)$$

$$\text{Upper limit} = R + \left(1.96 \times \left(R / \sqrt{B}\right)\right)$$

where:

R = birth rate

B = number of births

Example

Suppose that the first birth rate for white women 40-44 years of age was 1.55 per thousand, based on 14,108 births in the numerator. Therefore, the 95-percent confidence interval would be:

$$\text{Lower limit} = 1.55 - \left(1.96 \times \left(1.55 / \sqrt{14{,}108}\right)\right)$$
$$= 1.55 - 0.026$$
$$= 1.52$$

$$\text{Upper limit} = 1.55 + \left(1.96 \times \left(1.55 / \sqrt{14{,}108}\right)\right)$$
$$= 1.55 + 0.026$$
$$= 1.58$$

This means that the chances are 95 out of 100 that the actual first birth rate for white women 40-44 years of age lies between 1.52 and 1.58.

Computing 95-percent confidence intervals for percents -- In many instances we need to compute the confidence intervals for percents. Percents derive from a binomial distribution. As with birth rates, an asterisk (*) will be shown for any percent which is based on fewer than 20 births in the numerator. We easily compute a 95-percent confidence interval for a percent when the following conditions are met:

$$B \times p \geq 5 \text{ and } B \times q \geq 5$$

where:

B	=	number of births in the denominator
p	=	percent divided by 100
q	=	1 - p

For natality data, these conditions will be met except for very rare events in small subgroups. If the conditions are not met, the variation in the percent will be so large as to render the confidence intervals meaningless. When these conditions are met the 95-percent confidence interval can be computed using the normal approximation of the binomial. The 95-percent confidence intervals are computed by the following formulas:

$$\text{Lower limit} = p - \left(1.96 \bullet \left(\sqrt{p \bullet q / B}\right)\right)$$

$$\text{Upper limit} = p + \left(1.96 \bullet \left(\sqrt{p \bullet q / B}\right)\right)$$

where:

p	=	percent divided by 100
q	=	1- p
B	=	number of births in the denominator

Example

Suppose that the percent of births to Hispanic women in Arizona that were to unmarried women was 49.7 percent. This was based on 14,751 births in the numerator and 29,682 births in the denominator. First we test to make sure we can use the normal approximation of the binomial:

$$29{,}682 \times 0.497 = 14{,}752$$

$$29{,}682 \times (1 - 0.497) = 29{,}682 \times 0.503 = 14{,}930$$

Both 14,752 and 14,930 are greater than 5 so we can proceed. The 95-percent confidence interval would be:

$$\begin{aligned} \text{Lower limit} &= 0.497 - \left(1.96 \bullet \left(\sqrt{0.497 \bullet 0.503 / 29{,}682}\right)\right) \\ &= 0.497 - 0.006 \\ &= 0.491 \text{ or } 49.1 \text{ percent} \end{aligned}$$

$$\begin{aligned} \text{Upper limit} &= 0.497 + \left(1.96 \bullet \left(\sqrt{0.497 \bullet 0.503 / 29{,}682}\right)\right) \\ &= 0.497 + 0.006 \\ &= 0.503 \text{ or } 50.3 \text{ percent} \end{aligned}$$

This means that the chances are 95 out of 100 that the actual percent of births to unmarried Hispanic women in Arizona is between 49.1 and 50.3 percent.

Significance testing when one or both of the rates is based on fewer than 100 cases -- To compare two rates, when one or both of those rates are based on less than 100 cases, you first compute the confidence intervals for both rates. Then you check to see if those intervals overlap. If they **do** overlap, the difference is not statistically significant at the 95-percent level. If they **do not** overlap, the difference is indeed statistically significant.

Example

Suppose that the first birth rate for American Indian women 40-44 years of age was 0.70 per 1,000 in year X and 0.57 in year Y. Is the rate for year X significantly higher than the rate for year Y? The two rates are based on 63 events in year X and 54 events in year Y. Both rates are based on fewer than 100 events; therefore, the first step is to compute the confidence intervals for both rates.

	Lower Limit	Upper Limit
Year X	0.54	0.90
Year Y	0.43	0.74

These two confidence intervals overlap. Therefore, the first birth rate for American women 40-44 in year X is not significantly higher (at the 95-percent confidence level) than the rate in year Y.

This method of comparing confidence intervals is a conservative test for statistical significance. That is, the difference between two rates may, in fact, be statistically significant even though confidence intervals for the two rates overlap [51]. Thus, caution should be observed when interpreting a non-significant difference between two rates, especially when the lower and upper limits being compared overlap only slightly.

Significance testing when both rates are based on 100 or more events -- When both rates are based on 100 or more events, the difference between the two rates, irrespective of sign (+/-), is considered statistically significant if it exceeds the statistic in the formula below. This statistic equals 1.96 times the standard error for the difference between two rates.

$$1.96 \times \sqrt{\frac{R_1^2}{N_1} + \frac{R_2^2}{N_2}}$$

where:

R_1 = first rate

R_2 = second rate

N_1 = first number of births

N_2 = second number of births

If the difference is **greater** than this statistic, then the difference would occur by chance less than 5 times out of 100. If the difference is **less than or equal** to this statistic, the difference might occur by chance more than 5 times out of 100. We say that the difference is not statistically significant at the 95-percent confidence level.

Example

Is the first birth rate for black women 40-44 years of age (1.08 per 1,000) significantly lower than the comparable rate for white women (1.55)? Both rates are based on more than 100 births (1,535 for black women and 14,108 for white women). The difference between the rates is 1.55 - 1.08 = 0.47. The statistic is then calculated as follows:

$$
\begin{aligned}
&= 1.96 \times \sqrt{\frac{1.08^2}{1{,}535} + \frac{1.55^2}{14{,}108}} \\
&= 1.96 \times \sqrt{\left(\left(1.166/1{,}535\right) + \left(2.403/14{,}108\right)\right)} \\
&= 1.96 \times \sqrt{0.00076 + 0.00017} \\
&= 1.96 \times \sqrt{0.00093} \\
&= 1.96 \times 0.03 \\
&= 0.06
\end{aligned}
$$

The difference between the rates (0.47) is greater than this statistic (0.06). Therefore, the difference is statistically significant at the 95-percent confidence level.

Significance testing differences between two percents -- When testing the difference between two percents, both percents must meet the following conditions:

$$B \times p \geq 5 \text{ and } B \times q \geq 5$$

where:

B	=	number of births in the denominator
p	=	percent divided by 100
q	=	1 - p

When both percents meet these conditions then the difference between the two

percents is considered statistically significant if it is greater than the statistic in the formula below. This statistic equals 1.96 times the standard error for the difference between two percents.

$$1.96 \times \sqrt{p \times (1-p) \times \left(\frac{1}{B_1} + \frac{1}{B_2} \right)}$$

where:

B_1 = number of births in the denominator of the first percent

B_2 = number of births in the denominator of the second percent

$$p = \frac{B_1 \times p_1 + B_2 \times p_2}{B_1 + B_2}$$

p_1 = the first percent divided by 100

p_2 = the second percent divided by 100

Example

Is the percent of births to Hispanic women that were to unmarried women higher in New Mexico (50.2) than in Arizona (49.7)? Suppose that the number in the denominator was 13,714 in New Mexico and 29,682 in Arizona. The necessary conditions are met for both percents (calculations not shown). The difference between the two percents is 0.502 - 0.497 = 0.005. The statistic is then calculated as follows:

$$\begin{aligned} & 1.96 \times \sqrt{0.499 \times (0.501) \times (0.000106609)} \\ & = 1.96 \times \sqrt{0.000026652} \\ & = 1.96 \times 0.005162563 \\ & = 0.010 \end{aligned}$$

The difference between the percents (0.005) is less than this statistic (0.010). Therefore, the difference is not statistically significant at the 95-percent confidence level.

Random variation and significance testing for population subgroups

This section presents information relevant to Hispanic subgroups (or generally speaking, any subgroup of the population for which survey data has been used for estimation of the denominator.) Birth and fertility rates for Mexicans, Puerto Ricans, Cubans, and "Other" Hispanic subgroups for 2003 are shown in tables 6, 8, 9, and 14 of 2003 natality final report [3] and in tables 1-4 and 1-12 of "Vital Statistics of the United States, 2003, Part 1, Natality" (in preparation). Population estimates for Hispanic subgroups are derived from the U.S. Census Bureau's *Current Population Survey* (CPS) and adjusted to resident population control totals as shown in table 4-3 [41,44]. As a result, the rates are subject to the variability of the denominator as well as the numerator. For these Hispanic subgroups (but not for all origin, total Hispanic, total non-Hispanic, non-Hispanic white, or non-Hispanic black populations), the following formulas are used for testing statistical significance in trends and differences:

Approximate 95-percent confidence interval: 100 or more births -- When the number of events in the numerator is greater than 100, the confidence interval for the birth rate can be estimated from the following formulas: For crude and age–specific birth rates,

$$\text{Lower limit} = R - 1.96 * R * \sqrt{\left(\frac{1}{B}\right) + f\left(a + \frac{b}{P}\right)}$$

$$\text{Upper limit} = R + 1.96 * R * \sqrt{\left(\frac{1}{B}\right) + f\left(a + \frac{b}{P}\right)}$$

where:

R = rate (births per 1,000 population)
B = total number of births upon which rate is based
f = the factor which depends on whether an entire or a sampled population (like one from a Current Population Survey – CPS) is used, and the span of years represented. f equals 0.670 for a single year
a and b are single year averages of the 2002 and 2003 CPS standard error parameters [52, 53]
a = -0.000096
b = 3,809
P = total estimated population upon which rate is based

Example

Suppose that the fertility rate of Cuban women 15–44 years of age was 51.2 per 1,000 based on 13,088 births in the numerator and an estimated resident population of 255,399 in the denominator. The 95-percent confidence interval would be:

$$\text{Lower limit} = 51.2 - 1.96 * 51.2 * \sqrt{\left(\frac{1}{13{,}088}\right) + 0.670 * \left[-0.000096 + \left(\frac{3{,}809}{255{,}399}\right)\right]}$$

$$= 51.2 - 1.96 * 51.2 * \sqrt{0.000076406 + (0.670 * 0.014914)}$$

$$= 51.2 - 1.96 * 51.2 * \sqrt{0.01000475}$$

$$= 51.2 - 1.96 * 51.2 * 0.100024$$

$$= 41.16$$

$$\text{Upper limit} = 51.2 + 1.96 * 51.2 * \sqrt{\left(\frac{1}{13{,}088}\right) + 0.670 * \left[-0.000096 + \left(\frac{3{,}809}{255{,}399}\right)\right]}$$

$$= 51.2 + 1.96 * 51.2 * \sqrt{0.000076406 + (0.670 * 0.014914)}$$

$$= 51.2 + 1.96 * 51.2 * \sqrt{0.01000475}$$

$$= 51.2 + 1.96 * 51.2 * 0.100024$$

$$= 61.24$$

This means that the chances are 95 out of 100 that the actual fertility rate of Cuban women 15–44 years of age is between 41.16 and 61.24.

Approximate 95-percent confidence interval: less than 100 births -- When the number of events in the numerator is less than 20, an asterisk is shown in place of the rate. When the number of events in the numerator is greater than 20 but less than 100, the confidence interval for the birth rate can be estimated using the formulas that follow and the values in table C.

For crude and age–specific birth rates,

$$\text{Lower limit} = R * L(1 - \alpha = .96, B) * \left(1 - 2.576\sqrt{f\left(a + \frac{b}{P}\right)}\right)$$

$$\text{Upper limit} = R * U(1 - \alpha = .96, B) * \left(1 + 2.576\sqrt{f\left(a + \frac{b}{P}\right)}\right)$$

where:

R = rate (births per 1,000 population)
B = total number of births upon which rate is based
L = the value in table C that corresponds to the number B, using the 96 percent CI column
U = the value in table C that corresponds to the number B, using the 96 percent CI column
f = the factor which depends on whether an entire or a sampled population (like one from a Current Population Survey – CPS) is used, and the span of years represented. *f* equals 0.670 for a single year
a and *b* are CPS standard error parameters (see previous section on 95-percent confidence interval for 100 or more births for description and specific values)
P = total estimated population upon which the rate is based

NOTE: In the formulas above, the confidence limits are estimated from the non-sampling error in the number of births, the numerator, and the sampling error in the population estimate, the denominator. A 96 percent standard error is computed for the numerator and a 99 percent standard error is computed for the denominator in order to compute a 95-percent confidence interval for the rate**.**

Example

Suppose that the birth rate of Puerto Rican women 45–49 years of age was 0.4 per 1,000, based on 35 births in the numerator and an estimated resident population of 87,892 in the denominator. Using table C, the 95-percent confidence interval would be:

$$\text{Lower limit} = 0.4 * 0.68419 * \left(1 - 2.576\sqrt{0.670\left(-0.000096 + \left(\frac{3{,}809}{87{,}892}\right)\right)}\right)$$
$$= 0.4 * 0.68419 * \left(1 - 2.576\sqrt{0.028972}\right)$$
$$= 0.4 * 0.68419 * \left(1 - (2.576 * 0.170211)\right)$$
$$= 0.4 * 0.68419 * 0.561536$$
$$= 0.154$$

$$\text{Upper limit} = 0.4 * 1.41047 * \left(1 + 2.576\sqrt{0.670\left(-0.000096 + \left(\frac{3{,}809}{87{,}892}\right)\right)}\right)$$
$$= 0.4 * 1.41047 * \left(1 + 2.576\sqrt{0.028972}\right)$$
$$= 0.4 * 1.41047 * \left(1 + (2.576 * 0.170211)\right)$$
$$= 0.4 * 1.41047 * 1.438464$$
$$= 0.812$$

This means that the chances are 95 out of 100 that the actual birth rate of Puerto Rican women 45–49 years of age lies between 0.15 and 0.81.

Significance testing for subgroups -- When both rates are based on 100 or more events, the difference between the two rates is considered statistically significant if it exceeds the value given by the formula below. This statistic equals 1.96 times the standard error for the difference between two rates.

$$z = 1.96 * \sqrt{R_1^2 * \left[\left(\frac{1}{B_1}\right) + f\left(a + \frac{b}{P_1}\right)\right] + R_2^2 * \left[\left(\frac{1}{B_2}\right) + f\left(a + \frac{b}{P_2}\right)\right]}$$

If the difference is greater than this statistic, then the difference would occur by chance less than 5 times out of 100. If the difference is less than this statistic, the difference might occur by chance more than 5 times out of 100. We would therefore conclude that the difference is not statistically significant at the 95-percent confidence level.

Example

Suppose the birth rate for Mexican mothers 15–19 years of age (R_1) is 94.5, based on 97,744 births and an estimated population of 1,033,878, and the birth rate for Puerto Rican mothers 15–19 years of age (R_2) is 61.4, based on 10,006 births and an estimated population of 162,899. Using the above formula, the z score is computed as follows:

$$= 1.96 * \sqrt{94.5^2 * \left[\left(\frac{1}{97{,}744}\right) + 0.670\left(-0.000096 + \frac{3{,}809}{1{,}033{,}878}\right)\right] + 61.4^2 * \left[\left(\frac{1}{10{,}006}\right) + 0.670\left(-0.000096 + \frac{3{,}809}{162{,}899}\right)\right]}$$

$$= 1.96 * \sqrt{8930.25 * (0.000010231 + 0.670 * 0.003589) + 3769.96(0.00009994 + 0.670 * 0.023287)}$$

$$= 1.96 * \sqrt{(8930.25 * 0.0024147) + (3769.96 * 0.015702)}$$

$$= 1.96 * \sqrt{21.563 + 59.20}$$

$$= 1.96 * 8.99$$

$$= 17.61$$

Since the difference between the two rates 33.1 is greater than the value above, the two rates are statistically significantly different at the 0.05 level of significance.

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Table A. Percent of birth records on which specified items were not stated: United States and each State and territory, 2003

[By place of residence]

Area	All births	Place of birth	Attendant at birth	Mother's birthplace	Father's age	Father's race	Hispanic Origin	
							Mother	Father
Total of reporting areas 1/	4089950	0.0	0.2	0.4	13.4	14.7	0.7	14.1
Alaska	10,086	0.0	0.3	0.8	11.5	15.3	17.6	20.5
Alabama	59,552	-	0.0	0.0	20.2	20.3	0.1	20.1
Arkansas	37,784	-	0.0	0.3	19.7	21.1	0.2	19.8
Arizona	90,967	0.0	0.0	0.1	23.0	26.2	1.8	24.3
California	540,997	0.0	0.0	0.4	7.2	7.5	1.1	7.1
Colorado	69,339	0.0	-	0.5	8.0	8.6	0.0	8.6
Connecticut	42,873	0.0	0.1	0.5	9.8	10.9	0.5	10.3
District of Columbia	7,619	0.0	-	0.0	35.3	44.6	0.2	35.4
Delaware	11,329	0.0	0.1	0.3	32.6	33.7	0.4	32.7
Florida	212,250	0.0	0.0	0.1	16.8	17.1	0.2	18.3
Georgia	135,979	0.0	0.0	0.2	16.9	17.6	1.7	18.4
Hawaii	18,100	-	0.1	0.2	8.9	12.5	0.2	8.9
Iowa	38,174	-	0.0	0.0	13.8	15.3	0.2	15.1
Idaho	21,800	0.0	0.0	0.5	9.2	12.3	0.7	11.8
Illinois	182,495	0.0	0.0	0.2	13.5	14.7	0.1	14.6
Indiana	86,434	0.0	0.1	0.1	13.0	13.0	0.4	13.3
Kansas	39,476	-	0.0	0.1	9.7	10.4	1.1	11.4
Kentucky	55,236	0.0	0.2	0.0	19.2	21.9	0.1	22.3
Louisiana	65,040	0.0	0.0	0.0	19.5	19.6	0.1	19.5
Massachusetts	80,184	-	0.0	0.0	7.3	8.0	0.5	7.2
Maryland	74,930	-	0.0	0.2	12.3	16.0	0.1	12.9
Maine	13,855	-	0.0	-	8.9	12.7	0.4	13.1
Michigan	131,094	0.0	0.1	0.1	14.0	16.5	1.9	17.5
Minnesota	70,050	-	0.0	0.2	10.2	13.5	0.9	13.7
Missouri	77,045	0.0	0.0	0.3	16.7	19.0	0.1	18.0
Mississippi	42,380	0.0	0.1	0.1	20.6	20.9	0.1	13.7
Montana	11,422	0.0	0.1	0.0	9.6	11.0	1.7	12.4
North Carolina	118,323	-	0.0	0.0	15.7	15.9	0.1	15.8
North Dakota	7,972	-	-	-	8.5	8.7	2.1	10.6
Nebraska	25,917	-	-	-	12.5	14.5	2.2	14.6
New Hampshire	14,393	-	-	0.0	5.5	7.7	4.2	11.1
New Jersey	116,983	0.0	0.0	0.2	7.4	8.9	0.2	7.7
New Mexico	27,821	-	-	1.2	21.0	20.7	0.0	20.7
Nevada	33,647	-	0.0	0.6	22.3	23.9	0.9	22.7
New York	253,714	0.0	0.0	0.4	12.8	13.2	0.3	13.0
Ohio	149,679	0.0	0.0	0.3	15.3	16.0	0.3	15.4
Oklahoma	50,981	0.0	0.0	0.0	16.0	17.4	0.2	17.1
Oregon	45,953	-	0.0	0.2	9.8	5.5	0.6	5.6
Pennsylvania	145,959	0.0	4.4	4.0	6.3	9.4	1.3	5.7
Rhode Island	13,209	0.0	-	0.4	13.1	13.7	12.9	22.6
South Carolina	55,649	0.0	0.0	0.2	27.0	27.2	0.1	27.0
South Dakota	11,027	-	0.0	0.0	10.1	10.9	0.1	13.8
Tennessee	78,890	-	0.0	0.1	15.3	15.6	0.0	15.3
Texas	377,476	0.0	0.0	0.4	13.8	14.2	0.3	14.1
Utah	49,860	0.0	0.0	0.2	8.9	10.3	0.4	9.7
Virginia	101,254	-	0.0	0.1	16.1	18.5	0.2	16.2
Vermont	6,589	-	-	0.2	6.8	9.1	0.7	9.4
Washington	80,489	0.0	0.1	0.1	9.1	23.3	2.7	12.9
Wisconsin	70,040	-	-	0.1	30.0	30.1	0.0	30.0
West Virginia	20,935	0.1	0.0	0.1	14.2	14.4	0.4	14.4
Wyoming	6,700	-	0.0	0.1	15.4	15.7	0.3	15.7
Puerto Rico	50696	-	0.1	-	3.1	4.1	---	---
Virgin Islands	1522	0.1	0.9	-	18.1	18.7	9.2	56.4
Guam	3281	0.1	1.2	0.4	20.8	21.0	2.3	28.2
American Samoa	1608	0.1	0.6	3.5	37.9	37.9	---	---
Northern Marianas	1349	-	0.7	-	9.4	8.5	---	---

See footnotes at end of table.

Table A. Percent of birth records on which specified items were not stated: United States and each State and territory, 2003 -- Con.

[By place of residence]

Area	Educational attainment of mother	Live-birth order	Length of gestation	Month prenatal care began	Number of prenatal visits
Total of reporting areas 1/	1.4	0.3	1.1	4/1.8	2.9
Alabama	0.2	0.0	0.1	0.3	0.4
Alaska	3.9	4.8	0.8	5.9	11.3
Arizona	1.6	0.2	0.1	1.4	2.6
Arkansas	0.6	0.1	0.3	1.4	2.1
California	2.4	0.1	3/6.9	1.7	2.9
Colorado	0.9	0.0	0.0	1.5	2.0
Connecticut	0.6	0.0	0.1	0.7	1.8
Delaware	3.0	0.3	0.1	2.6	0.6
District of Columbia	6.4	0.2	0.2	9.1	5.6
Florida	0.9	0.0	0.1	1.1	2.0
Georgia	2.4	0.2	0.1	1.1	1.0
Hawaii	1.1	0.1	0.2	2.5	2.3
Idaho	5.1	0.2	0.2	3.7	2.0
Illinois	1.3	0.5	0.2	4.0	4.4
Indiana	0.7	0.1	0.0	1.1	1.6
Iowa	0.2	0.0	0.1	0.3	0.4
Kansas	0.3	0.0	0.1	0.7	1.0
Kentucky	0.4	0.1	0.1	1.0	1.4
Louisiana	0.1	0.1	0.2	0.3	0.3
Maine	1.0	0.3	0.0	0.3	0.4
Maryland	1.5	0.4	0.2	1.5	2.1
Massachusetts	0.3	0.2	0.1	1.7	0.5
Michigan	2.3	0.4	0.1	2.4	3.3
Minnesota	1.8	0.5	0.3	4.4	5.5
Mississippi	0.3	0.1	0.2	0.8	1.6
Missouri	0.9	1.0	0.2	2.1	4.7
Montana	0.5	0.1	0.1	0.6	0.6
Nebraska	0.1	0.0	0.1	0.3	0.2
Nevada	2.9	1.2	0.9	6.3	7.7
New Hampshire	1.4	0.2	0.1	1.2	1.2
New Jersey	2.4	0.1	0.1	2.2	1.3
New Mexico	2.5	0.9	0.3	4.8	4.9
New York	1.2	0.3	0.1	2.9	1.9
North Carolina	0.3	0.1	0.0	0.9	1.0
North Dakota	0.3	0.1	0.1	0.9	0.8
Ohio	1.3	0.5	0.0	1.2	2.6
Oklahoma	0.4	0.1	0.2	2.3	2.4
Oregon	2.9	0.0	0.0	1.3	0.1
Pennsylvania	2/3.4	1.1	0.9	2/19.4	8.9
Rhode Island	2.6	1.9	0.3	8.3	14.0
South Carolina	0.7	0.1	0.1	1.6	1.7
South Dakota	0.0	0.0	0.0	0.2	0.3
Tennessee	0.4	0.1	0.3	2.3	2.7
Texas	1.5	0.4	0.4	1.4	3.7
Utah	1.5	0.4	0.0	3.3	3.3
Vermont	0.5	0.1	0.1	4.5	0.9
Virginia	1.3	0.0	0.0	0.2	1.2
Washington	2/5.6	1.3	0.3	2/27.1	13.7
West Virginia	1.5	0.1	0.1	2.9	1.0
Wisconsin	0.4	0.0	0.0	0.2	0.3
Wyoming	0.6	0.0	0.1	0.8	0.9
Puerto Rico	0.3	0.0	0.1	0.2	0.1
Virgin Islands	1.3	0.5	0.3	0.5	1.4
Guam	0.7	0.8	0.0	0.7	0.7
American Samoa	---	-	---	---	---
Northern Marianas	6.2	1.3	0.3	1.0	0.5

See footnotes at end of table.

Table A. Percent of birth records on which specified items were not stated: United States and each State and territory, 2003 -- Con.

[By place of residence]

Area	Birthweight	5-minute apgar score	Medical risk factors	Tobacco use	Alcohol use	Weight gain
Total of reporting areas 1/	0.1	0.4	0.5	0.6	0.6	5.8
Alabama	0.1	0.2	0.0	0.0	0.1	2.1
Alaska	0.2	1.6	8.2	1.3	1.4	9.2
Arizona	0.1	0.5	0.0	1.9	2.1	14.6
Arkansas	0.0	3.2	0.1	0.3	0.4	9.0
California	0.0	---	0.0	---	---	---
Colorado	0.1	0.3	0.0	0.1	0.1	2.3
Connecticut	0.0	0.1	0.2	0.1	0.1	1.4
Delaware	0.0	0.2	0.0	2.5	2.5	0.9
District of Columbia	0.0	0.3	0.0	0.1	0.1	11.5
Florida	0.0	0.2	0.0	0.1	0.1	5.5
Georgia	0.0	0.4	0.4	0.2	0.2	8.0
Hawaii	0.1	0.5	0.0	0.1	0.1	13.0
Idaho	0.1	0.5	0.2	2.2	2.2	6.1
Illinois	0.1	0.3	0.0	0.2	0.1	5.4
Indiana	0.4	0.3	0.0	7/0.2	0.2	2.1
Iowa	0.1	0.3	0.0	0.1	0.1	0.5
Kansas	0.0	0.6	5/0.0	0.1	0.1	0.2
Kentucky	0.1	0.4	2.5	2.0	2.5	6.3
Louisiana	0.1	0.4	0.2	0.2	0.2	4.7
Maine	0.1	0.2	0.1	0.5	0.7	1.0
Maryland	0.0	0.3	0.0	0.4	0.4	2.9
Massachusetts	0.1	0.2	0.3	0.2	0.2	0.7
Michigan	0.1	0.3	0.0	1.0	1.0	6.5
Minnesota	0.1	0.3	5.6	4.6	4.7	11.8
Mississippi	0.1	0.2	0.2	0.2	0.2	4.9
Missouri	0.1	0.5	0.1	0.4	0.4	4.1
Montana	0.1	0.4	0.0	0.8	1.2	1.4
Nebraska	0.0	0.1	0.0	0.1	0.1	1.7
Nevada	0.0	1.6	1.4	2.2	2.3	8.9
New Hampshire	0.1	0.1	0.0	0.3	0.3	3.5
New Jersey	0.1	0.3	0.3	1.6	1.7	1.3
New Mexico	0.3	3.5	0.0	1.6	1.7	6.5
New York	0.1	0.2	1.4	7/0.5	0.5	5.0
North Carolina	0.1	0.3	0.0	0.1	0.2	2.6
North Dakota	0.1	0.3	0.3	0.3	0.7	2.6
Ohio	0.1	0.2	0.0	0.5	0.5	3.3
Oklahoma	0.1	0.9	2.0	1.0	1.1	3.3
Oregon	0.0	0.4	0.8	2.3	2.4	2.5
Pennsylvania	0.4	1.0	0.0	2/4.2	---	13.6
Rhode Island	0.2	0.3	6.5	2.0	2.2	15.4
South Carolina	0.0	0.2	0.0	0.2	0.2	2.2
South Dakota	0.0	0.2	-	8/0.1	8/0.1	0.7
Tennessee	0.1	0.3	0.0	0.2	0.2	10.0
Texas	0.1	---	6/0.6	0.2	0.2	8.9
Utah	0.1	0.2	0.2	0.9	0.9	3.6
Vermont	0.6	0.2	0.0	0.7	0.3	1.2
Virginia	0.1	0.2	0.0	0.1	0.1	2.8
Washington	0.4	0.4	5.4	2/3.5	---	14.2
West Virginia	0.1	0.3	0.3	1.3	1.5	6.1
Wisconsin	0.1	0.4	0.1	0.1	0.1	1.9
Wyoming	0.1	0.2	0.0	0.2	0.3	1.9
Puerto Rico	0.0	0.2	0.0	0.0	0.0	0.0
Virgin Islands	0.3	2.9	5.9	2.5	2.5	19.8
Guam	0.2	1.2	0.6	0.4	0.4	1.6
American Samoa	-	---	---	---	---	---
Northern Marianas	0.1	1.1	1.1	8/ -	8/ -	---

See footnotes at end of table.

Table A. Percent of birth records on which specified items were not stated: United States and each State and territory, 2003 -- Con.

[By place of residence]

Area	Obstetric procedures 9/	Complications of labor and/or delivery 10/	Method or delivery	Abnormal conditions of newborn	Congenital anomalies
Total of reporting areas 1/	0.3	0.4	0.5	0.6	0.5
Alabama	0.0	0.0	0.6	0.0	0.0
Alaska	7.7	8.4	0.3	9.4	9.5
Arizona	0.0	0.0	0.5	0.0	0.3
Arkansas	0.0	0.0	0.4	0.0	0.0
California	0.0	0.0	0.0	0.0	0.0
Colorado	0.0	0.0	0.0	0.0	0.1
Connecticut	0.0	0.0	0.2	0.8	0.9
Delaware	0.0	0.0	0.0	2.4	0.0
District of Columbia	0.0	0.0	0.1	0.1	0.0
Florida	0.0	0.0	0.7	0.0	0.0
Georgia	0.0	0.0	0.6	0.0	0.0
Hawaii	0.0	0.0	0.7	0.1	0.0
Idaho	0.2	0.4	0.4	2.1	0.3
Illinois	0.0	0.0	0.6	0.0	0.0
Indiana	0.0	0.0	0.6	0.0	0.0
Iowa	0.0	0.0	0.7	0.1	0.1
Kansas	0.0	0.0	0.2	0.0	0.1
Kentucky	1.7	2.4	2.3	3.4	2.7
Louisiana	0.2	0.2	0.2	0.2	0.2
Maine	0.1	0.1	0.2	0.1	0.1
Maryland	0.0	-	0.3	0.3	0.0
Massachusetts	0.3	0.3	0.3	0.3	0.8
Michigan	0.0	0.0	0.5	0.0	0.0
Minnesota	3.8	5.6	1.3	7.3	7.4
Mississippi	0.1	0.1	0.5	0.1	0.1
Missouri	0.1	0.1	0.7	0.1	0.1
Montana	0.0	0.0	0.3	0.2	0.0
Nebraska	0.0	0.0	0.3	12/0.0	0.0
Nevada	1.0	1.7	1.4	1.3	1.4
New Hampshire	0.0	0.0	0.3	0.0	0.0
New Jersey	0.0	0.1	0.9	1.9	0.5
New Mexico	0.0	0.0	0.4	0.0	---
New York	0.3	0.4	0.5	13/1.4	1.2
North Carolina	0.0	0.0	0.5	0.0	0.0
North Dakota	0.3	0.3	1.9	0.8	0.5
Ohio	0.0	0.0	0.8	0.3	0.0
Oklahoma	1.2	2.0	1.5	4.0	4.5
Oregon	0.0	0.0	0.5	1.3	0.0
Pennsylvania	0.0	0.0	0.2	2/ &	0.0
Rhode Island	6.4	6.5	0.2	14.9	14.0
South Carolina	0.0	0.0	1.0	0.0	0.0
South Dakota	0.0	0.0	0.6	0.0	0.0
Tennessee	0.0	0.0	0.7	0.0	0.0
Texas	0.0	11/0.0	0.7	12/0.0	0.0
Utah	0.0	0.0	0.5	0.1	0.1
Vermont	0.0	0.0	0.2	0.0	0.0
Virginia	0.0	0.0	0.5	0.2	0.0
Washington	5.9	6.0	0.0	2/ &	3.5
West Virginia	0.2	0.3	0.4	0.9	0.1
Wisconsin	0.0	0.0	0.0	14/0.1	0.1
Wyoming	0.0	0.0	0.2	0.0	0.0
Puerto Rico	0.0	0.0	0.0	0.0	0.0
Virgin Islands	2.0	7.6	1.9	7.7	8.5
Guam	0.3	0.8	0.1	0.2	0.4
American Samoa	---	---	---	---	---
Northern Marianas	0.6	0.6	2.4	2.3	1.2

0.0 Quantity more than zero but less than 0.05.

---Data not available.

- Quantity zero.

& Data not shown.

1/ Excludes data for Puerto Rico, Virgin Islands, Guam, American Samoa, and the Commonwealth of the .
Northern Marianas.

2/ Data for Pennsylvania and Washington, which were implemented in the 2003 revision to the U.S. Certificate, are not compatible with data based on the 1989 revision.

3/ California reports date last normal menses began but does not report clinical estimate of gestation .

4/ Excludes data for Pennsylvania and Washington.

5/ Kansas does not report Rh sensitization.

6/ Texas does not report genital herpes and uterine bleeding.
7/ Indiana and New York State report tobacco use but do not report the average number of cigarettes smoked per day in standard categories; data for New York City are reported in standard categories.
8/ South Dakota and the Commonwealth of the Northern Marianas report tobacco and alcohol use but do not report the average number of cigarettes smoked per day or the average number of drinks per week.
9/ The percent not stated for induction of labor and tocolysis may differ slightly from levels shown here because of formatting differences between the 1989 and 2003 Revision of the Certificate of Live Birth.
10/ The percent not stated for meconium, precipitous labor and malpresentation may differ slightly from levels shown here because of formatting differences between the 1989 and 2003 Revision of the Certificate of Live Birth.
11/ Texas does not report anesthetic complications and fetal distress.
12/ Nebraska and Texas do not report birth injury.
13/ New York City does not report assisted ventilation less than 30 minutes and assisted ventilation of 30 minutes or more .
14/ Wisconsin does not report fetal alcohol syndrome.

Table B. Births by place of occurrence and residence for births occurring in the 50 States, the District of Columbia, and U.S. territories, 2003

Area	Number live births	
	Occurrence	Residence
United States 1/	4,096,092	4,089,950
Alabama	58,415	59,552
Alaska	9,991	10,086
Arizona	91,061	90,967
Arkansas	37,127	37,784
California	541,835	540,997
Colorado	69,525	69,339
Connecticut	43,510	42,873
Delaware	12,120	11,329
District of Columbia	14,637	7,619
Florida	212,313	212,250
Georgia	137,274	135,979
Hawaii	18,139	18,100
Idaho	21,290	21,800
Illinois	179,082	182,495
Indiana	87,115	86,434
Iowa	38,401	38,174
Kansas	40,326	39,476
Kentucky	53,417	55,236
Louisiana	65,302	65,040
Maine	13,662	13,855
Maryland	70,783	74,930
Massachusetts	81,308	80,184
Michigan	129,889	131,094
Minnesota	69,999	70,050
Mississippi	41,291	42,380
Missouri	77,878	77,045
Montana	11,417	11,422
Nebraska	26,079	25,917
Nevada	33,205	33,647
New Hampshire	13,872	14,393
New Jersey	113,851	116,983
New Mexico	27,320	27,821
New York	254,922	253,714
North Carolina	119,006	118,323
North Dakota	9,191	7,972
Ohio	150,023	149,679
Oklahoma	49,855	50,981
Oregon	46,845	45,953
Pennsylvania	145,955	145,959
Rhode Island	13,824	13,209
South Carolina	53,376	55,649
South Dakota	11,503	11,027
Tennessee	84,014	78,890
Texas	383,207	377,476
Utah	51,064	49,860
Vermont	98,991	6,589
Virginia	6,290	101,254
Washington	80,010	80,489
West Virginia	68,893	20,935
Wisconsin	21,481	70,040
Wyoming	6,208	6,700
Births occurring to foreign residents		
Canada	-	210
México	-	5,402
Remainder of world	-	474
Births occurring to US territorial residents		
Puerto Rico	-	50,696
Virgin Islands	-	1,522
Guam	-	3,281
American Samoa	-	1,608
Northern Marianas	-	1,349

--- Data not available.
- Quantity zero.
1/ Excludes data for the territories and foreign residents

Table C. Lower and upper 95 percent and 96 percent confidence limit factors for a birth rate based on a Poisson variable of 1 through 99 births, *B*

B	L(1- a=.95,*B*)	U(1- a =.95,*B*)	L(1- a =.96,*B*)	U(1- a =.96,*B*)
1	0.02532	5.57164	0.02020	5.83392
2	0.12110	3.61234	0.10735	3.75830
3	0.20622	2.92242	0.18907	3.02804
4	0.27247	2.56040	0.25406	2.64510
5	0.32470	2.33367	0.30591	2.40540
6	0.36698	2.17658	0.34819	2.23940
7	0.40205	2.06038	0.38344	2.11666
8	0.43173	1.97040	0.41339	2.02164
9	0.45726	1.89831	0.43923	1.94553
10	0.47954	1.83904	0.46183	1.88297
11	0.49920	1.78928	0.48182	1.83047
12	0.51671	1.74680	0.49966	1.78566
13	0.53246	1.71003	0.51571	1.74688
14	0.54671	1.67783	0.53027	1.71292
15	0.55969	1.64935	0.54354	1.68289
16	0.57159	1.62394	0.55571	1.65610
17	0.58254	1.60110	0.56692	1.63203
18	0.59266	1.58043	0.57730	1.61024
19	0.60207	1.56162	0.58695	1.59042
20	0.61083	1.54442	0.59594	1.57230
21	0.61902	1.52861	0.60435	1.55563
22	0.62669	1.51401	0.61224	1.54026
23	0.63391	1.50049	0.61966	1.52602
24	0.64072	1.48792	0.62666	1.51278
25	0.64715	1.47620	0.63328	1.50043
26	0.65323	1.46523	0.63954	1.48888
27	0.65901	1.45495	0.64549	1.47805
28	0.66449	1.44528	0.65114	1.46787
29	0.66972	1.43617	0.65652	1.45827
30	0.67470	1.42756	0.66166	1.44922
31	0.67945	1.41942	0.66656	1.44064
32	0.68400	1.41170	0.67125	1.43252
33	0.68835	1.40437	0.67575	1.42480
34	0.69253	1.39740	0.68005	1.41746
35	0.69654	1.39076	0.68419	1.41047
36	0.70039	1.38442	0.68817	1.40380
37	0.70409	1.37837	0.69199	1.39743
38	0.70766	1.37258	0.69568	1.39134
39	0.71110	1.36703	0.69923	1.38550
40	0.71441	1.36172	0.70266	1.37991
41	0.71762	1.35661	0.70597	1.37454
42	0.72071	1.35171	0.70917	1.36938
43	0.72370	1.34699	0.71227	1.36442
44	0.72660	1.34245	0.71526	1.35964
45	0.72941	1.33808	0.71816	1.35504
46	0.73213	1.33386	0.72098	1.35060
47	0.73476	1.32979	0.72370	1.34632
48	0.73732	1.32585	0.72635	1.34218
49	0.73981	1.32205	0.72892	1.33818
50	0.74222	1.31838	0.73142	1.33431

Table C. Lower and upper 95 percent and 96 percent confidence limit factors for a birth rate based on a Poisson variable of 1 through 99 births, *B* --Con.

B	L(1- a=.95,*B*)	U(1- a =.95,*B*)	L(1- a =.96,*B*)	U(1- a =.96,*B*)
51	0.74457	1.31482	0.73385	1.33057
52	0.74685	1.31137	0.73621	1.32694
53	0.74907	1.30802	0.73851	1.32342
54	0.75123	1.30478	0.74075	1.32002
55	0.75334	1.30164	0.74293	1.31671
56	0.75539	1.29858	0.74506	1.31349
57	0.75739	1.29562	0.74713	1.31037
58	0.75934	1.29273	0.74916	1.30734
59	0.76125	1.28993	0.75113	1.30439
60	0.76311	1.28720	0.75306	1.30152
61	0.76492	1.28454	0.75494	1.29873
62	0.76669	1.28195	0.75678	1.29601
63	0.76843	1.27943	0.75857	1.29336
64	0.77012	1.27698	0.76033	1.29077
65	0.77178	1.27458	0.76205	1.28826
66	0.77340	1.27225	0.76373	1.28580
67	0.77499	1.26996	0.76537	1.28340
68	0.77654	1.26774	0.76698	1.28106
69	0.77806	1.26556	0.76856	1.27877
70	0.77955	1.26344	0.77011	1.27654
71	0.78101	1.26136	0.77162	1.27436
72	0.78244	1.25933	0.77310	1.27223
73	0.78384	1.25735	0.77456	1.27014
74	0.78522	1.25541	0.77598	1.26810
75	0.78656	1.25351	0.77738	1.26610
76	0.78789	1.25165	0.77876	1.26415
77	0.78918	1.24983	0.78010	1.26223
78	0.79046	1.24805	0.78143	1.26036
79	0.79171	1.24630	0.78272	1.25852
80	0.79294	1.24459	0.78400	1.25672
81	0.79414	1.24291	0.78525	1.25496
82	0.79533	1.24126	0.78648	1.25323
83	0.79649	1.23965	0.78769	1.25153
84	0.79764	1.23807	0.78888	1.24987
85	0.79876	1.23652	0.79005	1.24824
86	0.79987	1.23499	0.79120	1.24664
87	0.80096	1.23350	0.79233	1.24507
88	0.80203	1.23203	0.79344	1.24352
89	0.80308	1.23059	0.79453	1.24201
90	0.80412	1.22917	0.79561	1.24052
91	0.80514	1.22778	0.79667	1.23906
92	0.80614	1.22641	0.79771	1.23762
93	0.80713	1.22507	0.79874	1.23621
94	0.80810	1.22375	0.79975	1.23482
95	0.80906	1.22245	0.80074	1.23345
96	0.81000	1.22117	0.80172	1.23211
97	0.81093	1.21992	0.80269	1.23079
98	0.81185	1.21868	0.80364	1.22949
99	0.81275	1.21746	0.80458	1.22822

Table D. Sources for resident population and population including Armed Forces abroad: Birth and death-registration States, 1900-1932, and United States, 1900-2003

[2004] US Census Bureau. Monthly postcensal resident population plus Armed Forces overseas, by single year of age, sex, race, and Hispanic origin. Available at: http://www.census.gov/popest/national/asrh/2004_nat_af.html

[2003] National Center for Health Statistics. Postcensal estimates of the resident population of the United States as of July 1, 2003, by year, State and county, age, bridged race, sex, and Hispanic origin (vintage 2003). File pcen_v2003_y03.txt (ASCII). Released September 14, 2004. Available at: http://www.cdc.gov/nchs/about/major/dvs/popbridge/datadoc.htm

[2002] National Center for Health. Postcensal estimates of the resident population of the United States as of July 1, 2002, by State and county, age, bridged race, sex, and Hispanic origin. File pcen v2002.txt. Internet released, August 1, 2003. Available at: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm.

[2001] National Center for Health. Postcensal estimates of the resident population of the United States as of July 1, 2001, by State and county, age, bridged race, sex, and Hispanic origin. File pcen v2002.txt. Internet released, August 1, 2003. Available at: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm.

[2001] National Center for Health. Postcensal estimates of the resident population of the United States as of July 1, 2001, by age, bridged race, sex, and Hispanic origin. File pcen v2001.txt. Internet released, January 12, 2003. Available at: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm.

[2000] National Center for Health Statistics. Estimates of the April 1, 2000, United States resident population by State and county, age, sex, bridged race, and Hispanic origin, prepared under a collaborative arrangement with the U.S. Census Bureau. File br040100.txt. Internet released, January 12, 2003. Available at: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm.

[1999] National Center for Health Statistics. Intercensal estimates of the July 1, 1999, United States resident population by State and county, age, sex, bridged race, and Hispanic origin, prepared under a collaborative arrangement with the U.S. Census Bureau. File icen1999.txt. Internet released, April 15, 2003. Available at: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm.

[1998] National Center for Health Statistics. Intercensal estimates of the July 1, 1998, United States resident population by State and county, age, sex, bridged race, and Hispanic origin, prepared under a collaborative arrangement with the U.S. Census Bureau. File icen1999.txt. Internet released, April 15, 2003. Available at: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm.

[1997] National Center for Health Statistics. Intercensal estimates of the July 1,

1997, United States resident population by State and county, age, sex, bridged race, and Hispanic origin, prepared under a collaborative arrangement with the U.S. Census Bureau. File icen1997.txt. Internet released, April 15, 2003. Available at: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm.

[1996] National Center for Health Statistics. Intercensal estimates of the July 1, 1996, United States resident population by State and county, age, sex, bridged race, and Hispanic origin, prepared under a collaborative arrangement with the U.S. Census Bureau. File icen1996.txt. Internet released, April 15, 2003. Available at: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm.

[1995] National Center for Health Statistics. Intercensal estimates of the July 1, 1995, United States resident population by State and county, age, sex, bridged race, and Hispanic origin, prepared under a collaborative arrangement with the U.S. Census Bureau. File icen1995.txt. Internet released, April 15, 2003. Available at: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm.

[1994] National Center for Health Statistics. Intercensal estimates of the July 1, 1994, United States resident population by State and county, age, sex, bridged race, and Hispanic origin, prepared under a collaborative arrangement with the U.S. Census Bureau. File icen1994.txt. Internet released, April 15, 2003. Available at: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm.

[1993] National Center for Health Statistics. Intercensal estimates of the July 1, 1993, United States resident population State and county, by age, sex, bridged race, and Hispanic origin, prepared under a collaborative arrangement with the U.S. Census Bureau. File icen1993.txt. Internet released, April 15, 2003. Available at: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm.

[1992] National Center for Health Statistics. Intercensal estimates of the July 1, 1992, United States resident population by State and county, age, sex, bridged race, and Hispanic origin, prepared under a collaborative arrangement with the U.S. Census Bureau. File icen1992.txt. Internet released, April 15, 2003. Available at: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm.

[1991] National Center for Health Statistics. Intercensal estimates of the July 1, 1991, United States resident population by State and county, age, sex, bridged race, and Hispanic origin, prepared under a collaborative arrangement with the U.S. Census Bureau. File icen1991.txt. Internet released, April 15, 2003. Available at: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm.

Table E. Percentage net undercount, by age, sex, and race/Hispanic origin: United States, April 1, 2000	
Characteristic	Estimate (%)
Total	-0.49
Age/sex	
10–17 Male and female	-1.32
18–29 Male	1.12
18–29 Female	-1.39
30–49 Male	2.01
30–49 Female	-0.60
50 years and over male	-0.80
50 years and over female	-2.53
Race/Hispanic origin	
Non-Hispanic white	-1.13
Non-Hispanic black	1.84
Hispanic	0.71

SOURCE: Fenstermaker D, Haines D. Summary of estimated net coverage. DSSD A.C.E. Revision II Memorandum Series #PP-54. Washington: U.S. Census Bureau. 2002.

Table 4–1. Population of birth- and death-registration States, 1900–1932, and United States, 1900–2003

[Population enumerated as of April 1 for 1940, 1950, 1960, 1970, 1980, 1990, and 2000 and estimated as of July 1 for all other years]

Year	United States 1/		Year	United States 1/		Birth-registration States		Death-registration States	
	Population including Armed Forces abroad	Population residing in area		Population including Armed Forces abroad	Population residing in area	Number of States2/	Population residing in area	Number of States2/	Population residing in area
2003	291,028,156	290,810,789	1950	151,132,000	150,697,361	. . .	. . .	. . .	. . .
2002	288,600,204	288,368,706	1949	149,188,000	148,665,000	. . .	. . .	. . .	. . .
2001	285,024,000	284,796,887	1948	146,631,000	146,093,000	. . .	. . .	. . .	. . .
2000	281,652,000	281,421,906	1947	144,126,000	143,446,000	. . .	. . .	. . .	. . .
1999	279,294,713	279,040,168	1946	141,389,000	140,054,000	. . .	. . .	. . .	. . .
1998	276,115,288	275,854,104	1945	139,928,000	132,481,000	. . .	. . .	. . .	. . .
1997	272,911,760	272,646,925	1944	138,397,000	132,885,000	. . .	. . .	. . .	. . .
1996	269,667,391	269,394,284	1943	136,739,000	134,245,000	. . .	. . .	. . .	. . .
1995	266,557,091	266,278,393	1942	134,860,000	133,920,000	. . .	. . .	. . .	. . .
1994	263,435,673	263,125,821	1941	133,402,000	133,121,000	. . .	. . .	. . .	. . .
1993	260,255,352	259,918,588	1940	131,820,000	131,669,275	. . .	. . .	. . .	. . .
1992	256,894,189	256,514,224	1939	131,028,000	130,879,718	. . .	. . .	. . .	. . .
1991	253,492,503	252,980,941	1938	129,969,000	129,824,939	. . .	. . .	. . .	. . .
1990	249,225,000	248,709,873	1937	128,961,000	128,824,829	. . .	. . .	. . .	. . .
1989	247,342,000	246,819,000	1936	128,181,000	128,053,180	. . .	. . .	. . .	. . .
1988	245,021,000	244,499,000	1935	127,362,000	127,250,232	. . .	. . .	. . .	. . .
1987	242,804,000	242,289,000	1934	126,485,000	126,373,773	. . .	. . .	. . .	. . .
1986	240,651,000	240,133,000	1933	125,690,000	125,578,763	. . .	. . .	. . .	. . .
1985	238,466,000	237,924,000	1932	124,949,000	124,840,471	47	118,903,899	47	118,903,899
1984	236,348,000	235,825,000	1931	124,149,000	124,039,648	46	117,455,229	47	118,148,987
1983	234,307,000	233,792,000	1930	123,188,000	123,076,741	46	116,544,946	47	117,238,278
1982	232,188,000	231,664,000	1929		121,769,939	46	115,317,450	46	115,317,450
1981	229,966,000	229,466,000	1928		120,501,115	44	113,636,160	44	113,636,160
1980	227,061,000	226,545,805	1927		119,038,062	40	104,320,830	42	107,084,532
1979	225,055,000	224,567,000	1926		117,399,225	35	90,400,590	41	103,822,683
1978	222,585,000	222,095,000	1925		115,831,963	33	88,294,564	40	102,031,555
1977	220,239,000	219,760,000	1924		114,113,463	33	87,000,295	39	99,318,098
1976	218,035,000	217,563,000	1923		111,949,945	30	81,072,123	38	96,788,197
1975	215,973,000	215,465,000	1922		110,054,778	30	79,560,746	37	92,702,901
1974	213,854,000	213,342,000	1921		108,541,489	27	70,807,090	34	87,814,447
1973	211,909,000	211,357,000	1920		106,466,420	23	63,597,307	34	86,079,263
1972	209,896,000	209,284,000	1919	105,063,000	104,512,110	22	61,212,076	33	83,157,982
1971	207,661,000	206,827,000	1918	104,550,000	103,202,801	20	55,153,782	30	79,008,412
1970	204,270,000	203,211,926	1917	103,414,000	103,265,913	20	55,197,952	27	70,234,775
1969	202,677,000	201,385,000	1916		101,965,984	11	32,944,013	26	66,971,177
1968	200,706,000	199,399,000	1915		100,549,013	10	31,096,697	24	61,894,847
1967	198,712,000	197,457,000	1914		99,117,567	. . .	. . .	24	60,963,309
1966	196,560,000	195,576,000	1913		97,226,814	. . .	. . .	23	58,156,740
1965	194,303,000	193,526,000	1912		95,331,300	. . .	. . .	22	54,847,700
1964	191,889,000	191,141,000	1911		93,867,814	. . .	. . .	22	53,929,644
1963	189,242,000	188,483,000	1910		92,406,536	. . .	. . .	20	47,470,437
1962	186,538,000	185,771,000	1909		90,491,525	. . .	. . .	18	44,223,513
1961	183,691,000	182,992,000	1908		88,708,976	. . .	. . .	17	38,634,759
1960	179,933,000	179,323,175	1907		87,000,271	. . .	. . .	15	34,552,837
1959	177,264,000	176,513,000	1906		85,436,556	. . .	. . .	15	33,782,288
1958	174,141,000	173,320,000	1905		83,819,666	. . .	. . .	10	21,767,980
1957	171,274,000	170,371,000	1904		82,164,974	. . .	. . .	10	21,332,076

1956	168,221,000	167,306,000	1903		80,632,152	. . .	. . .	10	20,943,222
1955	165,275,000	164,308,000	1902		79,160,196	. . .	. . .	10	20,582,907
1954	162,391,000	161,164,000	1901		77,585,128	. . .	. . .	10	20,237,453
1953	159,565,000	158,242,000	1900		76,094,134	. . .	. . .	10	19,965,446
1952	156,954,000	155,687,000							
1951	154,287,000	153,310,000							

- - - Data not available.
... Category not applicable.

1/ Alaska included beginning 1959 and Hawaii, 1960.

2/ The District of Columbia is not included in "Number of States," but it is represented in all data shown for each year.

SOURCE: Published and unpublished data from the U.S. Census Bureau; see text and table D.

Table 4-2. Estimated total population by race, and estimated female population by age and race: United States, 2003

[Populations estimated as of July 1]

Age	All races	White	Black	American Indian	Asian or Pacific Islander
Total population	290,810,789	236,349,420	38,148,112	3,111,067	13,202,190
Female population					
15-44 years	61,910,608	48,781,745	9,054,043	737,138	3,337,682
10-14 years	10,336,612	8,000,163	1,749,239	150,708	436,502
15-19 years	9,959,789	7,795,394	1,583,322	144,926	436,147
15-17 years	5,997,800	4,687,044	965,207	87,450	258,099
18-19 years	3,961,989	3,108,350	618,115	57,476	178,048
20-24 years	10,063,772	7,862,961	1,556,595	133,130	511,086
25-29 years	9,395,243	7,294,715	1,394,320	112,534	593,674
30-34 years	10,254,869	8,015,352	1,467,416	111,871	660,230
35-39 years	10,681,456	8,478,198	1,503,136	114,337	585,785
40-44 years	11,555,479	9,335,125	1,549,254	120,340	550,760
45-49 years	11,030,309	9,005,159	1,408,560	108,883	507,707

NOTE: These population counts are estimated based on the 2000 census; see text:"Population bases". Race categories are consistent with the 1977 Office of Management and Budget guidelines.

SOURCE: U.S. Census Bureau and NCHS. See reference 41.

Table 4-3. Estimated total population by specified Hispanic origin and estimated female population by age and specific Hispanic origin and by race for women of non-Hispanic origin: United States, 2003

[Populations estimated as of July 1, 2003]

Age		Hispanic					Non-Hispanic		
		Total	Mexican	Puerto Rican	Cuban	Other Hispanic 1/	Total 2/	White	Black
Total population	290,810,789	39,899,063	26,526,961	3,861,862	1,496,974	8,013,241	250,911,726	199,214,378	36,508,902
Female population									
15-44 years	61,910,608	9,413,358	6,201,464	947,551	240,901	2,023,444	52,497,250	40,061,288	8,639,424
10-14 years	10,336,612	1,788,726	1,263,091	186,328	44,904	294,411	8,547,886	6,356,246	1,664,204
15-19 years	9,959,789	1,562,601	1,055,394	168,451	28,609	310,150	8,397,188	6,355,772	1,513,477
15-17 years	5,997,800	944,433	637,856	106,359	21,225	178,999	5,053,367	3,818,116	922,089
18-19 years	3,961,989	618,168	417,538	62,092	4,384	131,151	3,343,821	2,537,656	591,388
20-24 years	10,063,772	1,672,471	1,149,488	148,559	34,138	340,289	8,391,301	6,317,351	1,482,135
25-29 years	9,395,243	1,706,215	1,171,850	163,684	38,601	332,064	7,689,028	5,711,126	1,319,339
30-34 years	10,254,869	1,656,952	1,098,812	167,168	31,143	359,838	8,597,917	6,476,430	1,394,425
35-39 years	10,681,456	1,493,028	958,105	152,952	51,382	330,592	9,188,428	7,092,435	1,437,765
40-44 years	11,555,479	1,322,091	767,815	146,737	57,028	350,511	10,233,388	8,108,174	1,492,283
45-49 years	11,030,309	1,072,103	641,391	104,809	46,835	279,069	9,958,206	8,009,801	1,362,200

1/ Includes Central and South American and other and unknown Hispanic.

2/ Includes races other than white and black.

NOTE: These population counts are estimated based on the 2000 census; see text: "Population bases". Race categories are consistent with the 1977 Office of Management and Budget guidelines.

SOURCE: U.S. Census Bureau and NCHS. See references 41 and 44.

4-4. Estimated total population and female population aged 15-44 years: United States, each State, and Territory: July 1, 2003

Geographic area	Total population	Females15-44 years
United States	290,810,789	61,910,608
Alabama	4,500,752	952,087
Alaska	648,820	139,194
Arizona	5,580,811	1,148,001
Arkansas	2,725,715	560,422
California	35,484,453	7,734,367
Colorado	4,550,688	997,999
Connecticut	3,483,375	719,173
Delaware	817,491	175,293
District of Columbia	564,353	141,289
Florida	17,019,068	3,345,724
Georgia	8,684,715	1,963,462
Hawaii	1,257,613	250,610
Idaho	1,366,332	286,935
Illinois	12,653,544	2,723,508
Indiana	6,195,643	1,301,726
Iowa	2,944,062	603,002
Kansas	2,723,508	568,347
Kentucky	4,117,827	874,761
Louisiana	4,496,334	983,257
Maine	1,305,732	266,228
Maryland	5,508,909	1,201,519
Massachusetts	6,433,422	1,402,058
Michigan	10,079,985	2,125,430
Minnesota	5,059,375	1,093,415
Mississippi	2,881,283	624,230
Missouri	5,704,484	1,201,978
Montana	917,621	182,464
Nebraska	1,739,291	362,833
Nevada	2,241,154	466,283
New Hampshire	1,287,689	273,124

New Jersey	8,638,396	1,803,203
New Mexico	1,874,614	389,591
New York	19,190,115	4,161,106
North Carolina	8,407,248	1,798,023
North Dakota	633,840	129,510
Ohio	11,435,799	2,387,729
Oklahoma	3,511,532	729,796
Oregon	3,559,596	735,735
Pennsylvania	12,365,459	2,511,912
Rhode Island	1,076,166	233,533
South Carolina	4,147,153	884,115
South Dakota	764,309	155,788
Tennessee	5,841,748	1,250,389
Texas	22,118,509	4,871,950
Utah	2,351,467	540,615
Vermont	619,116	128,931
Virginia	7,386,330	1,598,601
Washington	6,131,445	1,315,445
West Virginia	1,810,357	360,089
Wisconsin	5,472,299	1,153,678
Wyoming	501,242	102,150
Puerto Rico	3,878,532	854,116
Virgin Islands	108,814	22,789
Guam	163,593	36,708
American Samoa	57,844	12,892
Northern Marianas	76,129	29,890

Source: National Center for Health Statistics. Unpublished estimates of the July 1, 2003, United States population by age, sex, race, and Hispanic origin, prepared undered a collaborative arrangement with the U.S. Census Bureau, 2003.