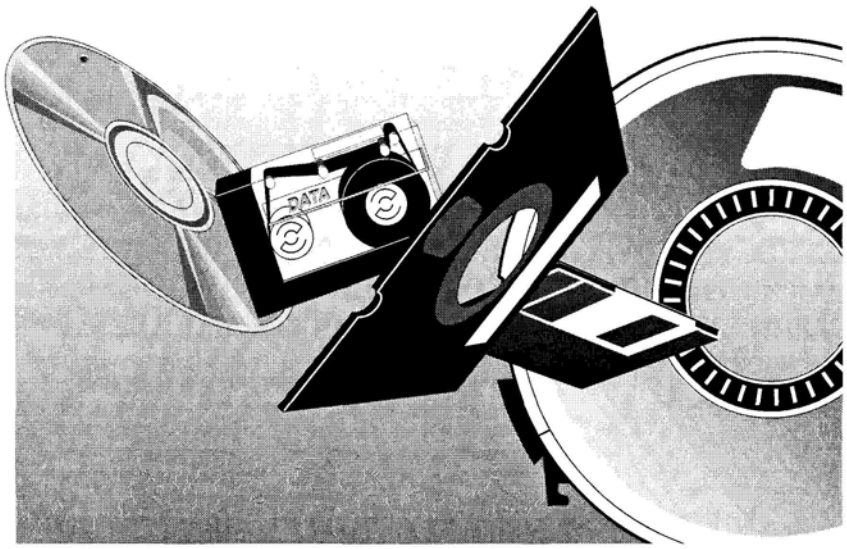
Public Use Data File Documentation

2003 Period Linked Birth/Infant Death Data Set

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



2003 Period Linked Birth/lnfant Death Data Set

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Introduction

The linked birth/infant death data set (linked file) is released in two formats - period data and birth cohort data. This documentation is for the 2003 period linked file. Beginning with 1995 data, the period linked files have formed the basis for all official NCHS linked file statistics. Differences between period and birth cohort data are outlined below.

Period data - The numerator for the 2003 period linked file consists of all infant deaths occurring in 2003 linked to their corresponding birth certificates, whether the birth occurred in 2002 or 2003. The denominator file for this data set is the 2003 natality file, that is, all births occurring in 2003. NCHS accepted late filed birth certificates to be used specifically for the 2003 linked file. This reduced the number of unlinked records and increased the number of births in the denominator file.

Birth cohort data - The numerator for the 2002 birth cohort linked file consists of deaths to infants born in 2002 whether the death occurred in 2002 or 2003. The denominator file is the 2002 natality file, that is, all births occurring in 2002.

The 2003 period linked birth/infant death data set includes several data files. The first file includes all US infant deaths which occurred in the 2003 data year linked to their corresponding birth certificates, whether the birth occurred in 2002 or in 2003 - referred to as the numerator file. The second file contains information from the death certificate for all US infant death records which could not be linked to their corresponding birth certificates - referred to as the unlinked death file. The third file is the 2003 NCHS natality file for the US (plus late filed records mentioned above), which is used to provide denominators for rate computations. These same three data files are also available for Puerto Rico, the Virgin Islands, and Guam.

Changes Beginning with the 1995 Data Year

In part to correct for known biases in the data, changes were made to the linked file beginning with the 1995 data year, and these changes remain effective for 2003 data. A weight has been added to the linked numerator file to correct in part for biases in percent of records linked by major characteristics (see section on Percent of records linked below). The number of infant deaths in the linked file are weighted to equal the sum of the linked plus unlinked infant deaths by age at death and state. The formula for computing the weights is as follows:

$$\frac{\text{number of linked infant deaths + number of unlinked infant deaths}}{\text{number of linked infant deaths}}$$

A separate weight is computed for each State of residence of birth and each age at death category (<1 day, 1-27 days, 28 days-1year). Thus, weights are 1.0 for states which link all of their infant deaths. The denominator file is not weighted. Weights are not computed for the Puerto Rico, Virgin Islands, and Guam file.

An imputation for not-stated birthweight has been added to the data set, to reduce potential bias in the computation of birthweight-specific infant mortality rates. Basically, if birthweight is not-stated and the period of gestation is known, birthweight is assigned the value from the previous record

with the same period of gestation, race, sex, and plurality. Imputed values are flagged. The addition of this imputation has reduced the percent of not-stated responses for birthweight from 3.85 to 0.61 in the numerator file, and from 0.09 to 0.02 in the denominator file, thus reducing (but not eliminating) the potential for underestimation when computing birthweight-specific infant mortality rates.

The 1989 and 2003 Revisions of the U.S. Certificates

This data file includes data based on both the 1989 Revision of the U.S. Standard Certificate of Live Birth (unrevised) and the 2003 revision of the U.S. Standard Certificate of Live Birth in 2003 (revised), which was used by Pennsylvania and Washington. The 2003 revision is described in detail elsewhere. (See the 2003 Revision website at: http://www.cdc.gov/nchs/vital_certs_rev.htm). Where comparable revised data from Pennsylvania and Washington are combined with data from the remaining 48 states and the District of Columbia. (Revised data are denoted by "R;" unrevised data are denoted by "U" in the "Rev" column of the documentation.) Where data for the 1989 and 2003 certificate revisions are not comparable (e.g., educational attainment of the mother), unrevised and revised data are given in separate fields in the data file. Also, see discussion of reporting flags. Data on items new to the 2003 Revision of the U.S. Certificate of Live Birth are not included in this data file.

This file includes data for five areas (California, Idaho, Montana, New York City, and New York State), which implemented the 2003 revision of the U.S. Standard Certificate of Death in 2003 and for the remaining 46 States and the District of Columbia that collected and reported death data in 2003 based on the 1989 revision of the U.S. Standard Certificate of Death. Most of the items in this file are comparable despite changes to item wording and format in the 2003 revision. The 2003 revision is described in detail elsewhere. (See the 2003 Revision website at: http://www.cdc.gov/nchs/vital_certs_rev.htm).

The Use of Reporting Flags

Data are collected by the place of occurrence but typically tabulated by place of residence. Reporting flags are included in the file to assist in accurately excluding records from non-reporting areas when tabulating data by place of residence. For this purpose, the complete reporting area means the 50 States, the District of Columbia and New York City. For medical information collected using a checkbox format on the birth certificate (e.g. medical risk factors) non-reporting areas are excluded by use of the code "8" (item not on certificate) which is part of the code structure for each specific checkbox item.

For non-checkbox items (e.g. prenatal care) a separate reporting flag is used. Reporting flags must be invoked to generate accurate numbers by residence for items which are not reported by all States. Reporting flag codes are "0" (item not on certificate) or "1" (item on certificate). Where applicable, reporting flags are shown in the column "Reporting Flag Position" in the file documentation.

Multiple Race

In 1997, the Office of Management and Budget (OMB) issued revised standards requiring Federal collection programs to allow respondents to select *one or more race categories.* Beginning with 2003 data, multiple race was reported on the birth certificates of California, Hawaii, Ohio (December only), Pennsylvania,

Utah, and Washington. Multiple race was reported on the death certificates of California, Hawaii, Idaho, Maine, Montana, New York, and Wisconsin. In order to provide uniformity and comparability of the data before all or most of the data are available in the new multiple-race format, it was necessary to ''bridge'' the responses of those for whom more than one race was reported (multiple race) to one, single race. See the "Technical Notes" of "Births: Final Data for 2003" and "Deaths: Final Data for 2003" which are included on this CD ROM for more information.

Comparisons of infant mortality data from the linked file with infant mortality data from the vital statistics mortality file

Although the time periods are the same, numbers of infant deaths and infant mortality rates by characteristics are not always identical between the period linked file and the vital statistics mortality file. Differences in numbers of infant deaths between the two data sources are primarily due to geographic coverage differences, as for the vital statistics mortality file, all deaths occurring in the 50 States and the District of Columbia are included regardless of the place of birth of the infant. In contrast, to be included in the linked file, both the birth and death must occur in the 50 States and the District of Columbia. Also, although every effort has been made to design weights that will accurately reflect the distribution of deaths by characteristics, weighting may contribute to small differences in numbers and rates by specific variables between these two data sets.

In most cases, differences between numbers of infant deaths and infant mortality rates between the linked file and those computed from the vital statistics mortality file are negligible.

Methodology

The methodology used to create the national file of linked birth and infant death records takes advantage of two existing data sources:

1. State linked files for the identification of linked birth and infant death certificates; and

2. NCHS natality and mortality computerized statistical files, the source of computer records for the two linked certificates.

Virtually all States routinely link infant death certificates to their corresponding birth certificates for legal and statistical purposes. When the birth and death of an infant occur in different States, copies of the records are exchanged by the State of death and State of birth in order to effect a link. In addition, if a third State is identified as the State of residence at the time of birth or death, that State is also sent a copy of the appropriate certificate by the State where the birth or death occurred.

The NCHS natality and mortality files, produced annually, include statistical data from birth and death certificates that are provided to NCHS by States under the Vital Statistics Cooperative Program (VSCP). The data have been coded according to uniform coding specifications, have passed rigid quality control standards, have been edited and reviewed, and are the basis for official U.S. birth and death statistics.

To initiate processing, NCHS obtained matching birth certificate numbers from States for all infant deaths that occurred in their jurisdiction. We used this

information to extract final, edited mortality and natality data from the NCHS natality and mortality statistical files. Individual birth and death records were selected from their respective files and linked into a single statistical record, thereby establishing a national linked record file.

After the initial linkage, NCHS returned to the States where the death occurred computer lists of unlinked infant death certificates for follow up linking. If the birth occurred in a State different from the State of death, the State of birth identified on the death certificate was contacted to obtain the linking birth certificate. State additions and corrections were incorporated, and a final, national linked file was produced. Characteristics of the natality and mortality data from which the linked file is constructed are described in detail in the Technical Appendix and Final Reports included in this document.

Characteristics of Unlinked File

For the 2003 linked file 1.0% of all infant death records could not be linked to their corresponding birth certificates. Unlinked records are included in a separate data file in this data set. The unlinked record file uses the same record layout as the numerator file of linked birth and infant death records. However, except as noted below, reserved for information from the matching birth certificate, are blank since no matching birth certificate could be found for these records. The sex field contains the sex of infant as reported on the death certificate, rather than the sex of infant from the birth certificate, which is not available. The race field contains the race of the decedent as reported on the death certificate rather than the race of mother as reported on the birth certificate as is the case with the linked record file. The race of mother on the birth certificate is generally considered to be more accurate than the race information from the death certificate (see section on Race and Hispanic origin in the Mortality Technical Notes included in this documentation). Also, date of birth as reported on the death certificate is used to generate age at death. This information is used in place of date of birth from the birth certificate, which is not available. Documentation table 6 shows counts of unlinked records by race and age at death for each State of residence. The user is cautioned in using table 6 that the race and residence items are based on information reported on the death certificate; whereas, tables 1-5 present data from the linked file in which the race and residence items are based on information reported on the birth certificate.

Percent of Records Linked

The 2003 linked file includes 27,727 linked infant death records and 285 unlinked infant death records. The linked file is weighted to the sum of linked plus unlinked records, thus the total number of weighted infant deaths by place of occurrence is 28,012. While the overall percent linked for infant deaths in the 2003 file is 99.0%, there are differences in percent linked by certain variables. These differences have important implications for how the data is analyzed.

Table 1 below shows the percent of infant deaths linked by State of occurrence of death. While many States link all of their infant deaths, linkage rates for some States are below the national average. Note in particular the percent linked for the California (97.4), Louisiana (95.6), New Jersey (96.6), and Texas (97.0). When a high percentage of deaths remain unlinked, unweighted infant mortality rates computed for these States are underestimated. It is for this

reason that weights were added to the file to correct for biases in the data due to poor data linkage for particular states.

In general, a slightly higher percentage of postneonatal (28 days to under 1 year) than neonatal (less than 28 days) deaths were linked (99.4 and 98.8, respectively.) While the weighting protocol has been designed to correct for possible bias due to variations in match rates by characteristics, no statistical method can correct perfectly for data limitations. Therefore, variations in the percent of records linked should be taken into consideration when comparing infant mortality rates by detailed characteristics.

Geographic classification

Geographic codes in this data set are based on the results of the 2000 census. Because of confidentiality concerns, only those counties and cities with a population size of 250,000 or more are separately identified in this data set. Users should refer to the geographic code outline in this document for the list of available areas and codes.

For events to be included in the linked file, both the birth and death must occur inside the 50 States and D.C. in the case of the 50 States and D.C. file; or in Puerto Rico, the Virgin Islands or Guam in the case of the Puerto Rico, Virgin Islands and Guam file. In tabulations of linked data and denominator data events occurring in each of the respective areas to nonresidents are included in tabulations that are by place of occurrence, and excluded from tabulations by place of residence. These exclusions are based on the usual place of residence of the mother. This item is contained in both the denominator file and the birth section of the numerator (linked) file. Nonresidents are identified by a code 4 in location 138 of these files.

Table 1. Percent of infant deaths linked by state of occurrence of death: United States, 2003 linked file

United States	99.0	Nebraska	100.0
Alabama	100.0	Nevada	100.0
Alaska	100.0	New Hampshire	100.0
Arizona	99.3	New Jersey	96.6
Arkansas	100.0	New Mexico	98.6
California	97.4	New York State	98.7
Colorado	100.0	New York City	99.5
Connecticut	100.0	North Carolina	99.8
Delaware	100.0	North Dakota	100.0
District of Columbia	99.0	Ohio	99.6
Florida	99.9	Oklahoma	97.6
Georgia	100.0	Oregon	99.7
Hawaii	100.0	Pennsylvania	99.5
Idaho	100.0	Rhode Island	100.0
Illinois	98.2	South Carolina	100.0
Indiana	99.2	South Dakota	100.0
Iowa	100.0	Tennessee	100.0
Kansas	98.6	Texas	97.0
Kentucky	99.7	Utah	100.0
Louisiana	95.6	Vermont	100.0
Maine	100.0	Virginia	100.0
Maryland	100.0	Washington	98.8

Massachusetts	98.2	West Virginia	100.0
Michigan	100.0	Wisconsin	100.0
Minnesota	100.0	Wyoming	100.0
Mississippi	100.0	Puerto Rico	99.6
Missouri	100.0	Virgin Islands	100.0
Montana	98.6	Guam	100.0

Demographic and Medical Classification

The documents listed below describe in detail the procedures employed for demographic classification on both the birth and death records and medical classification on death records. These documents, while not absolutely essential to the proper interpretation of the data for a number of general applications, should nevertheless be studied carefully prior to any detailed analysis of demographic or medical data variables. In particular, there are a number of exceptions to the ICD rules in multiple cause-of-death coding which, if not treated properly, may result in faulty analysis of the data. Volumes 1, 2 and 3 of the ICD-10 may be purchased from the World Health Organization (WHO) Publication Center USA, 49 Sheridan Avenue, Albany, New York, 12210 (http://www.who.int/whosis/icd10/index.html). Many of the instruction manuals listed below are available electronically on the NCHS website at: http://www.cdc.gov/nchs/about/major/dvs/im.htm. In addition, users who do not already have access to these documents may request them from the Chief, Mortality Medical Classification Branch, Division of Vital Statistics, National Center for Health Statistics, P.O. Box 12214, Research Triangle Park, North Carolina 27709. The technical appendices for natality and mortality included in this document also provide information on the source of data, coding procedures, quality of the data, etc.

A. National Center for Health Statistics. Vital statistics, Instructions for Classifying the Underlying Cause-of-Death, 2006. NCHS Instruction Manual, Part 2a. Hyattsville, Maryland: Public Health Service.

B. National Center for Health Statistics. Vital statistics, Instructions for Classifying Multiple Cause-of-Death, 2006. NCHS Instruction Manual, Part 2b. Hyattsville, Maryland: Public Health Service.

C. National Center for Health Statistics. Vital statistics, ICD-10 ACME Decision Tables for Classifying Underlying Causes-of-Death, 2006. NCHS Instruction Manual, Part 2c. Hyattsville, Maryland: Public Health Service.

D. National Center for Health Statistics. Vital statistics, ICD-10 TRANSAX Disease Reference Tables for Classifying Multiple Causes-of-Death, 2002. NCHS Instruction Manual, Part 2f. Hyattsville, Maryland: Public Health Service.

E. National Center for Health Statistics. Vital statistics, Classification and Coding Instructions for Live Birth Records, 1999. NCHS Instruction Manual, Part 3a. Hyattsville, Maryland: Public Health Service.

F. National Center for Health Statistics. Vital statistics, Demographic Classification and Coding Instructions for Death Records, 1999-2001. NCHS Instruction Manual, Part 4. Hyattsville, Maryland: Public Health Service.

G. National Center for Health Statistics. Vital statistics, Computer Edits for Natality Data, Effective 1993. NCHS Instruction Manual Part 12. Hyattsville, Maryland: Public Health Service.

H. National Center for Health Statistics. Vital statistics, Computer Edits for Mortality Data, Effective 2005. NCHS Instruction Manual Part 11. Hyattsville, Maryland: Public Health Service.

Also see: http://www.cdc.gov/nchs/vital_certs_rev.htm for the most recent information about revised certificates.

Underlying Cause of Death Data

Mortality statistics by cause of death are compiled from entries on the medical certification portion of the death certificate. The U.S. Standard Certificate of Death is shown in the Mortality Technical Appendix which is included in this documentation. Causes of death include "all those diseases, morbid conditions or injuries which either resulted in or contributed to death and the circumstances of the accident or violence which produced these injuries". The medical certification of death is divided into two sections. In Part I, the physician is asked to provide the causal chain of morbid conditions that led to death, beginning with the condition most proximate to death on line (a) and working backwards to the initiating condition. The lines (a) through (d) in Part I are connected by the phrase "due to, or as a consequence of." They were designed to encourage the physician to provide the causally related sequence of medical conditions that resulted in death. Thus, the condition on line (a) should be due to the condition on line (b), and the condition on line (b) should be a consequence of the condition on line (c), etc., until the full sequence is described back to the originating or initiating condition. If only one step in the chain of morbid events is recorded, a single entry on line (a) is adequate. Part I of the medical certification is designed to facilitate the selection of the underlying cause of death when two or more causes are recorded on the certificate. The underlying cause of death is defined by the WHO in the ICD-10 as "(a) the disease or injury which initiated the chain of morbid events leading directly to death, or (b) the circumstances of the accident or violence that produced the fatal injury" and is generally considered the most useful cause from a public health standpoint. Part II of the cause-of-death section of the death certificate solicits other conditions that the certifier believed contributed to death, but were not in the causal chain. While some details of the death certificate vary by State, all States use the same general format for medical certification outlined in the U.S. Standard Certificate. The U.S. Standard Certificate, in turn, closely follows the format recommended by the WHO.

If the death certificate is properly completed, the disease or condition listed on the lowest used line in Part I is usually accepted as the underlying cause of death. This is an application of "The General Principle." The General Principle is applied unless it is highly improbable that the condition on the lowest line used could have given rise to all of the diseases or conditions listed above it. In some cases, the sequence of morbid events entered on the death certificate is not specified correctly. A variety of errors may occur in completing the medical certification of death. Common problems include the following: The causal chain may be listed in reverse order; the distinction between Part I and Part II may have been ignored so that the causal sequence in Part I is simply extended unbroken into Part II; or the reported underlying cause is unlikely, in an etiological sense, to have caused the condition listed above it. In addition, sometimes the certifier attributes the death to uninformative causes such as cardiac arrest or pulmonary arrest.

To resolve the problems of incorrect or implausible cause-of-death statements, the WHO designed standardized rules to select an underlying cause of death from the information available on the death certificate that is most informative from a public health perspective. The rules for the Tenth Revision as updated by WHO since the publication of ICD-10 are described in NCHS instruction manual Part 2A. Coding rules beyond the General Principle are invoked if the cause-of-death section is completed incorrectly or if their application can improve the specificity and characterization of the cause of death in a manner consistent with the ICD. The rules are applied in two steps: selection of a tentative

underlying cause of death, and modification of the tentative underlying cause in view of the other conditions reported on the certificate in either Part I or Part II. Modification involves several considerations by the medical coder: determining whether conditions in Part II could have given rise to the underlying cause, giving preference to specific terms over generalized terms, and creating linkages of conditions that are consistent with the terminology of the ICD.

For a given death, the underlying cause is selected from the condition or conditions recorded by the certifier in the cause-of-death section of the death certificate. NCHS is bound by international agreement to make the selection of the underlying cause through the use of the ICD-10 classification structure, and the selection and modification rules contained in this revision of the ICD. These rules are contained in a computer software program called ACME (Automated Classification of Medical Entities). ACME does exactly what a coder would do to select the underlying cause of death. The ACME program has been used for final mortality data since 1968.

The WHO selection rules take into account the certifier's ordering of conditions and their causal relationships to systematically identify the underlying cause of death. The intent of these rules is to improve the usefulness of mortality statistics by giving preference to certain classification categories over others and consolidating two or more conditions on the certificate into a single classification category.

In addition to changes due to the implementation of a new ICD revision, rules for coding a cause of death may occasionally require modification at other times, when evidence suggests that such modifications will improve the quality of cause-of-death data. These changes may affect comparability of data between years for select causes of death. For example, the large decrease in Birth trauma (ICD-10 codes P10-P15) and subsequent increase in Neonatal hemorrhage (ICD-10 codes P50-P52,P54), from 2002-2003, is primarily due to a coding rule change which resulted in deaths that would have previously been assigned to Intracranial laceration and hemorrhage due to birth injury (ICD-10 code P10) instead being assigned to Intracranial non-traumatic hemorrhage of fetus and newborn (ICD-10 code P52). Also, the large increase from 2002-2003 in Persistent fetal circulation (ICD-10 code P29.3) is the result of a change introduced by WHO in 2003, whereby "Pulmonary hypertension (persistent) of newborn" was added to the terms included under Persistent fetal circulation. Previously, the ICD documentation did not clearly indicate if these records should be assigned to Neonatal hypertension (ICD-10 code P29.2) or Primary pulmonary hypertension (ICD-10 code I27.0).

Multiple Cause of Death Data

The limitations of the underlying cause concept and the need for more comprehensive data suggested the need for coding and tabulating all conditions listed on the death certificate. Coding all listed conditions on the death certificate was designed with two objectives in mind. First, to facilitate studies of the relationships among conditions reported on the death certificate, which require presenting each condition and its location on the death certificate in the exact manner given by the certifier. Secondly, the coding needed to be carried out in a manner by which the underlying cause-of-death could be assigned using the WHO coding rules. Thus, the approach in developing multiple cause data was to provide two fields: 1) entity axis and 2) record axis. For entity axis, NCHS suspends the provisions of the ICD that create linkages between conditions for the purpose of coding each individual condition, or entity, with minimum regard to other conditions present on the death certificate.

Record axis is designed for the generation of person-based multiple cause statistics. Person-based analysis requires that each condition be coded within the context of every other condition on the same death certificate and modified or linked to such conditions as provided by ICD-10. By definition, the entity

data cannot meet this requirement since the linkage provisions modify the character and placement of the information originally recorded by the certifier. Essentially, the axis of the classification has been converted from an entity basis to a record (or person) basis. The record axis codes are assigned in terms of the set of codes that best describe the overall medical certification portion of the death certificate.

This translation is accomplished by a computer system called TRANSAX (Translation of Axis). TRANSAX selectively uses the traditional linkage and modification rules for mortality coding. Underlying cause linkages which simply prefer one code over another for purposes of underlying cause selection are not included. Each entity code on the record is examined and modified or deleted as necessary to create a set of codes that are free of contradictions and are the most precise within the constraints of ICD-10 and medical information on the record. Repetitive codes are deleted. The process may 1) combine two entity axis categories together to a new category thereby eliminating a contradiction or standardizing the data; or 2) eliminate one category in favor of another to promote specificity of the data or resolve contradictions. The following examples from ICD-10 illustrate the effect of this translation:

Case 1: When reported on the same record as separate entities, cirrhosis of liver and alcoholism are coded to K74.6 (Other and unspecified cirrhosis of liver) and F10.2 (Mental and behavioral disorders due to use of alcohol; dependence syndrome), respectively. Tabulation of records with K74.6 would imply that such records had no mention of alcohol. A preferable code would be K70.3 (Alcoholic cirrhosis of liver) in lieu of both K74.6 and F10.2.

Case 2: If "gastric ulcer" and "bleeding gastric ulcer" are reported on a record they are coded to K25.9 (Gastric ulcer, unspecified as acute or chronic, without mention of hemorrhage or perforation) and K25.4 (Gastric ulcer, chronic or unspecified with hemorrhage), respectively. A more concise code is K25.4 which shows both the gastric ulcer and the bleeding.

Entity Axis Codes

The original conditions coded for selection of the underlying cause-of-death are reformatted and edited prior to creating the public-use data file. The following paragraphs describe the format and application of entity axis data.

1. Format. Each entity-axis code is displayed as an overall seven byte code with subcomponents as follows:

1. Line indicator: The first byte represents the line of the death certificate on which the code appears. Six lines (1-6) are allowable with the fourth and fifth denoting one or two written in "due to"s beyond the three lines provided in Part I of the U.S. standard death certificate. Line "6" represents Part II of the death certificate.

2. Position indicator: The next byte indicates the position of the code on the line, i.e., it is the first (1), second (2), third (3) .... eighth (8) code on the line.

3. Cause category: The next four bytes represent the ICD-10 cause code.

4. The last byte is blank.

A maximum of 20 of these seven byte codes are captured on a record for multiple cause purposes. This may consist of a maximum of 8 codes on any given line with up to 20 codes distributed across three or more lines depending on where the subject conditions are located on the certificate. Codes may be omitted from one

or more lines, e.g., line 1 with one or more codes, line 2 with no codes, line 3 with one or more codes.

In writing out these codes, they are ordered as follows: line 1 first code, line 1 second code, etc. ----- line 2 first code, line 2 second code, etc. ----- line 3 ---- line 4 ----- line 5 ----- line 6. Any space remaining in the field is left blank. The specifics of locations are contained in the record layout given later in this document.

2. Edit. The original conditions are edited to remove invalid codes, reverify the coding of certain rare causes of death, and assure age/cause and sex/cause compatibility. Detailed information relating to the edit criteria and the sets of cause codes which are valid to underlying cause coding and multiple cause coding are provided in NCHS Instruction Manual Part 11.

3. Entity Axis Applications. The entity axis multiple cause data file is appropriate for analyses that require that each condition be coded as a stand alone entity without linkage to other conditions and/or require information on the placement of such conditions in the death certificate. Within this framework, the entity data are appropriate to examine relationships among conditions and the validity of traditional assumptions in underlying cause selection. Additionally, the entity data provide in certain categories a more detailed code assignment that could be excluded in creating record axis data. Where such detail is needed for a study, the user should use entity data. Finally, the researcher may not wish to be bound by the assumptions used in the axis translation process.

The main limitation of entity axis data is that it does not necessarily reflect the best code for a condition when considered within the context of the medical certification as a whole. As a result, certain entity codes can be misleading or even contradict other codes in the record. For example, category K80.2 is titled "Calculus of gallbladder without cholecystitis." Within the framework of entity codes this is interpreted to mean that the codable entity itself contained no mention of cholecystitis rather than that cholecystitis was not mentioned anywhere on the record. Tabulation of records with a "K80.2" as a count of persons having Calculus of gallbladder without cholecystitis would therefore be erroneous. This illustrates the fact that under entity coding the ICD-10 titles cannot be taken literally. The user should study the rules for entity coding as they relate to his/her research prior to use of entity data. The user is further cautioned that the inclusion notes in ICD-10 that relate to modifying and combining categories are seldom applicable to entity coding (except where provided NCHS Instruction Manual Part 2b).

In tabulating the entity axis data, one may count codes with an individual code representing the number of times the condition(s) appears in the file. In this kind of tabulation of morbid conditions, the counts among categories may be added together to produce counts for groups of codes. Alternatively, subject to the limitations given above, one may count persons having mention of the disease represented by a code or codes. In this instance it is not correct to add counts for individual codes to create person counts for groups of codes. Since more than one code in the researcher's interest may appear together on the certificate, totaling must account for higher order interactions among codes. Up to 20 codes may be assigned on a record; therefore, a 20-way interaction is theoretically possible. All totaling must be based on mention of one or more of the categories under investigation.

Record Axis Codes

The following paragraphs describe the format and application of record-axis data. Part 2f of the Instruction Manual Series (ICD-10 TRANSAX Disease Reference Tables for classifying Multiple Causes-of-Death) describes the TRANSAX process for creating record axis data from entity axis data.

1. Format. Each record (or person) axis code is displayed in five bytes. Location information is not relevant. The Code consists of the following components:

1. Cause category: The first four bytes represent the ICD-10 cause code.

2. The last byte is blank.

Again, a maximum of 20 codes are captured on a record for multiple cause purposes. The codes are written in a 100-byte field in ascending code number (5 bytes) order with any unused bytes left blank.

2. Edit. The record axis codes are edited for rare causes and age/cause and sex/cause compatibility. Likewise, individual code validity is checked. The valid code set for record axis coding is the same as that for entity coding.

3. Record Axis Applications. The record axis multiple cause data are the basis for NCHS core multiple cause tabulations. Location of codes is not relevant to this data, and conditions have been linked into the most meaningful categories for the certification. The most immediate consequence for the user is that the codes on the record already represent mention of a disease assignable to that particular ICD-10 category. This is in contrast to the entity code which is assigned each time such a disease is reported on different lines of the certification. Secondly, the linkage implies that within the constraints of ICD-10 the most meaningful code has been assigned. The translation process creates for the user a data file that is edited for contradictions, duplicate codes, and imprecisions. In contrast to entity axis data, record axis data are classified in a manner comparable to underlying cause of death classification thereby facilitating joint analysis of these variables. A potential disadvantage of record axis data is that some detail is sacrificed in a number of the linkages.

The user can take the record axis codes as literally representing the information conveyed in ICD-10 category titles. While knowledge of the rules for combining and linking and coding conditions is useful, it is not a prerequisite to meaningful analysis of the data as long as one is willing to accept the assumptions of the axis translation process. The user is cautioned, however, that due to special rules in mortality coding, not all linkage notes in ICD-10 are used. (NCHS Instruction Manual Part 2f).

The user should proceed with caution in using record axis data to count conditions as opposed to people with conditions, since linkages have been invoked and duplicate codes have been eliminated. As with entity data, person-based tabulations that combine individual cause categories must take into account the possible interaction of up to 20 codes on a single certificate.

Additional Information

In using the NCHS multiple cause data files, the user is urged to review the information in this document and its references. The instructional material does change from year to year and ICD revision to ICD revision. The user is cautioned that coding of specific ICD-10 categories should be checked in the appropriate instruction manual. What may appear on the surface to be the correct code by ICD-10 may in fact not be correct as given in the instruction manuals.

If on the surface it is not obvious whether entity axis or record axis data should be employed in a given application, detailed examination of NCHS Instruction Manual Part 2f and its attachments will probably provide the necessary information to make a decision. It allows the user to determine the extent of the trade-offs between the two sets of data in terms of specific categories and the assumption of axis translation. In certain situations, a combination of entity and record axis data may be the more appropriate alternative.

2003 Period Linked Birth/Infant Death Data Set

I. Numerator File:

United States

A. Record count:	27,727
B. Record length:	1,142
C. Data counts:	a. By occurrence: 27,727
	b. By residence: 27,710
	c. To foreign residents: 17

Territories

A. Record count:	539
B. Record length:	1,142

II. Denominator File:

United States

A. Record count:	4,096,151
B. Record length:	751
C. Data counts:	a. By occurrence: 4,096,151
	b. By residence: 4,090,007
	c. To foreign residents: 6,144

Territories

A. Record count:	55,709
B. Record length:	751

III. Unlinked File:

United States

A. Record count:	285
B. Record length:	1,142
C. Data counts:	a. By occurrence: 285
	b. By residence: 281
	c. To foreign residents: 4

Territories

A. Record count:	2
B. Record length:	1,142

Linked 2003 Elements and Locations

Data Items	Denominator File	Numerator File: Birth	Numerator File: Death	Unlinked File
1. General				
a. Year of birth	15-18	15-18	--	15-18 *
b. Year of death	--	--	1071-74	1071-74
c. Record type	137	137	--	--
d. Resident status	138	138	1034	1034
e. Record weight	776-83	--	--	--
f. Flag indicating records included in both numerator and denominator files	751	--	--	--
2. Occurrence				
a. State	30-31	30-31	1035-36	1035-36
b. Expanded state	32-33	32-33	1040-41	1040-41
c. County	37-39	37-39	1037-39	1037-39
d. Population size	40	40	1042	1042
3. Residence				
a. State	109-10	109-10	1043-44	1043-44
d. Expanded state	107-8	107-8	1059-60	1059-60
c. County	114-16	114-16	1049-51	1049-51
d. Population size - County	132	132	1065	1065
e. Place(city)	120-24	120-24	1052-56	1052-56
f. Population size - City	133	133	1057	1057
g. Metropolitan/Nonmetropolitan county	135	135	1058	1058
h. CMSA	125-6	125-6	1067-8	1067-8
i. PMSA/MSA	127-30	127-30	1061-4	1061-4
j. Population of statistical area	131	131	--	--
4. Infant				
a. Age at death	--	--	755-60	755-60+
b. Race	--	--	--	139-44*
c. Sex	436	436	--	436*
d. Gestation	451-57	451-57	--	--
e. Birthweight	463-66	463-66	--	--
f. Plurality	423	423	--	--
g. Apgar score	415-17	415-17	--	--
h. Day of week of birth/death	29	29	496	496
i. Month of birth/death	15-20	15-20	494-5	494-5
5. Mother				
a. Age	89-93	89-93	--	--
b. Race	139-44	139-44	--	--
c. Education	155-8	155-8	--	--
d. Marital status	153	153	--	--
e. Place of birth	96-97	96-97	--	--
f. Hispanic origin	148-49	148-49	--	--
6. Father				
a. Age	184-87	184-87	--	--
b. Race	188-91	188-91	--	--
c. Hispanic origin	195-96	195-96	--	--
7. Pregnancy items				
a. Month prenatal care began	256-59	256-59	--	--
b. Number of prenatal visits	270-73	270-73	--	--
c. Total birth order	215-17	215-17	--	--
d. Live birth order	210-12	210-12	--	--
e. Born alive, now living	204-5	204-5	--	--
f. Born alive, now dead	206-7	206-7	--	--
g. Other terminations	208-9	208-9	--	--
h. Date of last live birth month	220-21	220-21	--	--
i. Date of last live birth year	222-25	222-25	--	--

8. Medical and Health Data

a.	Method of delivery	395-401	395-401	--	--
b.	Medical risk factors	328-44	328-44	--	--
c.	Other risk factors				
	Tobacco	282-94	282-94	--	--
	Alcohol	295-98	295-98	--	--
	Weight gain during pregnancy	276-78	276-78	--	--
d.	Obstetric procedures	355-61	355-61	--	--
e.	Complications of labor and delivery	374-89	374-89	--	--
f.	Abnormal conditions of the newborn	483-91	483-91	--	--
g.	Congenital anomalies	504-25	504-25	--	--
h.	Underlying cause of death	--	--	767-70	767-70
i.	130 Infant cause recode	--	--	772-74	772-74
j.	Multiple conditions	--	--	786-1031	786-1031

9. Other items

a.	Late record flag	9	9	--	--
b.	Place of birth	42,59	42,59	--	--
c.	Attendant at birth	408	408	--	--
d.	Place of death and decedent's status	--	--	1069	1069
e.	Place of injury	--	--	--	765
f.	Manner of death	--	--	761	--
g.	Method of Disposition	--	--	762	--
h.	Autopsy	--	--	763	--

* For the unlinked file, these items are from the death certificate.

\+ For the unlinked file, date of birth as reported on the death certificate is used to generate age at death.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
1-6	6	FILLER	**Filler**			Blank	
7	1	REVISION	**Revision**		U,R	A	State used the 2003 version of the US Standard Birth Certificate (Revised)
						S	State used the 1989 version of the US Standard Birth Certificate (Unrevised)
8	1	FILLER	**Filler**			Blank	
9	1	LATEREC	**Late Record Flag**		U,R	0	Not late record
						1	Late record
10-14	5	FILLER	**Filler**			Blank	
15-18	4	DOB_YY	**Birth Year**		U,R	2002	2002
						2003	2003
19-20	2	DOB_MM	**Birth Month**		U,R	01	January
						02	February
						03	March
						04	April
						05	May
						06	June
						07	July
						08	August
						09	September
						10	October
						11	November
						12	December
21-28	8	FILLER	**Filler**			Blank	
29	1	DOB_WK	**Weekday**		U,R	1	Sunday
						2	Monday
						3	Tuesday
						4	Wednesday
						5	Thursday
						6	Friday
						7	Saturday
30-31	2	OSTATE	**Occurrence FIPS State**		U,R		

*U,R Includes data based on both the 1989 Revision of the U.S. Certificate of Live Birth (unrevised), and the 2003 Revision of the U.S. Certificate of Live Birth (revised).
U Includes data based on the 1989 Revision of the U.S. Certificate of Live Birth; excludes data based on the 2003 Revision.
R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
			United States			AK	Alaska
						AL	Alabama
						AR	Arkansas
						AZ	Arizona
						CA	California
						CO	Colorado
						CT	Connecticut
						DE	Delaware
						DC	District of Columbia
						FL	Florida
						GA	Georgia
						HI	Hawaii
						ID	Idaho
						IL	Illinois
						IN	Indiana
						IA	Iowa
						KS	Kansas
						KY	Kentucky
						LA	Louisiana
						MA	Massachusetts
						MD	Maryland
						ME	Maine
						MI	Michigan
						MN	Minnesota
						MO	Missouri
						MS	Mississippi
						MT	Montana
						NC	North Carolina
						ND	North Dakota
						NE	Nebraska
						NH	New Hampshire
						NJ	New Jersey
						NM	New Mexico
						NV	Nevada
						NY	New York
						OH	Ohio
						OK	Oklahoma
						OR	Oregon
						PA	Pennsylvania
						RI	Rhode Island

*U,R Includes data based on both the 1989 Revision of the U.S. Certificate of Live Birth (unrevised), and the 2003 Revision of the U.S. Certificate of Live Birth (revised).
U Includes data based on the 1989 Revision of the U.S. Certificate of Live Birth; excludes data based on the 2003 Revision.
R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						SC	South Carolina
						SD	South Dakota
						TN	Tennessee
						TX	Texas
						UT	Utah
						VA	Virginia
						VT	Vermont
						WA	Washington
						WI	Wisconsin
						WV	West Virginia
						WY	Wyoming
			Possessions			GU	Guam
						PR	Puerto Rico
						VI	Virgin Islands
32-33	2	XOSTATE	**Expanded Occurrence FIPS State**		U,R		
			United States			AK	Alaska
						AL	Alabama
						AR	Arkansas
						AZ	Arizona
						CA	California
						CO	Colorado
						CT	Connecticut
						DE	Delaware
						DC	District of Columbia
						FL	Florida
						GA	Georgia
						HI	Hawaii
						ID	Idaho
						IL	Illinois
						IN	Indiana
						IA	Iowa
						KS	Kansas
						KY	Kentucky
						LA	Louisiana
						MA	Massachusetts
						MD	Maryland
						ME	Maine
						MI	Michigan

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U Includes data based on the 1989 Revision of the U.S. Certificate of Live Birth; excludes data based on the 2003 Revision.
R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						MN	Minnesota
						MO	Missouri
						MS	Mississippi
						MT	Montana
						NC	North Carolina
						ND	North Dakota
						NE	Nebraska
						NH	New Hampshire
						NJ	New Jersey
						NM	New Mexico
						NV	Nevada
						NY	New York
						OH	Ohio
						OK	Oklahoma
						OR	Oregon
						PA	Pennsylvania
						RI	Rhode Island
						SC	South Carolina
						SD	South Dakota
						TN	Tennessee
						TX	Texas
						UT	Utah
						VA	Virginia
						VT	Vermont
						WA	Washington
						WI	Wisconsin
						WV	West Virginia
						WY	Wyoming
						YC	New York City
			Possessions			GU	Guam
						PR	Puerto Rico
						VI	Virgin Islands
34-36	3	FILLER	**Filler**			Blank	
37-39	3	OCNTYFIPS	**Occurrence FIPS County**		U,R	000-nnn	County of Occurrence
						999	County with less than 250,000 population
40	1	OCNTYPOP	**Occurrence County Pop**		U,R	0	County of 1,000,000 or more
						1	County of 500,000 to 1,000,000

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R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						2	County of 250,000 to 500,000
						9	County less than 250,000
41	1	FILLER	**Filler**			Blank	
42	1	UBFACIL	**Birth Place**		U,R	1	Hospital
						2	Freestanding Birthing Center
						3	Clinic / Doctor's Office
						4	Residence
						5	Other
						9	Unknown
43-58	16	FILLER	**Filler**			Blank	
59	1	BFACIL3	**Birth Place Recode**		U,R	1	In Hospital
						2	Not in Hospital
						3	Unknown or Not Stated
60-76	17	FILLER	**Filler**			Blank	
77-78	2	UMAGERPT	**Mother's Reported Age**		U	10-54	Age in Years
						99	Unknown or Not Stated
						Blank	Not on Certificate
79-86	8	FILLER	**Filler**			Blank	
87	1	MAGE_IMPFLG	**Mother's Age Imputed**		U,R	Blank	Age not imputed
						1	Age imputed
88	1	MAGE_REPFLG	**Reported Age of Mother Flag**		U,R	Blank	Reported age not used
						1	Reported age used
89-90	2	MAGER41	**Mother's Age Recode 41**		U,R	01	Under 15 years
						02	15 years
						03	16 years
						04	17 years
						05	18 years
						06	19 years
						07	20 years
						08	21 years
						09	22 years

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R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						10	23 years
						11	24 years
						12	25 years
						13	26 years
						14	27 years
						15	28 years
						16	29 years
						17	30 years
						18	31 years
						19	32 years
						20	33 years
						21	34 years
						22	35 years
						23	36 years
						24	37 years
						25	38 years
						26	39 years
						27	40 years
						28	41 years
						29	42 years
						30	43 years
						31	44 years
						32	45 years
						33	46 years
						34	47 years
						35	48 years
						36	49 years
						37	50 years
						38	51 years
						39	52 years
						40	53 years
						41	54 years
91-92	2	MAGER14	**Mother's Age Recode 14**		U,R	01	Under 15 Years
						03	15 years
						04	16 years
						05	17 years
						06	18 years
						07	19 years
						08	20-24 years
						09	25-29 years

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						10	30-34 years
						11	35-39 years
						12	40-44 years
						13	45-49 years
						14	50-54 years
93	1	MAGER9	**Mother's Age Recode 9**		U,R	1	Under 15 years
						2	15-19 years
						3	20-24 years
						4	25-29 years
						5	30-34 years
						6	35-39 years
						7	40-44 years
						8	45-49 years
						9	50-54 years
94-95	2	FILLER	**Filler**			Blank	
96-97	2	UMBSTATE	**Mother's Birth State**		U		
			United States			AK	Alaska
						AL	Alabama
						AR	Arkansas
						AZ	Arizona
						CA	California
						CO	Colorado
						CT	Connecticut
						DE	Delaware
						DC	District of Columbia
						FL	Florida
						GA	Georgia
						HI	Hawaii
						ID	Idaho
						IL	Illinois
						IN	Indiana
						IA	Iowa
						KS	Kansas
						KY	Kentucky
						LA	Louisiana
						MA	Massachusetts
						MD	Maryland

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R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						ME	Maine
						MI	Michigan
						MN	Minnesota
						MO	Missouri
						MS	Mississippi
						MT	Montana
						NC	North Carolina
						ND	North Dakota
						NE	Nebraska
						NH	New Hampshire
						NJ	New Jersey
						NM	New Mexico
						NV	Nevada
						NY	New York
						OH	Ohio
						OK	Oklahoma
						OR	Oregon
						PA	Pennsylvania
						RI	Rhode Island
						SC	South Carolina
						SD	South Dakota
						TN	Tennessee
						TX	Texas
						UT	Utah
						VA	Virginia
						VT	Vermont
						WA	Washington
						WI	Wisconsin
						WV	West Virginia
						WY	Wyoming
			Possessions			AS	American Samoa
						GU	Guam
						MP	Northern Marianas
						PR	Puerto Rico
						VI	Virgin Islands
			Foreign			CC	Canada
						CU	Cuba
						MX	Mexico
						YY	Rest of the World

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R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						ZZ	Not Classifiable
98-99	2	FILLER	**Filler**			Blank	
100	1	MBSTATE_REC	**Mother's Birth State Recode**		U,R	1	Native born (50 US States)
						2	Foreign born (includes possessions)
						3	Unknown or Not Stated
101-106	6	FILLER	**Filler**			Blank	
107-108	2	XMRSTATE	**Expanded State of Residence of Mother**		U,R		
			United States			AK	Alaska
						AL	Alabama
						AR	Arkansas
						AZ	Arizona
						CA	California
						CO	Colorado
						CT	Connecticut
						DE	Delaware
						DC	District of Columbia
						FL	Florida
						GA	Georgia
						HI	Hawaii
						ID	Idaho
						IL	Illinois
						IN	Indiana
						IA	Iowa
						KS	Kansas
						KY	Kentucky
						LA	Louisiana
						MA	Massachusetts
						MD	Maryland
						ME	Maine
						MI	Michigan
						MN	Minnesota
						MO	Missouri
						MS	Mississippi
						MT	Montana
						NC	North Carolina
						ND	North Dakota

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R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						NE	Nebraska
						NH	New Hampshire
						NJ	New Jersey
						NM	New Mexico
						NV	Nevada
						NY	New York
						OH	Ohio
						OK	Oklahoma
						OR	Oregon
						PA	Pennsylvania
						RI	Rhode Island
						SC	South Carolina
						SD	South Dakota
						TN	Tennessee
						TX	Texas
						UT	Utah
						VA	Virginia
						VT	Vermont
						WA	Washington
						WI	Wisconsin
						WV	West Virginia
						WY	Wyoming
						YC	New York City
			Possessions			AS	American Samoa
						GU	Guam
						MP	Northern Marianas
						PR	Puerto Rico
						VI	Virgin Islands
			Foreign			CC	Canada
						CU	Cuba
						MX	Mexico
						XX	Not Applicable
						ZZ	Not Classifiable
109-110	2	MRSTATEFIPS	**Mother's Residence FIPS State**		U,R		
			United States			AK	Alaska
						AL	Alabama
						AR	Arkansas

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R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						AZ	Arizona
						CA	California
						CO	Colorado
						CT	Connecticut
						DE	Delaware
						DC	District of Columbia
						FL	Florida
						GA	Georgia
						HI	Hawaii
						ID	Idaho
						IL	Illinois
						IN	Indiana
						IA	Iowa
						KS	Kansas
						KY	Kentucky
						LA	Louisiana
						MA	Massachusetts
						MD	Maryland
						ME	Maine
						MI	Michigan
						MN	Minnesota
						MO	Missouri
						MS	Mississippi
						MT	Montana
						NC	North Carolina
						ND	North Dakota
						NE	Nebraska
						NH	New Hampshire
						NJ	New Jersey
						NM	New Mexico
						NV	Nevada
						NY	New York
						OH	Ohio
						OK	Oklahoma
						OR	Oregon
						PA	Pennsylvania
						RI	Rhode Island
						SC	South Carolina
						SD	South Dakota
						TN	Tennessee
						TX	Texas

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R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						UT	Utah
						VA	Virginia
						VT	Vermont
						WA	Washington
						WI	Wisconsin
						WV	West Virginia
						WY	Wyoming
			Possessions			AS	American Samoa
						GU	Guam
						MP	Northern Marianas
						PR	Puerto Rico
						VI	Virgin Islands
			Foreign			CC	Canada
						CU	Cuba
						MX	Mexico
						XX	Not Applicable
						ZZ	Not Classifiable
111-113	3	FILLER	**Filler**			Blank	
114-116	3	MRCNTYFIPS	**Mother's FIPS County**		U,R	001-999	See Geographic Tables
						000	Foreign
117-119	3	FILLER	**Filler**			Blank	
120-124	5	MRCITYFIPS	**Mother's Residence City**		U,R	00001-99999	See Geographic Table
						00000	Foreign
125-126	2	CMSA	**Consolidated Metropolitan Statistical Areas**		U,R		
			United States			00	Not a CMSA
						07	Boston, Worchester, Lawrence, MA-NH-ME-CT, CMSA
						14	Chicago-Gary-Kenosha, IL-IN-WI, CMSA
						21	Cincinnati-Hamilton, OH-KY-IN, CMSA
						28	Cleveland-Akron, OH, CMSA
						31	Dallas-Fort Worth, TX, CMSA
						34	Denver-Bolder-Greeley, CO, CMSA
						35	Detroit-Ann Arbor-Flint, MI, CMSA
						42	Houston-Galveston-Brazoria, TX, CMSA

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						49	Los Angeles-Riverside-Orange County, CA, CMSA
						56	Miami-Fort Lauderdale, FL, CMSA
						63	Milwaukee-Racine, WI, CMSA
						70	New York-Northern New Jersey-Long Island, NY-NJ-CT-PA, CMSA
						77	Philadelphia-Wilmington-Atlantic City, PA-NJ-DE-MD, CMSA
						79	Portland-Salem, OR-WA, CMSA
						82	Sacramento-Yolo, CA, CMSA
						84	San Francisco-Oakland-San Jose, CA, CMSA
						91	Seattle-Tacoma-Bremerton, WA, CMSA
						97	Washington-Baltimore, DC-MD-VA-WV, CMSA
			Possessions			00	Not a CMSA
						87	San Juan-Caguas-Arecibo, PR, CMSA
127-130	4	MSA	**Metropolitan Statistical Areas**		U,R	0000 0040	Nonmetropolitan counties or Foreign residence
						-9360	Code Range
						9999	Area less than 250,000
131	1	MSA_POP	**Population of Statistical Area**		U,R	1	Area of 250,000 or more
						2	Area less than 250,000
						9	Nonmetropolitan areas
						Z	Foreign resident
132	1	RCNTY_POP	**Population of Residence County**		U,R	0	County of 1,000,000 or more
						1	County of 500,000 to 1,000,000
						2	County of 250,000 to 500,000
						9	County less than 250,000
						Z	Foreign resident
133	1	RCITY_POP	**Population of Residence City**		U,R	0	City of 1,000,000 or more
						1	City of 500,000 to 1,000,000
						2	City of 250,000 to 500,000
						9	All other areas in the US
						Z	Foreign resident
134	1	FILLER	**Filler**			Blank	
135	1	METRORES	**Metropolitan Residence County**		U,R	1	Metropolitan County

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						2	Nonmetropolitan County
						Z	Foreign resident
136	1	FILLER	**Filler**			Blank	
137	1	RECTYPE	**Record Type**		U,R	1	RESIDENT: State and county of occurrence and residence are the same.
						2	NONRESIDENT: State and county of occurrence and residence are different.
138	1	RESTATUS	**Residence Status**		U,R		
			United States			1	RESIDENT: State and county of occurrence and residence are the same.
						2	INTRASTATE NONRESIDENT: State of occurrence and residence are the same but county is different.
						3	INTERSTATE NONRESIDENT: State of occurrence and residence are different but both are one of the 50 US states or District of Columbia.
						4	FOREIGN RESIDENT: The state of residence is not one of the 50 US states or District of Columbia.
			Possessions			1	RESIDENT: State and county of occurrence and residence are the same. (Unique to Guam, all US residents are considered residents of Guam and thus are assigned 1.)
						2	INTRATERRITORY NONRESIDENT: Territory of occurrence and residence are the same but county is different.
						3	INTERTERRITORY RESIDENT: Territory of occurrence and residence are different but both are US Territories.
						4	FOREIGN RESIDENT: The residence is not a US Territory.
139-140	2	MBRACE	**Mother's Bridged Race**		U,R	01	White – single race
						02	Black – single race
						03	American Indian – single race
						04	Asian Indian – single race
						05	Chinese – single race
						06	Filipino – single race
						07	Japanese – single race
						08	Korean – single race

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						09	Vietnamese – single race
						10	Other Asian – single race
						11	Hawaiian – single race
						12	Guamanian – single race
						13	Samoan – single race
						14	Other Pacific Islander – single race
						21	White – bridged multiple race
						22	Black – bridged multiple race
						23	American Indian & Alaskan Native – bridged multiple race
						24	Asian / Pacific Islander – bridged multiple race
						Blank	Not on Certificate
141-142	2	MRACE	**Mother's Race**		U		
			United States			01	White
						02	Black
						03	American Indian & Alaskan Natives
						04	Chinese
						05	Japanese
						06	Hawaiian (includes part Hawaiian)
						07	Filipino
						18	Asian Indian
						28	Korean
						38	Samoan
						48	Vietnamese
						58	Guamanian
						68	Other Asian or Pacific Islander in areas reporting codes 18-58.
						78	Combined other Asian or Pacific Islander, includes 18-68 for areas that do not report them separately.
						Blank	Not on Certificate
			Puerto Rico			01	White
						02	Black
						00	Other races
						Blank	Not on Certificate
			Guam			01	White
						02	Black
						03	American Indian & Alaskan Natives
						04	Chinese

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						05	Japanese
						06	Hawaiian (includes part Hawaiian)
						07	Filipino
						08	Other Asian or Pacific Islander
						58	Guamanian
						Blank	Not on Certificate
			All other Territories			01	White
						02	Black
						03	American Indian & Alaskan Natives
						04	Chinese
						05	Japanese
						06	Hawaiian (includes part Hawaiian)
						07	Filipino
						08	Other Asian or Pacific Islander
						Blank	Not on Certificate
143	1	MRACEREC	**Mother's Race Recode**		U,R		
			United States and non-Puerto Rican Territories			1	White
						2	Black
						3	American Indian / Alaskan Native
						4	Asian / Pacific Islander
			Puerto Rico			1	White
						2	Black
						0	Other (not classified as White or Black)
144	1	MRACEIMP	**Mother's Race Imputed**		U,R	Blank	Mother's race not imputed
						1	Unknown race imputed
						2	All other races, formerly coded 09, imputed.
145-147	3	FILLER	**Filler**			Blank	
148	1	UMHISP	**Mother's Hispanic Origin**				
				569	U,R	0	Non-Hispanic
						1	Mexican
						2	Puerto Rican
						3	Cuban
						4	Central American
						5	Other and Unknown Hispanic

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						9	Origin unknown or not stated
149	1	MRACEHISP	**Mother's Race/Hispanic Origin**	569	U,R	1	Mexican
						2	Puerto Rican
						3	Cuban
						4	Central or South American
						5	Other and Unknown Hispanic
						6	Non-Hispanic White
						7	Non-Hispanic Black
						8	Non-Hispanic Other Races
						9	Origin unknown or not stated
150-152	3	FILLER	**Filler**			Blank	
153	1	MAR	**Mother's Marital Status**	652	U,R		
			United States & all non-Puerto Rican Territories			1	Yes
						2	No
						9	Unknown or not Stated
			Puerto Rico			1	Yes
						2	Unmarried parents living together
						3	Unmarried parents not living together
						9	Unknown or not stated
154	1	MAR_IMP	**Mother's Marital Status Imputed**		U,R	Blank	Marital Status not imputed
						1	Marital Status imputed
155	1	MEDUC	**Mother's Education Revised**	571	R	1	8th grade or less
						2	9th through 12th grade with no diploma
						3	High school graduate or GED completed
						4	Some college credit, but not a degree.
						5	Associate degree (AA,AS)
						6	Bachelor's degree (BA, AB, BS)
						7	Master's degree (MA, MS, MEng, MEd, MSW, MBA)
						8	Doctorate (PhD, EdD) or Professional Degree (MD, DDS, DVM, LLB, JD)
						9	Unknown
						Blank	Not on Certificate

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
156-157	2	UMEDUC	**Mother's Education Unrevised**	647	U	00	No formal education
						01-08	Years of elementary school
						09	1 year of high school
						10	2 years of high school
						11	3 years of high school
						12	4 years of high school
						13	1 year of college
						14	2 years of college
						15	3 years of college
						16	4 years of college
						17	5 or more years of college
						99	Not stated
						Blank	Not on Certificate
158	1	MEDUC_REC	**Mother's Education Recode**	647	U	1	0 – 8 years
						2	9 – 11 years
						3	12 years
						4	13 – 15 years
						5	16 years and over
						6	Not stated
						Blank	Not on Certificate
159-174	16	FILLER	**Filler**			Blank	
175	1	FAGERPT_FLG	**Father's Reported Age Used**		U,R	Blank	Father's reported age not used
						1	Father's reported age used
176-177	2	FAGERPT	**Father's Reported Age**		U,R	09-98	Father's reported age in years
						99	Unknown or not stated
						Blank	Not on Certificate
178-183	6	FILLER	**Filler**			Blank	
184-185	2	UFAGECOMB	**Father's Combined Age**		U	10-98	Father's combined age in years
						99	Unknown or not stated
186-187	2	FAGEREC11	**Father's Age Recode 11**		U,R	01	Under 15 years
						02	15-19 years
						03	20-24 years
						04	25-29 years
						05	30-34 years

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						06	35-39 years
						07	40-44 years
						08	45-49 years
						09	50-54 years
						10	55-98 years
						11	Not stated
188-189	2	FBRACE	**Father's Bridged Race**		U,R	01	White – single race
						02	Black – single race
						03	American Indian – single race
						04	Asian Indian – single race
						05	Chinese – single race
						06	Filipino – single race
						07	Japanese – single race
						08	Korean – single race
						09	Vietnamese – single race
						10	Other Asian – single race
						11	Hawaiian – single race
						12	Guamanian – single race
						13	Samoan – single race
						14	Other Pacific Islander – single race
						21	White – bridged multiple race
						22	Black – bridged multiple race
						23	American Indian & Alaskan Native – bridged multiple race
						24	Asian / Pacific Islander – bridged multiple race
						99	Unknown or not stated, also includes states not reporting multiple race.
						Blank	Not on certificate
190	1	FILLER	**Filler**			Blank	
191	1	FRACEREC	**Father's Race Recode**		U,R		
			United States and non-Puerto Rican Territories			1	White
						2	Black
						3	American Indian / Alaskan Native
						4	Asian / Pacific Islander
						9	Unknown or not stated
			Puerto Rico			1	White
						2	Black

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						9	Unknown or not stated
						0	Other (not classified as White or Black)
192-194	3	FILLER	**Filler**			Blank	
195	1	UFHISP	F**ather's Hispanic Origin**	570	U,R	0	Non-Hispanic
						1	Mexican
						2	Puerto Rican
						3	Cuban
						4	Central American
						5	Other and Unknown Hispanic
						9	Origin unknown or not stated
196	1	FRACEHISP	**Father's Race/Hisp Origin**	570	U,R	1	Mexican
						2	Puerto Rican
						3	Cuban
						4	Central or South American
						5	Other and Unknown Hispanic
						6	Non-Hispanic White
						7	Non-Hispanic Black
						8	Non-Hispanic Other Races
						9	Origin unknown or not stated
197-198	2	FILLER	**Filler**			Blank	
199-200	2	FRACE	**Father's Race**		U		
			United States			01	White
						02	Black
						03	American Indian & Alaskan Natives
						04	Chinese
						05	Japanese
						06	Hawaiian (includes part Hawaiian)
						07	Filipino
						18	Asian Indian
						28	Korean
						38	Samoan
						48	Vietnamese
						58	Guamanian
						68	Other Asian or Pacific Islander in areas reporting codes 18-58.

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						78	Combined other Asian or Pacific Islander, includes 18-68 for areas that do not report them separately.
						99	Unknown or not stated
						Blank	Not on certificate
			Puerto Rico			01	White
						03	Black
						00	Other races not classified white or black
						99	Unknown or not stated
						Blank	Not on certificate
			Guam			01	White
						02	Black
						03	American Indian & Alaskan Natives
						04	Chinese
						05	Japanese
						06	Hawaiian (includes part Hawaiian)
						07	Filipino
						08	Other Asian or Pacific Islander
						58	Guamanian
						99	Unknown or not stated
						Blank	Not on certificate
			All other Territories			01	White
						02	Black
						03	American Indian & Alaskan Natives
						04	Chinese
						05	Japanese
						06	Hawaiian (includes part Hawaiian)
						07	Filipino
						08	Other Asian or Pacific Islander
						99	Unknown or not stated
						Blank	Not on certificate
201-203	3	FILLER	**Filler**			Blank	
204-205	2	PRIORLIVE	**Prior Births Now Living**		U,R	00-30	Number of children still living from previous live births.
						99	Unknown or not stated
206-207	2	PRIORDEAD	**Prior Births Now Dead**		U,R	00-30	Number of children dead from previous live births.

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						99	Unknown or not stated
208-209	2	PRIORTERM	**Prior Other Terminations**		U,R	00-30 99	Number other terminations Unknown or not stated
210-211	2	LBO	**Live Birth Order**		U,R	01-31 99	Sum of all previous live births (now living and now dead) plus this one. Unknown or not stated
212	1	LBO_REC	**Live Birth Order Recode**		U,R	1-7 8 9	Number of live birth order. 8 or more live births Unknown or not stated
213-214	2	FILLER	**Filler**			Blank	
215-216	2	TBO	**Total Birth Order**		U,R	01-40 99	Sum of all previous pregnancies plus this one Unknown or not stated
217	1	TBO_REC	**Total Birth Order Recode**		U,R	1-7 8 9	Number of total birth order. 8 or more total births Unknown or not stated
218-219	2	FILLER	**Filler**			Blank	
220-221	2	DLLB_MM	**Date of Last Live Birth Month**		U,R	01 02 03 04 05 06 07 08 09 10 11 12 88 99	January February March April May June July August September October November December Not applicable Unknown or not stated
222-225	4	DLLB_YY	**Date of Last Live Birth Year**		U,R	nnnn 8888	Year of last live birth Not applicable

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						9999	Unknown or not stated
226-244	19	FILLER	**Filler**			Blank	
245-246	2	PRECARE	**Month Prenatal Care Began**	668	R	00	No prenatal care
						01-10	Month prenatal care began
						99	Unknown or not stated
						Blank	Not on certificate
247	1	PRECARE_REC	**Month Prenatal Care Began Recode**	668	R	1	1st to 3rd month
						2	4th to 6th month
						3	7th to final month
						4	No prenatal care
						5	Unknown or not stated
						Blank	Not on certificate
248-255	8	FILLER	**Filler**			Blank	
256-257	2	MPCB	**Month Prenatal Care Began**	669	U	00	No prenatal care
						01-10	Month prenatal care began
						99	Unknown or not stated
						Blank	Not on certificate
258	1	MPCB_REC6	**Month Prenatal Care Began Recode 6**	669	U	1	1st to 2nd month
						2	3rd month
						3	4th to 6th month
						4	7th to final month
						5	No prenatal care
						6	Unknown or not stated
						Blank	Not on certificate
259	1	MPCB_REC5	**Month Prenatal Care Began Recode 5**	669	U	1	1st trimester (1st to 3rd month)
						2	2nd trimester (4th to 6th month)
						3	3rd trimester (7th to final month)
						4	No prenatal care
						5	Unknown or not stated
						Blank	Not on certificate

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
260-269	10	FILLER	**Filler**			Blank	
270-271	2	UPREVIS	**Number of Prenatal Visits**		U,R	00-49 99	Number of prenatal visits Unknown or not stated
272-273	2	PREVIS_REC	**Number of Prenatal Visits Recode**		U,R	01 02 03 04 05 06 07 08 09 10 11 12	No visits 1 to 2 visits 3 to 4 visits 5 to 6 visits 7 to 8 visits 9 to 10 visits 11 to 12 visits 13 to 14 visits 15 to 16 visits 17 to 18 visits 19 or more visits Unknown or not stated
274-275	2	FILLER	**Filler**			Blank	
276-277	2	WTGAIN	**Weight Gain**	648	U,R	00-97 98 99	Weight gain in pounds 98 pounds and over Unknown or not stated
278	1	WTGAIN_REC	**Weight Gain Recode**	648	U,R	1 2 3 4 5 6 7 8 9	Less than 16 pounds 16 to 20 pounds 21 to 25 pounds 26 to 30 pounds 31 to 35 pounds 36 to 40 pounds 41 to 45 pounds 46 or more pounds Unknown or not stated
279-281	3	FILLER	**Filler**			Blank	
282-283	2	CIG_0	**Cigarettes Before Pregnancy**		R	00-97 98 99 Blank	Number of cigarettes daily 98 or more cigarettes daily Unknown or not stated Not on certificate

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284-285	2	CIG_1	**Cigarettes 1st Trimester**		R	00-97 98 99 Blank	Number of cigarettes daily 98 or more cigarettes daily Unknown or not stated Not on certificate
286-287	2	CIG_2	**Cigarettes 2nd Trimester**		R	00-97 98 99 Blank	Number of cigarettes daily 98 or more cigarettes daily Unknown or not stated Not on certificate
288-289	2	CIG_3	**Cigarettes 3rd Trimester**		R	00-97 98 99 Blank	Number of cigarettes daily 98 or more cigarettes daily Unknown or not stated Not on certificate
290	1	TOBUSE	**Tobacco Use**	667	U	1 2 9 Blank	Yes No Unknown or not stated Not on certificate
291-292	2	CIGS	**Cigarettes per Day**		U	00-97 98 99 Blank	Number of cigarettes daily 98 or more cigarettes daily Unknown or not stated Not on certificate
293	1	CIG_REC6	**Cigarette Recode**		U	0 1 2 3 4 5 6 Blank	Non-smoker 1 to 5 cigarettes daily 6 to 10 cigarettes daily 11 to 20 cigarettes daily 21 to 40 cigarettes daily 41 or more cigarettes daily Unknown or not stated Not on certificate
294	1	CIG_REC	**Cigarette Recode**	575	R	Y N U Blank	Yes No Unknown or not stated Not on certificate
295	1	ALCOHOL	**Alcohol Use**	649	U	1 2	Yes No

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						9	Unknown or not stated
						Blank	Not on certificate
296-297	2	DRINKS	**Drinks per Week**	649	U	00-97	Number of drinks weekly
						98	98 or more drinks weekly
						99	Unknown or not stated
						Blank	Not on certificate
298	1	DRINKS_REC	**Drinks Recode**	649	U	0	Non drinker
						1	1 drink per week
						2	2 drinks per week
						3	3-4 drinks per week
						4	5 or more drinks per week
						5	Unknown or not stated
						Blank	Not on certificate
299-327	29	FILLER	**Filler**			Blank	
328-344	17		Risk Factors				
						1	Yes
						2	No
						8	Not on certificate
						9	Unknown
						Blank	Not on certificate
328	1	URF_ANEMIA	Anemia		U		
329	1	URF_CARDC	Cardiac		U		
330	1	URF_LUNG	Acute or Chronic Lung Disease		U		
331	1	URF_DIAB	Diabetes		U,R		
332	1	URF_GEN	Genital Herpes		U		
333	1	URF_HYDR	Hydramnios / Oligohydramnios		U		
334	1	URF_HEMO	Hemoglobinopathy		U		
335	1	URF_CHYPER	Cronic Hypertension		U,R		
336	1	URF_PHYPER	Prepregnacny Associated Hypertension		U,R		
337	1	URF_ECLAM	Eclampsia		U,R		
338	1	URF_INCERV	Incompetent Cervix		U		
339	1	URF_PRE4000	Previous Infant 4000+ Grams		U		
340	1	URF_PRETERM	Previous Preterm Small for Gestation		U		
341	1	URF_RENAL	Renal Disease		U		
342	1	URF_RH	Rh Sensitization		U		
343	1	URF_UTERINE	Uterine Bleeding		U		
344	1	URF_OTHER	Other medical risk factors		U		

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
345-354	10	FILLER	**Filler**			Blank	
355-361	7		Obstetric Procedures				
						1	Yes
						2	No
						8	Not on certificate
						9	Unknown or not stated
						Blank	Not on certificate
355	1	UOP_AMNIO	Amniocentesis		U		
356	1	UOP_MONIT	Electronic Fetal Monitoring		U		
357	1	UOP_INDUC	Induction of Labor		U,R		
358	1	UOP_STIML	Stimulation of Labor		U		
359	1	UOP_TOCOL	Tocolysis		U,R		
360	1	UOP_ULTRA	Ultrasound		U		
361	1	UOP_OTHER	Other Obstetric Procedures		U		
362-373	12	FILLER	**Filler**			Blank	
374-389	16		Complications of Labor and Delivery				
						1	Yes
						2	No
						8	Not on certificate
						9	Unknown or not stated
						Blank	Not on certificate
374	1	ULD_FEBR	Febrile		U		
375	1	ULD_MECO	Meconium		U,R		
376	1	ULD_RUPTR	Premature Rupture of Membrane		U		
377	1	ULD_ABRUP	Abruptio Placenta		U		
378	1	ULD_PREPLA	Placenta Previa		U		
379	1	ULD_EXCBL	Other Excessive Bleeding		U		
380	1	ULD_SEIZ	Seizures During Labor		U		
381	1	ULD_PRECIP	Precipitous Labor		U,R		
382	1	ULD_PROLG	Prolonged Labor		U		
383	1	ULD_DYSFN	Dysfunctional Labor		U		
384	1	ULD_BREECH	Breech		U,R		
385	1	ULD_CEPHAL	Cephalopelvic Disproportion		U		
386	1	ULD_CORD	Cord Prolapse		U		
387	1	ULD_ANEST	Anesthetic Comlications		U		
388	1	ULD_DISTR	Fetal Distress		U		
389	1	ULD_OTHER	Other Complications		U		

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
390-394	5	FILLER	**Filler**			Blank	
395-400	6		Method of Delivery				
						1	Yes
						2	No
						8	Not on certificate
						9	Unknown or not stated
395	1	UME_VAG	Vaginal		U,R		
396	1	UME_VBAC	Vaginal after C-Section		U,R		
397	1	UME_PRIMC	Primary C-Section		U,R		
398	1	UME_REPEC	Repeat C-Section		U,R		
399	1	UME_FORCP	Forceps		U,R		
400	1	UME_VAC	Vacuum		U,R		
401	1	DMETH_REC	**Delivery Method Recode**		U,R	1	Vaginal (excludes vaginal after previous C-section)
						2	Vaginal after previous c-section
						3	Primary C-section
						4	Repeat C-section
						5	Not stated
						6	Vaginal (unknown if previous c-section) (2003 Standard only)
						7	C-section (unknown if previous c-section) (2003 Standard only
402-407	6	FILLER	**Filler**			Blank	
408	1	ATTEND	**Attendent**		U,R	1	Doctor of Medicine (MD)
						2	Doctor of Osteopathy (DO)
						3	Certified Nurse Midwife (CNM)
						4	Other Midwife
						5	Other
						9	Unknown or not stated
409-414	6	FILLER	**Filler**			Blank	
415-416	2	APGAR5	**Five Minute APGAR Score**	574	U,R	00-10	A score of 0-10
						99	Unknown or not stated
417	1	APGAR5R	**Five Minute APGAR Recode**	574	U,R	1	A score of 0-3

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						2	A score of 4-6
						3	A score of 7-8
						4	A score of 9-10
						5	Unknown or not stated
418-422	5	FILLER	**Filler**			Blank	
423	1	DPLURAL	**Plurality Recode**		U,R	1	Single
						2	Twin
						3	Triplet
						4	Quadruplet
						5	Quintuplet or higher
424	1	FILLER	**Filler**			Blank	
425	1	IMP_PLUR	**Plurality Imputed**		U,R	Blank	Plurality is not imputed
						1	Plurality is imputed
426-435	10	FILLER	**Filler**			Blank	
436	1	SEX	**Sex of Infant**		U,R	M	Male
						F	Female
437	1	IMP_SEX	**Imputed Sex**		U,R	Blank	Infant Sex not Imputed
						1	Infant Sex is Imputed
438-439	2	DLMP_MM	**Last Normal Menses Month**		U,R	01	January
						02	February
						03	March
						04	April
						05	May
						06	June
						07	July
						08	August
						09	September
						10	October
						11	November
						12	December
						99	Unknown or not stated
440-441	2	DLMP_DD	**Last Normal Menses Day**		U,R	01-31	As applicable to month of LMP

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						99	Unknown or not stated
442-445	4	DLMP_YY	**Last Normal Menses Year**		U,R	nnnn 9999	Year of last normal menses Unknown or not stated
446-447	2	ESTGEST	**Obstetric/Clinical Gestation Est.**	573	U,R	16-47 99	16th through 47th week of gestation Unknown or not stated
448-450	3	FILLER	**Filler**				
451-452	2	COMBGEST	**Gestation – Detail in Weeks**		U,R	17-47 99	17th through 47th week of Gestation Unknown
453-454	2	GESTREC10	**Gestation Recode 10**		U,R	01 02 03 04 05 06 07 08 09 10	Under 20 weeks 20-27 weeks 28-31 weeks 32-35 weeks 36 weeks 37-39 weeks 40 weeks 41 weeks 42 weeks and over Unknown
455	1	GESTREC3	**Gestation Recode 3**		U,R	1 2 3	Under 37 weeks 37 weeks and over Not stated
456	1	OBGEST_FLG	**Clinical Estimate of Gestation Used Flag**		U,R	Blank 1	Clinical Estimate is not used Clinical Estimate is used
457	1	GEST_IMP	**Gestation Imputed Flag**		U,R	Blank 1	Gestation is not imputed Gestation is imputed
458-466	9	FILLER	**Filler**			Blank	
467-470	4	DBWT	**Birth Weight – Detail in Grams**		U,R	0227-8165 9999	Number of grams Not stated birth weight
471-472	2	BWTR14	**Birth Weight Recode 14**		U,R	01 02	499 grams or less 500 – 749 grams

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						03	750 - 999 grams
						04	1000 - 1249 grams
						05	1250 – 1499 grams
						06	1500 – 1999 grams
						07	2000 – 2499 grams
						08	2500 – 2999 grams
						09	3000 – 3499 grams
						10	3500 – 3999 grams
						11	4000 – 4499 grams
						12	4500 – 4999 grams
						13	5000 – 8165 grams
						14	Not Stated
473	1	BWTR4	**Birth Weight Recode 4**		U,R	1	1499 grams or less
						2	1500 – 2499 grams
						3	2500 grams or more
						4	Unknown or not stated
474	1	FILLER	**Filler**			Blank	
475	1	BWTIMP	**Imputed Birth Weight Flag**		U,R	Blank	Birthweight is not imputed
						1	Birthweight is imputed
476-482	7	FILLER	**Filler**			Blank	
483-491	9		**Abnormal Conditions of the Newborn**				
						1	Complication reported
						2	Complication not reported
						8	Complication not on certificate
						9	Complication not classifiable
483	1	UAB_ANEM	Anemia		U		
484	1	UAB_INJURY	Birth Injury		U		
485	1	UAB_ALCOH	Fetal Alcohol Syndrome		U		
486	1	UAB_HYAL	Hyaline Membrane Disease		U		
487	1	UAB_MECON	Meconium Aspiration Syndrome		U		
488	1	UAB_VENL30	Assisted Ventilation < 30 min		U		
489	1	UAB_VEN30M	Assisted Ventilation >= 30 min		U		
490	1	UAB_NSEIZ	Seizures		U		
491	1	UAB_OTHER	Other Abnormal Conditions		U		
492-503	12	FILLER	**Filler**			Blank	

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
504-525	22		**Congenital Anomalies of the Newborn**				
						1	Anomaly reported
						2	Anomaly not reported
						8	Anomaly not on certificate
						9	Anomaly not classifiable
						Blank	Not on certificate
504	1	UCA_ANEN	Anencephalus		U,R		
505	1	UCA_SPINA	Spina Bifida / Meningocele		U,R		
506	1	UCA_HYDRO	Hydrocephalus		U		
507	1	UCA_MICRO	Microciphalus		U		
508	1	UCA_NERV	Other Central Nervous System Anomalies		U		
509	1	UCA_HEART	Heart Malformations		U		
510	1	UCA_CIRC	Other Circulatory / Respiration Anomalies		U		
511	1	UCA_RECTAL	Rectal Atrseia / Stenosis		U		
512	1	UCA_TRACH	Tracheo-Esophageal Fistual		U		
513	1	UCA_OMPHA	Omphalocele / Gastroschisis		U,R		
514	1	UCA_GASTRO	Other Gastrointestinal Anomalies		U		
515	1	UCA_GENITAL	Malformed Genitalia		U		
516	1	UCA_RENAL	Renal Agenesis		U		
517	1	UCA_UROGEN	Other Urogenital Anomalies		U		
518	1	UCA_CELFTLP	Cleft Lip / Palate		U,R		
519	1	UCA_ADACTY	Polydactyly / Syndactyly / Adactyly		U		
520	1	UCA_CLUBFT	Club Foot		U		
521	1	UCA_HERNIA	Diaphramatic Hernia		U		
522	1	UCA_MUSCU	Other Musculoskeletal Anomalies		U		
523	1	UCA_DOWNS	Downs Syndrome		U,R		
524	1	UCA_CHROM	Other Chromosomal Anomalies		U		
525	1	UCA_OTHER	Other Congenital Anomalies		U		
526-568	43	FILLER	**Filler**			Blank	
569-669	101		Flag File for Reporting Flags The reporting flags indented below follow this coding structure:				
						0	Not reporting
						1	Reporting
569	1	F_MORIGIN	Origin of Mother		U,R		
570	1	F_FORIGIN	Origin of Father		U,R		
571	1	F_MEDUC	Education of Mother		R		
572	1	FILLER	**Filler**			Blank	
573	1	F_CLINEST	Clinical Estimate of Gestation		U,R		

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Position		Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
	574	1	F_APGAR5	Five minute APGAR		U,R		
	575	1	F_TOBACO	Tobacco use		R		
	576-646	71	FILLER	**Filler**			Blank	
	647	1	F_MED	Mother's Education		U		
	648	1	F_WTGAIN	Weight Gain		U,R		
	649	1	F_ALCOL	Alcohol use		U		
	650	1	F_API	API Codes		U		
	651-666	16	FILLER	**Filler**			Blank	
	667	1	F_TOBAC	Tobacco Use		U		
	668	1	F_MPCB	Month Prenatal Care Began		R		
	669	1	F_MPCB_U	Month Prenatal Care Began		U		
670-682		13	FILLER	**Filler**			Blank	
683-706		24	**Mother's Race Edited**			R**	100-999 A00-R99	Mother's Race Edited Code
	683	3	MRACE1E					
	686	3	MRACE2E					
	689	3	MRACE3E					
	692	3	MRACE4E					
	695	3	MRACE5E					
	698	3	MRACE6E					
	701	3	MRACE7E					
	704	3	MRACE8E					
				**Also includes unrevised States that report multiple race.				
707-717		11	FILLER	**Filler**			Blank	
718-741		24	**Father's Race Edited**			R**	100-999 A00-R99	Father's Race Edited Code
	718	3	FRACE1E					
	721	3	FRACE2E					
	724	3	FRACE3E					
	727	3	FRACE4E					
	730	3	FRACE5E					
	733	3	FRACE6E					
	736	3	FRACE7E					
	739	3	FRACE8E					
				**Also includes unrevised States that report multiple race.				
742-750		9	FILLER	**Filler**			Blank	

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
751	1	FLGND	Flag indicating records in both numerator and denominator file		U,R		
						1	Record in both files
						Blank	Record not in numerator file

Here ends the Denominator file. Documentation of the Mortality Section of the Numerator (Linked) file begins on the next page.

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
752-754	3	FILLER	**Filler**			Blank	
755-757	3	AGED	**Age at Death in Days**			000-364	Number of days
758	1	AGER5	**Infant age recode 5**			1	Under 1 hour
						2	1 – 23 hours
						3	1 – 6 days
						4	7 – 27 days (late neonatal)
						5	28 days and over (postneonatal)
759-760	2	AGER22	**Infant age recode 22**			Blank	Age 1 year and over or not stated
						01	Under 1 hour (includes not stated hours and minutes)
						02	1 – 23 hours
						03	1 day (includes not stated days)
						04	2 days
						05	3 days
						06	4 days
						07	5 days
						08	6 days
						09	7 - 13 days (includes not stated weeks)
						10	14 – 20 days
						11	21 – 27 days
						12	1 month (includes not stated months)
						13	2 months
						14	3 months
						15	4 months
						16	5 months
						17	6 months
						18	7 months
						19	8 months
						20	9 months
						21	10 months
						22	11 months
761	1	MANNER	**Manner of Death**			1	Accident
						2	Suicide
						3	Homicide
						4	Pending investigation
						5	Could not determine
						6	Self-inflicted
						7	Natural

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						Blank	Not specified
762	1	DISPO	**Method of Disposition**			B	Burial
						C	Cremation
						D	Donation
						E	Entombment
						R	Removed from State
						O	Other
						U	Unknown
763	1	AUTOPSY	**Autopsy**			Y	Yes
						N	No
						U	Unknown
764	1	FILLER	**Filler**			Blank	
765	1	PLACE	**Place of injury for causes W00-Y34, except Y06.- and Y07.-**				
						0	Home
						1	Residential institution
						2	School, other institution and public administrative area
						3	Sports and athletics area
						4	Street and highway
						5	Trade and service area
						6	Industrial and construction area
						7	Farm
						8	Other Specified Places
						9	Unspecified place
						Blank	Cause other than W00-Y34, except Y06.- and Y07.-
766	1	FILLER	**Filler**			Blank	
767-774	8		UNDERLYING CAUSE OF DEATH				
767-770	4	UCOD	**ICD Code (10th Revision)** See the International Classification of Diseases, 1992 Revision, Volume 1.				
771	1	FILLER	**Filler**			Blank	
772-774	3	UCODR130	**130 Infant Cause Recode**			001-158	Code range

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
775	1	FILLER	**Filler**			Blank	
776-783	8	RECWT	**Record Weight** (no weights computed for possessions file)			1.XXXXXX	
784-785	2	FILLER	**Filler**			Blank	
786-1066	281		MULTIPLE CONDITIONS				
786-787	2	EANUM	**Number of Entity-Axis Conditions**			00-20	Code range
788-927	140	ENTITY	**Entity-Axis Conditions** Space has been provided for a maximum of 20 conditions. Each condition takes 7 positions in the record. The 7th position will be blank. Records that do not have 20 conditions are blank in the unused area. Position 1: Part/line number on certificate 1 … Part I, line 1 (a) 2 … Part I, line 2 (b) 3 … Part I, line 3 (c) 4 … Part I, line 4 (d) 5 … Part I, line 5 (e) 6 … Part II, Position 2: Sequence of condition within part/line 1-7 … Code range Position 3 – 6: Condition code				
788-794	7		1st Condition				
795-801	7		2nd Condition				
802-808	7		3rd Condition				
809-815	7		4th Condition				
816-822	7		5th Condition				
823-829	7		6th Condition				
830-836	7		7th Condition				
837-843	7		8th Condition				
844-850	7		9th Condition				

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
851-857	7		10th Condition				
858-864	7		11th Condition				
865-871	7		12th Condition				
872-878	7		13th Condition				
879-885	7		14th Condition				
886-892	7		15th Condition				
893-899	7		16th Condition				
900-906	7		17th Condition				
907-913	7		18th Condition				
914-920	7		19th Condition				
921-927	7		20th Condition				
928-929	2	FILLER	**Filler**			Blank	
930-931	2	RANUM	**Number of Record-Axis Conditions**			00-20	Code range
932-1031	100	RECORD	**Record-Axis Conditions** Space has been provided for a maximum of 20 conditions. Each condition takes 5 positions in the record. The 5th position will be blank. Records that do not have 20 conditions are blank in the unused area. Positions 1 – 4: Condition Code				
932-936	5		1st Condition				
937-941	5		2nd Condition				
942-946	5		3rd Condition				
947-951	5		4th Condition				
952-956	5		5th Condition				
957-961	5		6th Condition				
962-966	5		7th Condition				
967-971	5		8th Condition				
972-976	5		9th Condition				
977-981	5		10th Condition				
982-986	5		11th Condition				
987-991	5		12th Condition				
992-996	5		13th Condition				
997-1001	5		14th Condition				
1002-1006	5		15th Condition				
1007-1011	5		16th Condition				
1012-1016	5		17th Condition				

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
1017-1021	5		18th Condition				
1022-1026	5		19th Condition				
1027-1031	5		20th Condition				
1032-1033	2	FILLER	**Filler**			Blank	
1034	1	RESSTATD	**Resident Status**				
			United States Occurrence			1	RESIDENTS State and County of Occurrence and Residence are the same.
						2	INTRASTATE NONRESIDENTS State of Occurrence and Residence are the same, but County is different.
						3	INTERSTATE NONRESIDENTS State of Occurrence and Residence are different, but both are in the U.S.
						4	FOREIGN RESIDENTS State of Occurrence is one of the 50 States or the District of Columbia, but Place of Residence is outside of the U.S.
			Puerto Rico Occurrence				
						1	RESIDENTS Territory and County-equivalent of Occurrence and Residence are the same.
						2	INTRASTATE NONRESIDENTS Territory of Occurrence and Residence are the same, but County-equivalent is different.
						3	INTERTERRITORY NONRESIDENTS Territory of occurrence and residence are different, but both are a Territory.
						4	FOREIGN RESIDENTS Occurred in Puerto Rico to a resident of any other place.
			Virgin Islands Occurrence				
						1	RESIDENTS Territory and County-equivalent of Occurrence and Residence are the same.
						2	INTRASTATE NONRESIDENTS Territory of Occurrence and Residence are the same, but County-equivalent is different.

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U Includes data based on the 1989 Revision of the U.S. Certificate of Live Birth; excludes data based on the 2003 Revision.
R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						3	INTERTERRITORY NONRESIDENTS Territory of occurrence and residence are different, but both are a Territory.
						4	FOREIGN RESIDENTS Occurred in Virgin Islands to a resident of any other place.
			Guam Occurrence				
						1	RESIDENTS Occurred in Guam to a resident of Guam or to a resident of the U.S.
						3	INTERTERRITORY NONRESIDENTS Territory of occurrence and residence are different, but both are a Territory.
						4	FOREIGN RESIDENTS Occurred in Guam to a resident of any place other than Guam or the U.S.
1035-1068	34		FEDERAL INFORMATION PROCESSING STANDARDS (FIPS) GEOGRAPHIC CODES Refer to the Geographic Code Outline further back in this document for a detailed list of areas and codes. For an explanation of FIPS codes, reference should be made to various National Institute of Standards and Technology (NIST) publications. Some geographic codes have been changed to reflect the results of the 2000 Census.				
1035-1042	8		PLACE OF OCCURRENCE				
1035-1036	2	STOCCFIPD	**State of Occurrence (FIPS)**				
			United States				
						AL	Alabama
						AK	Alaska
						AZ	Arizona
						AR	Arkansas
						CA	California
						CO	Colorado
						CT	Connecticut
						DE	Delaware
						DC	District of Columbia
						FL	Florida

*U,R Includes data based on both the 1989 Revision of the U.S. Certificate of Live Birth (unrevised), and the 2003 Revision of the U.S. Certificate of Live Birth (revised).
U Includes data based on the 1989 Revision of the U.S. Certificate of Live Birth; excludes data based on the 2003 Revision.
R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						GA	Georgia
						HI	Hawaii
						ID	Idaho
						IL	Illinois
						IN	Indiana
						IA	Iowa
						KS	Kansas
						KY	Kentucky
						LA	Louisiana
						ME	Maine
						MD	Maryland
						MA	Massachusetts
						MI	Michigan
						MN	Minnesota
						MS	Mississippi
						MO	Missouri
						MT	Montana
						NE	Nebraska
						NV	Nevada
						NH	New Hampshire
						NJ	New Jersey
						NM	New Mexico
						NY	New York
						NC	North Carolina
						ND	North Dakota
						OH	Ohio
						OK	Oklahoma
						OR	Oregon
						PA	Pennsylvania
						RI	Rhode Island
						SC	South Carolina
						SD	South Dakota
						TN	Tennessee
						TX	Texas
						UT	Utah
						VT	Vermont
						VA	Virginia
						WA	Washington
						WV	West Virginia
						WI	Wisconsin
						WY	Wyoming

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U Includes data based on the 1989 Revision of the U.S. Certificate of Live Birth; excludes data based on the 2003 Revision.
R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
			Puerto Rico				
						PR	Puerto Rico
			Virgin Islands				
						VI	Virgin Islands
			Guam				
						GU	Guam
1037-1039	3	CNTOCFIPD	**County of Occurrence (FIPS)** Counties and county equivalents (independent and coextensive cities) are numbered alphabetically within each State and identify each county. (Note: To uniquely identify a county, both the state and county codes must be used.) A complete list of counties is shown in the Geographic Code Outline further back in this document.				
						001-nnn	Code range
						999	County with less than 250,000 population
1040-1041	2	ESTATOCD	**Expanded State of Occurrence Code** This item is designed to separately identify New York City records (YC) from other New York State records. Note: YC is not an official FIPS code.				
			United States				
						AL	Alabama
						AK	Alaska
						AZ	Arizona
						AR	Arkansas
						CA	California
						CO	Colorado
						CT	Connecticut
						DE	Delaware
						DC	District of Columbia
						FL	Florida
						GA	Georgia
						HI	Hawaii
						ID	Idaho

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U Includes data based on the 1989 Revision of the U.S. Certificate of Live Birth; excludes data based on the 2003 Revision.
R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						IL	Illinois
						IN	Indiana
						IA	Iowa
						KS	Kansas
						KY	Kentucky
						LA	Louisiana
						ME	Maine
						MD	Maryland
						MA	Massachusetts
						MI	Michigan
						MN	Minnesota
						MS	Mississippi
						MO	Missouri
						MT	Montana
						NE	Nebraska
						NV	Nevada
						NH	New Hampshire
						NJ	New Jersey
						NM	New Mexico
						NY	New York
						YC	New York City
						NC	North Carolina
						ND	North Dakota
						OH	Ohio
						OK	Oklahoma
						OR	Oregon
						PA	Pennsylvania
						RI	Rhode Island
						SC	South Carolina
						SD	South Dakota
						TN	Tennessee
						TX	Texas
						UT	Utah
						VT	Vermont
						VA	Virginia
						WA	Washington
						WV	West Virginia
						WI	Wisconsin
						WY	Wyoming
			Puerto Rico				

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R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						PR	Puerto Rico
			Virgin Islands			VI	Virgin Islands
			Guam			GU	Guam
1042	1	CNTOCPPD	**Population Size of County of Occurrence** Based on the results of the 2000 Census				
						0	County of 1,000,000 or more
						1	County of 500,000 to 1,000,000
						2	County of 250,000 to 500,000
						9	Counties of less than 250,000
1043-1066	24		PLACE OF RESIDENCE Refer to the Geographic Code Outline further back in this document for a detailed list of areas and codes. Beginning with 2003 data, some areas started reporting additional codes for foreign residents.				
1043-1044	2	STRESFIPD	**State of Residence (FIPS)**				
			US Occurrence				
						ZZ	Foreign residents
						AL	Alabama
						AK	Alaska
						AZ	Arizona
						AR	Arkansas
						CA	California
						CO	Colorado
						CT	Connecticut
						DE	Delaware
						DC	District of Columbia
						FL	Florida
						GA	Georgia
						HI	Hawaii
						ID	Idaho
						IL	Illinois
						IN	Indiana
						IA	Iowa

*U,R Includes data based on both the 1989 Revision of the U.S. Certificate of Live Birth (unrevised), and the 2003 Revision of the U.S. Certificate of Live Birth (revised).
U Includes data based on the 1989 Revision of the U.S. Certificate of Live Birth; excludes data based on the 2003 Revision.
R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						KS	Kansas
						KY	Kentucky
						LA	Louisiana
						ME	Maine
						MD	Maryland
						MA	Massachusetts
						MI	Michigan
						MN	Minnesota
						MS	Mississippi
						MO	Missouri
						MT	Montana
						NE	Nebraska
						NV	Nevada
						NH	New Hampshire
						NJ	New Jersey
						NM	New Mexico
						NY	New York
						NC	North Carolina
						ND	North Dakota
						OH	Ohio
						OK	Oklahoma
						OR	Oregon
						PA	Pennsylvania
						RI	Rhode Island
						SC	South Carolina
						SD	South Dakota
						TN	Tennessee
						TX	Texas
						UT	Utah
						VT	Vermont
						VA	Virginia
						WA	Washington
						WV	West Virginia
						WI	Wisconsin
						WY	Wyoming
			Territories				
						PR	Puerto Rico
						VI	Virgin Islands
						GU	Guam
						AS	American Samoa

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U Includes data based on the 1989 Revision of the U.S. Certificate of Live Birth; excludes data based on the 2003 Revision.
R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						MP	Northern Marianas
			Puerto Rico Occurrence				
						PR	Puerto Rico
						AL-WY, VI,AS,GU, MP,ZZ	Foreign residents: refer to U.S. for specific code structure.
			Virgin Islands Occurrence				
						VI	Virgin Islands
						AL-WY, PR,AS,GU, MP, ZZ	Foreign residents: refer to U.S. for specific code structure.
			Guam Occurrence				
						GU	Guam
						AL-WY	U.S. resident. Also considered a resident of Guam.
						PR,AS, VI,MP, ZZ	Foreign residents: refer to U.S. for specific code structure.
1045-1046	2	DRCNTRY	**Country of Residence**				
			US Occurrence				
			Countries have alphabetic values. A complete list of countries is shown in the Geographic coding manual.				
						AA-ZZ	Code range
1047-1048	2	DRSTCNTRY	**State/Country of Residence Recode** See Country of Residence (location 1045-1046) for detailed Country information. Note: Canada (CC) and Remainder of world (YY) are not the official FIPS code.				
			United States Occurrence				
						AL	Alabama
						AK	Alaska
						AZ	Arizona
						AR	Arkansas
						CA	California
						CO	Colorado

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U Includes data based on the 1989 Revision of the U.S. Certificate of Live Birth; excludes data based on the 2003 Revision.
R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						CT	Connecticut
						DE	Delaware
						DC	District of Columbia
						FL	Florida
						GA	Georgia
						HI	Hawaii
						ID	Idaho
						IL	Illinois
						IN	Indiana
						IA	Iowa
						KS	Kansas
						KY	Kentucky
						LA	Louisiana
						ME	Maine
						MD	Maryland
						MA	Massachusetts
						MI	Michigan
						MN	Minnesota
						MS	Mississippi
						MO	Missouri
						MT	Montana
						NE	Nebraska
						NV	Nevada
						NH	New Hampshire
						NJ	New Jersey
						NM	New Mexico
						NY	New York
						NC	North Carolina
						ND	North Dakota
						OH	Ohio
						OK	Oklahoma
						OR	Oregon
						PA	Pennsylvania
						RI	Rhode Island
						SC	South Carolina
						SD	South Dakota
						TN	Tennessee
						TX	Texas
						UT	Utah
						VT	Vermont
						VA	Virginia

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U Includes data based on the 1989 Revision of the U.S. Certificate of Live Birth; excludes data based on the 2003 Revision.
R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						WA	Washington
						WV	West Virginia
						WI	Wisconsin
						WY	Wyoming
			Territorial residents				
						PR	Puerto Rico
						VI	Virgin Islands
						GU	Guam
						AS	American Samoa
						MP	Northern Marianas
			Foreign residents				
						CC	Canada
						MX	Mexico
						CU	Cuba
						YY	Remainder of the world
			Puerto Rico Occurrence				
						PR	Puerto Rico
						AL-ZZ	Foreign residents: refer to U.S. for specific code structure.
			Virgin Islands Occurrence				
						VI	Virgin Islands
						AL-ZZ	Foreign residents: refer to U.S. for specific code structure.
			Guam Occurrence				
						GU	Guam
						AL-WY	U.S. resident. Also considered a resident of Guam
						PR,VI,AS, MP,ZZ	Foreign residents: refer to U.S. for specific code structure.
1049-1051	3	CNTYRFPD	**County of Residence (FIPS)** Counties and county equivalents (independent and coextensive cities) are numbered alphabetically within each State and identify each county. (Note: To uniquely identify a county, both the state and county codes must be used.) A complete list of counties is shown in the Geographic Code Outline further back in this document.				
						000	Foreign residents
						001-nnn	Code range
						999	County with less than 250,000 population

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U Includes data based on the 1989 Revision of the U.S. Certificate of Live Birth; excludes data based on the 2003 Revision.
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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
1052-1056	5	PLRES	**City of Residence (FIPS)** A complete list of cities is shown in the Geographic code outline further back in this document. Effective with the 1994 data year, the FIPS place code has been added to the Mortality record.				
						00000	Foreign residents
						00001-nnnnn	Code range
						99999	Balance of county or city less than 250,000 population
1057	1	CITRSPPD	**Population Size of City of Residence** Based on the results of the 2000 Census.				
						0	Place of 1,000,000 or more
						1	Place of 500,000 to 1,000,000
						2	Place of 250,000 to 500,000
						9	Place of less than 250,000
						Z	Foreign residents
1058	1	METRRESD	**Metropolitan - Nonmetropolitan County of Residence** NOTE: Guam and the Virgin Islands do not have any metropolitan areas.				
						1	Metropolitan county
						2	Nonmetropolitan county
						Z	Foreign residents
1059-1060	2	DRSTATE	**Expanded State of Residence Code** This item is designed to separately identify New York City records (YC) from other New York State records. Note: YC, CC, and YY are not official FIPS codes. United States Occurrence				
						AL	Alabama
						AK	Alaska
						AZ	Arizona
						AR	Arkansas
						CA	California
						CO	Colorado
						CT	Connecticut
						DE	Delaware
						DC	District of Columbia
						FL	Florida

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U Includes data based on the 1989 Revision of the U.S. Certificate of Live Birth; excludes data based on the 2003 Revision.
R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						GA	Georgia
						HI	Hawaii
						ID	Idaho
						IL	Illinois
						IN	Indiana
						IA	Iowa
						KS	Kansas
						KY	Kentucky
						LA	Louisiana
						ME	Maine
						MD	Maryland
						MA	Massachusetts
						MI	Michigan
						MN	Minnesota
						MS	Mississippi
						MO	Missouri
						MT	Montana
						NE	Nebraska
						NV	Nevada
						NH	New Hampshire
						NJ	New Jersey
						NM	New Mexico
						NY	New York
						YC	New York City
						NC	North Carolina
						ND	North Dakota
						OH	Ohio
						OK	Oklahoma
						OR	Oregon
						PA	Pennsylvania
						RI	Rhode Island
						SC	South Carolina
						SD	South Dakota
						TN	Tennessee
						TX	Texas
						UT	Utah
						VT	Vermont
						VA	Virginia
						WA	Washington
						WV	West Virginia
						WI	Wisconsin

*U,R Includes data based on both the 1989 Revision of the U.S. Certificate of Live Birth (unrevised), and the 2003 Revision of the U.S. Certificate of Live Birth (revised).
U Includes data based on the 1989 Revision of the U.S. Certificate of Live Birth; excludes data based on the 2003 Revision.
R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						WY	Wyoming
			Territorial residents				
						PR	Puerto Rico
						VI	Virgin Islands
						GU	Guam
						AS	American Samoa
						MP	Northern Marianas
			Foreign residents				
						CC	Canada
						MX	Mexico
						CU	Cuba
						YY	Remainder of the world
			Puerto Rico Occurrence				
						PR	Puerto Rico
						AL-ZZ	Foreign residents: refer to U.S. for specific code structure.
			Virgin Islands Occurrence				
						VI	Virgin Islands
						AL-ZZ	Foreign residents: refer to U.S. for specific code structure.
			Guam Occurrence				
						GU	Guam
						AL-WY	U.S. resident. Also considered a resident of Guam.
						PR,VI,AS, MP,ZZ	Foreign residents: refer to U.S. for specific code structure.
1061-1064	4	SMSARFIPD	**PMSA/MSA of Residence (FIPS)** Primary Metropolitan Statistical Areas and Metropolitan Statistical Areas are those defined by the U.S. Office of Management and Budget (OMB) as of 2000. For New England, the New England County Metropolitan Areas (NECMA) are used. Further back in this document is a list of PMSA's, MSA's, NECMA's, and their component counties.				
						0000	Nonmetropolitan counties or foreign residents
						0040-9360	Code range

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
1065	1	CNTRSPPD	**Population Size of County of Residence** Based on the results of the 2000 Census				
						0	County of 1,000,000 or more
						1	County of 500,000 to 1,000,000
						2	County of 250,000 to 500,000
						9	County of less than 250,000
						Z	Foreign residents
1066	1	POPSMASD	**PMSA/MSA Population Size of Residence** Based on the results of the 2000 Census				
						1	Area of 250,000 or more
						2	Area of less than 250,000
						9	Nonmetropolitan area
						Z	Foreign residents
1067-1068	2	CMSAD	**CMSA of Residence (FIPS)** Consolidated Metropolitan Statistical Areas are groupings of certain Primary Metropolitan Statistical Areas and are defined by the U.S. Office of Management and Budget (OMB) as of 2000.				
			All Areas			00	Not a CMSA
			United States Occurrence			07	Boston - Worcester-Lawrence, MA-NH-ME-CT, CMSA
						14	Chicago - Gary-Kenosha, IL-IN-WI, CMSA
						21	Cincinnati - Hamilton, OH-KY-IN, CMSA
						28	Cleveland - Akron, OH, CMSA
						31	Dallas - Fort Worth, TX, CMSA
						34	Denver - Boulder-Greeley, CO, CMSA
						35	Detroit - Ann Arbor-Flint, MI, CMSA
						42	Houston - Galveston-Brazoria, TX, CMSA
						49	Los Angeles -Riverside- Orange County, CA, CMSA
						56	Miami - Fort Lauderdale, FL, CMSA
						63	Milwaukee - Racine, WI, CMSA
						70	New York -Northern New Jersey-Long Island, NY-NJ-CT-PA, CMSA
						77	Philadelphia - Wilmington-Atlantic City, PA-NJ-DE-MD, CMSA
						79	Portland - Salem, OR-WA, CMSA
						82	Sacramento - Yolo, CA, CMSA
						84	San Francisco -Oakland-San Jose, CA, CMSA

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						91	Seattle - Tacoma-Bremerton, WA, CMSA
						97	Washington - Baltimore, DC-MD-VA-WV, CMSA
			Puerto Rico Occurrence			87	San Juan -Caguas-Arecibo, PR, CMSA
1069	1	HOSPD	**Place of Death and Decendent's Status**				
						1	Hospital, clinic or Medical Center – Inpatient
						2	Hospital, clinic or Medical Center – Outpatient or admitted to Emergency Room
						3	Hospital, clinic or Medical Center – Dead on Arrival
						4	Decedent's home
						5	Hospice facility
						6	Nursing home/long term care
						7	Other
						9	Place of death unknown
1070	1	WEEKDAYD	**Day of Week of Death**				
						1	Sunday
						2	Monday
						3	Tuesday
						4	Wednesday
						5	Thursday
						6	Friday
						7	Saturday
						9	Unknown
1071-1074	4	DTHYR	**Data Year**			2003	2003
1075-1140	66	FILLER	**Filler**			Blank	
1141-1142	2	DTHMON	**Month of Death**				
						01	January
						02	February
						03	March
						04	April
						05	May
						06	June
						07	July
						08	August
						09	September
						10	October

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Position	Len	Field	Description	Reporting Flag Position	Vers*	Values	Definition
						11	November
						12	December

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R Includes data based on the 2003 Revision of the U.S. Certificate of Live Birth; excludes data based on the 1989 Revision.

Listings of Counties Identified in the Linked Data Set
Vital Statistics Geographic Code Outline Effective With 2000 Data

State	County	State and County Name
01		Alabama
	073	Jefferson
	089	Madison
	097	Mobile
02		Alaska
		Anchorage, coext. with Anchorage city
04		Arizona
	013	Maricopa
	019	Pima
05		Arkansas
	119	Pulaski
06		California
	001	Alameda
	013	Contra Costa
	019	Fresno
	029	Kern
	037	Los Angeles
	053	Monterey
	059	Orange
	065	Riverside
	067	Sacramento
	071	San Bernardino
	073	San Diego
	075	San Francisco, coext. with San Francisco city
	077	San Joaquin
	081	San Mateo
	083	Santa Barbara
	085	Santa Clara
	087	Santa Cruz
	095	Solano
	097	Sonoma
	099	Stanislaus
	107	Tulare
	111	Ventura

State	County	State and County Name
08		Colorado
	001	Adams
	005	Arapahoe
	013	Boulder
	031	Denver, coext. with Denver city
	041	El Paso
	059	Jefferson
	069	Larimer
09		Connecticut
	001	Fairfield
	003	Hartford
	009	New Haven
	011	New London
10		Delaware
	003	New Castle
11		District of Columbia
	001	District of Columbia
12		Florida
	009	Brevard
	011	Broward
	021	Collier
	031	Duval
	033	Escambia
	057	Hillsborough
	071	Lee
	081	Manatee
	083	Marion
	086	Miami-Dade
	095	Orange
	099	Palm Beach
	101	Pasco
	103	Pinellas
	105	Polk
	115	Sarasota
	117	Seminole
	127	Volusia

State	County	State and County Name
13		Georgia
	067	Cobb
	089	De Kalb
	121	Fulton
	135	Gwinnett
15		Hawaii
	003	Honolulu
16		Idaho
	001	Ada
17		Illinois
	031	Cook
	043	Du Page
	089	Kane
	097	Lake
	111	McHenry
	119	Madison
	163	St. Clair
	197	Will
	201	Winnebago
18		Indiana
	003	Allen
	089	Lake
	097	Marion
	141	St. Joseph
19		Iowa
	153	Polk
20		Kansas
	091	Johnson
	173	Sedgwick
21		Kentucky
	067	Fayette, coext. with Lexington-Fayette
	111	Jefferson

State	County	State and County Name
22		Louisiana
	017	Caddo
	033	East Baton Rouge
	051	Jefferson
	071	Orleans, coext. with New Orleans city
23		Maine
	005	Cumberland
24		Maryland
	003	Anne Arundel
	005	Baltimore
	031	Montgomery
	033	Prince George's
	510	Baltimore city
25		Massachusetts
	005	Bristol
	009	Essex
	013	Hampden
	017	Middlesex
	021	Norfolk
	023	Plymouth
	027	Worcester
26		Michigan
	049	Genesee
	065	Ingham
	081	Kent
	099	Macomb
	125	Oakland
	161	Washtenaw
	163	Wayne
27		Minnesota
	003	Anoka
	037	Dakota
	053	Hennepin
	123	Ramsey
28		Mississippi
	049	Hinds

State	County	State and County Name
29		Missouri
	095	Jackson
	183	St. Charles
	189	St. Louis
	510	St. Louis city
30		Montana
31		Nebraska
	055	Douglas
	109	Lancaster
32		Nevada
	003	Clark
	031	Washoe
33		New Hampshire
	011	Hillsborough
	015	Rockingham
34		New Jersey
	001	Atlantic
	003	Bergen
	005	Burlington
	007	Camden
	013	Essex
	015	Gloucester
	017	Hudson
	021	Mercer
	023	Middlesex
	025	Monmouth
	027	Morris
	029	Ocean
	031	Passaic
	035	Somerset
	039	Union
35		New Mexico
	001	Bernalillo

State	County	State and County Name
36		New York
	001	Albany
	027	Dutchess
	029	Erie
	055	Monroe
	059	Nassau
	085	Staten Island borough, Richmond county
	081	Queens borough, Queens county
	061	Manhattan borough, New York county
	047	Brooklyn borough, Kings county
	005	Bronx borough, Bronx county
	067	Onondaga
	071	Orange
	087	Rockland
	103	Suffolk
	119	Westchester
37		North Carolina
	051	Cumberland
	067	Forsyth
	081	Guilford
	119	Mecklenburg
	183	Wake
38		North Dakota
39		Ohio
	017	Butler
	035	Cuyahoga
	049	Franklin
	061	Hamilton
	093	Lorain
	095	Lucas
	099	Mahoning
	113	Montgomery
	151	Stark
	153	Summit
40		Oklahoma
	109	Oklahoma
	143	Tulsa

State	County	State and County Name
41		Oregon
	005	Clackamas
	039	Lane
	047	Marion
	051	Multnomah
	067	Washington
42		Pennsylvania
	003	Allegheny
	011	Berks
	017	Bucks
	029	Chester
	043	Dauphin
	045	Delaware
	049	Erie
	071	Lancaster
	077	Lehigh
	079	Luzerne
	091	Montgomery
	095	Northampton
	101	Philadelphia, coext. with Philadelphia city
	129	Westmoreland
	133	York
44		Rhode Island
	007	Providence
45		South Carolina
	019	Charleston
	045	Greenville
	079	Richland
	083	Spartanburg
46		South Dakota
47		Tennessee
	037	Davidson
	065	Hamilton
	093	Knox
	157	Shelby

State	County	State and County Name
48		Texas
	029	Bexar
	061	Cameron
	085	Collin
	113	Dallas
	121	Denton
	141	El Paso
	157	Fort Bend
	167	Galveston
	201	Harris
	215	Hidalgo
	245	Jefferson
	339	Montgomery
	355	Nueces
	439	Tarrant
	453	Travis
49		Utah
	035	Salt Lake
	049	Utah
51		Virginia
	041	Chesterfield
	059	Fairfax
	087	Henrico
	153	Prince William
	810	Virginia Beach city
53		Washington
	033	King
	053	Pierce
	061	Snohomish
	063	Spokane
55		Wisconsin
	025	Dane
	079	Milwaukee
	133	Waukesha

State	County	State and County Name
72		Puerto Rico
	127	San Juan
78		Virgin Islands
66	010	Guam
00	000	Canada
00	000	Cuba
00	000	Mexico
00	000	Remainder of World

Listing of Cities/Places Identified in the Linked Data Set
Vital Statistics Geographic Code Outline Effective With 2000 Data

State	FIPS Codes City/Place	State and City/Place Name
AK		Alaska
	03000	Anchorage
AZ		Arizona
	46000	Mesa
	55000	Phoenix
	77000	Tucson
AR		Arkansas
CA		California
	02000	Anaheim
	27000	Fresno
	43000	Long Beach
	44000	Los Angeles
	53000	Oakland
	62000	Riverside
	64000	Sacramento
	66000	San Diego
	67000	San Francisco
	68000	San Jose
	69000	Santa Ana
CO		Colorado
	04000	Aurora
	16000	Colorado Springs
	20000	Denver
CT		Connecticut
DE		Delaware
DC		District of Columbia
	50000	Washington
FL		Florida
	35000	Jacksonville
	45000	Miami
	71000	Tampa
GA		Georgia
	04000	Atlanta

State	City/Place	State and City/Place Name
HI		Hawaii
	17000	Honolulu
ID		Idaho
IL		Illinois
	14000	Chicago
IN		Indiana
	36003	Indianapolis
KS		Kansas
	79000	Wichita
KY		Kentucky
	46027	Lexington-Fayette
	48000	Louisville
LA		Louisiana
	55000	New Orleans
MD		Maryland
	04000	Baltimore
MA		Massachusetts
	07000	Boston
MI		Michigan
	22000	Detroit
MN		Minnesota
	43000	Minneapolis
	58000	St. Paul
MO		Missouri
	38000	Kansas City
	65000	St. Louis
NB		Nebraska
	37000	Omaha
NV		Nevada
	40000	Las Vegas

State	City/Place	State and City/Place Name
NJ		New Jersey
	51000	Newark
NM		New Mexico
	02000	Albuquerque
NY		New York
	51000	Brooklyn borough, Kings county
	51000	Bronx borough, Bronx county
	11000	Buffalo
	51000	Manhattan borough, New York county
	51000	Queens borough, Queens county
	51000	Staten Island borough, Richmond county
NC		North Carolina
	12000	Charlotte
	55000	Raleigh
OH		Ohio
	15000	Cincinnati
	16000	Cleveland
	18000	Columbus
	77000	Toledo
OK		Oklahoma
	55000	Oklahoma City
	75000	Tulsa, part
	75000	Tulsa, part
OR		Oregon
	59000	Portland
PA		Pennsylvania
	60000	Philadelphia
	61000	Pittsburgh
TN		Tennessee
	48000	Memphis
	52006	Nashville-Davidson

State	City/Place	State and City/Place Name
TX		Texas
	04000	Arlington
	05000	Austin
	17000	Corpus Christ
	19000	Dallas
	24000	El Paso
	27000	Fort Worth
	35000	Houston
	65000	San Antonio
VA		Virginia
	82000	Virginia Beach
WA		Washington
	63000	Seattle
WI		Wisconsin
	53000	Milwaukee
WY		Wyoming
PR	00000	Puerto Rico
VI	00000	Virgin Islands
GU	00000	Guam
00	00000	Canada
00	00000	Cuba
00	00000	Mexico
00	00000	Remainder of the World

ST: 1 = Subtotal Limited: Sex: 1 = Males; 2 = Females
Age: 1 = 5 and over; 2 = 10-54; 3 = 28 days and over
4 = Under 1 year; 5 = 1-4 years; 6 = 1 year and over
7 = 10 years and over

***** Cause Subtotals are not identified in this file *****

130 Recode	S T	Limited Sex	Age	Cause Title and ICD-10 Codes Included
001	1			Certain infectious and parasitic diseases (A00-B99)
002				Certain intestinal infectious diseases (A00-A08)
003				Diarrhea and gastroenteritis of infectious origin (A09)
004				Tuberculosis (A16-A19)
005				Tetanus (A33,A35)
006				Diphtheria (A36)
007				Whooping cough (A37)
008				Meningococcal infection (A39)
009		3		Septicemia (A40-A41)
010				Congenital syphilis (A50)
011				Gonococcal infection (A54)
012	1			Viral diseases (A80-B34)
013				Acute poliomyelitis (A80)
014				Varicella (chickenpox) (B01)
015				Measles (B05)
016				Human immunodeficiency virus (HIV) disease (B20-B24)
017				Mumps (B26)
018				Other and unspecified viral diseases (A81-B00,B02-B04,B06-B19,B25,B27-B34)
019				Candidiasis (B37)
020				Malaria (B50-B54)
021				Pneumocystosis (B59)
022				All other and unspecified infectious and parasitic diseases (A20-A32,A38,A42-A49,A51-A53,A55-A79,B35-B36,B38-B49,B55-B58,B60-B99)
023	1			Neoplasms (C00-D48)
024	1			Malignant neoplasms (C00-C97)
025				Hodgkin's disease and non-Hodgkin's lymphomas (C81-C85)
026				Leukemia (C91-C95)
027				Other and unspecified malignant neoplasms (C00-C80,C88,C90,C96-C97)
028				In situ neoplasms, benign neoplasms and neoplasms of uncertain or unknown behavior (D00-D48)
029	1			Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (D50-D89)
030				Anemias (D50-D64)
031				Hemorrhagic conditions and other diseases of blood and blood-forming organs (D65-D76)
032				Certain disorders involving the immune mechanism (D80-D89)
033	1			Endocrine, nutritional and metabolic diseases (E00-E88)
034				Short stature, not elsewhere classified (E34.3)
035				Nutritional deficiencies (E40-E64)
036				Cystic fibrosis (E84)
037		3		Volume depletion, disorders of fluid, electrolyte and acid-base balance (E86-E87)
038				All other endocrine, nutritional and metabolic diseases (E00-E32,E34.0-E34.2,E34.4-E34.9,E65-E83,E85,E88)
039	1			Diseases of the nervous system (G00-G98)
040				Meningitis (G00,G03)
041				Infantile spinal muscular atrophy, type I (Werdnig-Hoffman) (G12.0)
042				Infantile cerebral palsy (G80)
043				Anoxic brain damage, not elsewhere classified (G93.1)
044				Other diseases of nervous system (G04,G06-G11,G12.1-G12.9,G20-G72,G81-G92,G93.0,G93.2-G93.9,G95-G98)
045				Diseases of the ear and mastoid process (H60-H93)
046	1			Diseases of the circulatory system (I00-I99)
047				Pulmonary heart disease and diseases of pulmonary circulation (I26-I28)
048				Pericarditis, endocarditis and myocarditis (I30,I33,I40)
049				Cardiomyopathy (I42)
050				Cardiac arrest (I46)
051				Cerebrovascular diseases (I60-I69)
052				All other diseases of circulatory system (I00-I25,I31,I34-I38,I44-I45,I47-I51,I70-I99)
053	1			Diseases of the respiratory system (J00-J98)
054				Acute upper respiratory infections (J00-J06)
055	1			Influenza and pneumonia (J10-J18)

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130 Recode	S T	Limited Sex	Age	Cause Title and ICD-10 Codes Included
056				Influenza (J10-J11)
057				Pneumonia (J12-J18)
058				Acute bronchitis and acute bronchiolitis (J20-J21)
059				Bronchitis, chronic and unspecified (J40-J42)
060				Asthma (J45-J46)
061				Pneumonitis due to solids and liquids (J69)
062				Other and unspecified diseases of respiratory system (J22,J30-J39,J43-J44,J47-J68,J70-J98)
063	1			Diseases of the digestive system (K00-K92)
064				Gastritis, duodenitis, and noninfective enteritis and colitis (K29,K50-K55)
065				Hernia of abdominal cavity and intestinal obstruction without hernia (K40-K46,K56)
066				All other and unspecified diseases of digestive system (K00-K28,K30-K38,K57-K92)
067	1			Diseases of the genitourinary system (N00-N95)
068				Renal failure and other disorders of kidney (N17-N19,N25,N27)
069				Other and unspecified diseases of genitourinary system (N00-N15,N20-N23,N26,N28-N95)
070	1			Certain conditions originating in the perinatal period (P00-P96)
071	1			Newborn affected by maternal factors and by complications of pregnancy, labor and delivery (P00-P04)
072				Newborn affected by maternal hypertensive disorders (P00.0)
073				Newborn affected by other maternal conditions which may be unrelated to present pregnancy (P00.1-P00.9)
074	1			Newborn affected by maternal complications of pregnancy (P01)
075				Newborn affected by incompetent cervix (P01.0)
076				Newborn affected by premature rupture of membranes (P01.1)
077				Newborn affected by multiple pregnancy (P01.5)
078				Newborn affected by other maternal complications of pregnancy (P01.2-P01.4,P01.6-P01.9)
079	1			Newborn affected by complications of placenta, cord and membranes (P02)
080				Newborn affected by complications involving placenta (P02.0-P02.3)
081				Newborn affected by complications involving cord (P02.4-P02.6)
082				Newborn affected by chorioamnionitis (P02.7)
083				Newborn affected by other and unspecified abnormalities of membranes (P02.8-P02.9)
084				Newborn affected by other complications of labor and delivery (P03)
085				Newborn affected by noxious influences transmitted via placenta or breast milk (P04)
086	1			Disorders related to length of gestation and fetal malnutrition (P05-P08)
087				Slow fetal growth and fetal malnutrition (P05)
088	1			Disorders related to short gestation and low birthweight, not elsewhere classified (P07)
089				Extremely low birthweight or extreme immaturity (P07.0,P07.2)
090				Other low birthweight or preterm (P07.1,P07.3)
091				Disorders related to long gestation and high birthweight (P08)
092				Birth trauma (P10-P15)
093	1			Intrauterine hypoxia and birth asphyxia (P20-P21)
094				Intrauterine hypoxia (P20)
095				Birth asphyxia (P21)
096				Respiratory distress of newborn (P22)
097	1			Other respiratory conditions originating in the perinatal period (P23-P28)
098				Congenital pneumonia (P23)
099				Neonatal aspiration syndromes (P24)
100				Interstitial emphysema and related conditions originating in the perinatal period (P25)
101				Pulmonary hemorrhage originating in the perinatal period (P26)
102				Chronic respiratory disease originating in the perinatal period (P27)
103				Atelectasis (P28.0-P28.1)
104				All other respiratory conditions originating in the perinatal period (P28.2-P28.9)
105	1			Infections specific to the perinatal period (P35-P39)
106				Bacterial sepsis of newborn (P36)
107				Omphalitis of newborn with or without mild hemorrhage (P38)

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130 Recode	S T	Limited Sex	Age	Cause Title and ICD-10 Codes Included
108				All other infections specific to the perinatal period (P35,P37,P39)
109	1			Hemorrhagic and hematological disorders of newborn (P50-P61)
110				Neonatal hemorrhage (P50-P52,P54)
111				Hemorrhagic disease of newborn (P53)
112				Hemolytic disease of newborn due to isoimmunization and other perinatal jaundice (P55-P59)
113				Hematological disorders (P60-P61)
114				Syndrome of infant of a diabetic mother and neonatal diabetes mellitus (P70.0-P70.2)
115				Necrotizing enterocolitis of newborn (P77)
116				Hydrops fetalis not due to hemolytic disease (P83.2)
117				Other perinatal conditions (P29,P70.3-P70.9,P71-P76,P78-P81,P83.0-P83.1, P83.3-P83.9,P90-P96)
118	1			Congenital malformations, deformations and chromosomal abnormalities (Q00-Q99)
119				Anencephaly and similar malformations (Q00)
120				Congenital hydrocephalus (Q03)
121				Spina bifida (Q05)
122				Other congenital malformations of nervous system (Q01-Q02,Q04,Q06-Q07)
123				Congenital malformations of heart (Q20-Q24)
124				Other congenital malformations of circulatory system (Q25-Q28)
125				Congenital malformations of respiratory system (Q30-Q34)
126				Congenital malformations of digestive system (Q35-Q45)
127				Congenital malformations of genitourinary system (Q50-Q64)
128				Congenital malformations and deformations of musculoskeletal system, limbs and integument (Q65-Q85)
129				Down's syndrome (Q90)
130				Edward's syndrome (Q91.0-Q91.3)
131				Patau's syndrome (Q91.4-Q91.7)
132				Other congenital malformations and deformations (Q10-Q18,Q86-Q89)
133				Other chromosomal abnormalities, not elsewhere classified (Q92-Q99)
134	1			Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (R00-R99)
135				Sudden infant death syndrome (R95)
136				Other symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified (R00-R53,R55-R94,R96-R99)
137				All other diseases (Residual) (F01-F99,H00-H57,L00-M99)
138	1			External causes of mortality (*U01,V01-Y84)
139	1			Accidents (unintentional injuries) (V01-X59)
140	1			Transport accidents (V01-V99)
141				Motor vehicle accidents(V02-V04,V09.0,V09.2,V12-V14,V19.0-V19.2, V19.4-V19.6,V20-V79,V80.3-V80.5,V81.0-V81.1,V82.0-V82.1,V83-V86, V87.0-V87.8,V88.0-V88.8,V89.0,V89.2)
142				Other and unspecified transport accidents (V01,V05-V06,V09.1,V09.3-V09.9,V10-V11,V15-V18,V19.3, V19.8-V19.9,V80.0-V80.2,V80.6-V80.9,V81.2-V81.9,V82.2-V82.9, V87.9,V88.9,V89.1,V89.3,V89.9,V90-V99)
143				Falls (W00-W19)
144				Accidental discharge of firearms (W32-W34)
145				Accidental drowning and submersion (W65-W74)
146				Accidental suffocation and strangulation in bed (W75)
147				Other accidental suffocation and strangulation (W76-W77,W81-W84)
148				Accidental inhalation and ingestion of food or other objects causing obstruction of respiratory tract (W78-W80)
149				Accidents caused by exposure to smoke, fire and flames (X00-X09)
150				Accidental poisoning and exposure to noxious substances (X40-X49)
151				Other and unspecified accidents (W20-W31,W35-W64,W85-W99,X10-X39,X50-X59)
152	1			Assault (homicide) (*U01,X85-Y09)
153				Assault (homicide) by hanging, strangulation and suffocation (X91)
154				Assault (homicide) by discharge of firearms (*U01.4,X93-X95)
155				Neglect, abandonment and other maltreatment syndromes (Y06-Y07)
156				Assault (homicide) by other and unspecified means (*U01.0-*U01.3,*U01.5-*U01.9,X85-X90,X92,X96-X99,Y00-Y05,Y08-Y09)
157				Complications of medical and surgical care (Y40-Y84)

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***** Cause Subtotals are not identified in this file *****

130 Recode	S T	Limited Sex	Age	Cause Title and ICD-10 Codes Included
158				Other external causes (X60-X84,Y10-Y36)

Documentation Table 1. Live births and infant deaths by state of occurrence of birth and by state of residence at birth
United States, Puerto Rico, Virgin Islands, and Guam, 2003 Period Data.
(Residence of birth is of the mother)

State	Live births		Infant deaths			
			Unweighted		Weighted 1/	
	Occurence	Residence	Occurence	Residence	Occurence	Residence
United States /2	4096151	4090007	27727	27710	28012	27995
Alabama	58415	59552	507	515	507	515
Alaska	9991	10086	63	68	63	68
Arizona	91061	90967	593	588	597	592
Arkansas	37127	37784	305	326	305	326
California	541835	540997	2723	2725	2794	2796
Colorado	69525	69339	427	422	427	422
Connecticut	43510	42873	225	228	225	228
Delaware	12120	11329	114	107	114	107
Dist of Columbia	14637	7619	144	81	146	82
Florida	212313	212250	1597	1585	1598	1586
Georgia	137275	135980	1162	1151	1162	1151
Hawaii	18139	18100	140	138	140	138
Idaho	21290	21800	134	137	134	137
Illinois	179082	182495	1327	1386	1351	1410
Indiana	87115	86434	650	660	655	665
Iowa	38401	38174	199	217	199	217
Kansas	40326	39476	252	262	255	265
Kentucky	53417	55238	350	375	351	376
Louisiana	65309	65047	595	578	622	604
Maine	13662	13855	66	70	66	70
Maryland	70783	74930	566	615	566	616
Massachusetts	81308	80184	383	376	390	383
Michigan	129895	131100	1111	1124	1111	1124
Minnesota	69999	70051	338	324	338	324
Mississippi	41291	42380	438	458	438	459
Missouri	77878	77045	670	608	670	608
Montana	11417	11422	81	81	82	82
Nebraska	26079	25917	148	142	148	142
Nevada	33205	33647	198	192	198	192
New Hampshire	13872	14393	46	60	46	60
New Jersey	113852	116984	623	638	643	657
New Mexico	27320	27823	145	156	147	158
New York	130578	133897	772	785	782	795
New York City	124344	119817	766	747	770	751
North Carolina	119006	118323	960	966	962	968
North Dakota	9191	7972	58	58	58	58
Ohio	150037	149691	1161	1157	1166	1162
Oklahoma	49862	50988	381	388	390	397
Oregon	46845	45953	279	257	280	258
Pennsylvania	145956	145960	1084	1064	1090	1070
Rhode Island	13824	13209	102	88	102	88
South Carolina	53376	55649	432	463	432	463
South Dakota	11503	11027	85	73	85	73
Tennessee	84014	78890	816	726	816	726
Texas	383227	377495	2387	2391	2460	2464
Utah	51064	49860	265	249	265	249
Vermont	6290	6589	33	33	33	33
Virginia	98991	101254	754	777	754	777
Washington	80012	80489	432	446	437	451
West Virginia	21481	20935	168	156	168	156
Wisconsin	68893	70040	445	457	445	457
Wyoming	6208	6700	27	36	27	36
Foreign Residents	-	6144	-	17	-	17
Puerto Rico	50803	50707	492	486	492	486
Virgin Islands	1610	1541	10	11	10	11
Guam	3296	3283	37	37	37	37

1/ Figures are based on weighted data rounded to the nearest infant, so categories may not add to totals
2/ Excludes data for Puerto Rico, Virgin Islands and Guam.

Documentation Table 2. Live births,infant deaths and infant mortality rates by race of mother, sex and birthweight of child: United States, 2003 Period Data.

[Infant death are weighted. Rates are per 1000 live births]

Race of mother and sex	Total	<500 grams	500-749 grams	750-999 grams	1000-1249 grams	1250-1499 grams	1500-1999 grams	2000-2499 grams	2500 grams or more	Not Stated
All races										
Both sexes										
Live births	4090007	7,060	11,515	11,892	13,635	16,403	63,891	201,223	3763758	630
Infant deaths	27,995	6,110	5,490	1,947	945	755	1,781	2,195	8,602	169
Infant mortality rate	6.84	865.44	476.77	163.72	69.31	46.03	27.88	10.91	2.29	268.25
Male										
Live births	2093564	3,653	5,828	6,187	6,970	8,240	31,111	92,518	1938702	355
Infant deaths	15,880	3,232	3,175	1,252	572	419	932	1,188	4,998	112
Infant mortality rate	7.59	884.75	544.78	202.36	82.07	50.85	29.96	12.84	2.58	315.49
Female										
Live births	1996443	3,407	5,687	5,705	6,665	8,163	32,780	108,705	1825056	275
Infant deaths	12,114	2,878	2,315	695	373	337	849	1,007	3,604	57
Infant mortality rate	6.07	844.73	407.07	121.82	55.96	41.28	25.90	9.26	1.97	207.27
White										
Both sexes										
Live births	3225890	4,035	6,840	7,515	8,952	11,287	44,495	141,446	3000852	468
Infant deaths	18,455	3,510	3,327	1,275	630	528	1,248	1,577	6,250	110
Infant mortality rate	5.72	869.89	486.40	169.66	70.38	46.78	28.05	11.15	2.08	235.04
Male										
Live births	1652166	2,080	3,480	3,945	4,638	5,672	21,800	65,456	1544839	256
Infant deaths	10,524	1,851	1,939	815	385	304	643	859	3,661	68
Infant mortality rate	6.37	889.90	557.18	206.59	83.01	53.60	29.50	13.12	2.37	265.63
Female										
Live births	1573724	1,955	3,360	3,570	4,314	5,615	22,695	75,990	1456013	212
Infant deaths	7,931	1,658	1,388	460	246	224	605	719	2,590	42
Infant mortality rate	5.04	848.08	413.10	128.85	57.02	39.89	26.66	9.46	1.78	198.11
Black										
Both sexes										
Live births	599,860	2,705	4,159	3,753	3,970	4,271	15,673	46,072	519,127	130
Infant deaths	8,095	2,334	1,910	557	271	182	425	513	1,849	54
Infant mortality rate	13.49	862.85	459.25	148.41	68.26	42.61	27.12	11.13	3.56	415.38
Male										
Live births	305,215	1,420	2,059	1,898	1,982	2,119	7,372	20,578	267,701	86
Infant deaths	4,558	1,251	1,087	359	165	89	239	270	1,055	43
Infant mortality rate	14.93	880.99	527.93	189.15	83.25	42.00	32.42	13.12	3.94	500.00
Female										
Live births	294,645	1,285	2,100	1,855	1,988	2,152	8,301	25,494	251,426	44
Infant deaths	3,537	1,083	823	198	106	94	186	243	794	11
Infant mortality rate	12.00	842.80	391.90	106.74	53.32	43.68	22.41	9.53	3.16	*

Documentation Table 2. Live births,infant deaths and infant mortality rates by race of mother, sex and birthweight of child: United States, 2003 Period Data.

[Infant death are weighted. Rates are per 1000 live births]

Race of mother and sex	Total	<500 grams	500-749 grams	750-999 grams	1000-1249 grams	1250-1499 grams	1500-1999 grams	2000-2499 grams	2500 grams or more	Not Stated
American Indian /1										
Both sexes										
Live births	43,054	54	108	117	139	153	637	1,983	39,856	7
Infant deaths	376	38	55	30	9	12	20	29	180	1
Infant mortality rate	8.73	703.70	509.26	256.41	*	*	31.40	14.62	4.52	*
Male										
Live births	22,019	29	67	73	76	93	345	953	20,379	4
Infant deaths	211	21	32	19	2	7	13	16	99	1
Infant mortality rate	9.58	724.14	477.61	*	*	*	*	*	4.86	*
Female										
Live births	21,035	25	41	44	63	60	292	1,030	19,477	3
Infant deaths	165	17	23	11	7	5	7	13	81	0
Infant mortality rate	7.84	*	560.98	*	*	*	*	*	4.16	*
Asian or Pacific Islander										
Both sexes										
Live births	221,203	266	408	507	574	692	3,086	11,722	203,923	25
Infant deaths	1,068	228	197	85	34	33	87	76	323	4
Infant mortality rate	4.83	857.14	482.84	167.65	59.23	47.69	28.19	6.48	1.58	*
Male										
Live births	114,164	124	222	271	274	356	1,594	5,531	105,783	9
Infant deaths	588	109	117	59	20	19	37	43	184	0
Infant mortality rate	5.15	879.03	527.03	217.71	72.99	*	23.21	7.77	1.74	*
Female										
Live births	107,039	142	186	236	300	336	1,492	6,191	98,140	16
Infant deaths	480	119	80	26	14	14	51	32	139	4
Infant mortality rate	4.48	838.03	430.11	110.17	*	*	34.18	5.17	1.42	*

* Figure does not meet standard of reliability or precision; based on fewer then 20 deaths in the numerator
- Quantity zero
/1 Includes Aleut and Eskimos

Documentation Table 3

Live births, infant deaths, and infant mortality rates by birthweight, race of mother, and gestational age:
United states, 2003 period data

[Infant deaths weighted. Rates are per 1000 live births]

Birthweight	Gestation									
	Total	<28 Weeks	28-31 Weeks	32-35 Weeks	36 Weeks	37-39 Weeks	40 Weeks	41 Weeks	42 Weeks or more	Not Stated
All races										
Total										
Live births	4,090,007	30,088	49,545	234,074	185,328	2,097,773	807,157	383,620	258,553	43,869
Infant deaths	27,995	12,642	2,348	2,539	1,040	5,457	1,657	847	744	721
Infant mortality rate	6.84	420.17	47.39	10.85	5.61	2.60	2.05	2.21	2.88	16.44
Less then 2,500 grams										
Live births	325,619	29,167	38,055	110,819	38,007	82,550	11,320	5,233	6,207	4,261
Infant deaths	19,223	12,613	2,252	1,850	485	1,172	220	94	125	412
Infant mortality rate	59.04	432.44	59.18	16.69	12.76	14.20	19.43	17.96	20.14	96.69
Less then 500 grams										
Live births	7,060	6,609	247	23	5	2	3	1	1	169
Infant deaths	6,110	5,798	162	13	5	2	3	1	1	125
Infant mortality rate	865.44	877.29	655.87	*	*	*	*	*	*	739.64
500-749 grams										
Live births	11,515	9,759	1,354	121	7	21	3	2	4	244
Infant deaths	5,489	4,905	407	34	3	10	2	-	3	124
Infant mortality rate	476.68	502.61	300.59	280.99	*	*	*	-	*	508.20
750-999 grams										
Live births	11,892	7,246	3,825	408	25	112	32	14	15	215
Infant deaths	1,947	1,389	420	62	3	14	-	-	4	55
Infant mortality rate	163.72	191.69	109.80	151.96	*	*	-	-	*	255.81
1,000-1,249 grams										
Live births	13,635	3,072	7,468	2,102	157	360	134	58	82	202
Infant deaths	945	329	386	150	12	32	9	3	5	19
Infant mortality rate	69.31	107.10	51.69	71.36	*	88.89	*	*	*	*
1,250-1,499 grams										
Live births	16,403	880	8,666	5,088	433	721	163	73	131	248
Infant deaths	755	86	364	186	31	51	11	5	5	16
Infant mortality rate	46.03	97.73	42.00	36.56	71.59	70.74	*	*	*	*
1,500-1,999 grams										
Live births	63,891	978	12,291	34,826	5,171	7,422	1,097	470	794	842
Infant deaths	1,781	84	388	708	146	310	57	25	27	35
Infant mortality rate	27.88	85.89	31.57	20.33	28.23	41.77	51.96	53.19	34.01	41.57
2,000-2,499 grams										
Live births	201,223	623	4,204	68,251	32,209	73,912	9,888	4,615	5,180	2,341
Infant deaths	2,194	22	124	697	284	753	138	59	80	37
Infant mortality rate	10.90	35.31	29.50	10.21	8.82	10.19	13.96	12.78	15.44	15.81
2,500-2,999 grams										
Live births	711,351	921	4,179	60,099	68,186	412,699	87,737	37,097	32,933	7,500
Infant deaths	2,927	28	63	417	287	1,455	318	149	153	56
Infant mortality rate	4.11	30.40	15.08	6.94	4.21	3.53	3.62	4.02	4.65	7.47
3,000-3,499 grams										
Live births	1,558,404	-	4,842	41,142	54,934	888,785	314,602	137,858	100,030	16,211
Infant deaths	3,371	-	23	187	183	1,770	591	310	260	46
Infant mortality rate	2.16	-	4.75	4.55	3.33	1.99	1.88	2.25	2.60	2.84

See footnotes at end of table.

Documentation Table 3

Live births, infant deaths, and infant mortality rates by birthweight, race of mother, and gestational age:
United states, 2003 period data

[Infant deaths weighted. Rates are per 1000 live births]-Cont

Birthweight	Gestation									
	Total	<28 Weeks	28-31 Weeks	32-35 Weeks	36 Weeks	37-39 Weeks	40 Weeks	41 Weeks	42 Weeks or more	Not Stated
All races										
3,500-3,999 grams										
Live births	1,132,005	-	2,469	17,528	19,505	559,684	291,037	143,513	86,913	11,356
Infant deaths	1,747	-	11	61	65	833	391	213	153	18
Infant mortality rate	1.54	-	*	3.48	3.33	1.49	1.34	1.48	1.76	*
4,000-4,499 grams										
Live births	309,849	-	-	3,811	3,917	132,826	88,339	50,437	27,184	3,335
Infant deaths	413	-	-	17	13	165	113	63	34	7
Infant mortality rate	1.33	-	-	*	*	1.24	1.28	1.25	1.25	*
4,500-4,999 grams										
Live births	46,715	-	-	577	666	18,905	12,813	8,535	4,720	499
Infant deaths	111	-	-	6	5	44	17	14	16	8
Infant mortality rate	2.38	-	-	*	*	2.33	*	*	*	*
5,000 grams or more										
Live births	5,434	-	-	98	113	2,324	1,309	947	566	77
Infant deaths	34	-	-	1	1	16	7	3	2	4
Infant mortality rate	6.26	-	-	*	*	*	*	*	*	*
Not stated										
Live births	630	-	-	-	-	-	-	-	-	630
Infant deaths	169	-	-	-	-	-	-	-	-	169
Infant mortality rate	268.25	-	-	-	-	-	-	-	-	268.25
White										
Total										
Live births	3,225,890	17,983	34,155	172,141	141,096	1,659,140	648,700	311,122	206,544	35,009
Infant deaths	18,458	7,534	1,582	1,791	763	3,904	1,228	610	536	509
Infant mortality rate	5.72	418.95	46.32	10.40	5.41	2.35	1.89	1.96	2.60	14.54
Less then 2,500 grams										
Live births	224,570	17,412	26,083	79,504	26,799	56,257	7,596	3,584	4,286	3,049
Infant deaths	12,097	7,517	1,507	1,280	352	844	157	59	85	297
Infant mortality rate	53.87	431.71	57.78	16.10	13.13	15.00	20.67	16.46	19.83	97.41
Less then 500 grams										
Live births	4,035	3,741	159	14	3	1	2	1	-	114
Infant deaths	3,510	3,296	107	10	3	1	2	1	-	90
Infant mortality rate	869.89	881.05	672.96	*	*	*	*	*	-	789.47
500-749 grams										
Live births	6,840	5,709	851	76	4	19	1	2	3	175
Infant deaths	3,328	2,970	240	18	2	9	1	-	3	84
Infant mortality rate	486.55	520.23	282.02	*	*	*	*	-	*	480.00
750-999 grams										
Live births	7,515	4,492	2,444	281	19	83	27	7	9	153
Infant deaths	1,275	906	275	43	2	7	-	-	1	41
Infant mortality rate	169.66	201.69	112.52	153.02	*	*	-	-	*	267.97
1,000-1,249 grams										
Live births	8,952	1,949	4,959	1,391	96	238	91	34	54	140
Infant deaths	630	222	269	88	6	22	6	2	3	12
Infant mortality rate	70.38	113.90	54.24	63.26	*	92.44	*	*	*	*

See footnotes at end of table.

Documentation Table 3

Live births, infant deaths, and infant mortality rates by birthweight, race of mother, and gestational age:
United states, 2003 period data

[Infant deaths weighted. Rates are per 1000 live births]-Cont

Birthweight	Gestation									
	Total	<28 Weeks	28-31 Weeks	32-35 Weeks	36 Weeks	37-39 Weeks	40 Weeks	41 Weeks	42 Weeks or more	Not Stated
White										
1,250-1,499 grams										
Live births	11,287	541	6,054	3,463	311	495	111	43	101	168
Infant deaths	528	50	258	129	27	35	7	3	4	14
Infant mortality rate	46.78	92.42	42.62	37.25	86.82	70.71	*	*	*	*
1,500-1,999 grams										
Live births	44,495	594	8,801	24,342	3,552	5,016	701	322	548	619
Infant deaths	1,248	58	268	485	102	234	40	14	20	28
Infant mortality rate	28.05	97.64	30.45	19.92	28.72	46.65	57.06	*	36.50	45.23
2,000-2,499 grams										
Live births	141,446	386	2,815	49,937	22,814	50,405	6,663	3,175	3,571	1,680
Infant deaths	1,577	15	90	507	210	535	101	38	54	28
Infant mortality rate	11.15	*	31.97	10.15	9.20	10.61	15.16	11.97	15.12	16.67
2,500-2,999 grams										
Live births	511,562	571	2,745	44,671	51,228	295,504	61,672	26,283	23,396	5,492
Infant deaths	2,050	17	48	314	219	980	239	98	100	37
Infant mortality rate	4.01	*	17.49	7.03	4.28	3.32	3.88	3.73	4.27	6.74
3,000-3,499 grams										
Live births	1,221,031	-	3,410	30,596	43,277	700,077	245,010	107,815	77,890	12,956
Infant deaths	2,397	-	17	133	133	1,259	422	222	179	32
Infant mortality rate	1.96	-	*	4.35	3.07	1.80	1.72	2.06	2.30	2.47
3,500-3,999 grams										
Live births	952,131	-	1,917	13,734	15,932	472,804	244,650	120,810	72,667	9,617
Infant deaths	1,354	-	10	45	46	636	306	166	128	16
Infant mortality rate	1.42	-	*	3.28	2.89	1.35	1.25	1.37	1.76	*
4,000-4,499 grams										
Live births	270,283	-	-	3,091	3,214	115,978	77,215	44,238	23,636	2,911
Infant deaths	333	-	-	13	9	137	87	52	28	6
Infant mortality rate	1.23	-	-	*	*	1.18	1.13	1.18	1.18	*
4,500-4,999 grams										
Live births	41,179	-	-	467	553	16,551	11,423	7,563	4,174	448
Infant deaths	92	-	-	5	3	37	13	12	14	7
Infant mortality rate	2.23	-	-	*	*	2.24	*	*	*	*
5,000 grams or more										
Live births	4,666	-	-	78	93	1,969	1,134	829	495	68
Infant deaths	25	-	-	1	1	11	5	1	2	4
Infant mortality rate	5.36	-	-	*	*	*	*	*	*	*
Not stated										
Live births	468	-	-	-	-	-	-	-	-	468
Infant deaths	110	-	-	-	-	-	-	-	-	110
Infant mortality rate	235.04	-	-	-	-	-	-	-	-	235.04
Black										
Total										
Live births	599,860	10,685	12,789	48,486	33,150	299,385	106,021	48,803	36,235	4,306
Infant deaths	8,094	4,518	661	593	215	1,236	338	191	170	171
Infant mortality rate	13.49	422.84	51.69	12.23	6.49	4.13	3.19	3.91	4.69	39.71

See footnotes at end of table.

Documentation Table 3

Live births, infant deaths, and infant mortality rates by birthweight, race of mother, and gestational age: United states, 2003 period data

[Infant deaths weighted. Rates are per 1000 live births]-Cont

Birthweight	Gestation									
	Total	<28 Weeks	28-31 Weeks	32-35 Weeks	36 Weeks	37-39 Weeks	40 Weeks	41 Weeks	42 Weeks or more	Not Stated
Black										
Less then 2,500 grams										
Live births	80,603	10,377	10,118	24,998	8,673	19,916	2,903	1,303	1,539	776
Infant deaths	6,191	4,508	642	455	106	273	51	32	32	90
Infant mortality rate	76.81	434.42	63.45	18.20	12.22	13.71	17.57	24.56	20.79	115.98
Less then 500 grams										
Live births	2,705	2,577	72	8	2	1	1	-	1	43
Infant deaths	2,334	2,249	48	3	2	1	1	-	1	29
Infant mortality rate	862.85	872.72	666.67	*	*	*	*	-	*	674.42
500-749 grams										
Live births	4,159	3,617	444	41	3	2	2	-	1	49
Infant deaths	1,909	1,709	151	15	1	1	1	-	-	31
Infant mortality rate	459.00	472.49	340.09	*	*	*	*	-	-	632.65
750-999 grams										
Live births	3,753	2,393	1,183	92	4	25	4	4	6	42
Infant deaths	556	405	116	14	1	7	-	-	3	10
Infant mortality rate	148.15	169.24	98.06	*	*	*	-	-	*	*
1,000-1,249 grams										
Live births	3,970	968	2,153	571	55	105	31	20	24	43
Infant deaths	271	94	108	45	4	9	2	1	2	6
Infant mortality rate	68.26	97.11	50.16	78.81	*	*	*	*	*	*
1,250-1,499 grams										
Live births	4,271	296	2,193	1,355	101	186	38	27	25	50
Infant deaths	182	27	87	44	4	12	4	2	1	1
Infant mortality rate	42.61	91.22	39.67	32.47	*	*	*	*	*	*
1,500-1,999 grams										
Live births	15,673	332	2,912	8,443	1,250	1,935	326	123	203	149
Infant deaths	426	21	100	179	33	58	13	9	5	6
Infant mortality rate	27.18	63.25	34.34	21.20	26.40	29.97	*	*	*	*
2,000-2,499 grams										
Live births	46,072	194	1,161	14,488	7,258	17,662	2,501	1,129	1,279	400
Infant deaths	513	4	32	154	60	184	30	20	20	7
Infant mortality rate	11.13	*	27.56	10.63	8.27	10.42	12.00	17.71	15.64	*
2,500-2,999 grams										
Live births	143,252	308	1,167	11,957	12,670	82,745	18,491	7,784	7,134	996
Infant deaths	717	10	14	80	53	390	67	41	45	15
Infant mortality rate	5.01	*	*	6.69	4.18	4.71	3.62	5.27	6.31	*
3,000-3,499 grams										
Live births	228,445	-	1,099	8,140	8,599	126,996	46,464	20,263	15,471	1,413
Infant deaths	764	-	4	42	33	398	140	70	65	10
Infant mortality rate	3.34	-	*	5.16	3.84	3.13	3.01	3.45	4.20	*
3,500-3,999 grams										
Live births	117,937	-	405	2,804	2,588	56,991	30,120	14,798	9,465	766
Infant deaths	296	-	1	12	16	145	62	38	20	1
Infant mortality rate	2.51	-	*	*	*	2.54	2.06	2.57	2.11	*

See footnotes at end of table.

Documentation Table 3

Live births, infant deaths, and infant mortality rates by birthweight, race of mother, and gestational age: United states, 2003 period data

[Infant deaths weighted. Rates are per 1000 live births]-Cont

Birthweight	Gestation									
	Total	<28 Weeks	28-31 Weeks	32-35 Weeks	36 Weeks	37-39 Weeks	40 Weeks	41 Weeks	42 Weeks or more	Not Stated
Black										
4,000-4,499 grams										
Live births	25,443	-	-	501	525	10,972	7,027	3,970	2,247	201
Infant deaths	51	-	-	3	4	19	13	7	5	-
Infant mortality rate	2.00	-	-	*	*	*	*	*	*	-
4,500-4,999 grams										
Live births	3,546	-	-	73	78	1,529	901	610	333	22
Infant deaths	14	-	-	1	2	5	3	1	2	-
Infant mortality rate	*	-	-	*	*	*	*	*	*	-
5,000 grams or more										
Live births	504	-	-	13	17	236	115	75	46	2
Infant deaths	7	-	-	-	-	5	1	1	-	-
Infant mortality rate	*	-	-	-	-	*	*	*	-	-
Not stated										
Live births	130	-	-	-	-	-	-	-	-	130
Infant deaths	54	-	-	-	-	-	-	-	-	54
Infant mortality rate	415.38	-	-	-	-	-	-	-	-	415.38
American Indian[1]										
Total										
Live births	43,054	305	620	2,770	2,061	21,042	8,193	4,294	3,390	379
Infant deaths	376	123	26	37	19	110	25	15	15	5
Infant mortality rate	8.73	403.28	41.94	13.36	*	5.23	3.05	*	*	*
Less then 2,500 grams										
Live births	3,191	292	395	1,070	341	819	117	45	66	46
Infant deaths	194	123	24	20	5	17	1	-	3	1
Infant mortality rate	60.80	421.23	60.76	18.69	*	*	*	-	*	*
Less then 500 grams										
Live births	54	47	5	-	-	-	-	-	-	2
Infant deaths	38	36	2	-	-	-	-	-	-	-
Infant mortality rate	703.70	765.96	*	-	-	-	-	-	-	-
500-749 grams										
Live births	108	90	13	1	-	-	-	-	-	4
Infant deaths	55	50	4	-	-	-	-	-	-	1
Infant mortality rate	509.26	555.56	*	-	-	-	-	-	-	*
750-999 grams										
Live births	117	67	40	6	1	-	1	-	-	2
Infant deaths	30	24	6	-	-	-	-	-	-	-
Infant mortality rate	256.41	358.21	*	-	-	-	-	-	-	-
1,000-1,249 grams										
Live births	139	38	72	22	-	5	1	-	-	1
Infant deaths	9	4	3	2	-	-	-	-	-	-
Infant mortality rate	*	*	*	*	-	-	-	-	-	-
1,250-1,499 grams										
Live births	153	14	79	41	2	10	-	-	2	5
Infant deaths	12	4	4	3	-	1	-	-	-	-
Infant mortality rate	*	*	*	*	-	*	-	-	-	-

See footnotes at end of table.

Documentation Table 3

Live births, infant deaths, and infant mortality rates by birthweight, race of mother, and gestational age:
United states, 2003 period data

[Infant deaths weighted. Rates are per 1000 live births]-Cont

Birthweight	Gestation									
	Total	<28 Weeks	28-31 Weeks	32-35 Weeks	36 Weeks	37-39 Weeks	40 Weeks	41 Weeks	42 Weeks or more	Not Stated
American Indian[1]										
1,500-1,999 grams										
Live births	637	20	124	332	46	82	11	5	9	8
Infant deaths	20	3	3	8	-	5	-	-	1	-
Infant mortality rate	31.40	*	*	*	-	*	-	-	*	-
2,000-2,499 grams										
Live births	1,983	16	62	668	292	722	104	40	55	24
Infant deaths	29	1	2	7	5	11	1	-	2	-
Infant mortality rate	14.62	*	*	*	*	*	*	-	*	-
2,500-2,999 grams										
Live births	7,010	13	65	718	721	3,810	842	402	375	64
Infant deaths	47	-	1	7	5	27	2	3	1	1
Infant mortality rate	6.70	-	*	*	*	7.09	*	*	*	*
3,000-3,499 grams										
Live births	15,841	-	114	589	653	8,534	3,034	1,494	1,292	131
Infant deaths	72	-	1	7	9	36	7	5	6	1
Infant mortality rate	4.55	-	*	*	*	4.22	*	*	*	*
3,500-3,999 grams										
Live births	12,314	-	46	291	281	5,921	2,931	1,585	1,155	104
Infant deaths	42	-	-	3	-	23	7	4	4	1
Infant mortality rate	3.41	-	-	*	-	3.88	*	*	*	*
4,000-4,499 grams										
Live births	3,883	-	-	84	55	1,625	1,073	620	401	25
Infant deaths	16	-	-	-	-	6	8	1	1	-
Infant mortality rate	*	-	-	-	-	*	*	*	*	-
4,500-4,999 grams										
Live births	701	-	-	14	9	290	163	134	89	2
Infant deaths	1	-	-	-	-	-	-	1	-	-
Infant mortality rate	*	-	-	-	-	-	-	*	-	-
5,000 grams or more										
Live births	107	-	-	4	1	43	33	14	12	-
Infant deaths	1	-	-	-	-	-	-	1	-	-
Infant mortality rate	*	-	-	-	-	-	-	*	-	-
Not stated										
Live births	7	-	-	-	-	-	-	-	-	7
Infant deaths	1	-	-	-	-	-	-	-	-	1
Infant mortality rate	*	-	-	-	-	-	-	-	-	*
Asian or Pacific Islander										
Total										
Live births	221,203	1,115	1,981	10,677	9,021	118,206	44,243	19,401	12,384	4,175
Infant deaths	1,068	466	79	117	44	207	65	31	22	36
Infant mortality rate	4.83	417.94	39.88	10.96	4.88	1.75	1.47	1.60	1.78	8.62
Less then 2,500 grams										
Live births	17,255	1,086	1,459	5,247	2,194	5,558	704	301	316	390
Infant deaths	741	465	78	94	22	38	11	3	5	24
Infant mortality rate	42.94	428.18	53.46	17.91	10.03	6.84	*	*	*	61.54

See footnotes at end of table.

Documentation Table 3

Live births, infant deaths, and infant mortality rates by birthweight, race of mother, and gestational age:
United states, 2003 period data

[Infant deaths weighted. Rates are per 1000 live births]-Cont

Birthweight	Gestation									
	Total	<28 Weeks	28-31 Weeks	32-35 Weeks	36 Weeks	37-39 Weeks	40 Weeks	41 Weeks	42 Weeks or more	Not Stated
Asian or Pacific Islander										
Less then 500 grams										
Live births	266	244	11	1	-	-	-	-	-	10
Infant deaths	228	218	4	-	-	-	-	-	-	6
Infant mortality rate	857.14	893.44	*	-	-	-	-	-	-	*
500-749 grams										
Live births	408	343	46	3	-	-	-	-	-	16
Infant deaths	197	176	12	1	-	-	-	-	-	8
Infant mortality rate	482.84	513.12	*	*	-	-	-	-	-	*
750-999 grams										
Live births	507	294	158	29	1	4	-	3	-	18
Infant deaths	85	54	22	5	-	-	-	-	-	4
Infant mortality rate	167.65	183.67	139.24	*	-	-	-	-	-	*
1,000-1,249 grams										
Live births	574	117	284	118	6	12	11	4	4	18
Infant deaths	34	9	6	14	2	1	1	-	-	1
Infant mortality rate	59.23	*	*	*	*	*	*	-	-	*
1,250-1,499 grams										
Live births	692	29	340	229	19	30	14	3	3	25
Infant deaths	33	5	16	9	-	2	-	-	-	1
Infant mortality rate	47.69	*	*	*	-	*	-	-	-	*
1,500-1,999 grams										
Live births	3,086	32	454	1,709	323	389	59	20	34	66
Infant deaths	87	2	17	35	11	13	4	2	1	1
Infant mortality rate	28.19	*	*	20.48	*	*	*	*	*	*
2,000-2,499 grams										
Live births	11,722	27	166	3,158	1,845	5,123	620	271	275	237
Infant deaths	76	2	-	29	9	22	6	1	4	2
Infant mortality rate	6.48	*	-	9.18	*	4.29	*	*	*	*
2,500-2,999 grams										
Live births	49,527	29	202	2,753	3,567	30,640	6,732	2,628	2,028	948
Infant deaths	112	1	-	16	10	58	10	7	7	3
Infant mortality rate	2.26	*	-	*	*	1.89	*	*	*	*
3,000-3,499 grams										
Live births	93,087	-	219	1,817	2,405	53,178	20,094	8,286	5,377	1,711
Infant deaths	138	-	1	5	8	77	22	13	9	3
Infant mortality rate	1.48	-	*	*	*	1.45	1.09	*	*	*
3,500-3,999 grams										
Live births	49,623	-	101	699	704	23,968	13,336	6,320	3,626	869
Infant deaths	55	-	-	1	3	29	15	5	1	-
Infant mortality rate	1.11	-	-	*	*	1.21	*	*	*	-
4,000-4,499 grams										
Live births	10,240	-	-	135	123	4,251	3,024	1,609	900	198
Infant deaths	13	-	-	1	-	3	5	3	-	1
Infant mortality rate	*	-	-	*	-	*	*	*	-	*

See footnotes at end of table.

Documentation Table 3

Live births, infant deaths, and infant mortality rates by birthweight, race of mother, and gestational age:
United states, 2003 period data

[Infant deaths weighted. Rates are per 1000 live births]-Cont

Birthweight	Gestation									
	Total	<28 Weeks	28-31 Weeks	32-35 Weeks	36 Weeks	37-39 Weeks	40 Weeks	41 Weeks	42 Weeks or more	Not Stated
Asian or Pacific Islander										
4,500-4,999 grams										
Live births	1,289	-	-	23	26	535	326	228	124	27
Infant deaths	4	-	-	-	-	2	1	-	-	1
Infant mortality rate	*	-	-	-	-	*	*	-	-	*
5,000 grams or more										
Live births	157	-	-	3	2	76	27	29	13	7
Infant deaths	1	-	-	-	-	-	1	-	-	-
Infant mortality rate	*	-	-	-	-	-	*	-	-	-
Not stated										
Live births	25	-	-	-	-	-	-	-	-	25
Infant deaths	4	-	-	-	-	-	-	-	-	4
Infant mortality rate	*	-	-	-	-	-	-	-	-	*

-/ Quality zero.
*/Figure does not meet standard of reliability or precision; based on fewer than 20 death in the numerator.
[1]/ Includes Aleuts and Eskimos.

Documentation Table 4

Live births, infant deaths, and infant mortality rates by birthweight, race of mother, and age at death: United states, 2003 period data

[Infant deaths are weighted. Infant deaths are under 1 year.Neonatal deaths are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Rates are per 1000 live births]

Birthweight and race of mother	Live Births	Infant	Total Neonatal	Early Neonatal	Late Neonatal	Post-Neonatal
All races						
Total (all birthweights)	4,090,007	27,995	18,935	15,152	3,783	9,060
Rate		6.84	4.63	3.70	0.92	2.22
Less than 2,500 grams	325,619	19,223	15,762	13,259	2,503	3,461
Rate		59.04	48.41	40.72	7.69	10.63
Less than 500 grams	7,060	6,110	5,975	5,800	174	136
Rate		865.44	846.32	821.53	24.65	19.26
500-749 grams	11,515	5,489	4,747	3,880	867	742
Rate		476.68	412.24	336.95	75.29	64.44
750-999 grams	11,892	1,947	1,447	970	477	500
Rate		163.72	121.68	81.57	40.11	42.05
1,000-1,249 grams	13,635	945	717	492	226	227
Rate		69.31	52.59	36.08	16.57	16.65
1,250-1,499 grams	16,403	755	549	413	136	206
Rate		46.03	33.47	25.18	8.29	12.56
1,500-1,999 grams	63,891	1,781	1,182	922	260	600
Rate		27.88	18.50	14.43	4.07	9.39
2,000-2,499 grams	201,223	2,194	1,145	783	363	1,049
Rate		10.90	5.69	3.89	1.80	5.21
2,500-2,999 grams	711,351	2,927	1,140	701	439	1,787
Rate		4.11	1.60	0.99	0.62	2.51
3,000-3,499 grams	1,558,404	3,371	1,141	622	519	2,230
Rate		2.16	0.73	0.40	0.33	1.43
3,500-3,999 grams	1,132,005	1,747	523	283	240	1,224
Rate		1.54	0.46	0.25	0.21	1.08
4,000-4,499 grams	309,849	413	145	89	56	268
Rate		1.33	0.47	0.29	0.18	0.86
4,500-4,999 grams	46,715	111	49	30	19	62
Rate		2.38	1.05	0.64	*	1.33
5,000 grams or more	5,434	34	20	16	4	14
Rate		6.26	3.68	*	*	*
Not stated	630	169	155	152	3	14
Rate		268.25	246.03	241.27	*	*

See footnotes at end of table.

Documentation Table 4

Live births, infant deaths, and infant mortality rates by birthweight, race of mother, and age at death: United states, 2003 period data -Cont

[Infant deaths are weighted. Infant deaths are under 1 year.Neonatal deaths are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Rates are per 1000 live births]

Birthweight and race of mother	Live Births	Infant	Total Neonatal	Early Neonatal	Late Neonatal	Post-Neonatal
White						
Total (all birthweights).....	3,225,890	18,458	12,457	9,975	2,482	6,000
Rate.....		5.72	3.86	3.09	0.77	1.86
Less than 2,500 grams.....	224,570	12,097	10,037	8,506	1,531	2,060
Rate.....		53.87	44.69	37.88	6.82	9.17
Less than 500 grams.....	4,035	3,510	3,450	3,364	86	60
Rate.....		869.89	855.02	833.71	21.31	14.87
500-749 grams.....	6,840	3,328	2,954	2,488	467	373
Rate.....		486.55	431.87	363.74	68.27	54.53
750-999 grams.....	7,515	1,275	995	674	321	280
Rate.....		169.66	132.40	89.69	42.71	37.26
1,000-1,249 grams.....	8,952	630	507	359	147	124
Rate.....		70.38	56.64	40.10	16.42	13.85
1,250-1,499 grams.....	11,287	528	397	303	94	131
Rate.....		46.78	35.17	26.85	8.33	11.61
1,500-1,999 grams.....	44,495	1,248	860	694	166	389
Rate.....		28.05	19.33	15.60	3.73	8.74
2,000-2,499 grams.....	141,446	1,577	874	624	249	703
Rate.....		11.15	6.18	4.41	1.76	4.97
2,500-2,999 grams.....	511,562	2,050	854	547	307	1,196
Rate.....		4.01	1.67	1.07	0.60	2.34
3,000-3,499 grams.....	1,221,031	2,397	866	476	390	1,531
Rate.....		1.96	0.71	0.39	0.32	1.25
3,500-3,999 grams.....	952,131	1,354	419	232	186	935
Rate.....		1.42	0.44	0.24	0.20	0.98
4,000-4,499 grams.....	270,283	333	123	78	45	209
Rate.....		1.23	0.46	0.29	0.17	0.77
4,500-4,999 grams.....	41,179	92	44	27	17	48
Rate.....		2.23	1.07	0.66	*	1.17
5,000 grams or more.....	4,666	25	16	13	3	9
Rate.....		5.36	*	*	*	*
Not stated.....	468	110	99	96	3	11
Rate.....		235.04	211.54	205.13	*	*

See footnotes at end of table.

Documentation Table 4

Live births, infant deaths, and infant mortality rates by birthweight, race of mother, and age at death: United states, 2003 period data -Cont

[Infant deaths are weighted. Infant deaths are under 1 year.Neonatal deaths are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Rates are per 1000 live births]

Birthweight and race of mother	Live Births	Infant	Total Neonatal	Early Neonatal	Late Neonatal	Post-Neonatal
Black						
Total (all birthweights).....	599,860	8,094	5,530	4,423	1,107	2,563
Rate.....		13.49	9.22	7.37	1.85	4.27
Less than 2,500 grams.....	80,603	6,191	4,943	4,110	833	1,248
Rate.....		76.81	61.33	50.99	10.33	15.48
Less than 500 grams.....	2,705	2,334	2,265	2,184	81	68
Rate.....		862.85	837.34	807.39	29.94	25.14
500-749 grams.....	4,159	1,909	1,560	1,209	351	349
Rate.....		459.00	375.09	290.69	84.40	83.91
750-999 grams.....	3,753	556	362	238	124	194
Rate.....		148.15	96.46	63.42	33.04	51.69
1,000-1,249 grams.....	3,970	271	175	111	64	96
Rate.....		68.26	44.08	27.96	16.12	24.18
1,250-1,499 grams.....	4,271	182	117	84	33	65
Rate.....		42.61	27.39	19.67	7.73	15.22
1,500-1,999 grams.....	15,673	426	247	167	80	179
Rate.....		27.18	15.76	10.66	5.10	11.42
2,000-2,499 grams.....	46,072	513	216	118	98	297
Rate.....		11.13	4.69	2.56	2.13	6.45
2,500-2,999 grams.....	143,252	717	221	110	110	496
Rate.....		5.01	1.54	0.77	0.77	3.46
3,000-3,499 grams.....	228,445	764	211	104	107	552
Rate.....		3.34	0.92	0.46	0.47	2.42
3,500-3,999 grams.....	117,937	296	80	34	45	216
Rate.....		2.51	0.68	0.29	0.38	1.83
4,000-4,499 grams.....	25,443	51	17	8	9	34
Rate.....		2.00	*	*	*	1.34
4,500-4,999 grams.....	3,546	14	4	3	1	10
Rate.....		*	*	*	*	*
5,000 grams or more.....	504	7	3	2	1	4
Rate.....		*	*	*	*	*
Not stated.....	130	54	51	51	-	3
Rate.....		415.38	392.31	392.31	-	*

See footnotes at end of table.

Documentation Table 4

Live births, infant deaths, and infant mortality rates by birthweight, race of mother, and age at death: United states, 2003 period data -Cont

[Infant deaths are weighted. Infant deaths are under 1 year.Neonatal deaths are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Rates are per 1000 live births]

Birthweight and race of mother	Live Births	Infant	Total Neonatal	Early Neonatal	Late Neonatal	Post-Neonatal
American Indian[1]						
Total (all birthweights)	43,054	376	196	147	49	180
Rate		8.73	4.55	3.41	1.14	4.18
Less than 2,500 grams	3,191	194	148	117	31	46
Rate		60.80	46.38	36.67	9.71	14.42
Less than 500 grams	54	38	37	34	3	1
Rate		703.70	685.19	629.63	*	*
500-749 grams	108	55	47	35	12	8
Rate		509.26	435.19	324.07	*	*
750-999 grams	117	30	23	15	8	7
Rate		256.41	196.58	*	*	*
1,000-1,249 grams	139	9	6	4	2	3
Rate		*	*	*	*	*
1,250-1,499 grams	153	12	10	8	2	2
Rate		*	*	*	*	*
1,500-1,999 grams	637	20	14	13	1	6
Rate		31.40	*	*	*	*
2,000-2,499 grams	1,983	29	10	7	3	19
Rate		14.62	*	*	*	*
2,500-2,999 grams	7,010	47	18	12	6	29
Rate		6.70	*	*	*	4.14
3,000-3,499 grams	15,841	72	16	10	6	56
Rate		4.55	*	*	*	3.54
3,500-3,999 grams	12,314	42	10	5	5	32
Rate		3.41	*	*	*	2.60
4,000-4,499 grams	3,883	16	2	1	1	14
Rate		*	*	*	*	*
4,500-4,999 grams	701	1	-	-	-	1
Rate		*	-	-	-	*
5,000 grams or more	107	1	-	-	-	1
Rate		*	-	-	-	*
Not stated	7	1	1	1	-	-
Rate		*	*	*	-	-

See footnotes at end of table.

Documentation Table 4

Live births, infant deaths, and infant mortality rates by birthweight, race of mother, and age at death: United states, 2003 period data -Cont

[Infant deaths are weighted. Infant deaths are under 1 year.Neonatal deaths are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Rates are per 1000 live births]

Birthweight and race of mother	Live Births	Infant	Total Neonatal	Early Neonatal	Late Neonatal	Post-Neonatal
Asian or Pacific Islander						
Total (all birthweights)	221,203	1,068	752	607	145	316
Rate		4.83	3.40	2.74	0.66	1.43
Less than 2,500 grams	17,255	741	634	526	109	107
Rate		42.94	36.74	30.48	6.32	6.20
Less than 500 grams	266	228	222	218	4	6
Rate		857.14	834.59	819.55	*	*
500-749 grams	408	197	185	148	37	12
Rate		482.84	453.43	362.75	90.69	*
750-999 grams	507	85	66	43	23	19
Rate		167.65	130.18	84.81	45.36	*
1,000-1,249 grams	574	34	29	17	12	5
Rate		59.23	50.52	*	*	*
1,250-1,499 grams	692	33	25	18	7	8
Rate		47.69	36.13	*	*	*
1,500-1,999 grams	3,086	87	61	48	13	26
Rate		28.19	19.77	15.55	*	8.43
2,000-2,499 grams	11,722	76	46	34	12	30
Rate		6.48	3.92	2.90	*	2.56
2,500-2,999 grams	49,527	112	47	31	15	66
Rate		2.26	0.95	0.63	*	1.33
3,000-3,499 grams	93,087	138	47	31	16	91
Rate		1.48	0.50	0.33	*	0.98
3,500-3,999 grams	49,623	55	14	11	3	40
Rate		1.11	*	*	*	0.81
4,000-4,499 grams	10,240	13	3	2	1	10
Rate		*	*	*	*	*
4,500-4,999 grams	1,289	4	1	-	1	3
Rate		*	*	-	*	*
5,000 grams or more	157	1	1	1	-	-
Rate		*	*	*	-	-
Not stated	25	4	4	4	-	-
Rate		*	*	*	-	-

See footnotes at end of table.

*/ Figure does not meet standard of reliability or precision; based on fewer than 20 death in the numerator
-/ Quality zero
[1]/ Includes Aleuts and Eskimos

Documentation Table 5

Infant deaths and infant mortality rates by age of death, birthweight, and race of mother for 10 major causes of infant death: United states, 2003 period data

[Infant deaths are weighted. Infant deaths are under 1 year.Neonatal deaths are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Rates are per 100,000 live births]

Cause of death, birthweight, and race of mother	Live Births	Infant	Total Neonatal	Early Neonatal	Late Neonatal	Post-Neonatal
All races						
All birthweights						
All causes	4,090,007	27,995	18,935	15,152	3,783	9,060
		684.47	462.96	370.46	92.49	221.52
Congenital malformations (Q00-Q99)		5,640	4,044	3,082	962	1,597
		137.90	98.88	75.35	23.52	39.05
Short gestation and low birthweight nec (P07)		4,849	4,759	4,638	121	90
		118.56	116.36	113.40	2.96	2.20
Sudden infant death syndrome (R95)		2,161	192	33	159	1,969
		52.84	4.69	0.81	3.89	48.14
Maternal complications of pregnancy (P01)		1,707	1,694	1,663	31	13
		41.74	41.42	40.66	0.76	*
Complications of placenta, cord, membranes (P02)		1,092	1,079	1,040	39	13
		26.70	26.38	25.43	0.95	*
Respiratory distress of newborn (P22)		838	782	610	172	56
		20.49	19.12	14.91	4.21	1.37
Accidents (unintentional injures) (V01-X59)		942	112	20	92	830
		23.03	2.74	0.49	2.25	20.29
Bacterial sepsis of newborn (P36)		775	742	323	419	33
		18.95	18.14	7.90	10.24	0.81
Deseases of the circulatory system (I00-I99)		588	180	92	88	408
		14.38	4.40	2.25	2.15	9.98
Intrauterine hypoxia, birth asphyxia (P20-P21)		551	511	389	121	40
		13.47	12.49	9.51	2.96	0.98
All other causes		8,851	4,840	3,261	1,579	4,011
		216.41	118.34	79.73	38.61	98.07
Less then 2,500 grams						
All causes	325,619	19,223	15,762	13,259	2,503	3,461
		5,903.53	4,840.63	4,071.94	768.69	1,062.90
Congenital malformations (Q00-Q99)		3,363	2,702	2,236	465	661
		1,032.80	829.80	686.69	142.80	203.00
Short gestation and low birthweight nec (P07)		4,744	4,657	4,536	120	88
		1,456.92	1,430.20	1,393.04	36.85	27.03
Sudden infant death syndrome (R95)		416	28	3	25	388
		127.76	8.60	*	7.68	119.16
Maternal complications of pregnancy (P01)		1,643	1,630	1,601	29	13
		504.58	500.59	491.68	8.91	*
Complications of placenta, cord, membranes (P02)		991	985	956	29	6
		304.34	302.50	293.59	8.91	*
Respiratory distress of newborn (P22)		813	757	591	167	55
		249.68	232.48	181.50	51.29	16.89
Accidents (unintentional injures) (V01-X59)		158	25	9	16	133
		48.52	7.68	*	*	40.85
Bacterial sepsis of newborn (P36)		689	657	280	377	31
		211.60	201.77	85.99	115.78	9.52
Deseases of the circulatory system (I00-I99)		287	96	57	39	191
		88.14	29.48	17.51	11.98	58.66

See footnotes at end of table.

Documentation Table 5

Infant deaths and infant mortality rates by age of death, birthweight, and race of mother for 10 major causes of infant death: United states, 2003 period data -Cont

[Infant deaths are weighted. Infant deaths are under 1 year.Neonatal deaths are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Rates are per 100,000 live births]

Cause of death, birthweight, and race of mother	Live Births	Total Infant	Early Neonatal	Late Neonatal	Post-Neonatal
All races					
Intrauterine hypoxia, birth asphyxia (P20-P21).....		268	207	51	10
		82.30	63.57	15.66	*
All other causes.....		5,851	2,783	1,184	1,884
		1,796.89	854.68	363.62	578.59
2,500 grams or more					
All causes 3,763,758		8,603	1,741	1,277	5,585
		228.57	46.26	33.93	148.39
Congenital malformations (Q00-Q99).....		2,267	838	495	934
		60.23	22.26	13.15	24.82
Short gestation and low birthweight nec (P07).....		31	28	1	2
		0.82	0.74	*	*
Sudden infant death syndrome (R95).....		1,742	30	134	1,578
		46.28	0.80	3.56	41.93
Maternal complications of pregnancy (P01).....		40	38	2	-
		1.06	1.01	*	-
Complications of placenta, cord, membranes (P02).....		90	73	10	7
		2.39	1.94	*	*
Respiratory distress of newborn (P22).....		25	19	5	1
		0.66	*	*	*
Accidents (unintentional injures) (V01-X59).....		784	11	75	698
		20.83	*	1.99	18.55
Bacterial sepsis of newborn (P36).....		85	43	40	2
		2.26	1.14	1.06	*
Deseases of the circulatory system (I00-I99).....		298	34	49	214
		7.92	0.90	1.30	5.69
Intrauterine hypoxia, birth asphyxia (P20-P21).....		277	176	70	30
		7.36	4.68	1.86	0.80
All other causes.....		2,963	450	395	2,119
		78.72	11.96	10.49	56.30
Not stated birthweight					
All causes	630	169	152	3	14
		26,825.40	24,126.98	*	*
Congenital malformations (Q00-Q99).....		10	7	2	1
		*	*	*	*
Short gestation and low birthweight nec (P07).....		74	74	-	-
		11,746.03	11,746.03	-	-
Sudden infant death syndrome (R95).....		3	-	-	3
		*	-	-	*
Maternal complications of pregnancy (P01).....		24	24	-	-
		3,809.52	3,809.52	-	-
Complications of placenta, cord, membranes (P02).....		11	11	-	-
		*	*	-	-
Respiratory distress of newborn (P22).....		-	-	-	-
		-	-	-	-
Accidents (unintentional injures) (V01-X59).....		-	-	-	-
		-	-	-	-

See footnotes at end of table.

Documentation Table 5

Infant deaths and infant mortality rates by age of death, birthweight, and race of mother for 10 major causes of infant death: United states, 2003 period data -Cont

[Infant deaths are weighted. Infant deaths are under 1 year.Neonatal deaths are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Rates are per 100,000 live births]

Cause of death, birthweight, and race of mother	Live Births	Total Infant	Early Neonatal	Late Neonatal	Post-Neonatal
All races					
Bacterial sepsis of newborn (P36).....		1 *	1 *	- -	1 *	- -
Deseases of the circulatory system (I00-I99).....		3 *	1 *	1 *	- -	2 *
Intrauterine hypoxia, birth asphyxia (P20-P21).....		6 *	6 *	6 *	- -	- -
All other causes.....		36 5,714.29	28 4,444.44	28 4,444.44	- -	8 *
White						
All birthweights						
All causes	3,225,890	18,458 572.18	12,457 386.16	9,975 309.22	2,482 76.94	6,000 186.00
Congenital malformations (Q00-Q99).....		4,301 133.33	3,131 97.06	2,414 74.83	717 22.23	1,170 36.27
Short gestation and low birthweight nec (P07).....		2,733 84.72	2,690 83.39	2,621 81.25	69 2.14	43 1.33
Sudden infant death syndrome (R95).....		1,407 43.62	132 4.09	24 0.74	107 3.32	1,275 39.52
Maternal complications of pregnancy (P01).....		1,077 33.39	1,071 33.20	1,054 32.67	17 *	6 *
Complications of placenta, cord, membranes (P02).....		738 22.88	731 22.66	710 22.01	21 0.65	7 *
Respiratory distress of newborn (P22).....		542 16.80	505 15.65	396 12.28	108 3.35	37 1.15
Accidents (unintentional injures) (V01-X59).....		646 20.03	72 2.23	13 *	58 1.80	574 17.79
Bacterial sepsis of newborn (P36).....		478 14.82	456 14.14	218 6.76	238 7.38	22 0.68
Deseases of the circulatory system (I00-I99).....		371 11.50	129 4.00	69 2.14	60 1.86	242 7.50
Intrauterine hypoxia, birth asphyxia (P20-P21).....		392 12.15	364 11.28	281 8.71	83 2.57	28 0.87
All other causes.....		5,773 178.96	3,177 98.48	2,175 67.42	1,002 31.06	2,596 80.47
Less then 2,500 grams						
All causes	224,570	12,097 5,386.74	10,037 4,469.43	8,506 3,787.68	1,531 681.75	2,060 917.31
Congenital malformations (Q00-Q99).....		2,536 1,129.27	2,070 921.76	1,741 775.26	330 146.95	466 207.51
Short gestation and low birthweight nec (P07).....		2,671 1,189.38	2,629 1,170.68	2,561 1,140.40	68 30.28	42 18.70
Sudden infant death syndrome (R95).....		249 110.88	19 *	2 *	17 *	229 101.97
Maternal complications of pregnancy (P01).....		1,028 457.76	1,022 455.09	1,007 448.41	15 *	6 *

See footnotes at end of table.

Documentation Table 5

Infant deaths and infant mortality rates by age of death, birthweight, and race of mother for 10 major causes of infant death: United states, 2003 period data -Cont

[Infant deaths are weighted. Infant deaths are under 1 year.Neonatal deaths are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Rates are per 100,000 live births]

Cause of death, birthweight, and race of mother	Live Births	Total Infant	Early Neonatal	Late Neonatal	Post-Neonatal
White					
Complications of placenta, cord, membranes (P02).....		663 295.23	659 293.45	643 286.32	16 *	4 *
Respiratory distress of newborn (P22).....		520 231.55	483 215.08	378 168.32	105 46.76	36 16.03
Accidents (unintentional injures) (V01-X59).....		94 41.86	13 *	5 *	8 *	80 35.62
Bacterial sepsis of newborn (P36).....		416 185.24	396 176.34	184 81.93	212 94.40	20 8.91
Deseases of the circulatory system (I00-I99).....		168 74.81	67 29.83	42 18.70	25 11.13	102 45.42
Intrauterine hypoxia, birth asphyxia (P20-P21).....		169 75.25	163 72.58	132 58.78	31 13.80	6 *
All other causes.....		3,583 1,595.49	2,515 1,119.92	1,812 806.88	703 313.04	1,068 475.58
2,500 grams or more						
All causes	3,000,852	6,251 208.31	2,322 77.38	1,373 45.75	948 31.59	3,929 130.93
Congenital malformations (Q00-Q99).....		1,756 58.52	1,053 35.09	667 22.23	385 12.83	704 23.46
Short gestation and low birthweight nec (P07).....		18 *	17 *	16 *	1 *	1 *
Sudden infant death syndrome (R95).....		1,155 38.49	113 3.77	22 0.73	90 3.00	1,043 34.76
Maternal complications of pregnancy (P01).....		34 1.13	34 1.13	32 1.07	2 *	- -
Complications of placenta, cord, membranes (P02).....		68 2.27	65 2.17	60 2.00	5 *	3 *
Respiratory distress of newborn (P22).....		22 0.73	21 0.70	18 *	3 *	1 *
Accidents (unintentional injures) (V01-X59).....		552 18.39	58 1.93	8 *	50 1.67	494 16.46
Bacterial sepsis of newborn (P36).....		61 2.03	59 1.97	34 1.13	25 0.83	2 *
Deseases of the circulatory system (I00-I99).....		200 6.66	62 2.07	26 0.87	35 1.17	139 4.63
Intrauterine hypoxia, birth asphyxia (P20-P21).....		219 7.30	197 6.56	145 4.83	52 1.73	22 0.73
All other causes.....		2,165 72.15	643 21.43	344 11.46	299 9.96	1,521 50.69
Not stated birthweight						
All causes	468	110 23,504.27	99 21,153.85	96 20,512.82	3 *	11 *
Congenital malformations (Q00-Q99).....		8 *	8 *	6 *	2 *	- -
Short gestation and low birthweight nec (P07).....		44 9,401.71	44 9,401.71	44 9,401.71	- -	- -

See footnotes at end of table.

Documentation Table 5

Infant deaths and infant mortality rates by age of death, birthweight, and race of mother for 10 major causes of infant death: United states, 2003 period data -Cont

[Infant deaths are weighted. Infant deaths are under 1 year.Neonatal deaths are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Rates are per 100,000 live births]

Cause of death, birthweight, and race of mother	Live Births	Total Infant	Early Neonatal	Late Neonatal	Post-Neonatal
White					
Sudden infant death syndrome (R95)		3 *	- -	- -	3 *
Maternal complications of pregnancy (P01)		15 *	15 *	15 *	- -	- -
Complications of placenta, cord, membranes (P02)		7 *	7 *	7 *	- -	- -
Respiratory distress of newborn (P22)		- -	- -	- -	- -	- -
Accidents (unintentional injures) (V01-X59)		- -	- -	- -	- -	- -
Bacterial sepsis of newborn (P36)		1 *	1 *	- -	1 *	- -
Deseases of the circulatory system (I00-I99)		2 *	1 *	1 *	- -	1 *
Intrauterine hypoxia, birth asphyxia (P20-P21)		4 *	4 *	4 *	- -	- -
All other causes		25 5,341.88	18 *	18 *	- -	7 *
Black						
All birthweights						
All causes	599,860	8,094 1,349.31	5,530 921.88	4,423 737.34	1,107 184.54	2,563 427.27
Congenital malformations (Q00-Q99)		1,000 166.71	675 112.53	481 80.19	194 32.34	325 54.18
Short gestation and low birthweight nec (P07)		1,875 312.57	1,832 305.40	1,784 297.40	48 8.00	42 7.00
Sudden infant death syndrome (R95)		640 106.69	56 9.34	6 *	50 8.34	584 97.36
Maternal complications of pregnancy (P01)		564 94.02	558 93.02	545 90.85	13 *	6 *
Complications of placenta, cord, membranes (P02)		310 51.68	304 50.68	286 47.68	17 *	6 *
Respiratory distress of newborn (P22)		262 43.68	245 40.84	195 32.51	50 8.34	17 *
Accidents (unintentional injures) (V01-X59)		249 41.51	35 5.83	5 *	30 5.00	214 35.67
Bacterial sepsis of newborn (P36)		269 44.84	259 43.18	95 15.84	164 27.34	10 *
Deseases of the circulatory system (I00-I99)		178 29.67	42 7.00	18 *	24 4.00	136 22.67
Intrauterine hypoxia, birth asphyxia (P20-P21)		132 22.01	120 20.00	88 14.67	32 5.33	12 *
All other causes		2,615 435.94	1,404 234.05	919 153.20	484 80.69	1,211 201.88
Less then 2,500 grams						
All causes	80,603	6,191 7,680.86	4,943 6,132.53	4,110 5,099.07	833 1,033.46	1,248 1,548.33

See footnotes at end of table.

Documentation Table 5

Infant deaths and infant mortality rates by age of death, birthweight, and race of mother for 10 major causes of infant death: United states, 2003 period data -Cont

[Infant deaths are weighted. Infant deaths are under 1 year.Neonatal deaths are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Rates are per 100,000 live births]

Cause of death, birthweight, and race of mother	Live Births	Total Infant	Total Neonatal	Early Neonatal	Late Neonatal	Post-Neonatal
Black						
Congenital malformations (Q00-Q99)		635 787.81	472 585.59	365 452.84	107 132.75	163 202.23
Short gestation and low birthweight nec (P07)		1,836 2,277.83	1,795 2,226.96	1,747 2,167.41	48 59.55	41 50.87
Sudden infant death syndrome (R95)		150 186.10	9 *	1 *	8 *	141 174.93
Maternal complications of pregnancy (P01)		552 684.84	546 677.39	533 661.27	13 *	6 *
Complications of placenta, cord, membranes (P02)		287 356.07	285 353.58	272 337.46	13 *	2 *
Respiratory distress of newborn (P22)		260 322.57	243 301.48	194 240.69	49 60.79	17 *
Accidents (unintentional injures) (V01-X59)		61 75.68	12 *	4 *	8 *	49 60.79
Bacterial sepsis of newborn (P36)		249 308.92	239 296.52	86 106.70	154 191.06	10 *
Deseases of the circulatory system (I00-I99)		104 129.03	26 32.26	13 *	13 *	78 96.77
Intrauterine hypoxia, birth asphyxia (P20-P21)		83 102.97	79 98.01	63 78.16	16 *	4 *
All other causes		1,972 2,446.56	1,236 1,533.44	832 1,032.22	403 499.98	736 913.12
2,500 grams or more						
All causes	519,127	1,848 355.98	536 103.25	262 50.47	274 52.78	1,313 252.92
Congenital malformations (Q00-Q99)		363 69.93	202 38.91	115 22.15	86 16.57	161 31.01
Short gestation and low birthweight nec (P07)		11 *	10 *	10 *	- -	1 *
Sudden infant death syndrome (R95)		490 94.39	47 9.05	5 *	42 8.09	443 85.34
Maternal complications of pregnancy (P01)		4 *	4 *	4 *	- -	- -
Complications of placenta, cord, membranes (P02)		19 *	15 *	11 *	4 *	4 *
Respiratory distress of newborn (P22)		2 *	2 *	1 *	1 *	- -
Accidents (unintentional injures) (V01-X59)		188 36.21	23 4.43	1 *	22 4.24	165 31.78
Bacterial sepsis of newborn (P36)		19 *	19 *	9 *	10 *	- -
Deseases of the circulatory system (I00-I99)		72 13.87	16 *	5 *	11 *	56 10.79
Intrauterine hypoxia, birth asphyxia (P20-P21)		47 9.05	39 7.51	23 4.43	16 *	8 *
All other causes		633 121.94	158 30.44	77 14.83	81 15.60	474 91.31

See footnotes at end of table.

Documentation Table 5

Infant deaths and infant mortality rates by age of death, birthweight, and race of mother for 10 major causes of infant death: United states, 2003 period data -Cont

[Infant deaths are weighted. Infant deaths are under 1 year.Neonatal deaths are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Rates are per 100,000 live births]

Cause of death, birthweight, and race of mother	Live Births	Infant	Total Neonatal	Early Neonatal	Late Neonatal	Post-Neonatal
Black						
Not stated birthweight						
All causes	130	54 41,538.46	51 39,230.77	51 39,230.77	- -	3 *
Congenital malformations (Q00-Q99)		2 *	1 *	1 *	- -	1 *
Short gestation and low birthweight nec (P07)		27 20,769.23	27 20,769.23	27 20,769.23	- -	- -
Sudden infant death syndrome (R95)		- -	- -	- -	- -	- -
Maternal complications of pregnancy (P01)		8 *	8 *	8 *	- -	- -
Complications of placenta, cord, membranes (P02)		3 *	3 *	3 *	- -	- -
Respiratory distress of newborn (P22)		- -	- -	- -	- -	- -
Accidents (unintentional injures) (V01-X59)		- -	- -	- -	- -	- -
Bacterial sepsis of newborn (P36)		- -	- -	- -	- -	- -
Deseases of the circulatory system (I00-I99)		1 *	- -	- -	- -	1 *
Intrauterine hypoxia, birth asphyxia (P20-P21)		2 *	2 *	2 *	- -	- -
All other causes		11 *	10 *	10 *	- -	1 *
American Indian[1]						
All birthweights						
All causes	43,054	376 873.32	196 455.24	147 341.43	49 113.81	180 418.08
Congenital malformations (Q00-Q99)		81 188.14	54 125.42	45 104.52	9 *	27 62.71
Short gestation and low birthweight nec (P07)		48 111.49	47 109.17	46 106.84	1 *	1 *
Sudden infant death syndrome (R95)		53 123.10	3 *	2 *	1 *	50 116.13
Maternal complications of pregnancy (P01)		7 *	7 *	6 *	1 *	- -
Complications of placenta, cord, membranes (P02)		13 *	13 *	13 *	- -	- -
Respiratory distress of newborn (P22)		7 *	6 *	3 *	3 *	1 *
Accidents (unintentional injures) (V01-X59)		20 46.45	3 *	1 *	2 *	17 *
Bacterial sepsis of newborn (P36)		5 *	5 *	1 *	4 *	- -

See footnotes at end of table.

Documentation Table 5

Infant deaths and infant mortality rates by age of death, birthweight, and race of mother for 10 major causes of infant death: United states, 2003 period data -Cont

[Infant deaths are weighted. Infant deaths are under 1 year.Neonatal deaths are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Rates are per 100,000 live births]

Cause of death, birthweight, and race of mother	Live Births	Total Infant	Early Neonatal	Late Neonatal	Post-Neonatal
American Indian[1]					
Deseases of the circulatory system (I00-I99).....		7	1	1	-	6
		*	*	*	-	*
Intrauterine hypoxia, birth asphyxia (P20-P21).....		5	5	3	2	-
		*	*	*	*	-
All other causes.....		129	51	25	26	77
		299.62	118.46	58.07	60.39	178.85
Less then 2,500 grams						
All causes	3,191	194	148	117	31	46
		6,079.60	4,638.04	3,666.56	971.48	1,441.55
Congenital malformations (Q00-Q99).....		39	33	30	3	6
		1,222.19	1,034.16	940.14	*	*
Short gestation and low birthweight nec (P07).....		47	46	45	1	1
		1,472.89	1,441.55	1,410.22	*	*
Sudden infant death syndrome (R95).....		10	-	-	-	10
		*	-	-	-	*
Maternal complications of pregnancy (P01).....		7	7	6	1	-
		*	*	*	*	-
Complications of placenta, cord, membranes (P02).....		12	12	12	-	-
		*	*	*	-	-
Respiratory distress of newborn (P22).....		7	6	3	3	1
		*	*	*	*	*
Accidents (unintentional injures) (V01-X59).....		1	-	-	-	1
		*	-	-	-	*
Bacterial sepsis of newborn (P36).....		5	5	1	4	-
		*	*	*	*	-
Deseases of the circulatory system (I00-I99).....		2	-	-	-	2
		*	-	-	-	*
Intrauterine hypoxia, birth asphyxia (P20-P21).....		2	2	1	1	-
		*	*	*	*	-
All other causes.....		61	36	18	18	25
		1,911.63	1,128.17	*	*	783.45
2,500 grams or more						
All causes	39,856	180	47	28	18	133
		451.63	117.92	70.25	*	333.70
Congenital malformations (Q00-Q99).....		41	20	14	6	21
		102.87	50.18	*	*	52.69
Short gestation and low birthweight nec (P07).....		-	-	-	-	-
		-	-	-	-	-
Sudden infant death syndrome (R95).....		43	3	2	1	40
		107.89	*	*	*	100.36
Maternal complications of pregnancy (P01).....		-	-	-	-	-
		-	-	-	-	-
Complications of placenta, cord, membranes (P02).....		1	1	1	-	-
		*	*	*	-	-
Respiratory distress of newborn (P22).....		-	-	-	-	-
		-	-	-	-	-

See footnotes at end of table.

Documentation Table 5

Infant deaths and infant mortality rates by age of death, birthweight, and race of mother for 10 major causes of infant death: United states, 2003 period data -Cont

[Infant deaths are weighted. Infant deaths are under 1 year.Neonatal deaths are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Rates are per 100,000 live births]

Cause of death, birthweight, and race of mother	Live Births	Infant	Total Neonatal	Early Neonatal	Late Neonatal	Post-Neonatal
American Indian[1]						
Accidents (unintentional injures) (V01-X59).....		19	3	1	2	16
		*	*	*	*	*
Bacterial sepsis of newborn (P36).....		-	-	-	-	-
		-	-	-	-	-
Deseases of the circulatory system (I00-I99).....		5	1	1	-	4
		*	*	*	-	*
Intrauterine hypoxia, birth asphyxia (P20-P21).....		3	3	2	1	-
		*	*	*	*	-
All other causes.....		67	15	7	8	52
		168.11	*	*	*	130.47
Not stated birthweight						
All causes	7	1	1	1	-	-
		*	*	*	-	-
Congenital malformations (Q00-Q99).....		-	-	-	-	-
		-	-	-	-	-
Short gestation and low birthweight nec (P07).....		1	1	1	-	-
		*	*	*	-	-
Sudden infant death syndrome (R95).....		-	-	-	-	-
		-	-	-	-	-
Maternal complications of pregnancy (P01).....		-	-	-	-	-
		-	-	-	-	-
Complications of placenta, cord, membranes (P02).....		-	-	-	-	-
		-	-	-	-	-
Respiratory distress of newborn (P22).....		-	-	-	-	-
		-	-	-	-	-
Accidents (unintentional injures) (V01-X59).....		-	-	-	-	-
		-	-	-	-	-
Bacterial sepsis of newborn (P36).....		-	-	-	-	-
		-	-	-	-	-
Deseases of the circulatory system (I00-I99).....		-	-	-	-	-
		-	-	-	-	-
Intrauterine hypoxia, birth asphyxia (P20-P21).....		-	-	-	-	-
		-	-	-	-	-
All other causes.....		-	-	-	-	-
		-	-	-	-	-
Asian or Pacific Islander						
All birthweights						
All causes	221,203	1,068	752	607	145	316
		482.81	339.96	274.41	65.55	142.86
Congenital malformations (Q00-Q99).....		259	185	142	42	75
		117.09	83.63	64.19	18.99	33.91
Short gestation and low birthweight nec (P07).....		192	189	186	3	3
		86.80	85.44	84.09	*	*
Sudden infant death syndrome (R95).....		61	1	1	-	60
		27.58	*	*	-	27.12

See footnotes at end of table.

Documentation Table 5

Infant deaths and infant mortality rates by age of death, birthweight, and race of mother for 10 major causes of infant death: United states, 2003 period data -Cont

[Infant deaths are weighted. Infant deaths are under 1 year.Neonatal deaths are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Rates are per 100,000 live births]

Cause of death, birthweight, and race of mother	Live Births	Infant	Total Neonatal	Early Neonatal	Late Neonatal	Post-Neonatal
Asian or Pacific Islander						
Maternal complications of pregnancy (P01).....		59	58	58	-	1
		26.67	26.22	26.22	-	*
Complications of placenta, cord, membranes (P02).....		32	32	31	1	-
		14.47	14.47	14.01	*	-
Respiratory distress of newborn (P22).....		27	26	16	10	1
		12.21	11.75	*	*	*
Accidents (unintentional injures) (V01-X59).....		27	2	1	1	25
		12.21	*	*	*	11.30
Bacterial sepsis of newborn (P36).....		23	22	9	13	1
		10.40	9.95	*	*	*
Deseases of the circulatory system (I00-I99).....		32	8	4	4	24
		14.47	*	*	*	10.85
Intrauterine hypoxia, birth asphyxia (P20-P21).....		21	21	17	4	-
		9.49	9.49	*	*	-
All other causes.....		334	208	142	66	126
		150.99	94.03	64.19	29.84	56.96
Less then 2,500 grams						
All causes	17,255	741	634	526	109	107
		4,294.41	3,674.30	3,048.39	631.70	620.11
Congenital malformations (Q00-Q99).....		152	126	101	25	26
		880.90	730.22	585.34	144.89	150.68
Short gestation and low birthweight nec (P07).....		189	186	183	3	3
		1,095.33	1,077.95	1,060.56	*	*
Sudden infant death syndrome (R95).....		8	-	-	-	8
		*	-	-	-	*
Maternal complications of pregnancy (P01).....		56	55	55	-	1
		324.54	318.75	318.75	-	*
Complications of placenta, cord, membranes (P02).....		29	29	29	-	-
		168.07	168.07	168.07	-	-
Respiratory distress of newborn (P22).....		26	25	16	9	1
		150.68	144.89	*	*	*
Accidents (unintentional injures) (V01-X59).....		2	-	-	-	2
		*	-	-	-	*
Bacterial sepsis of newborn (P36).....		18	17	9	8	1
		*	*	*	*	*
Deseases of the circulatory system (I00-I99).....		12	3	2	1	9
		*	*	*	*	*
Intrauterine hypoxia, birth asphyxia (P20-P21).....		14	14	11	3	-
		*	*	*	*	-
All other causes.....		235	180	120	59	55
		1,361.92	1,043.18	695.45	341.93	318.75
2,500 grams or more						
All causes	203,923	323	113	77	36	210
		158.39	55.41	37.76	17.65	102.98
Congenital malformations (Q00-Q99).....		107	59	42	17	48
		52.47	28.93	20.60	*	23.54

See footnotes at end of table.

Documentation Table 5

Infant deaths and infant mortality rates by age of death, birthweight, and race of mother for 10 major causes of infant death: United states, 2003 period data -Cont

[Infant deaths are weighted. Infant deaths are under 1 year.Neonatal deaths are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Rates are per 100,000 live births]

Cause of death, birthweight, and race of mother	Live Births	Total Infant	Early Neonatal	Late Neonatal	Post-Neonatal
Asian or Pacific Islander					
Short gestation and low birthweight nec (P07).....		1	1	1	-
		*	*	*	-
Sudden infant death syndrome (R95).....		53	1	1	-
		25.99	*	*	-
Maternal complications of pregnancy (P01).....		2	2	2	-
		*	*	*	-
Complications of placenta, cord, membranes (P02).....		2	2	1	1
		*	*	*	*
Respiratory distress of newborn (P22).....		1	1	-	1
		*	*	-	*
Accidents (unintentional injures) (V01-X59).....		25	2	1	1
		12.26	*	*	*
Bacterial sepsis of newborn (P36).....		5	5	-	5
		*	*	-	*
Deseases of the circulatory system (I00-I99).....		20	5	2	3
		9.81	*	*	*
Intrauterine hypoxia, birth asphyxia (P20-P21).....		7	7	6	1
		*	*	*	*
All other causes.....		99	28	21	7
		48.55	13.73	10.30	*
Not stated birthweight					
All causes	25	4	4	4	-
		*	*	*	-
Congenital malformations (Q00-Q99).....		-	-	-	-
		-	-	-	-
Short gestation and low birthweight nec (P07).....		2	2	2	-
		*	*	*	-
Sudden infant death syndrome (R95).....		-	-	-	-
		-	-	-	-
Maternal complications of pregnancy (P01).....		1	1	1	-
		*	*	*	-
Complications of placenta, cord, membranes (P02).....		1	1	1	-
		*	*	*	-
Respiratory distress of newborn (P22).....		-	-	-	-
		-	-	-	-
Accidents (unintentional injures) (V01-X59).....		-	-	-	-
		-	-	-	-
Bacterial sepsis of newborn (P36).....		-	-	-	-
		-	-	-	-
Deseases of the circulatory system (I00-I99).....		-	-	-	-
		-	-	-	-
Intrauterine hypoxia, birth asphyxia (P20-P21).....		-	-	-	-
		-	-	-	-
All other causes.....		-	-	-	-
		-	-	-	-

*/Figure does not meet standard of reliability or precision; based on fewer than 20 death in the numerator.
-/ Quality zero.
1/ Includes Aleuts and Eskimos.

Documentation Table 6. Unlinked infant deaths by race, age at death, and state of residence: United States and each state, 2003

[Infant deaths are under 1 year. Neonatal death are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Data in this table is for infant deaths in 2003 that are not included in the linked file because they were not linked with their corresponding birth certificates. See methodology section. Residence is of infant decedent; race is from death certificate]

State and race of child 1/	Infant	Total neonatal	Early neonatal	Late neonatal	Postneonatal
United States /2					
Total	285	229	215	14	56
White	178	144	138	6	34
Black	88	70	63	7	18
Alabama					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Alaska					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Arizona					
Total	4	3	3	-	1
White	3	2	2	-	1
Black	-	-	-	-	-
Arkansas					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
California					
Total	72	60	55	5	12
White	45	39	36	3	6
Black	16	13	12	1	3
Colorado					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Connecticut					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Delaware					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Dist of Columbia					
Total	2	2	2	-	-
White	-	-	-	-	-
Black	2	2	2	-	-
Florida					
Total	1	-	-	-	1
White	1	-	-	-	1
Black	-	-	-	-	-
Georgia					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Hawaii					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-

Documentation Table 6. Unlinked infant deaths by race, age at death, and state of residence: United States and each state, 2003

[Infant deaths are under 1 year. Neonatal death are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Data in this table is for infant deaths in 2003 that are not included in the linked file because they were not linked with their corresponding birth certificates. See methodology section. Residence is of infant decedent; race is from death certificate]

State and race of child 1/	Infant	Total neonatal	Early neonatal	Late neonatal	Postneonatal
Idaho					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Illinois					
Total	24	18	17	1	6
White	15	12	12	-	3
Black	9	6	5	1	3
Indiana					
Total	5	5	5	-	-
White	3	3	3	-	-
Black	2	2	2	-	-
Iowa					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Kansas					
Total	3	-	-	-	3
White	2	-	-	-	2
Black	1	-	-	-	1
Kentucky					
Total	1	1	1	-	-
White	-	-	-	-	-
Black	1	1	1	-	-
Louisiana					
Total	28	20	17	3	8
White	15	11	11	-	4
Black	13	9	6	3	4
Maine					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Maryland					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Massachusetts					
Total	7	4	4	-	3
White	6	3	3	-	3
Black	-	-	-	-	-
Michigan					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Minnesota					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Mississippi					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-

Documentation Table 6. Unlinked infant deaths by race, age at death, and state of residence: United States and each state, 2003

[Infant deaths are under 1 year. Neonatal death are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Data in this table is for infant deaths in 2003 that are not included in the linked file because they were not linked with their corresponding birth certificates. See methodology section. Residence is of infant decedent; race is from death certificate]

State and race of child 1/	Infant	Total neonatal	Early neonatal	Late neonatal	Postneonatal
Missouri					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Montana					
Total	1	1	1	-	-
White	1	1	1	-	-
Black	-	-	-	-	-
Nebraska					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Nevada					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
New Hampshire					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
New Jersey					
Total	20	16	16	-	4
White	11	7	7	-	4
Black	8	8	8	-	-
New Mexico					
Total	2	2	2	-	-
White	1	1	1	-	-
Black	-	-	-	-	-
New York					
Total	10	10	10	-	-
White	7	7	7	-	-
Black	3	3	3	-	-
New York City					
Total	4	3	3	-	1
White	4	3	3	-	1
Black	-	-	-	-	-
North Carolina					
Total	2	1	1	-	1
White	1	1	1	-	-
Black	1	-	-	-	1
North Dakota					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Ohio					
Total	5	5	5	-	-
White	1	1	1	-	-
Black	4	4	4	-	-
Oklahoma					
Total	9	3	2	1	6
White	6	2	2	-	4
Black	2	1	-	1	1

Documentation Table 6. Unlinked infant deaths by race, age at death, and state of residence: United States and each state, 2003

[Infant deaths are under 1 year. Neonatal death are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Data in this table is for infant deaths in 2003 that are not included in the linked file because they were not linked with their corresponding birth certificates. See methodology section. Residence is of infant decedent; race is from death certificate]

State and race of child 1/	Infant	Total neonatal	Early neonatal	Late neonatal	Postneonatal
Oregon					
Total	1	1	-	1	-
White	1	1	-	1	-
Black	-	-	-	-	-
Pennsylvania					
Total	6	3	3	-	3
White	3	1	1	-	2
Black	3	2	2	-	1
Rhode Island					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
South Carolina					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
South Dakota					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Tennessee					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Texas					
Total	73	68	65	3	5
White	48	46	44	2	2
Black	22	19	18	1	3
Utah					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Vermont					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Virginia					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Washington					
Total	5	3	3	-	2
White	4	3	3	-	1
Black	1	-	-	-	1
West Virginia					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Wisconsin					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-

Documentation Table 6. Unlinked infant deaths by race, age at death, and state of residence: United States and each state, 2003

[Infant deaths are under 1 year. Neonatal death are under 28 days; early neonatal, 0-6 days; late neonatal, 7-27 days; and postneonatal, 28 days through 11 months. Data in this table is for infant deaths in 2003 that are not included in the linked file because they were not linked with their corresponding birth certificates. See methodology section. Residence is of infant decedent; race is from death certificate]

State and race of child 1/	Infant	Total neonatal	Early neonatal	Late neonatal	Postneonatal
Wyoming					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Foreign Residents					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Puerto Rico					
Total	2	1	1	-	1
White	1	-	-	-	1
Black	1	1	1	-	-
Virgin Islands					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-
Guam					
Total	-	-	-	-	-
White	-	-	-	-	-
Black	-	-	-	-	-

1/ Totals for geographic areas include races other than white and black.
2/ Excludes data for foreign residents, Puerto Rico, Virgin Islands and Guam.

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Infant Mortality Statistics from the 2003 Period Linked Birth/Infant Death Data Set

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Abstract

Objectives—This report presents 2003 period infant mortality statistics from the linked birth/infant death data file by a variety of maternal and infant characteristics. The linked file differs from the mortality file, which is based entirely on death certificate data.

Methods—Descriptive tabulations of data are presented and interpreted. Excluding rates by cause of death, the infant mortality rate is now published with two decimal places.

Results—The U.S. infant mortality rate was 6.84 infant deaths per 1,000 live births in 2003, a return to the rate in 2001, compared with 6.95 in 2002. Infant mortality rates ranged from 4.83 per 1,000 live births for Asian or Pacific Islander mothers to 13.60 for non-Hispanic black mothers. Among Hispanics, rates ranged from 4.57 for Cuban mothers to 8.18 for Puerto Rican mothers. Infant mortality rates were higher for those infants whose mothers were born in the 50 States and the District of Columbia, were unmarried, or smoked during pregnancy. Infant mortality was also higher for male infants, multiple births, and infants born preterm or at low birthweight. Infants born at the lowest birthweights and gestational ages have a large impact on overall U.S. infant mortality. Nearly one-half (49 percent) of all infant deaths in the U.S. in 2003 occurred to the 0.8 percent of infants whose birthweight was less than 1,000 grams. The three leading causes of infant death—Congenital malformations, low birthweight, and SIDS— taken

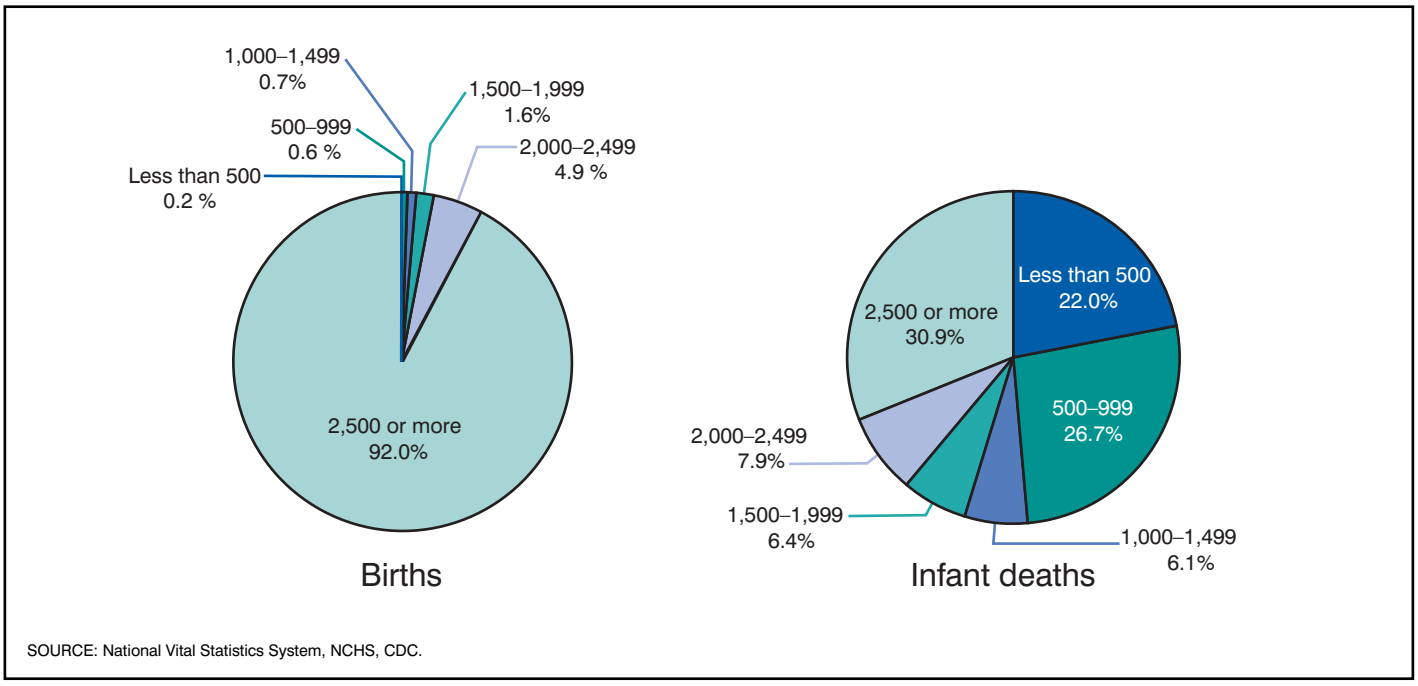


Figure 1. Percentage of live births and infant deaths by birthweight in grams, 2003

together accounted for 45 percent of all infant deaths. For infants of non-Hispanic black mothers, the cause-specific infant mortality rate for low birthweight was nearly four times that for infants of non-Hispanic white mothers. For infants of non-Hispanic black and American Indian mothers, the SIDS rates were more than double the rate for non-Hispanic white mothers.

Keywords: infant mortality • infant health • birthweight • maternal characteristics

Introduction

This report presents infant mortality data from the 2003 period linked file. In the linked file the information from the death certificate is linked to information from the birth certificate for each infant under 1 year of age who died in the 50 States, the District of Columbia, Puerto Rico, the Virgin Islands, or Guam during 2003. Linked birth/infant death data are not available for American Samoa and the Commonwealth of the Northern Marianas. The purpose of the linkage is to use the many additional variables available from the birth certificate to conduct more detailed analyses of infant mortality patterns. This report presents infant mortality data by race and Hispanic origin of the mother, birthweight, period of gestation, sex of infant, plurality, trimester of pregnancy prenatal care began, maternal age, maternal educational attainment, live-birth order, mother's marital status, mother's place of birth, maternal smoking during pregnancy, age at death, and underlying cause of death (Tables 1–7, A–C, and Figures 1–3). Other variables available in the linked file data set (1), but which are not discussed in this report, include: father's age, race, and Hispanic origin; birth attendant; place of delivery; mother's weight gain during pregnancy; and many medical and health measurements. Another report, based on data from the vital statistics mortality file, provides further information on trends in infant mortality and on causes of infant death (2). Some rates calculated from the mortality file differ from those published using the linked birth/infant death file (linked file). The linked file is used for analysis and for calculating infant mortality rates by race and ethnicity that are more accurately measured from the birth certificate. A more detailed discussion of the differences in the number of infant deaths and infant mortality rates between the linked file and the mortality file is presented in the "Technical Notes."

Methods

Data shown in this report are based on birth and infant death certificates registered in all States, the District of Columbia, Puerto Rico, the Virgin Islands, and Guam. As part of the Vital Statistics Cooperative Program, each State provided to the Centers for Disease Control and Prevention's National Center for Health Statistics (NCHS) matching birth and death certificate numbers for each infant under 1 year of age who died in the State during 2003. When the birth and death occurred in different States, the State of death was responsible for contacting the State of birth identified on the death certificate to obtain the original birth certificate number. NCHS used the matching birth and death certificate numbers provided by the States to extract final edited data from the NCHS natality and mortality statistical files. These data were linked to form a single statistical record, thereby establishing a national linked record file.

After the initial linkage, NCHS returned computer lists of unlinked infant death records and records with inconsistent data between the birth and death certificates to each State. State additions and corrections were incorporated, and a final national linked file was produced. In 2003, 99.0 percent of all infant death records were successfully

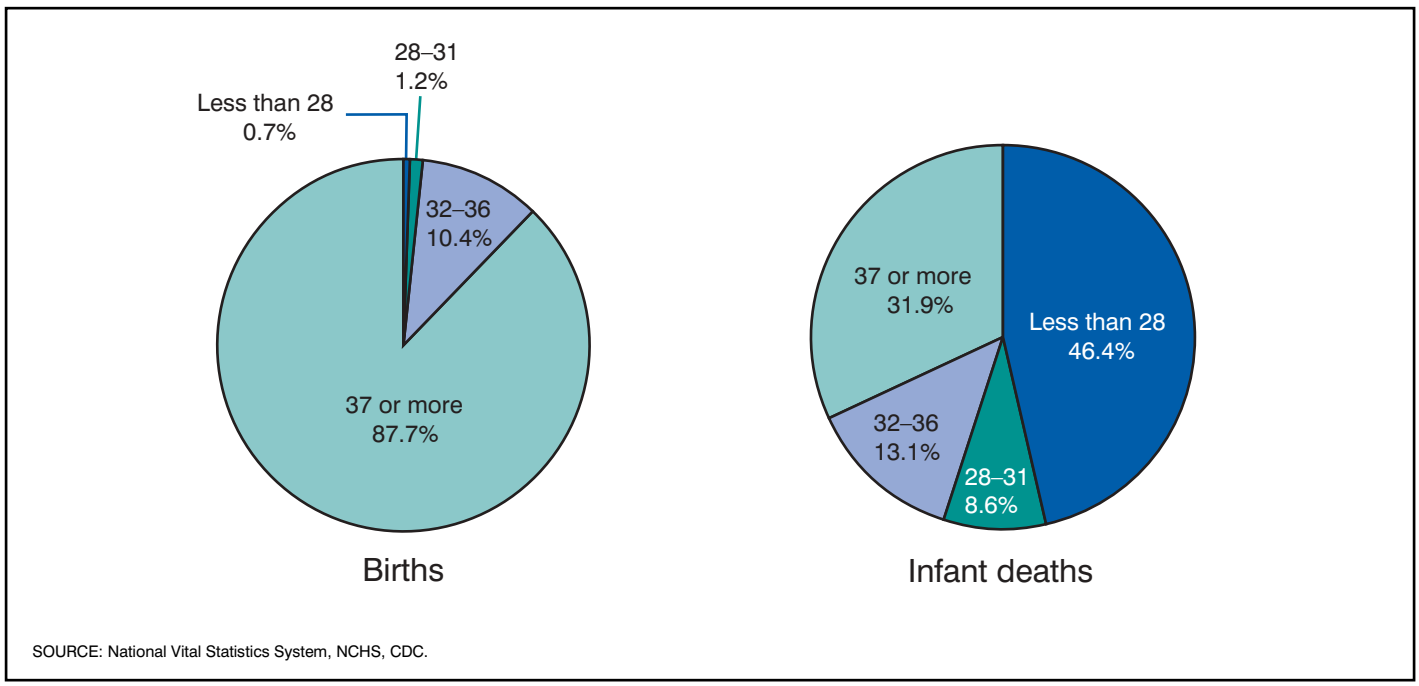
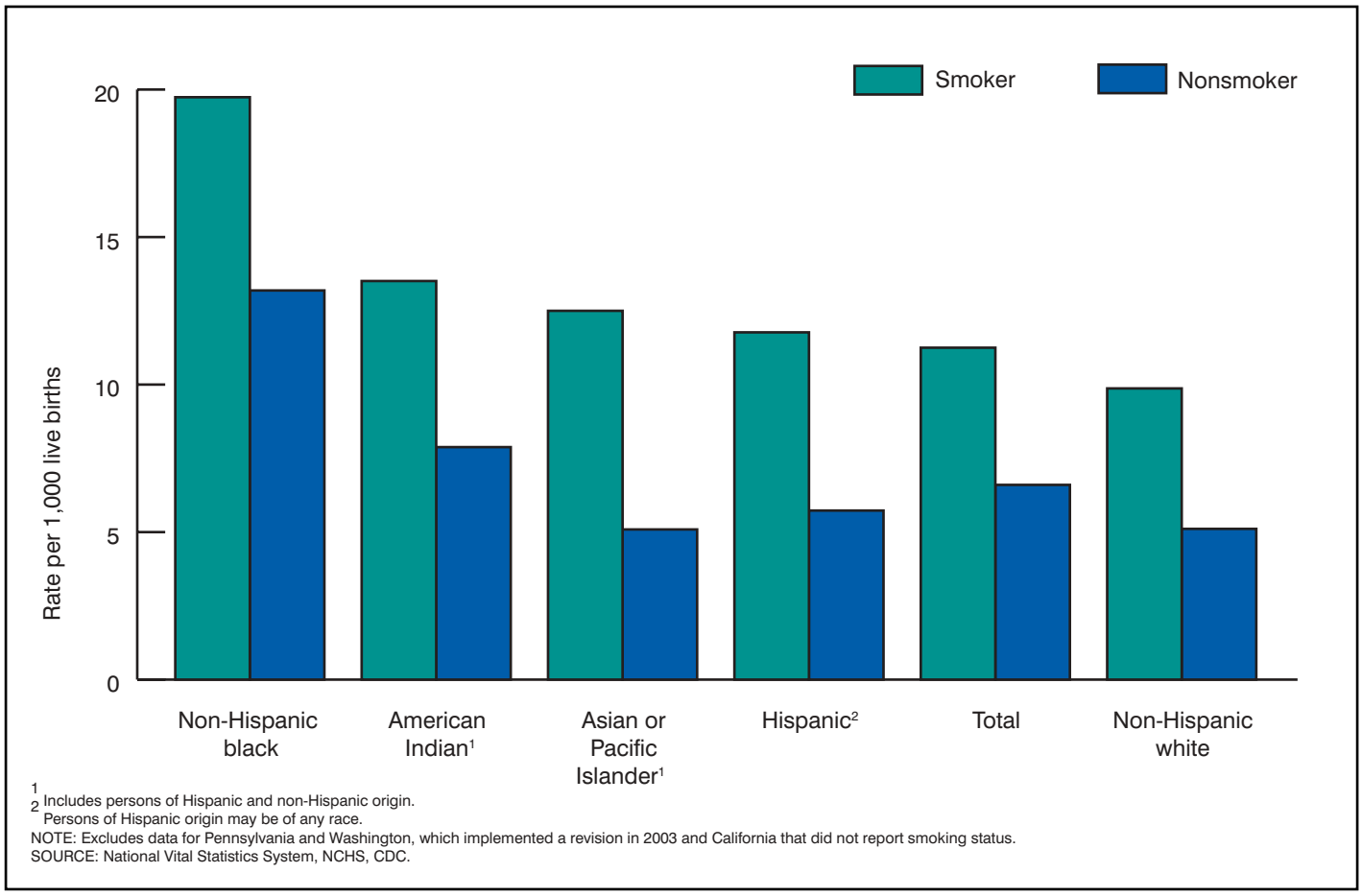


Figure 2. Percentage of live births and infant deaths by period of gestation in weeks, 2003



[1] [2] Includes persons of Hispanic and non-Hispanic origin.
Persons of Hispanic origin may be of any race.
NOTE: Excludes data for Pennsylvania and Washington, which implemented a revision in 2003 and California that did not report smoking status.
SOURCE: National Vital Statistics System, NCHS, CDC.

Figure 3. Infant mortality rates by smoking status of the mother during pregnancy by race and ethnicity, 2003

matched to their corresponding birth records. Records were weighted to adjust for the 1.0 percent of infant death records that were not linked to their corresponding birth certificates (see the "Technical Notes").

Information on births by age, race, or marital status of mother is imputed if it is not reported on the birth certificate. These items were not reported for less than 1 percent of U.S. births in 2003 (3).

Race and Hispanic origin are reported independently on the birth certificate. In tabulations of birth data by race and Hispanic origin, data for Hispanic persons are not further classified by race as the vast majority of women of Hispanic origin are reported as white. Data for American Indian and Asian or Pacific Islander (API) births are not shown separately by Hispanic origin because the vast majority of these populations are non-Hispanic.

Starting with data year 1999, cause-of-death statistics in this and similar publications are classified in accordance with the *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision* (ICD–10) (4). Issues of this report for data years previous to 1999 included causes of death classified according to the *Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, Ninth Revision* (ICD–9) (5). Issues related to comparability between ICD revisions are discussed in the "Technical Notes."

This report includes data for two States, Pennsylvania and Washington, that implemented the 2003 revision of the U.S. Standard Certificate of Live Birth in 2003 (revised), as well as the 48 States and the District of Columbia for which data are based on the 1989 revision of the U.S. Standard Certificate of Live Birth (unrevised). Revised and unrevised data are combined when comparable. See *National Vital Statistics Report* "Births: Final Data for 2003" for more information (3).

Data by maternal and infant characteristics

This report presents descriptive tabulations of infant mortality data by a variety of maternal and infant characteristics. These tabulations are useful for understanding the basic relationships between risk factors and infant mortality, *unadjusted for the possible effects of other variables*. In reality, women with one risk factor often have other risk factors as well. For example, teenage mothers are more likely to also be unmarried and of a low-income status, and mothers who do not receive prenatal care are more likely to be of a low-income status, and uninsured. The preferred method for disentangling the multiple interrelationships among risk factors is multivariate analysis; however, an understanding of the basic relationships between risk factors and infant mortality is a necessary precursor to more sophisticated types of analyses and is the aim of this publication.

Race and Hispanic origin data—Infant mortality rates are presented here by race and detailed Hispanic origin of mother. The linked file is particularly useful for computing accurate infant mortality rates for this purpose because the race and Hispanic origin of the mother from the birth certificate is used in both the numerator and denominator of the infant mortality rate. In contrast, for the vital statistics mortality

file, race information for the denominator is the race of the mother as reported on the birth certificate, whereas the race information for the numerator is the race of the decedent as reported on the death certificate (1,6). Race information from the birth certificate is generally considered to be more reliable than that from the death certificate where the race and ethnicity of the deceased infant is reported by the funeral director based on information provided by an informant or on observation. These different reporting methods can lead to differences in race and ethnic specific infant mortality rates between the two data files (2,6).

Statistical significance—Text statements have been tested for statistical significance, and a statement that a given infant mortality rate is higher or lower than another rate indicates that the rates are significantly different. Information on the methods used to test for statistical significance, as well as information on differences between period and cohort data, the weighting of the linked file, and a comparison of infant mortality data between the linked file and the vital statistics mortality file are presented in the "Technical Notes." Additional information on maternal age, marital status, period of gestation, birthweight, and cause-of-death classification is also presented in the "Technical Notes."

Results and Discussion

Trends in infant mortality

The overall 2003 infant mortality rate from the linked file was 6.84 infant deaths per 1,000 live births, not significantly lower than the rate in 2002 (6.95) and a return to the rate in 2001 (Table C) (the overall rate in 2003 from the mortality file was 6.85). Infant mortality rates for race and Hispanic origin groups were not significantly different in 2003 compared with 2002 (Table C).

The significant increase in the infant mortality rate from 2001 to 2002 generated considerable concern; it was the first such rise in more than 40 years. An intensive analysis of the 2001–02 increase in the infant mortality rate was published last year (7). This analysis discussed some of the potential explanatory factors that could account for the increase, concluding that the increase in the number of very small infants (less than 750 grams) was the principal factor. The increase did not continue in 2003.

The infant mortality rate was 10 percent lower in 2003 than in 1995 (7.57) (Table C). During this period, decreases have been observed for all race and ethnic groups, although only a few had significant declines. Significant declines were observed for infants of non-Hispanic white (9 percent), non-Hispanic black (7 percent), and Mexican mothers (9 percent).

Infant mortality by race and Hispanic origin of mother

There continues to be a wide variation in infant mortality rates by race and Hispanic origin of mother with the highest rate, 13.60 per 1,000 live births for infants of non-Hispanic black mothers, nearly three times greater than the lowest rate of 4.57 for infants of Cuban mothers. Rates were also high for infants of American Indian mothers (8.73) and Puerto Rican mothers (8.18) (Tables A and B). Rates were intermediate, but all below the U.S. rate, for infants of non-Hispanic white (5.70), Mexican (5.49), and Central and South American mothers (5.04) (Table B). The rate was low for Asian or Pacific Islander mothers (4.83) (Table A).

Infant mortality by State

Between 2002 and 2003, more States had decreases than increases in the infant mortality rate, but most changes were not significant. No State had a significant increase and two, Connecticut and Nebraska, had significant declines of 18 and 22 percent, respectively (detailed data not shown). Infant mortality rates varied considerably by State and within States by race and Hispanic origin of mother for 2001–03 (Table 3). To obtain statistically reliable rates by race and Hispanic origin, 3 years of data were combined. Infant mortality rates ranged from 10.53 for Mississippi to 4.33 for New Hampshire. The highest rate noted (10.94) was for the District of Columbia (DC); however, the rate for the District of Columbia is more appropriately compared with rates for other large U.S. cities, because of the high concentrations of high-risk women in these areas.

For infants of non-Hispanic black mothers, mortality rates ranged from 17.48 in Wisconsin to 8.39 in Minnesota. For infants of non-Hispanic white mothers, West Virginia had the highest infant mortality rate (7.65) and New Jersey had the lowest rate (3.92).

For infants of American Indian and Asian or Pacific Islander mothers, mortality rates could be reliably computed for only 15 and 27 States, respectively. For infants of American Indian mothers, mortality rates ranged from 12.66 in Wisconsin to 6.00 in New Mexico. Overall, infant mortality rates for infants of Asian or Pacific Islander mothers were the lowest, ranging from 3.38 in New York to 9.85 in Louisiana.

Sex of infant

In 2003, the overall infant mortality rate for female infants was 6.07 per 1,000, 20 percent lower than the rate for male infants (7.59). Infant mortality rates were higher for male than female infants in each race group except American Indian (Table 1). Among Hispanics, this difference was not significant for infants of Cuban mothers (Table 2).

Multiple births

For multiple births, the infant mortality rate was 30.99, more than five times the rate of 6.01 for single births (Tables 1 and 2). Infant mortality rates for multiple births were higher than rates for single births for all race and Hispanic-origin groups, except for Cubans for whom rates could not be reliably computed due to small numbers of events.

The risk of infant death increases with the increasing number of infants in the pregnancy. In 2003, the infant mortality rate for twins (28.66) was nearly five times the rate for single births (6.01). The rate for triplets (62.23) was 10 times, the rate for quadruplets (156.41) 26 times, and the rate for quintuplets and higher order births (242.86) was 40 times higher than the rate for single births (tabular data not shown).

For twins, the infant mortality rate declined significantly from 2002 (30.20) to 2003 (28.66). No other plurality group had a significant change in infant mortality from the year before.

Multiple pregnancy can lead to an accentuation of maternal risks and complications associated with pregnancy (3,8,9). For example, multiple births are much more likely to be born preterm and at low birthweight than single births (3,8,9). The higher risk profile of multiple

Table A. Infant, neonatal, and postneonatal deaths and mortality rates by race of mother: United States, 2003 linked file

Race of mother	Live births	Number of deaths			Mortality rate per 1,000 live births		
		Infant	Neonatal	Postneonatal	Infant	Neonatal	Postneonatal
All races	4,090,007	27,995	18,935	9,060	6.84	4.63	2.22
White	3,225,890	18,458	12,457	6,000	5.72	3.86	1.86
Black	599,860	8,094	5,530	2,563	13.49	9.22	4.27
American Indian[1]	43,054	376	196	180	8.73	4.55	4.18
Asian or Pacific Islander	221,203	1,068	752	316	4.83	3.40	1.43

[1]Includes Aleuts and Eskimos.

NOTES: Infant deaths are weighted so numbers may not exactly add to totals due to rounding. Neonatal is less than 28 days and postneonatal is 28 days to under 1 year. Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. In this table all women (including Hispanic women) are classified only according to their race. See reference 3.

Table B. Infant, neonatal, and postneonatal deaths and mortality rates by Hispanic origin of mother and by race of mother for mothers of non-Hispanic origin: United States, 2003 linked file

Hispanic origin and race of mother	Live births	Number of deaths			Mortality rate per 1,000 live births		
		Infant	Neonatal	Postneonatal	Infant	Neonatal	Postneonatal
All origins[1]	4,090,007	27,995	18,935	9,060	6.84	4.63	2.22
Total Hispanic	912,331	5,151	3,573	1,579	5.65	3.92	1.73
Mexican	654,507	3,595	2,462	1,133	5.49	3.76	1.73
Puerto Rican	58,400	478	333	145	8.18	5.70	2.48
Cuban	14,867	68	50	18	4.57	3.36	*
Central and South American	135,585	684	494	189	5.04	3.64	1.39
Other and unknown Hispanic	48,972	326	232	94	6.66	4.74	1.92
Non-Hispanic total[2]	3,149,067	22,396	14,994	7,402	7.11	4.76	2.35
Non-Hispanic white	2,321,921	13,228	8,797	4,431	5.70	3.79	1.91
Non-Hispanic black	576,047	7,836	5,335	2,501	13.60	9.26	4.34
Not stated	28,609	448	368	80	. . .	. . .	. . .

* Figure does not meet standards of reliability or precision; based on fewer than 20 deaths in the numerator.

. . . Category not applicable.

[1]Origin of mother not stated included in All origins but not distributed among origins.

[2]Includes races other than white or black.

NOTES: Infant deaths are weighted so numbers may not exactly add to totals due to rounding. Neonatal is less than 28 days and postneonatal is 28 days to under 1 year. Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. Persons of Hispanic origin may be of any race. In this table Hispanic women are classified only by place of origin; non-Hispanic women are classified by race. See reference 3.

Table C. Infant mortality rates by race and Hispanic origin of mother: United States, 1995–2003 linked files

Race and Hispanic origin of mother	1995	1996	1997	1998	1999	2000	2001	2002	2003	Percent Change 1995 to 2003	Percent Change 2002 to 2003
All races	7.57	7.30	7.21	7.19	7.04	6.89	6.84	6.95	6.84	–9.6	–1.6**
White	6.30	6.07	6.05	5.96	5.79	5.71	5.69	5.79	5.72	–9.2	–1.2**
Black	14.58	14.13	13.69	13.80	13.99	13.48	13.34	13.81	13.50	–7.4	–2.2**
American Indian[1]	9.04	9.95	8.69	9.34	9.29	8.30	9.65	8.64	8.73	–3.4**	1.0**
Asian or Pacific Islander	5.27	5.20	4.98	5.54	4.85	4.87	4.73	4.77	4.83	–8.3**	1.3**
Hispanic	6.27	6.05	5.95	5.76	5.71	5.59	5.44	5.62	5.65	–9.9	0.5**
Mexican	6.03	5.84	5.83	5.60	5.51	5.43	5.22	5.42	5.49	–9.0	1.3**
Puerto Rican	8.88	8.60	7.86	7.78	8.35	8.21	8.53	8.20	8.18	–7.9**	–0.2**
Cuban	5.29	5.07	5.51	3.63	4.66	4.54	4.28	3.72	4.57	–13.6**	22.8**
Central and South American	5.52	5.02	5.45	5.28	4.68	4.64	4.98	5.06	5.04	–8.7**	–0.4**
Non-Hispanic white	6.28	6.04	6.02	5.98	5.76	5.70	5.72	5.80	5.70	–9.2	–1.7**
Non-Hispanic black	14.65	14.20	13.72	13.88	14.14	13.59	13.46	13.89	13.60	–7.2	–2.1**

** Not significant at $p < .05$.

[1]Includes Aleuts and Eskimos.

NOTES: Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. Persons of Hispanic origin may be of any race. In this table Hispanic women are classified only by place of origin; non-Hispanic women are classified by race. See reference 3.

births has a substantial impact on overall infant mortality (7,8,10). For example, in 2003 multiples accounted for 3 percent of all live births, but 15 percent of all infant deaths in the U.S. (Table 1).

Age at death

In 2003, more than two-thirds of all infant deaths (18,935 out of 27,995) occurred during the neonatal period (from birth through 27 days of age). The neonatal mortality rate, 4.63 deaths per 1,000 live births in 2003, was more than double the postneonatal (28 days to under 1 year) mortality rate of 2.22. Neonatal and postneonatal mortality rates for 2003 were essentially unchanged from the previous year.

The neonatal mortality rate for infants of non-Hispanic black mothers (9.26) was significantly higher than for all other race/ethnic groups and more than double those for non-Hispanic white, Asian or Pacific Islander, Mexican, Central and South American, and Cuban women. Neonatal mortality rates for Puerto Rican (5.70) and American Indian (4.55) women were intermediate between these two groups. Infants of non-Hispanic black and American Indian mothers had the highest postneonatal mortality rates of any group (4.34 and 4.18, respectively)—more than twice those for non-Hispanic white, Asian or Pacific Islander, Mexican, and Central and South American women. Postneonatal mortality rates were intermediate for Puerto Rican women (2.48) (Tables A and B).

Birthweight and period of gestation

Birthweight and period of gestation are the two most important predictors of an infant's subsequent health and survival. Infants born too small or too soon have a much greater risk of death and both short-term and long-term disability than those born at term (37–41 weeks of gestation) or with birthweights of 2,500 grams or more (11–15).

Because of their much greater risk of death, infants born at the lowest birthweights and gestational ages have a large impact on overall U.S. infant mortality. Figure 1 shows the percent distribution of live births and infant deaths by birthweight. Births at less than 500 grams accounted for only 0.2 percent of births, but 22.0 percent of all infant deaths in the U.S. in 2003. Births at 500–999 grams accounted for 0.6 percent of births, but 26.7 percent of infant deaths. Together, births to infants weighing less than 1,000 grams accounted for 0.8 percent of births, and nearly one-half (48.6 percent) of all infant deaths in the U.S. in 2003. Conversely, 92.0 percent of infants born in the U.S. in 2003 weighed 2,500 grams or more, but these infants accounted for only 31.0 percent of infant deaths.

A similar pattern is found when data by period of gestation are examined (Figure 2). Births at less than 28 weeks of gestation accounted for 0.7 percent of all live births, and 46.4 percent of all infant deaths in the U.S. in 2003.

The percentage of infants born at low birthweight (less than 2,500 grams) varied greatly by race and ethnicity, from a low of 6.3 percent for births to Mexican mothers to a high of 13.6 percent for births to non-Hispanic black mothers (Tables 4 and 5). The percentage of preterm births (those born before 37 completed weeks of gestation) ranged from 10.5 percent for births to Asian or Pacific Islander mothers to 17.8 percent for births to non-Hispanic black mothers.

For all race and ethnic groups studied, infant mortality rates were much higher for low birthweight infants (59.04) than for infants with birthweights of 2,500 grams or more (2.29). Overall, the infant mortality rate for very low birthweight infants (those with birthweights of less than 1,500 grams) was 252.00, more than 110 times the rate for infants with birthweights of 2,500 grams or more (Table 6). Similarly, the infant mortality rate for very preterm infants (those born at less than 32 weeks of gestation) was 188.24, 78 times the rate for infants born at term (2.42) (37–41 weeks of gestation) (Tables 1 and 2).

At least 86 percent of infants with birthweights of less than 500 grams died within the first year of life (Table 6). Reporting of deaths among these very small infants may be incomplete (data not shown). An infant's chances of survival increase rapidly with increasing birthweight. Infant mortality rates were lowest at birthweights of 3,000–4,499 grams.

Trends in birthweight-specific infant mortality rates for the period 1995 to 2003 are shown in Table 6. For the total population, non-Hispanic white, non-Hispanic black, and Hispanic mothers, declines were largest for infants weighing 2,500–4,499 grams (Table 6).

From 2002 to 2003, changes in birthweight-specific infant mortality rates were not statistically significant. Previously, the infant mortality rate for very low birthweight infants had increased significantly from 2001–02, as had rates for preterm and very preterm infants. Also, the number of live born infants and fetal deaths of very low birthweights (i.e., less than 500 grams) had increased (7).

Prenatal care

Pennsylvania and Washington implemented the 2003 revision of the U.S. Standard Certificate of Live Birth in 2003. The question on the timing of prenatal care on the 2003 revision differs substantively from the question on the 1989 revision that is in use in the other States (3); thus, prenatal care data are not comparable between the two revisions. As a result, data for Pennsylvania and Washington were not included in the prenatal care tabulations in this report.

Although difficult to measure, the timing and quality of prenatal care received by the mother during pregnancy can be important to the infant's subsequent health and survival (16–19). Early comprehensive prenatal care can promote healthier pregnancies by providing health behavior advice, early detection and treatment of risk factors and symptoms, and monitoring (16,17). The initiation and subsequent utilization of prenatal care is also viewed as an indicator for access to care (19,20).

In 2003, the mortality rate for infants of mothers who began prenatal care after the first trimester of pregnancy or not at all was 8.96 per 1,000. This rate was 45 percent higher than the rate for infants of mothers who began care in the first trimester (6.20).

Overall, the infant mortality rate for women who began care in the third trimester (6.64) was lower than for women who began care in the second trimester (7.32). This is because women who began prenatal care in the third trimester had to have a period of gestation of at least 7 months, thus reducing the probability that the infant would be born preterm or of low birthweight. Therefore, to be able to compare women who receive the timeliest care with all other women, the category "after first trimester or no care" is used (Tables 1 and 2).

For each race and Hispanic origin group, infant mortality rates were higher for mothers who began prenatal care after the first trimester or no care, than for mothers who initiated prenatal care during the first trimester (Tables 1 and 2). These differences were significant for all but infants of American Indian, Puerto Rican, and Central or South

American mothers. Because of the small number of infant deaths for Cuban mothers with late or no care, a reliable rate could not be calculated.

Maternal age

Infant mortality rates vary with maternal age; infants of teenage mothers and mothers aged 40 and over have the highest rates (10.22 and 8.60 respectively). The lowest rates are for infants of mothers in their late twenties and early thirties (Tables 1 and 2).

In 2003, among births to teenagers, infants of the youngest mothers (under age 15 years) had the highest rate (16.06). The rate for infants of mothers aged 15–17 years was 11.45; the rate for infants of mothers aged 18–19 years was 9.49 (tabular data not shown).

Within race and ethnic subgroups, among groups for which rates could be reliably computed, infant mortality rates for births to non-Hispanic white mothers less than 20 years of age were higher than for mothers aged 40 and over. In contrast, for Mexican mothers, rates for births to the oldest mothers were higher than rates for infants of teenagers.

Studies suggest that the higher mortality risk for infants of younger mothers may be related to socioeconomic factors as well as biologic immaturity (21); young maternal age might be a marker for poverty (22). Among older mothers, especially those of low socioeconomic status, infant mortality rates may be affected by pregnancy complications related to higher maternal age, (e.g., gestational diabetes mellitus and hypertensive disorders) (23).

Maternal education

Pennsylvania and Washington implemented the 2003 revision of the U.S. Standard Certificate of Live Birth in 2003. The question on education on the 2003 revision differs substantively from the question on the 1989 revision that is in use in the other States (3); thus, education data are not comparable between the two revisions. As a result, data for Pennsylvania and Washington were not included in the education tabulations in this report.

Infant mortality rates generally decreased with increasing educational level (Tables 1 and 2). This pattern may reflect the effects of more education as well as socioeconomic differences; women with more education tend to have higher income levels (24). However, infants of mothers with 0–8 years of education had a lower infant mortality rate compared to those with 9–11 years of education. This may be because most mothers with 0–8 years of education were born outside of the 50 States and the District of Columbia (25), and their infant mortality rates tend to be lower than for native-born mothers (see "Nativity").

Live-birth order

Infant mortality rates were generally higher for first births than for second births, and then generally increased as birth order increased (Tables 1 and 2). Overall, the infant mortality rate for first births (6.83) was 14 percent higher than for second births (5.98). The rate for fifth and higher order births (10.28) was 72 percent higher than the rate for second births. The higher parities and, therefore, the highest order births (fifth child and above) are more likely to be associated with older maternal age, multiple births, and lower socioeconomic status (3,26).

Marital status

Marital status may be a marker for the presence or absence of social, emotional, and financial resources (27, 28). Infants of mothers who are not married have been shown to be at higher risk for poor outcomes (29,30). In 2003, infants of married mothers had an infant mortality rate of 5.33 per 1,000, 45 percent lower than the rate for infants of unmarried mothers (9.71) (Tables 1 and 2). Within each race and Hispanic origin group, infants of unmarried mothers had higher rates of mortality, and with the exception of Puerto Rican, Cuban, and Central and South American infants, these differences were significant.

Nativity

In 2003, the infant mortality rate for mothers born in the 50 States and the District of Columbia (7.15) was 37 percent higher than the rate for mothers born elsewhere (5.21). Among race and Hispanic-origin groups for whom infant mortality rates could be calculated, all had higher infant mortality rates for mothers born in the 50 States and the District of Columbia (the difference was not significant for Puerto Rican, Cuban, and Central and South American mothers) (Tables 1 and 2).

A variety of different hypotheses have been advanced to account for the lower infant mortality rate among infants of mothers born outside the 50 States and the District of Columbia, including possible differences in migration selectivity and the social support for new mothers (31). Also, women born outside the 50 States and the District of Columbia have been shown to have different characteristics than their U.S.-born counterparts with regard to socioeconomic and educational status (32).

Maternal smoking

Pennsylvania and Washington implemented the 2003 revision of the U.S. Standard Certificate of Live Birth in 2003. The question on smoking during pregnancy on the 2003 revision differs substantively from the question on the 1989 revision that is in use in the other States (3); thus, smoking during pregnancy data are not comparable between the two revisions. As a result, data for Pennsylvania and Washington were not included in the smoking during pregnancy tabulations in this report. Additionally, California does not report maternal smoking on the birth certificate.

Tobacco use during pregnancy causes the passage of substances such as nicotine, hydrogen cyanide, and carbon monoxide from the placenta into the fetal blood supply. These substances restrict the growing infant's access to oxygen and can lead to adverse pregnancy and birth outcomes such as low birthweight, preterm delivery, intrauterine growth retardation, and infant mortality (33,34).

The infant mortality rate for infants of smokers was 11.25 in 2003, 71 percent higher than the rate of 6.59 for nonsmokers. For each race and Hispanic-origin group for which these rates could be computed, the infant mortality rate for smokers was higher than for nonsmokers (Tables 1 and 2 and Figure 3). Infant mortality rates for API mothers

who smoked during pregnancy were nearly two and one-half times the rates for nonsmokers.

Leading causes of infant death

Infant mortality rates for the five leading causes of infant death are presented in Table 7 by race and Hispanic origin of mother. The leading cause of infant death in the United States in 2003 was Congenital malformations, deformations, and chromosomal abnormalities (congenital malformations), accounting for 20 percent of all infant deaths. Disorders relating to short gestation and low birthweight, not elsewhere classified (low birthweight) was second, accounting for 17 percent of all infant deaths, followed by Sudden infant death syndrome (SIDS) accounting for 8 percent of infant deaths. The fourth and fifth leading causes—Newborn affected by maternal complications of pregnancy (maternal complications), and Newborn affected by complications of placenta, cord, and membranes (cord complications), accounted for 6 and 4 percent, respectively, of all infant deaths in 2003. Together, the five leading causes accounted for 55 percent of all infant deaths in the U.S. in 2003. The order of the five leading causes of death was the same in 2003 as in the previous year.

The rank order of the leading causes of infant death varied substantially by race and Hispanic origin of the mother. Congenital malformations was the leading cause of infant death for all groups except for non-Hispanic black and Puerto Rican mothers, for whom low birthweight was the leading cause.

Infant mortality rates for the five leading causes of death were basically unchanged from 2002–03, except for SIDS, which decreased by 8 percent. Recent declines in SIDS may also reflect a change in the way SIDS is diagnosed by the medical community (35). When examined by race and ethnicity, none of the race/ethnic groups shown in Table 7 had significant changes in cause-specific infant mortality rates from 2002–03.

When differences among cause-specific infant mortality rates were examined by race and ethnicity, infant mortality rates from Congenital malformations were 31 percent higher for non-Hispanic black, 47 percent higher for American Indian, and 19 percent higher for Mexican than for non-Hispanic white mothers.

Infants of non-Hispanic black mothers had the highest mortality rates from low birthweight. The rate for non-Hispanic black mothers was nearly four times the rate for non-Hispanic white mothers. The rate for Puerto Rican mothers was more than twice the rate for non-Hispanic white mothers.

SIDS rates were highest for American Indian and non-Hispanic black mothers—2.4 and 2.2 times those for non-Hispanic white mothers, respectively. As most SIDS deaths occur during the postneonatal period, the high SIDS rates for infants of non-Hispanic black and American Indian mothers accounted for much of their elevated risk of postneonatal mortality. Compared with non-Hispanic white mothers, SIDS rates were 45 percent lower for Asian or Pacific Islander mothers, 51 percent lower for Mexican mothers, and 61 percent lower for Central and South American mothers.

For maternal complications and cord complications, infants of non-Hispanic black mothers had the highest mortality rates—2.8 and 2.2 times, respectively, than those for non-Hispanic white mothers. The higher percent of non-Hispanic black infants born at low birthweight may help to explain their higher infant mortality rates from these causes, which occur predominantly among low birthweight infants. Compared with non-Hispanic white women, Mexican women had lower infant mortality rates from maternal complications (15 percent lower) and cord complications (23 percent lower).

An examination of cause-specific differences in infant mortality rates between race and Hispanic origin groups can help the researcher to understand overall differences in infant mortality rates among these groups. For example, 30 percent of the elevated infant mortality rate for non-Hispanic black mothers, when compared with non-Hispanic white mothers, can be accounted for by their higher rate from low birthweight, 8 percent by differences in maternal complications, and 7 percent by differences in SIDS. In other words, if non-Hispanic black infant mortality rates for these three causes could be reduced to the levels for non-Hispanic white infants, the difference in the infant mortality rate between non-Hispanic black and non-Hispanic white mothers would be reduced by 45 percent.

For American Indian mothers, 24 percent of their elevated infant mortality rate, when compared with non-Hispanic white mothers, can be accounted for by their higher SIDS rates, 20 percent by differences in Congenital malformations, and 11 percent by differences in low birthweight. Thus, if American Indian infant mortality rates for these three causes could be reduced to non-Hispanic white levels, the difference in the infant mortality rate between American Indian and non-Hispanic white mothers would be reduced by 55 percent.

Similarly, 35 percent of the difference between Puerto Rican and non-Hispanic white infant mortality rates can be accounted for by differences in low birthweight, 6 percent by differences in Congenital malformations, and 5 percent by differences in cord complications. If Puerto Rican infant mortality for these three causes could be reduced to non-Hispanic white levels, the difference in the infant mortality rate between Puerto Rican and non-Hispanic white infants would be reduced by 46 percent. In addition to helping to explain differences in infant mortality rates among various groups, comparisons such as these can be helpful in targeting prevention efforts.

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Table 1. Infant mortality rates, live births, and infant deaths, by selected characteristics and specified race of mother: United States, 2003 linked file

Characteristics	All races	Race of mother			
		White	Black	American Indian[1]	Asian or Pacific Islander
	Infant mortality rates per 1,000 live births in specified group				
Total	6.84	5.72	13.49	8.73	4.83
Age at death:					
Total neonatal	4.63	3.86	9.22	4.55	3.40
Early neonatal (less than 7 days)	3.70	3.09	7.37	3.41	2.74
Late neonatal (7–27 days)	0.92	0.77	1.85	1.14	0.66
Postneonatal	2.22	1.86	4.27	4.18	1.43
Sex:					
Male	7.59	6.37	14.93	9.58	5.15
Female	6.07	5.04	12.00	7.84	4.48
Plurality:					
Single births	6.01	4.99	12.01	8.39	4.30
Plural births	30.99	26.96	53.89	21.30	23.93
Birthweight:					
Less than 2,500 grams	59.04	53.87	76.81	60.80	42.94
Less than 1,500 grams	252.00	240.00	278.56	253.94	236.21
1,500–2,499 grams	15.00	15.19	15.19	18.70	11.01
2,500 grams or more	2.29	2.08	3.56	4.52	1.58
Period of gestation:					
Less than 32 weeks	188.24	174.84	220.67	161.08	176.03
32–36 weeks	8.53	8.15	9.90	11.59	8.17
37–41 weeks	2.42	2.19	3.89	4.47	1.67
42 weeks or more	2.88	2.60	4.69	*	1.78
Trimester of pregnancy prenatal care began:[2]					
First trimester	6.20	5.24	12.56	7.99	4.43
After first trimester or no care	8.96	7.39	14.41	10.15	6.25
Second trimester	7.32	6.25	11.18	9.67	4.98
Third trimester	6.64	6.12	8.92	*	4.41
No prenatal care	34.06	25.22	53.66	32.00	41.10
Age of mother:					
Under 20 years	10.22	8.67	14.75	9.43	10.78
20–24 years	7.70	6.44	12.95	8.26	6.56
25–29 years	5.97	4.98	12.85	8.93	3.88
30–34 years	5.62	4.77	13.54	7.47	4.14
35–39 years	6.10	5.17	13.89	9.64	4.82
40–54 years	8.60	7.56	16.67	*	6.74
Educational attainment of mother:[2]					
0–8 years	6.99	6.45	14.34	12.36	6.41
9–11 years	9.35	7.80	15.19	9.01	8.12
12 years	7.66	6.28	13.37	8.98	6.05
13–15 years	6.21	5.12	11.93	6.42	4.46
16 years and over	4.24	3.76	10.21	7.96	3.61
Live-birth order:					
1	6.83	5.82	13.39	8.20	4.87
2	5.98	5.07	12.15	8.14	4.21
3	6.82	5.64	13.24	8.53	4.90
4	8.22	6.60	14.84	10.36	7.37
5 or more	10.28	8.04	17.18	11.56	7.58
Marital status:					
Married	5.33	4.89	11.51	7.27	4.20
Unmarried	9.71	7.73	14.41	9.66	8.36
Mother's place of birth:					
Born in the 50 States and DC	7.15	5.79	13.76	8.96	6.31
Born elsewhere	5.21	4.92	9.27	*	4.45
Maternal smoking during pregnancy:[2,3]					
Smoker	11.25	9.96	19.71	13.36	12.50
Nonsmoker	6.59	5.27	13.05	7.85	5.09

See footnotes at end of table.

Table 1. Infant mortality rates, live births, and infant deaths, by selected characteristics and specified race of mother: United States, 2003 linked file—Con.

Characteristics	All races	Race of mother			
		White	Black	American Indian[1]	Asian or Pacific Islander
	Live births				
Total	4,090,007	3,225,890	599,860	43,054	221,203
Sex:					
Male	2,093,564	1,652,166	305,215	22,019	114,164
Female	1,996,443	1,573,724	294,645	21,035	107,039
Plurality:					
Single births	3,953,667	3,117,848	578,577	41,974	215,268
Plural births	136,340	108,042	21,283	1,080	5,935
Birthweight:					
Less than 2,500 grams	325,619	224,570	80,603	3,191	17,255
Less than 1,500 grams	60,505	38,629	18,858	571	2,447
1,500–2,499 grams	265,114	185,941	61,745	2,620	14,808
2,500 grams or more	3,763,758	3,000,852	519,127	39,856	203,923
Not stated	630	468	130	7	25
Period of gestation:					
Less than 32 weeks	79,633	52,138	23,474	925	3,096
32–36 weeks	419,402	313,237	81,636	4,831	19,698
37–41 weeks	3,288,550	2,618,962	454,209	33,529	181,850
42 weeks or more	258,553	206,544	36,235	3,390	12,384
Not stated	43,869	35,009	4,306	379	4,175
Trimester of pregnancy prenatal care began:[2]					
First trimester	3,189,811	2,562,471	425,307	28,145	173,888
After first trimester or no care	603,714	427,592	134,879	11,627	29,616
Second trimester	469,651	336,408	101,347	8,585	23,311
Third trimester	94,603	65,011	22,090	2,292	5,210
No prenatal care	39,460	26,173	11,442	750	1,095
Not stated	70,033	50,852	13,602	898	4,681
Age of mother:					
Under 20 years	421,254	302,031	103,683	7,844	7,696
20–24 years	1,032,325	790,927	196,270	14,646	30,482
25–29 years	1,086,375	871,501	139,950	10,525	64,399
30–34 years	975,555	795,910	97,530	6,423	75,692
35–39 years	467,646	379,777	49,889	2,906	35,074
40–54 years	106,852	85,744	12,538	710	7,860
Educational attainment of mother:[2]					
0–8 years	233,843	210,713	14,570	1,699	6,861
9–11 years	588,289	443,340	121,101	10,547	13,301
12 years	1,162,705	879,196	221,000	15,925	46,584
13–15 years	811,986	629,733	132,461	8,563	41,229
16 years and over	1,012,739	837,728	75,614	3,393	96,004
Not stated	53,996	40,205	9,042	543	4,206
Live-birth order:					
1	1,634,003	1,288,693	226,482	15,238	103,590
2	1,320,479	1,057,831	174,614	11,788	76,246
3	684,299	544,266	105,790	7,738	26,505
4	267,686	205,042	49,948	4,152	8,544
5 or more	171,560	121,347	40,693	3,978	5,542
Not stated	11,980	8,711	2,333	160	776
Marital status:					
Married	2,673,979	2,278,856	190,518	16,651	187,954
Unmarried	1,416,028	947,034	409,342	26,403	33,249
Mother's place of birth:					
Born in the 50 States and DC	3,109,555	2,519,779	511,863	40,529	37,384
Born elsewhere	965,213	696,325	83,600	2,426	182,862
Not stated	15,239	9,786	4,397	99	957
Maternal smoking during pregnancy:[2,3]					
Smoker	354,591	301,072	43,740	6,738	3,041
Nonsmoker	2,948,501	2,285,705	495,373	30,448	136,975
Not stated	19,469	15,764	2,326	568	811

See footnotes at end of table.

Table 1. Infant mortality rates, live births, and infant deaths, by selected characteristics and specified race of mother: United States, 2003 linked file—Con.

Characteristics	All races	Race of mother			
		White	Black	American Indian[1]	Asian or Pacific Islander
	Infant deaths				
Total	27,995	18,458	8,094	376	1,068
Age at death:					
Total neonatal	18,935	12,457	5,530	196	752
Early neonatal (less than 7 days)	15,152	9,975	4,423	147	607
Late neonatal (7–27 days)	3,783	2,482	1,107	49	145
Postneonatal	9,060	6,000	2,563	180	316
Sex:					
Male	15,882	10,526	4,558	211	588
Female	12,113	7,931	3,536	165	480
Plurality:					
Single births	23,770	15,544	6,947	352	926
Plural births	4,225	2,913	1,147	23	142
Birthweight:					
Less than 2,500 grams	19,223	12,097	6,191	194	741
Less than 1,500 grams	15,247	9,271	5,253	145	578
1,500–2,499 grams	3,976	2,825	938	49	163
2,500 grams or more	8,603	6,251	1,848	180	323
Not stated	169	110	54	1	4
Period of gestation:					
Less than 32 weeks	14,990	9,116	5,180	149	545
32–36 weeks	3,579	2,554	808	56	161
37–41 weeks	7,961	5,743	1,765	150	304
42 weeks or more	744	536	170	15	22
Not stated	721	509	171	5	36
Trimester of pregnancy prenatal care began:[2]					
First trimester	19,772	13,434	5,342	225	771
After first trimester or no care	5,408	3,161	1,944	118	185
Second trimester	3,436	2,103	1,133	83	116
Third trimester	628	398	197	10	23
No prenatal care	1,344	660	614	24	45
Not stated	1,445	889	480	12	64
Age of mother:					
Under 20 years	4,304	2,618	1,529	74	83
20–24 years	7,954	5,091	2,542	121	200
25–29 years	6,484	4,341	1,799	94	250
30–34 years	5,481	3,799	1,321	48	313
35–39 years	2,853	1,962	693	28	169
40–54 years	919	648	209	10	53
Educational attainment of mother:[2]					
0–8 years	1,634	1,360	209	21	44
9–11 years	5,503	3,459	1,840	95	108
12 years	8,903	5,524	2,954	143	282
13–15 years	5,045	3,225	1,580	55	184
16 years and over	4,296	3,150	772	27	347
Not stated	1,244	765	411	13	55
Live-birth order:					
1	11,163	7,502	3,033	125	504
2	7,900	5,361	2,122	96	321
3	4,665	3,069	1,401	66	130
4	2,201	1,354	741	43	63
5 or more	1,763	976	699	46	42
Not stated	302	196	97	–	8
Marital status:					
Married	14,243	11,139	2,193	121	790
Unmarried	13,752	7,319	5,900	255	278

See footnotes at end of table.

Table 1. Infant mortality rates, live births, and infant deaths, by selected characteristics and specified race of mother: United States, 2003 linked file—Con.

Characteristics	All races	Race of mother			
		White	Black	American Indian[1]	Asian or Pacific Islander
		Infant deaths			
Mother's place of birth:					
Born in the 50 States and DC	22,241	14,597	7,044	363	236
Born elsewhere	5,027	3,428	775	11	813
Not stated	727	433	275	1	18
Maternal smoking during pregnancy:[2,3]					
Smoker	3,990	3,000	862	90	38
Nonsmoker	19,444	12,045	6,463	239	697
Not stated	384	278	93	7	6

* Figure does not meet standards of reliability or precision; based on fewer than 20 deaths in the numerator.

[1]Includes Aleuts and Eskimos.

[2]Excludes data for Pennsylvania and Washington, which implemented the 2003 Revision to the U.S. Standard Certificate of Live Birth for data year 2003. This change has resulted in a lack of comparability between data based on the 2003 Revision and data based on the 1989 Revision to the U.S. Certificate of Live Birth; see "Technical Notes."

[3]Excludes data for California, which does not report tobacco use on the birth certificate.

NOTE: Infant deaths are weighted so numbers may not exactly add to totals due to rounding. Not stated responses were included in totals but not distributed among group for rate computations. Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. In this table all women (including Hispanic women) are classified only according to their race. See reference 3.

Table 2. Infant mortality rates, live births, and infant deaths, by selected characteristics and Hispanic origin of mother and by race of mother for mothers of non-Hispanic origin: United States, 2003 linked file

Characteristics	All origins[1]	Hispanic						Non-Hispanic		
		Total	Mexican	Puerto Rican	Cuban	Central and South American	Other and unknown Hispanic	Total[2]	White	Black
	Infant mortality rates per 1,000 live births in specified group									
Total	6.84	5.65	5.49	8.18	4.57	5.04	6.66	7.11	5.70	13.60
Age at death:										
Total neonatal	4.63	3.92	3.76	5.70	3.36	3.64	4.74	4.76	3.79	9.26
Early neonatal (less than 7 days)	3.70	3.14	3.00	4.64	2.56	2.96	3.94	3.80	3.02	7.39
Late neonatal (7–27 days)	0.92	0.77	0.77	1.06	*	0.69	0.80	0.96	0.77	1.88
Postneonatal	2.22	1.73	1.73	2.48	*	1.39	1.92	2.35	1.91	4.34
Sex:										
Male	7.59	6.21	6.03	9.22	4.89	5.60	7.10	7.90	6.37	15.05
Female	6.07	5.06	4.94	7.10	4.24	4.45	6.19	6.29	4.99	12.10
Plurality:										
Single births	6.01	5.11	5.02	7.11	3.62	4.47	6.12	6.21	4.89	12.10
Plural births	30.99	29.28	28.06	42.76	*	27.74	26.28	31.01	26.21	54.12
Birthweight:										
Less than 2,500 grams	59.04	57.47	58.28	59.04	52.53	53.23	57.79	58.73	52.02	76.46
Less than 1,500 grams	252.00	255.82	259.14	247.26	210.78	243.72	279.07	248.67	231.69	276.92
1,500–2,499 grams	15.00	15.28	16.45	11.34	*	12.80	14.55	14.85	15.10	15.16
2,500 grams or more	2.29	1.89	1.91	2.46	*	1.57	2.13	2.40	2.15	3.60
Period of gestation:										
Less than 32 weeks	188.24	169.04	165.06	190.19	167.91	170.48	176.85	190.82	175.45	219.63
32–36 weeks	8.53	7.58	7.74	9.31	*	6.37	6.60	8.78	8.35	9.96
37–41 weeks	2.42	2.01	2.03	2.46	*	1.71	2.32	2.53	2.26	3.92
42 weeks or more	2.88	2.48	2.59	*	*	2.27	*	3.00	2.64	4.82
Trimester of pregnancy prenatal care began:[3]										
First trimester	6.20	5.30	5.23	7.56	4.18	4.77	5.66	6.42	5.22	12.68
After first trimester or no care	8.96	6.17	6.01	9.78	*	5.37	7.12	10.22	8.35	14.51
Second trimester	7.32	5.36	5.25	7.41	*	4.81	6.05	8.20	6.98	11.21
Third trimester	6.64	4.41	4.43	*	*	4.09	*	7.77	7.62	9.13
No prenatal care	34.06	19.25	17.11	54.87	*	19.84	*	41.65	31.32	53.72
Age of mother:										
Under 20 years	10.22	6.77	6.42	10.93	*	6.12	6.70	11.67	10.02	14.72
20–24 years	7.70	5.46	5.26	6.95	*	5.24	6.83	8.44	6.87	13.08
25–29 years	5.97	4.97	4.83	7.98	*	4.42	5.73	6.19	4.93	13.06
30–34 years	5.62	5.42	5.37	7.42	*	4.83	7.02	5.59	4.56	13.64
35–39 years	6.10	6.28	6.32	8.42	*	5.65	6.82	5.98	4.82	14.10
40–54 years	8.60	9.10	10.00	*	*	5.55	*	8.34	7.12	16.45
Educational attainment of mother:[3]										
0–8 years	6.99	5.61	5.44	11.92	*	5.83	7.34	11.29	10.61	15.51
9–11 years	9.35	5.92	5.71	9.74	*	5.45	5.80	11.62	9.85	15.38
12 years	7.66	5.52	5.39	7.78	4.62	5.30	5.31	8.28	6.62	13.50
13–15 years	6.21	5.11	5.21	6.97	*	3.78	5.66	6.40	5.16	12.04
16 years and over	4.24	4.40	4.17	5.67	5.04	4.06	4.90	4.22	3.71	10.20
Live-birth order:										
1	6.83	5.88	5.65	8.34	4.16	5.51	7.40	7.00	5.76	13.49
2	5.98	4.98	4.93	6.60	4.35	4.47	5.32	6.21	5.07	12.33
3	6.82	5.24	5.18	8.51	*	4.23	5.02	7.32	5.81	13.36
4	8.22	6.12	5.78	9.15	*	5.48	10.21	9.00	6.84	14.96
5 or more	10.28	7.97	7.65	13.86	*	7.00	*	11.15	8.08	17.31
Marital status:										
Married	5.33	5.13	5.07	7.46	3.92	4.73	5.51	5.31	4.78	11.61
Unmarried	9.71	6.28	6.04	8.64	6.00	5.42	7.96	11.00	8.66	14.52
Mother's place of birth:										
Born in the 50 States and DC	7.15	6.41	6.20	8.20	5.28	5.84	6.37	7.21	5.69	13.81
Born elsewhere	5.21	5.08	5.03	7.94	3.96	4.92	4.51	5.33	4.36	9.59
Maternal smoking during pregnancy:[3,4]										
Smoker	11.25	11.77	11.18	13.29	*	*	13.76	11.21	9.87	19.74
Nonsmoker	6.59	5.73	5.58	7.77	4.79	5.26	6.40	6.79	5.11	13.19

See footnotes at end of table.

Table 2. Infant mortality rates, live births, and infant deaths, by selected characteristics and Hispanic origin of mother and by race of mother for mothers of non-Hispanic origin: United States, 2003 linked file—Con.

Characteristics	All origins[1]	Hispanic						Non-Hispanic			Not stated
		Total	Mexican	Puerto Rican	Cuban	Central and South American	Other and unknown Hispanic	Total[2]	White	Black	
	Live births										
Total	4,090,007	912,331	654,507	58,400	14,867	135,585	48,972	3,149,067	2,321,921	576,047	28,609
Sex:											
Male	2,093,564	465,230	333,692	29,817	7,560	69,246	24,915	1,613,723	1,191,196	293,061	14,611
Female	1,996,443	447,101	320,815	28,583	7,307	66,339	24,057	1,535,344	1,130,725	282,986	13,998
Plurality:											
Single births	3,953,667	892,075	641,073	56,646	14,374	132,304	47,678	3,034,153	2,234,299	555,406	27,439
Plural births	136,340	20,256	13,434	1,754	493	3,281	1,294	114,914	87,622	20,641	1,170
Birthweight:											
Less than 2,500 grams	325,619	61,212	41,268	5,860	1,047	9,092	3,945	261,875	164,033	78,445	2,532
Less than 1,500 grams	60,505	10,738	7,112	1,185	204	1,592	645	49,146	27,964	18,370	621
1,500–2,499 grams	265,114	50,474	34,156	4,675	843	7,500	3,300	212,729	136,069	60,075	1,911
2,500 grams or more	3,763,758	851,069	613,206	52,534	13,820	126,489	45,020	2,886,805	2,157,621	497,506	25,884
Not stated	630	50	33	6	*	4	7	387	267	96	193
Period of gestation:											
Less than 32 weeks	79,633	15,405	10,487	1,488	268	2,229	933	63,501	36,905	22,848	727
32–36 weeks	419,402	90,283	64,066	6,551	1,483	13,029	5,154	326,344	224,058	79,146	2,775
37–41 weeks	3,288,550	721,266	515,224	46,009	12,172	109,061	38,800	2,545,085	1,904,576	435,340	22,199
42 weeks or more	258,553	63,292	45,575	4,109	897	9,256	3,455	193,615	144,119	34,670	1,646
Not stated	43,869	22,085	19,155	243	47	2,010	630	20,522	12,263	4,043	1,262
Trimester of pregnancy prenatal care began:[3]											
First trimester	3,189,811	673,272	479,633	41,517	13,388	103,926	34,808	2,498,043	1,892,780	411,017	18,496
After first trimester or no care	603,714	195,976	147,450	9,607	1,156	27,370	10,393	403,946	235,029	130,237	3,792
Second trimester	469,651	150,082	112,275	7,690	970	21,217	7,930	317,105	189,307	97,827	2,464
Third trimester	94,603	32,179	24,127	1,352	120	4,893	1,687	61,655	33,333	21,259	769
No prenatal care	39,460	13,715	11,048	565	66	1,260	776	25,186	12,389	11,151	559
Not stated	70,033	18,931	14,026	1,291	112	2,106	1,396	48,851	31,005	12,746	2,251
Age of mother:											
Under 20 years	421,254	130,880	100,238	10,430	1,177	11,271	7,764	287,870	174,023	100,157	2,504
20–24 years	1,032,325	273,311	203,315	19,004	2,608	33,587	14,797	752,619	522,283	189,023	6,395
25–29 years	1,086,375	246,362	177,500	14,169	3,966	38,505	12,222	832,788	627,438	133,824	7,225
30–34 years	975,555	169,055	115,034	9,301	4,298	31,448	8,974	799,183	626,318	93,347	7,317
35–39 years	467,646	75,801	48,120	4,515	2,283	16,629	4,254	387,808	303,355	47,661	4,037
40–54 years	106,852	16,922	10,300	981	535	4,145	961	88,799	68,504	12,035	1,131
Educational attainment of mother:[3]											
0–8 years	233,843	179,656	149,187	1,929	179	24,683	3,678	53,298	33,456	12,377	889
9–11 years	588,289	234,794	188,165	13,651	1,505	21,466	10,007	351,378	212,023	117,282	2,117
12 years	1,162,705	263,657	183,953	17,730	5,194	40,777	16,003	893,848	620,665	214,314	5,200
13–15 years	811,986	118,462	71,044	12,058	3,153	23,021	9,186	689,988	513,666	128,458	3,536
16 years and over	1,012,739	75,687	36,969	6,700	4,562	20,932	6,524	932,036	760,504	73,397	5,016
Not stated	53,996	15,923	11,791	347	63	2,523	1,199	30,292	18,500	8,172	7,781
Live-birth order:											
1	1,634,003	330,033	227,448	22,913	6,969	53,522	19,181	1,292,851	961,903	217,196	11,119
2	1,320,479	280,461	198,082	18,020	5,283	43,848	15,228	1,031,631	780,028	167,442	8,387
3	684,299	175,225	130,702	10,222	1,885	23,856	8,560	504,735	370,972	101,659	4,339
4	267,686	76,317	58,997	4,262	493	8,940	3,625	189,498	129,617	48,204	1,871
5 or more	171,560	47,922	37,638	2,814	219	5,140	2,111	122,125	73,900	39,526	1,513
Not stated	11,980	2,373	1,640	169	18	279	267	8,227	5,501	2,020	1,380
Marital status:											
Married	2,673,979	501,709	368,763	23,461	10,200	73,168	26,117	2,153,458	1,774,925	181,206	18,812
Unmarried	1,416,028	410,622	285,744	34,939	4,667	62,417	22,855	995,609	546,996	394,841	9,797
Mother's place of birth:											
Born in the 50 States and DC	3,109,555	334,095	236,685	38,639	7,013	16,430	35,328	2,753,747	2,181,598	501,663	21,713
Born elsewhere	965,213	576,245	416,948	19,399	7,838	118,976	13,084	383,605	133,209	70,707	5,363
Not stated	15,239	1,991	874	362	16	179	560	11,715	7,114	3,677	1,533
Maternal smoking during pregnancy:[3,4]											
Smoker	354,591	16,401	8,231	3,989	334	1,158	2,689	335,799	283,666	43,069	2,391
Nonsmoker	2,948,501	599,699	395,288	46,318	13,574	106,398	38,121	2,333,599	1,695,785	477,863	15,203
Not stated	19,469	2,374	1,615	133	19	269	338	15,975	12,599	2,143	1,120

See footnotes at end of table.

Table 2. Infant mortality rates, live births, and infant deaths, by selected characteristics and Hispanic origin of mother and by race of mother for mothers of non-Hispanic origin: United States, 2003 linked file—Con.

Characteristics	All origins[1]	Hispanic						Non-Hispanic			Not stated
		Total	Mexican	Puerto Rican	Cuban	Central and South American	Other and unknown Hispanic	Total[2]	White	Black	
	Infant deaths										
Total	27,995	5,151	3,595	478	68	684	326	22,396	13,228	7,836	448
Age at death:											
Total neonatal	18,935	3,572	2,463	333	50	494	232	14,994	8,798	5,336	368
Early neonatal (less than 7 days)	15,152	2,865	1,962	271	38	401	193	11,956	7,021	4,255	331
Late neonatal (7–27 days)	3,783	707	501	62	12	93	39	3,038	1,777	1,081	37
Postneonatal	9,060	1,579	1,133	145	18	189	94	7,402	4,431	2,501	80
Sex:											
Male	15,882	2,889	2,012	275	37	388	177	12,746	7,589	4,412	247
Female	12,113	2,262	1,584	203	31	295	149	9,650	5,639	3,424	201
Plurality:											
Single births	23,770	4,558	3,219	403	52	592	292	18,832	10,932	6,719	380
Plural births	4,225	593	377	75	16	91	34	3,564	2,297	1,117	68
Birthweight:											
Less than 2,500 grams	19,223	3,518	2,405	346	55	484	228	15,381	8,533	5,998	323
Less than 1,500 grams	15,247	2,747	1,843	293	43	388	180	12,221	6,479	5,087	279
1,500–2,499 grams	3,976	771	562	53	12	96	48	3,160	2,054	911	44
2,500 grams or more	8,603	1,606	1,171	129	13	198	96	6,916	4,643	1,793	81
Not stated	169	26	19	3	*	2	2	100	52	45	43
Period of gestation:											
Less than 32 weeks	14,990	2,604	1,731	283	45	380	165	12,117	6,475	5,018	269
32–36 weeks	3,579	684	496	61	9	83	34	2,864	1,870	788	30
37–41 weeks	7,961	1,447	1,046	113	13	186	90	6,441	4,302	1,708	74
42 weeks or more	744	157	118	13	1	21	4	580	380	167	7
Not stated	721	259	204	8	*	14	32	394	202	156	68
Trimester of pregnancy prenatal care began:[3]											
First trimester	19,772	3,570	2,507	314	56	496	197	16,037	9,881	5,213	165
After first trimester or no care	5,408	1,210	886	94	10	147	74	4,128	1,963	1,890	69
Second trimester	3,436	804	590	57	8	102	48	2,600	1,321	1,097	31
Third trimester	628	142	107	6	*	20	9	479	254	194	7
No prenatal care	1,344	264	189	31	2	25	17	1,049	388	599	31
Not stated	1,445	235	139	20	2	27	46	1,108	573	465	103
Age of mother:											
Under 20 years	4,304	886	644	114	8	69	52	3,360	1,744	1,474	58
20–24 years	7,954	1,493	1,069	132	15	176	101	6,352	3,589	2,473	108
25–29 years	6,484	1,225	858	113	15	170	70	5,159	3,091	1,748	100
30–34 years	5,481	917	618	69	16	152	63	4,464	2,854	1,273	99
35–39 years	2,853	476	304	38	10	94	29	2,319	1,462	672	58
40–54 years	919	154	103	12	4	23	11	741	488	198	24
Educational attainment of mother:[3]											
0–8 years	1,634	1,007	812	23	*	144	27	602	355	192	26
9–11 years	5,503	1,391	1,074	133	9	117	58	4,083	2,088	1,804	29
12 years	8,903	1,456	992	138	24	216	85	7,402	4,109	2,894	45
13–15 years	5,045	605	370	84	12	87	52	4,419	2,649	1,547	21
16 years and over	4,296	333	154	38	23	85	32	3,936	2,820	749	27
Not stated	1,244	224	128	12	*	22	62	831	395	382	190
Live-birth order:											
1	11,163	1,941	1,284	191	29	295	142	9,053	5,545	2,929	170
2	7,900	1,396	977	119	23	196	81	6,406	3,956	2,064	98
3	4,665	919	677	87	12	101	43	3,696	2,157	1,358	50
4	2,201	467	341	39	2	49	37	1,706	886	721	27
5 or more	1,763	382	288	39	2	36	16	1,362	597	684	20
Not stated	302	46	29	2	*	7	8	173	88	81	82
Marital status:											
Married	14,243	2,574	1,868	175	40	346	144	11,445	8,489	2,103	224
Unmarried	13,752	2,577	1,727	302	28	338	182	10,951	4,739	5,733	223

See footnotes at end of table.

Table 2. Infant mortality rates, live births, and infant deaths, by selected characteristics and Hispanic origin of mother and by race of mother for mothers of non-Hispanic origin: United States, 2003 linked file—Con.

Characteristics	All origins[1]	Hispanic						Non-Hispanic			Not stated
		Total	Mexican	Puerto Rican	Cuban	Central and South American	Other and unknown Hispanic	Total[2]	White	Black	
	Infant deaths										
Mother's place of birth:											
Born in the 50 States and DC	22,241	2,143	1,468	317	37	96	225	19,868	12,406	6,928	230
Born elsewhere	5,027	2,928	2,099	154	31	585	59	2,044	581	678	55
Not stated	727	80	28	7	*	3	42	485	241	230	162
Maternal smoking during pregnancy:[3,4]											
Smoker	3,990	193	92	53	3	8	37	3,764	2,800	850	32
Nonsmoker	19,444	3,434	2,206	360	65	560	244	15,853	8,671	6,302	158
Not stated	384	31	17	5	*	4	5	277	183	83	75

* Figure does not meet standards of reliability or precision; based on fewer than 20 deaths in the numerator.

– Quantity zero.

[1]Includes origin not stated.

[2]Includes races other than black or white.

[3]Excludes data for Pennsylvania and Washington, which implemented the 2003 Revision to the U.S. Standard Certificate of Live Birth for data year 2003. This change has resulted in a lack of comparability between data based on the 2003 Revision and data based on the 1989 Revision to the U.S. Certificate of Live Birth; see "Technical Notes."

[4]Excludes data for California, which does not report tobacco use on the birth certificate.

NOTES: Infant deaths are weighted so numbers may not exactly add to totals due to rounding. Not stated responses were included in totals but not distributed among groups for rate computations. Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. Persons of Hispanic origin may be of any race. In this table Hispanic women are classified only by place of origin; non-Hispanic women are classified by race. See reference 3.

Table 3. Infant mortality rates by race and Hispanic origin of mother: United States and each State, Puerto Rico, Virgin Islands, and Guam, 2001–2003 linked files

[By place of residence]

State	Total	Race and Hispanic origin of mother						
		Race				Hispanic origin		
		White	Black	American Indian[1]	Asian or Pacific Islander	Hispanic	Non-Hispanic white	Non-Hispanic black
		Infant mortality rates per 1,000 live births in specified group						
United States[2]	6.88	5.74	13.55	9.00	4.78	5.57	5.74	13.65
Alabama	9.04	6.74	14.09	*	*	7.00	6.71	14.09
Alaska	6.80	5.40	*	10.58	*	*	5.06	*
Arizona	6.62	6.13	13.74	9.68	6.21	6.17	6.10	13.81
Arkansas	8.46	7.35	13.08	*	*	5.27	7.63	13.08
California	5.32	5.00	11.15	7.34	4.34	5.08	4.67	11.13
Colorado	5.98	5.50	14.55	*	6.68	6.31	5.16	14.24
Connecticut	5.95	5.04	13.23	*	*	6.34	4.63	13.58
Delaware	9.53	7.48	16.34	*	*	6.88	7.57	16.43
District of Columbia	10.94	4.79	14.42	*	*	7.18	3.82	14.81
Florida	7.42	5.72	13.27	7.38	5.14	5.29	5.85	13.31
Georgia	8.66	6.36	13.50	*	6.54	6.41	6.34	13.46
Hawaii	7.05	5.71	*	*	7.34	6.77	5.32	*
Idaho	6.21	6.19	*	*	*	6.98	5.99	*
Illinois	7.58	5.90	15.50	*	5.42	5.86	5.93	15.52
Indiana	7.66	6.94	13.83	*	*	6.44	6.99	13.84
Iowa	5.56	5.35	12.08	*	*	6.45	5.25	12.31
Kansas	7.07	6.44	15.71	*	*	7.31	6.32	15.81
Kentucky	6.62	6.29	10.01	*	*	4.92	6.34	10.07
Louisiana	9.83	6.87	13.94	*	9.85	4.48	6.97	13.92
Maine	5.17	5.11	*	*	*	*	5.12	*
Maryland	7.96	5.48	13.09	*	4.33	6.04	5.40	13.21
Massachusetts	4.86	4.40	9.49	*	3.40	6.27	4.01	10.18
Michigan	8.23	6.49	16.77	*	5.19	7.29	6.35	16.71
Minnesota	5.12	4.67	8.82	9.82	5.48	5.67	4.55	8.39
Mississippi	10.53	7.13	14.77	*	*	*	7.14	14.72
Missouri	7.91	6.56	15.69	*	6.22	7.01	6.52	15.75
Montana	7.33	7.00	*	9.42	*	*	6.86	*
Nebraska	6.41	5.78	14.94	*	*	6.18	5.59	15.18
Nevada	5.80	5.14	12.78	*	4.26	4.44	5.40	12.81
New Hampshire	4.33	4.32	*	*	*	*	4.20	*
New Jersey	5.91	4.61	12.45	*	3.73	6.06	3.92	13.08
New Mexico	6.07	5.98	*	6.00	*	5.89	6.09	*
New York	5.98	4.91	10.85	11.91	3.38	5.55	4.63	11.22
North Carolina	8.30	6.15	15.13	11.05	4.78	6.07	6.15	15.12
North Dakota	7.48	6.93	*	11.40	*	*	6.84	*
Ohio	7.78	6.43	15.48	*	5.11	8.22	6.33	15.41
Oklahoma	7.76	7.11	14.41	7.37	*	5.62	7.19	14.25
Oregon	5.56	5.45	9.30	8.93	4.72	4.72	5.61	9.35
Pennsylvania	7.39	6.30	14.25	*	4.02	7.97	5.97	14.11
Rhode Island	6.88	6.31	11.14	*	*	8.75	5.30	11.84
South Carolina	8.88	6.01	14.49	*	7.85	5.30	6.09	14.52
South Dakota	6.86	5.76	*	12.65	*	*	5.75	*
Tennessee	9.08	7.02	16.90	*	6.41	6.61	7.06	16.87
Texas	6.24	5.57	11.98	*	4.38	5.38	5.70	11.94
Utah	5.16	5.01	*	*	7.95	6.40	4.76	*
Vermont	5.07	5.14	*	*	*	*	5.03	*
Virginia	7.51	5.67	14.04	*	5.03	4.89	5.74	14.15
Washington	5.68	5.42	9.72	10.62	4.72	5.15	5.33	9.45
West Virginia	7.91	7.73	12.85	*	*	*	7.65	12.47
Wisconsin	6.83	5.57	17.46	12.66	6.64	6.90	5.47	17.48
Wyoming	6.05	5.79	*	*	*	*	5.64	*
Puerto Rico	9.43	9.28	10.86	- - -	- - -	- - -	- - -	- - -
Virgin Islands	5.80	*	*	*	*	*	*	*
Guam	9.12	*	*	*	9.39	*	*	*

* Figure does not meet standards of reliability or precision; based on fewer than 20 deaths in the numerator. - - - Data not available.

[1]Includes Aleuts and Eskimos. [2]Excludes data for Puerto Rico, Virgin Islands, and Guam.

NOTES: Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. Persons of Hispanic origin may be of any race. In this table Hispanic women are classified only by place of origin; non-Hispanic women are classified by race. See reference 3.

Table 4. Percent of live births with selected maternal and infant characteristics by race of mother: United States, 2003 linked file

Characteristic	All races	White	Black	American Indian[1]	Asian or Pacific Islander
Birthweight:					
Less than 1,500 grams	1.5	1.2	3.2	1.3	1.1
Less than 2,500 grams	8.0	7.0	13.5	7.4	7.8
Preterm births[2]	12.3	11.4	17.7	13.5	10.5
Prenatal care beginning in the first trimester[3]	84.0	85.6	75.9	70.7	85.4
Births to mothers under 20 years	10.3	9.3	17.3	18.3	3.4
Fourth and higher order births	10.8	10.1	15.2	19.0	6.3
Births to unmarried mothers	34.6	29.2	68.4	61.5	14.7
Mothers completing 12 or more years of school[3]	78.3	78.2	76.1	69.5	90.2
Mothers born in the 50 States and DC	76.3	78.8	86.7	95.1	16.6
Mothers who smoked during pregnancy[3,4]	10.7	11.7	8.2	18.2	2.2

[1]Includes births to Aleuts and Eskimos.

[2]Born prior to 37 completed weeks of gestation.

[3]Excludes data for Pennsylvania and Washington, which implemented the 2003 Revision to the U.S. Standard Certificate of Live Birth for data year 2003. This change has resulted in a lack of comparability between data based on the 2003 Revision and data based on the 1989 Revision to the U.S. Certificate of Live Birth: see "Technical Notes."

[4]Excludes data for California, which does not report tobacco use on the birth certificate.

NOTES: Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. In this table all women (including Hispanic women) are classified only according to their race. See reference 3.

Table 5. Percent of live births with selected maternal and infant characteristics by Hispanic origin of mother and race of mother for mothers of non-Hispanic origin: United States, 2003 linked file

Characteristic	All origins[1]	Hispanic						Non-Hispanic		
		Total	Mexican	Puerto Rican	Cuban	Central and South American	Other and unknown Hispanic	Total[2]	White	Black
Birthweight:										
Less than 1,500 grams	1.5	1.2	1.1	2.0	1.4	1.2	1.3	1.6	1.2	3.2
Less than 2,500 grams	8.0	6.7	6.3	10.0	7.0	6.7	8.1	8.3	7.1	13.6
Preterm births[3]	12.3	11.9	11.7	13.8	11.8	11.4	12.6	12.5	11.3	17.8
Prenatal care beginning in the first trimester[4]	84.0	77.4	76.5	81.1	92.0	79.1	77.0	85.9	88.8	75.9
Births to mothers under 20 years	10.3	14.3	15.3	17.9	7.9	8.3	15.9	9.1	7.5	17.4
Fourth and higher order births	10.8	13.7	14.8	12.2	4.8	10.4	11.8	9.9	8.8	15.3
Births to unmarried mothers	34.6	45.0	43.7	59.8	31.4	46.0	46.7	31.6	23.6	68.5
Mothers completing 12 or more years of school[4]	78.3	52.5	46.4	70.0	88.4	64.7	69.8	86.0	88.3	76.2
Mothers born in the 50 States and DC	76.3	36.7	36.2	66.6	47.2	12.1	73.0	87.7	94.2	87.6
Mothers who smoked during pregnancy[4,5]	10.7	2.7	2.0	7.9	2.4	1.1	6.6	12.6	14.3	8.3

[1]Includes origin not stated.

[2]Includes races other than black or white.

[3]Born prior to 37 completed weeks of gestation.

[4]Excludes data for Pennsylvania and Washington, which implemented the 2003 Revision to the U.S. Standard Certificate of Live Birth for data year 2003. This change has resulted in a lack of comparability between data based on the 2003 Revision and data based on the 1989 Revision to the U.S. Certificate of Live Birth; see "Technical Notes."

[5]Excludes data for California, which does not report tobacco use on the birth certificate.

NOTES: Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. Persons of Hispanic origin may be of any race. In this table Hispanic women are classified only by place of origin; non-Hispanic women are classified by race. See reference 3.

Table 6. Live births, infant, neonatal, and postneonatal deaths and mortality rates by race and Hispanic origin of mother and birthweight: United States, 2003 linked file, and percentage change in birthweight-specific infant mortality, 1995–2003 linked file

Race and birthweight	Number in 2003				Mortality rate per 1,000 live births in 2003			Percent change in infant mortality rate 1995–2003
	Live births	Infant deaths	Neonatal deaths	Postneonatal deaths	Infant	Neonatal	Postneonatal	
All races[1]	4,090,007	27,995	18,935	9,060	6.84	4.63	2.22	–9.5
Less than 2,500 grams	325,619	19,223	15,762	3,461	59.04	48.41	10.63	–8.6
Less than 1,500 grams	60,505	15,247	13,435	1,812	252.00	222.05	29.95	–6.1
Less than 500 grams	7,060	6,110	5,975	136	865.44	846.32	19.26	–4.3**
500–749 grams	11,515	5,489	4,747	742	476.68	412.24	64.44	–9.7
750–999 grams	11,892	1,947	1,447	500	163.72	121.68	42.05	–10.1
1,000–1,249 grams	13,635	945	717	227	69.31	52.59	16.65	–19.0
1,250–1,499 grams	16,403	755	549	206	46.03	33.47	12.56	–15.7
1,500–1,999 grams	63,891	1,781	1,182	600	27.88	18.50	9.39	–15.9
2,000–2,499 grams	201,223	2,194	1,145	1,049	10.90	5.69	5.21	–19.6
2,500 grams or more	3,763,758	8,603	3,017	5,585	2.29	0.80	1.48	–22.7
2,500–2,999 grams	711,351	2,927	1,140	1,787	4.11	1.60	2.51	–24.3
3,000–3,499 grams	1,558,404	3,371	1,141	2,230	2.16	0.73	1.43	–24.7
3,500–3,999 grams	1,132,005	1,747	523	1,224	1.54	0.46	1.08	–23.3
4,000–4,499 grams	309,849	413	145	268	1.33	0.47	0.86	–26.7
4,500–4,999 grams	46,715	111	49	62	2.38	1.05	1.33	9.7**
5,000 grams or more	5,434	34	20	14	6.26	3.68	*	–25.1**
Not stated	630	169	155	14	. . .	. . .	. . .	*
White	3,225,890	18,458	12,457	6,000	5.72	3.86	1.86	–9.2
Less than 2,500 grams	224,570	12,097	10,037	2,060	53.87	44.69	9.17	–9.8
Less than 1,500 grams	38,629	9,271	8,303	968	240.00	214.94	25.06	–7.9
Less than 500 grams	4,035	3,510	3,450	60	869.89	855.02	14.87	–4.5**
500–749 grams	6,840	3,328	2,954	373	486.55	431.87	54.53	–10.9
750–999 grams	7,515	1,275	995	280	169.66	132.40	37.26	–12.0
1,000–1,249 grams	8,952	630	507	124	70.38	56.64	13.85	–22.6
1,250–1,499 grams	11,287	528	397	131	46.78	35.17	11.61	–15.7
1,500–1,999 grams	44,495	1,248	860	389	28.05	19.33	8.74	–15.5
2,000–2,499 grams	141,446	1,577	874	703	11.15	6.18	4.97	–18.6
2,500 grams or more	3,000,852	6,251	2,322	3,929	2.08	0.77	1.31	–22.4
2,500–2,999 grams	511,562	2,050	854	1,196	4.01	1.67	2.34	–24.0
3,000–3,499 grams	1,221,031	2,397	866	1,531	1.96	0.71	1.25	–26.1
3,500–3,999 grams	952,131	1,354	419	935	1.42	0.44	0.98	–22.0
4,000–4,499 grams	270,283	333	123	209	1.23	0.46	0.77	–22.6
4,500–4,999 grams	41,179	92	44	48	2.23	1.07	1.17	10.2**
5,000 grams or more	4,666	25	16	9	5.36	*	*	–30.2**
Not stated	468	110	99	11	. . .	. . .	. . .	*
Black	599,860	8,094	5,530	2,563	13.49	9.22	4.27	–7.4
Less than 2,500 grams	80,603	6,191	4,943	1,248	76.81	61.33	15.48	–3.0**
Less than 1,500 grams	18,858	5,253	4,480	772	278.56	237.56	40.94	–2.5**
Less than 500 grams	2,705	2,334	2,265	68	862.85	837.34	25.14	–3.6**
500–749 grams	4,159	1,909	1,560	349	459.00	375.09	83.91	–8.1
750–999 grams	3,753	556	362	194	148.15	96.46	51.69	–9.1**
1,000–1,249 grams	3,970	271	175	96	68.26	44.08	24.18	–8.3**
1,250–1,499 grams	4,271	182	117	65	42.61	27.39	15.22	–12.3**
1,500–1,999 grams	15,673	426	247	179	27.18	15.76	11.42	–16.0
2,000–2,499 grams	46,072	513	216	297	11.13	4.69	6.45	–17.2
2,500 grams or more	519,127	1,848	536	1,313	3.56	1.03	2.53	–21.5
2,500–2,999 grams	143,252	717	221	496	5.01	1.54	3.46	–19.6
3,000–3,499 grams	228,445	764	211	552	3.34	0.92	2.42	–18.3
3,500–3,999 grams	117,937	296	80	216	2.51	0.68	1.83	–27.9
4,000–4,499 grams	25,443	51	17	34	2.00	*	1.34	–53.9
4,500–4,999 grams	3,546	14	4	10	*	*	*	*
5,000 grams or more	504	7	3	4	*	*	*	*
Not stated	130	54	51	3	. . .	. . .	. . .	*

See footnotes at end of table.

Table 6. Live births, infant, neonatal, and postneonatal deaths and mortality rates by race and Hispanic origin of mother and birthweight: United States, 2003 linked file, and percentage change in birthweight-specific infant mortality, 1995–2003 linked file—Con.

Race and birthweight	Number in 2003				Mortality rate per 1,000 live births in 2003			Percent change in infant mortality rate 1995–2003
	Live births	Infant deaths	Neonatal deaths	Postneonatal deaths	Infant	Neonatal	Postneonatal	
American Indian[2]	43,054	376	196	180	8.73	4.55	4.18	–3.4**
Less than 2,500 grams	3,191	194	148	46	60.80	46.38	14.42	5.6**
Less than 1,500 grams	571	145	124	21	253.94	217.16	36.78	7.3**
Less than 500 grams	54	38	37	1	703.70	685.19	*	–20.8**
500–749 grams	108	55	47	8	509.26	435.19	*	–16.4**
750–999 grams	117	30	23	7	256.41	196.58	*	*
1,000–1,249 grams	139	9	6	3	*	*	*	*
1,250–1,499 grams	153	12	10	2	*	*	*	*
1,500–1,999 grams	637	20	14	6	31.40	*	*	*
2,000–2,499 grams	1,983	29	10	19	14.62	*	*	–24.0**
2,500 grams or more	39,856	180	47	133	4.52	1.18	3.34	–15.1**
2,500–2,999 grams	7,010	47	18	29	6.70	*	4.14	–36.5**
3,000–3,499 grams	15,841	72	16	56	4.55	*	3.54	–6.2**
3,500–3,999 grams	12,314	42	10	32	3.41	*	2.60	–16.6**
4,000–4,499 grams	3,883	16	2	14	*	*	*	*
4,500–4,999 grams	701	1	–	1	*	*	*	*
5,000 grams or more	107	1	–	1	*	*	*	*
Not stated	7	1	1	–	. . .	. . .	. . .	. . .
Asian or Pacific Islander	221,203	1,068	752	316	4.83	3.40	1.43	–8.5**
Less than 2,500 grams	17,255	741	634	107	42.94	36.74	6.20	–7.3**
Less than 1,500 grams	2,447	578	528	50	236.21	215.77	20.43	–1.5**
Less than 500 grams	266	228	222	6	857.14	834.59	*	–5.2**
500–749 grams	408	197	185	12	482.84	453.43	*	–6.5**
750–999 grams	507	85	66	19	167.65	130.18	*	–12.3**
1,000–1,249 grams	574	34	29	5	59.23	50.52	*	–34.8**
1,250–1,499 grams	692	33	25	8	47.69	36.13	*	–35.6**
1,500–1,999 grams	3,086	87	61	26	28.19	19.77	8.43	–31.6**
2,000–2,499 grams	11,722	76	46	30	6.48	3.92	2.56	–37.8
2,500 grams or more	203,923	323	113	210	1.58	0.55	1.03	–26.7
2,500–2,999 grams	49,527	112	47	66	2.26	0.95	1.33	–35.4
3,000–3,499 grams	93,087	138	47	91	1.48	0.50	0.98	–23.2
3,500–3,999 grams	49,623	55	14	40	1.11	*	0.81	–20.5**
4,000–4,499 grams	10,240	13	3	10	*	*	*	*
4,500–4,999 grams	1,289	4	1	3	*	*	*	*
5,000 grams or more	157	1	1	–	*	*	*	*
Not stated	25	4	4	–	. . .	. . .	. . .	*
Hispanic	912,331	5,151	3,573	1,579	5.65	3.92	1.73	–9.9
Less than 2,500 grams	61,212	3,518	2,944	575	57.47	48.10	9.39	–6.3
Less than 1,500 grams	10,738	2,747	2,441	306	255.82	227.32	28.50	–2.8**
Less than 500 grams	1,146	991	966	24	864.75	842.93	20.94	–1.0**
500–749 grams	2,090	1,057	926	131	505.74	443.06	62.68	–6.5**
750–999 grams	2,123	374	302	72	176.17	142.25	33.91	–7.0**
1,000–1,249 grams	2,450	175	138	36	71.43	56.33	14.69	–16.3**
1,250–1,499 grams	2,929	150	108	42	51.21	36.87	14.34	–5.9**
1,500–1,999 grams	11,675	354	250	104	30.32	21.41	8.91	–10.2**
2,000–2,499 grams	38,799	417	252	165	10.75	6.50	4.25	–17.2
2,500 grams or more	851,069	1,606	605	1,001	1.89	0.71	1.18	–24.6
2,500–2,999 grams	157,630	561	251	309	3.56	1.59	1.96	–20.6
3,000–3,499 grams	366,590	620	223	397	1.69	0.61	1.08	–25.9
3,500–3,999 grams	252,283	319	88	231	1.26	0.35	0.92	–31.3
4,000–4,499 grams	63,699	72	27	44	1.13	0.42	0.69	–25.3**
4,500–4,999 grams	9,620	27	11	16	2.81	*	*	–7.0**
5,000 grams or more	1,247	8	5	3	*	*	*	*
Not stated	50	26	23	3	. . .	. . .	. . .	*

See footnotes at end of table.

Table 6. Live births, infant, neonatal, and postneonatal deaths and mortality rates by race and Hispanic origin of mother and birthweight: United States, 2003 linked file, and percentage change in birthweight-specific infant mortality, 1995–2003 linked file—Con.

Race and birthweight	Number in 2003				Mortality rate per 1,000 live births in 2003			Percent change in infant mortality rate 1995–2003
	Live births	Infant deaths	Neonatal deaths	Postneonatal deaths	Infant	Neonatal	Postneonatal	
Non-Hispanic white	2,321,921	13,228	8,797	4,431	5.70	3.79	1.91	–9.2
Less than 2,500 grams	164,033	8,533	7,038	1,495	52.02	42.91	9.11	–11.6
Less than 1,500 grams	27,964	6,479	5,812	667	231.69	207.84	23.85	–10.2
Less than 500 grams	2,856	2,483	2,446	36	869.40	856.44	12.61	–5.7**
500–749 grams	4,752	2,260	2,016	244	475.59	424.24	51.35	–13.2
750–999 grams	5,421	898	690	208	165.65	127.28	38.37	–13.4
1,000–1,249 grams	6,549	458	369	88	69.93	56.34	13.44	–24.0
1,250–1,499 grams	8,386	381	291	91	45.43	34.70	10.85	–18.2
1,500–1,999 grams	32,970	888	604	284	26.93	18.32	8.61	–18.3
2,000–2,499 grams	103,099	1,166	622	544	11.31	6.03	5.28	–18.5
2,500 grams or more	2,157,621	4,643	1,708	2,935	2.15	0.79	1.36	–21.4
2,500–2,999 grams	356,426	1,487	598	889	4.17	1.68	2.49	–24.8
3,000–3,499 grams	858,603	1,781	645	1,136	2.07	0.75	1.32	–25.3
3,500–3,999 grams	701,090	1,033	327	705	1.47	0.47	1.01	–19.3
4,000–4,499 grams	206,495	261	96	165	1.26	0.46	0.80	–20.6
4,500–4,999 grams	31,591	63	31	32	1.99	0.98	1.01	7.1**
5,000 grams or more	3,416	18	11	7	*	*	*	*
Not stated	267	52	51	1	. . .	. . .	. . .	*
Non-Hispanic black	576,047	7,836	5,335	2,501	13.60	9.26	4.34	–7.2
Less than 2,500 grams	78,445	5,998	4,778	1,220	76.46	60.91	15.55	–3.3**
Less than 1,500 grams	18,370	5,087	4,330	757	276.92	235.71	41.21	–2.9**
Less than 500 grams	2,617	2,254	2,188	66	861.29	836.07	25.22	–3.8**
500–749 grams	4,060	1,851	1,509	342	455.91	371.67	84.24	–8.3
750–999 grams	3,659	544	352	192	148.67	96.20	52.47	–9.1**
1,000–1,249 grams	3,858	263	169	94	68.17	43.81	24.36	–8.3**
1,250–1,499 grams	4,176	175	112	63	41.91	26.82	15.09	–13.2**
1,500–1,999 grams	15,229	416	242	174	27.32	15.89	11.43	–15.4
2,000–2,499 grams	44,846	495	207	289	11.04	4.62	6.44	–17.7
2,500 grams or more	497,506	1,793	515	1,278	3.60	1.04	2.57	–21.2
2,500–2,999 grams	138,511	700	214	486	5.05	1.55	3.51	–18.9
3,000–3,499 grams	218,983	737	201	536	3.37	0.92	2.45	–18.2
3,500–3,999 grams	112,182	288	77	211	2.57	0.69	1.88	–27.1
4,000–4,499 grams	24,006	50	17	33	2.08	*	1.37	–53.0
4,500–4,999 grams	3,340	13	4	9	*	*	*	*
5,000 grams or more	484	5	2	3	*	*	*	*
Not stated	96	45	42	3	. . .	. . .	. . .	*

* Figure does not meet standards of reliability or precision; based on fewer than 20 deaths in the numerator.

** Not significant at $p < .05$.

. . . Category not applicable.

– Quantity zero.

[1]Includes races other than white or black.

[2]Includes Aleuts and Eskimos.

NOTES: Infant deaths are weighted so numbers may not exactly add to totals due to rounding. Neonatal is less than 28 days and postneonatal is 28 days to under 1 year. Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. Persons of Hispanic origin may be of any race. In this table Hispanic women are classified only by place of origin; non-Hispanic women are classified by race. See reference 3.

Table 7. Infant deaths and mortality rates for the five leading causes of infant death, by race and Hispanic origin of mother: United States, 2003 linked file

[Rates per 100,000 live births in specified group]

Cause of death (Based on the *International Classification of Diseases, Tenth Revision*, 1992)	All races			Non-Hispanic white			Non-Hispanic black[1]			American Indian[2,3]			Asian and Pacific Islander[4]		
	Rank	Number	Rate	Rank	Number	Rate	Rank	Number	Rate	Rank	Number	Rate	Rank	Number	Rate
All causes	...	27,995	684.5	...	13,227	569.7	...	7,838	1,360.7	...	376	872.9	...	1,068	482.9
Congenital malformations, deformations, and chromosomal abnormalities (Q00–Q99)	1	5,640	137.9	1	2,973	128.0	2	965	167.5	1	81	187.6	1	259	117.2
Disorders related to short gestation and low birth weight, not elsewhere classified (P07)	2	4,849	118.6	2	1,847	79.5	1	1,807	313.7	3	48	112.6	2	192	86.9
Sudden infant death syndrome (R95)	3	2,162	52.9	3	1,173	50.5	3	627	108.8	2	53	124.0	3	61	27.7
Newborn affected by maternal complications of pregnancy (P01)	4	1,708	41.8	4	780	33.6	4	542	94.1	9	7	*	4	59	26.7
Newborn affected by complications of placenta, cord and membranes (P02)	5	1,092	26.7	5	543	23.4	6	297	51.6	6	13	*	5	32	14.3

Cause of death (Based on the *International Classification of Diseases, Tenth Revision*, 1992)	Total Hispanic			Mexican			Puerto Rican			Central and South American[5]		
	Rank	Number	Rate	Rank	Number	Rate	Rank	Number	Rate	Rank	Number	Rate
All causes	...	5,150	564.5	...	3,594	549.1	...	478	818.5	...	684	504.5
Congenital malformations, deformations, and chromosomal abnormalities (Q00–Q99)	1	1,316	144.2	1	994	151.9	2	83	142.1	1	160	118.0
Disorders related to short gestation and low birth weight, not elsewhere classified (P07)	2	864	94.7	2	565	86.3	1	98	167.8	2	124	91.5
Sudden infant death syndrome (R95)	4	234	25.6	4	162	24.8	3	31	53.1	6	27	19.9
Newborn affected by maternal complications of pregnancy (P01)	3	277	30.4	3	187	28.6	4	24	41.1	3	42	31.0
Newborn affected by complications of placenta, cord and membranes (P02)	5	192	21.0	5	118	18.0	5	21	36.0	4	29	21.4

... Category not applicable.

* Figure does not meet standards of reliability or precision; based on fewer than 20 deaths in the numerator.

[1]For non-Hispanic blacks, infections specific to the perinatal period was the fifth leading cause of death, with 314 deaths and a rate of 54.5.

[2]Includes Aleuts and Eskimos.

[3]For American Indians, Accidents (unintentional injuries) was the fourth leading cause of death with 20 deaths and a rate of 46.7. Influenza and Pneumonia was the fifth leading cause of death; however, with only 14 deaths, a reliable infant mortality rate could not be computed. Maternal complications was tied for the ninth leading cause with Diseases of the circulatory system, Respiratory distress of newborn, and Necrotizing enterocolitis of newborn.

[4]For Asian or Pacific Islanders, Diseases of the circulatory system was tied for the fifth leading cause of death.

[5]For Central and South Americans, Infections specific to the perinatal period was the fifth leading cause of death, with 28 deaths and a rate of 20.7.

NOTES: Reliable cause-specific infant mortality rates cannot be computed for Cubans because of the small number of infant deaths (68). Race and Hispanic origin are reported separately on birth certificates. Race categories are consistent with the 1977 Office of Management and Budget standards. Persons of Hispanic origin may be of any race. In this table Hispanic women are classified only by place of origin; non-Hispanic women are classified by race. See reference 3.

Technical Notes

Differences between period and cohort data

From 1983 to 1991, NCHS produced linked files in a birth cohort format (36). Beginning with 1995 data, linked files are produced first using a period format and then subsequently using a birth cohort format. The 2003 period linked file contains a numerator file that consists of all infant deaths occurring in 2003 that have been linked to their corresponding birth certificates, whether the birth occurred in 2002 or in 2003. In contrast, the 2003 birth cohort linked file will contain a numerator file that consists of all infant deaths to babies born in 2003 whether the death occurred in 2003 or 2004.

Although the birth cohort format has methodological advantages, it creates delays in data availability, because it is necessary to wait until the close of the following data year to include all infant deaths in the birth cohort. Beginning with 1995 data, the period linked file is the basis for all official NCHS linked file statistics.

For the 2003 file, NCHS accepted birth records that could be linked to infant deaths even if registered after the closure of the 2003 birth file (less than 100 cases). This improved the infant birth/death linkage and made the denominator file distinctly different from the official 2003 birth file.

Weighting

A record weight is added to the linked file to compensate for the 1.0 percent (in 2003) of infant death records that could not be linked to their corresponding birth certificates. This procedure was initiated in 1995. Records for Puerto Rico, the Virgin Islands, and Guam are not weighted. The percent of records linked varied by registration area (from 95.6–100.0 percent with all but four areas—California, Louisiana, New Jersey, and Texas at 97.5 percent or higher) (Table I). The number of infant deaths in the linked file for the 50 States and the District of Columbia was weighted to equal the sum of the linked plus unlinked infant deaths by State of occurrence at birth and age at death (less than 7 days, 7–27 days, and 28 days to under 1 year). The addition of the weight greatly reduced the potential for bias in comparing infant mortality rates by characteristics.

The 2003 linked file started with 28,012 infant death records. Of these 28,012 records, 27,727 were linked; 285 were unlinked because corresponding birth certificates could not be identified. The 28,012 linked and unlinked records contained 17 records of infants whose mother's usual place of residence was outside the United States. These 17 records were excluded to derive a weighted total of 27,995 infant deaths. Thus, all total calculations for 2003 in this report used a weighted total of 27,995 infant deaths (Tables A, B, C, 1, 2, 6, and 7).

Comparison of infant mortality data between the linked file and the vital statistics mortality file

The overall infant mortality rate from the 2003 period linked file of 6.84 is nearly the same as the 2003 vital statistics mortality file (6.85) (2). The number of infant deaths differs slightly; the number in the mortality file was 28,025 (2). Differences in numbers of infant deaths between the two data sources are primarily due to geographic coverage differences. As for the vital statistics mortality file, all deaths occurring in the 50 States and the District of Columbia are included regardless of the place of birth of the infant. In contrast, to be included in the linked file, both the birth and death must occur in the 50 States and the District of Columbia. Also, although every effort has

Table I. Percent of infant death records which were linked to their corresponding birth records: United States and each State, Puerto Rico, Virgin Islands, and Guam, 2003 linked file

State	Percent linked by State of occurrence of death
United States[1]	99.0
Alabama	100.0
Alaska	100.0
Arizona	99.3
Arkansas	100.0
California	97.4
Colorado	100.0
Connecticut	100.0
Delaware	100.0
District of Columbia	99.0
Florida	99.9
Georgia	100.0
Hawaii	100.0
Idaho	100.0
Illinois	98.2
Indiana	99.2
Iowa	100.0
Kansas	98.6
Kentucky	99.7
Louisiana	95.6
Maine	100.0
Maryland	100.0
Massachusetts	98.2
Michigan	100.0
Minnesota	100.0
Mississippi	100.0
Missouri	100.0
Montana	98.6
Nebraska	100.0
Nevada	100.0
New Hampshire	100.0
New Jersey	96.6
New Mexico	98.6
New York	99.1
North Carolina	99.8
North Dakota	100.0
Ohio	99.6
Oklahoma	97.6
Oregon	99.7
Pennsylvania	99.5
Rhode Island	100.0
South Carolina	100.0
South Dakota	100.0
Tennessee	100.0
Texas	97.0
Utah	100.0
Vermont	100.0
Virginia	100.0
Washington	98.8
West Virginia	100.0
Wisconsin	100.0
Wyoming	100.0
Puerto Rico	99.6
Virgin Islands	100.0
Guam	100.0

[1]Excludes data for Puerto Rico, Virgin Islands, and Guam.

been made to design weights that will accurately reflect the distribution of deaths by characteristics, weighting may contribute to small differences in numbers and rates by specific variables between these two data sets.

Marital status

National estimates of births to unmarried women are based on two methods of determining marital status. In 2003, marital status was based on a direct question in 48 States and the District of Columbia. In the two States (Michigan and New York) that used inferential procedures to compile birth statistics by marital status, 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. For more information on the inferential procedures and on the changes in reporting, see "Technical Notes" in "Births: Final Data for 2003" (3).

Period of gestation and birthweight

The primary measure used to determine the gestational age of the newborn is the interval between the first day of the mother's last normal menstrual period (LMP) and the date of birth. It is subject to error for several reasons, including imperfect maternal recall or misidentification of the LMP because of postconception bleeding, delayed ovulation, or intervening early miscarriage. These data are edited for LMP-based gestational ages that are clearly inconsistent with the infant's plurality and birthweight (see below), but reporting problems for this item persist and many occur more frequently among some subpopulations and among births with shorter gestations (37,38).

The U.S. Standard Certificate of Live Birth contains an item, "clinical estimate of gestation," which is compared with length of gestation computed from the date the LMP began 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 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 consistent 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 about 0.006 percent of all birth records in 2003 (3).

For the linked file, not stated birthweight was imputed for 3,007 records or 0.07 percent of the birth records in 2003 when birthweight was not stated, but the period of gestation was known. In this case, birthweight was assigned the value from the previous record with the same period of gestation, maternal race, sex, and plurality. If birthweight and period of gestation were both unknown, the not stated value for birthweight was retained. This imputation was done to improve the accuracy of birthweight-specific infant mortality rates, because the percent of records with not stated birthweight was higher for infant deaths (3.85 percent before imputation) than for live births (0.09 percent before imputation). The imputation reduced the percent of not stated records to 0.61 percent for infant deaths, and 0.02 percent for births. The not stated birthweight cases in the natality/birth file, as distinct from the linked file, are not imputed (3).

Cause-of-death classification

The mortality statistics presented in this report were compiled in accordance with the World Health Organization (WHO) regulations, which specify that member nations classify and code causes of death in accordance with the current revision of the International Statistical Classification of Diseases and Related Health Problems (ICD). The ICD provides the basic guidance used in virtually all countries to code and classify causes of death. The ICD not only details disease classification but also provides definitions, tabulation lists, the format of the death certificate, and the rules for coding cause of death. Cause-of-death data presented in this report were coded by procedures outlined in annual issues of the NCHS Instruction Manual (39,40).

In this report, tabulations of cause-of-death statistics are based solely on the underlying cause of death. The underlying cause is defined by WHO as "the disease or injury which initiated the train of events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury" (4). It is selected from the conditions entered by the physician in the cause-of-death section of the death certificate. When more than one cause or condition is entered by the physician, the underlying cause is determined by the sequence of conditions on the certificate, provisions of the ICD, and associated selection rules and modifications. Generally, more medical information is reported on death certificates than is directly reflected in the underlying cause of death. This is captured in NCHS multiple cause-of-death statistics (41,42).

About every 10 to 20 years, the ICD is revised to take into account advances in medical knowledge. Effective with deaths occurring in 1999, the United States began using the Tenth Revision of the *International Statistical Classification of Diseases and Related Health Problems* (ICD–10) (4); during the period 1979–98, causes were coded and classified according to the Ninth Revision (ICD–9) (5).

Changes in classification of causes of death due to these revisions may result in discontinuities in cause-of-death trends. Measures of this discontinuity are essential to the interpretation of mortality trends and are discussed in detail in other NCHS publications (2,43,44).

Tabulation lists and cause-of-death ranking

The cause-of-death rankings for ICD–10 are based on the List of 130 Selected Causes of Infant Death. The tabulation lists and rules for ranking leading causes of death are published in the *NCHS Instruction Manual*, Part 9, "ICD–10 Cause-of-Death Lists for Tabulating Mortality Statistics, Effective 1999" (45). Briefly, category titles that begin with the words "Other" and "All other" are not ranked to determine the leading causes of death. When one of the titles that represents a subtotal is ranked (for example, Influenza and pneumonia (J10–J18)), its component parts are not ranked (in this case, Influenza (J10–J11) and Pneumonia (J12–J18)).

Computation of rates

Infant mortality rates (IMR) are the most commonly used index for measuring the risk of dying during the first year of life. For the linked birth/infant death data set, they are calculated by dividing the number of infant deaths in a calendar year by the number of live births registered for the same period and are presented as rates per 1,000 or per 100,000 live births. Both the mortality file and the linked birth/infant death file use this computation method but due to unique numbers of infant deaths, as explained in the section above on the comparison of these two files, the rates will often differ for specific variables (particularly for race and ethnicity). Infant mortality rates use the number of live births in the denominator to approximate the population at risk of dying before the first birthday. In contrast to the infant mortality rates based on live births, infant death rates, used only in age-specific death rates with the mortality file, use the estimated population of persons under 1 year of age as the denominator. For all variables, not stated responses were shown in tables of frequencies, but were dropped before rates were computed.

For the first time the National Center for Health Statistics (NCHS) is publishing the infant mortality rate with two digits after the decimal place per 1,000 live births. Displaying two digits after the decimal place for rates such as the IMR provides a more sensitive and precise measurement. This is particularly noticeable when examining differences in rates among groups or over time. For example, the published total IMR for 2002 was 7.0; this rate with two decimal places is 6.95. The rate for 2003 is 6.84 and would be 6.8 if calculated to one decimal place. The difference between years by one decimal place is 0.2, but when using two decimal places the difference is 0.11—nearly half the difference shown by one decimal. For rates per 100,000 live births (by cause of death) the IMR continues to be shown for one decimal place. Adding an additional decimal for rates per 100,000 does not increase precision as it does for rates per 1,000.

As stated previously, infant death records for the 50 States and the District of Columbia in the linked file are weighted so that the infant mortality rates are not underestimated for those areas that did not successfully link all records.

Random variation in infant mortality rates

The number of infant deaths and live births reported for an area represent complete counts of such events. As such, they are not subject to sampling error, although they are subject to nonsampling error in the registration process. However, when the figures are used for analytic purposes, such as the comparison of rates over time, for different areas or among different subgroups, the number of events that actually occurred may be considered as one of a large series of possible results that could have arisen under the same circumstances (46). As a result, numbers of births, deaths, and infant mortality rates are subject to random variation. The probable range of values may be estimated from the actual figures according to certain statistical assumptions.

In general, distributions of vital events may be assumed to follow the binomial distribution. When the number of events is large, the relative standard error is usually small. When the number of events is small (perhaps less than 100) and the probability of such an event is small, considerable caution must be observed in interpreting the data. Such infrequent events may be assumed to follow a Poisson probability distribution (2). Estimates of relative standard errors (RSEs) and 95 percent confidence intervals are shown below.

The formula for the RSE of infant deaths and live births is:

$$\mathrm{RSE}(D) = 100 \bullet \sqrt{\frac{1}{D}}$$

where D is the number of deaths and

$$\mathrm{RSE}\,(B) = 100 \bullet \sqrt{\frac{1}{B}}$$

where B is the number of births.

For example, let us say that for group A the number of infant deaths was 238 while the number of live births was 32,650 yielding an infant mortality rate of 7.29 infant deaths per 1,000 live births.

$$\text{The RSE of the deaths} = 100 \bullet \sqrt{\frac{1}{238}} = 6.48,$$

$$\text{while the RSE of the births} = 100 \bullet \sqrt{\frac{1}{32{,}650}} = 0.55.$$

The formula for the RSE of the infant mortality rate (IMR) is:

$$\mathrm{RSE(IMR)} = 100 \bullet \sqrt{\frac{1}{D} + \frac{1}{B}}$$

The RSE of the IMR for the example above

$$= 100 \bullet \sqrt{\frac{1}{238} + \frac{1}{32{,}650}} = 6.51.$$

Binomial distribution—When the number of events is greater than 100, the binomial distribution is used to estimate the 95 percent confidence intervals as follows:

$$\text{Lower: } R_1 - 1.96 \bullet R_1 \bullet \frac{\mathrm{RSE}(R_1)}{100}$$

$$\text{Upper: } R_1 + 1.96 \bullet R_1 \bullet \frac{\mathrm{RSE}(R_1)}{100}$$

Thus, for group A:

$$\text{Lower: } 7.29 - \left(1.96 \bullet 7.29 \bullet \frac{6.51}{100}\right) = 6.36$$

$$\text{Upper: } 7.29 + \left(1.96 \bullet 7.29 \bullet \frac{6.51}{100}\right) = 8.22$$

Thus the chances are 95 out of 100 that the true IMR for Group A lies somewhere in the 6.36–8.22 interval.

Poisson distribution—When the number of events in the numerator is less than 100, the confidence interval for the rate can be estimated based on the Poisson distribution using the values in Table II.

$$\text{Lower: } \mathrm{IMR} \bullet L\,(.95,\ D_{adj})$$

Table II. Values of *L* and *U* for calculating 95 percent confidence limits for numbers of events and rates when the number of events is less than 100

N	*L*	*U*	*N*	*L*	*U*
1	0.02532	5.57164	51	0.74457	1.31482
2	0.12110	3.61234	52	0.74685	1.31137
3	0.20622	2.92242	53	0.74907	1.30802
4	0.27247	2.56040	54	0.75123	1.30478
5	0.32470	2.33367	55	0.75334	1.30164
6	0.36698	2.17658	56	0.75539	1.29858
7	0.40205	2.06038	57	0.75739	1.29562
8	0.43173	1.97040	58	0.75934	1.29273
9	0.45726	1.89831	59	0.76125	1.28993
10	0.47954	1.83904	60	0.76311	1.28720
11	0.49920	1.78928	61	0.76492	1.28454
12	0.51671	1.74680	62	0.76669	1.28195
13	0.53246	1.71003	63	0.76843	1.27943
14	0.54671	1.67783	64	0.77012	1.27698
15	0.55969	1.64935	65	0.77178	1.27458
16	0.57159	1.62394	66	0.77340	1.27225
17	0.58254	1.60110	67	0.77499	1.26996
18	0.59266	1.58043	68	0.77654	1.26774
19	0.60207	1.56162	69	0.77806	1.26556
20	0.61083	1.54442	70	0.77955	1.26344
21	0.61902	1.52861	71	0.78101	1.26136
22	0.62669	1.51401	72	0.78244	1.25933
23	0.63391	1.50049	73	0.78384	1.25735
24	0.64072	1.48792	74	0.78522	1.25541
25	0.64715	1.47620	75	0.78656	1.25351
26	0.65323	1.46523	76	0.78789	1.25165
27	0.65901	1.45495	77	0.78918	1.24983
28	0.66449	1.44528	78	0.79046	1.24805
29	0.66972	1.43617	79	0.79171	1.24630
30	0.67470	1.42756	80	0.79294	1.24459
31	0.67945	1.41942	81	0.79414	1.24291
32	0.68400	1.41170	82	0.79533	1.24126
33	0.68835	1.40437	83	0.79649	1.23965
34	0.69253	1.39740	84	0.79764	1.23807
35	0.69654	1.39076	85	0.79876	1.23652
36	0.70039	1.38442	86	0.79987	1.23499
37	0.70409	1.37837	87	0.80096	1.23350
38	0.70766	1.37258	88	0.80203	1.23203
39	0.71110	1.36703	89	0.80308	1.23059
40	0.71441	1.36172	90	0.80412	1.22917
41	0.71762	1.35661	91	0.80514	1.22778
42	0.72071	1.35171	92	0.80614	1.22641
43	0.72370	1.34699	93	0.80713	1.22507
44	0.72660	1.34245	94	0.80810	1.22375
45	0.72941	1.33808	95	0.80906	1.22245
46	0.73213	1.33386	96	0.81000	1.22117
47	0.73476	1.32979	97	0.81093	1.21992
48	0.73732	1.32585	98	0.81185	1.21868
49	0.73981	1.32205	99	0.81275	1.21746
50	0.74222	1.31838			

Upper: IMR • U (.95, D_{adj})

where D_{adj} is the adjusted number of infant deaths (rounded to the nearest integer) used to take into account the RSE of the number of infant deaths and live births, and is computed as follows:

$$D_{adj} = \frac{D \bullet B}{D + B}$$

L (.95, D_{adj}) and U (.95, D_{adj}) refer to the values in Table II corresponding to the value of D_{adj}.

For example, let us say that for group B the number of infant deaths was 73, the number of live births was 11,422, and the infant mortality rate was 6.39.

$$D_{adj} = \frac{(73 \bullet 11{,}422)}{(73 + 11{,}422)} = 73$$

Therefore the 95 percent confidence interval (using the formula in Table II for 1–99 infant deaths) =

Lower: 6.39 • 0.78384 = 5.01

Upper: 6.39 • 1.25735 = 8.03

Comparison of two infant mortality rates—If either of the two rates to be compared is based on less than 100 deaths, compute the confidence intervals for both rates and check to see if they overlap. If so, the difference is not statistically significant at the 95 percent level.

If they do not overlap, the difference is statistically significant. If both of the two rates (R_1 and R_2) to be compared are based on 100 or more deaths, the following z-test may be used to define a significance test statistic:

$$z = \frac{R_1 - R_2}{\sqrt{R_1^2\left(\frac{\text{RSE}(R_1)}{100}\right)^2 + R_2^2\left(\frac{\text{RSE}(R_2)}{100}\right)^2}}$$

If $|z| \geq 1.96$, then the difference is statistically significant at the 0.05 level and if $|z| < 1.96$, the difference is not significant.

Availability of linked file data

Linked file data are available on CD-ROM from the National Center for Health Statistics (NCHS) at 1-866-441-6247. Data are also available in selected issues of the *Vital and Health Statistics*, Series 20 reports, the *National Vital Statistics Reports* (formerly the *Monthly Vital Statistics Report*) through NCHS. Additional unpublished tabulations are available from: http://www.cdc.gov/nchs.

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TECHNICAL APPENDIX FROM

VITAL STATISTICS OF THE UNITED STATES

2003

NATALITY

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

CENTERS FOR DISEASE CONTROL AND PREVENTION
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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 = $\dfrac{B_1 \times p_1 + B_2 \times p_2}{B_1 + B_2}$

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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Technical Notes

Nature and sources of data

Data in this report are based on information from all death certificates filed in the 50 States and the District of Columbia and are processed by the Centers for Disease Control and Prevention's National Center for Health Statistics (NCHS). Data for 2003 are based on records of deaths that occurred during 2003 and were received as of February 28, 2005. The U.S. Standard Certificate of Death—which is used as a model by the States—was revised in 2003 (33). Prior to 2003, the Standard Certificate of Death had not been revised since 1989. This report includes data for five areas (California, Idaho, Montana, New York City, and New York State), which implemented the 2003 revision of the U.S. Standard Certificate of Death in 2003 and for the remaining 46 States and the District of Columbia that collected and reported death data in 2003 based on the 1989 revision of the U.S. Standard Certificate of Death. The 1989 and 2003 revisions are described in detail elsewhere (33–36).

Because most of the items presented in this report appear largely comparable despite changes to item wording and format in the 2003 revision, data from both groups of States are combined unless otherwise stated. Data for Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Northern Marianas are included in tables showing data by State, but are not included in U.S. totals.

Mortality statistics are based on information coded by the States and provided to the National Center for Health Statistics (NCHS) through the Vital Statistics Cooperative Program (VSCP) and from copies of the original certificates received by NCHS from the State registration offices. In 2003, all the States and the District of Columbia participated in this program and submitted part or all of the mortality data for 2003 in electronic data files to NCHS. All areas provided precoded medical (cause-of-death) data to NCHS except Illinois, New York City, and West Virginia. For 2003, all States submitted precoded demographic data for all deaths.

Data for the entire United States refer to events occurring within the United States. Data shown for geographic areas are by place of residence. Beginning with 1970, mortality statistics for the United States exclude deaths of nonresidents of the United States. All data exclude fetal deaths.

Mortality statistics for Puerto Rico, Virgin Islands, American Samoa, and Northern Marianas exclude deaths of nonresidents of Puerto Rico, Virgin Islands, American Samoa, and Northern Marianas, respectively. For Guam, however, mortality statistics exclude deaths that occurred to a resident of any place other than Guam or the United States.

Cause-of-death classification

The mortality statistics presented in this report were compiled in accordance with World Health Organization (WHO) regulations, which specify that member nations classify and code causes of death in accordance with the current revision of the *International Classification of Diseases* (ICD). The ICD provides the basic guidance used in virtually all countries to code and classify causes of death. Effective with deaths occurring in 1999, the United States began using the Tenth Revision of this classification (ICD–10) (8). For earlier years, causes of death were classified according to the revisions then in use—1979–98, Ninth Revision; 1968–78, Eighth Revision, adapted for use in the United States; 1958–67, Seventh Revision; and 1949–57, Sixth Revision.

Changes in classification of causes of death due to these revisions may result in discontinuities in cause-of-death trends. Consequently, cause-of-death comparisons among revisions require consideration of comparability ratios and, where available, estimates of their standard errors. Comparability ratios between the Ninth and Tenth Revisions, between the Eighth and Ninth Revisions, between the Seventh and Eighth Revisions, and between the Sixth and Seventh Revisions may be found in other NCHS reports (20,37,38).

Rules for coding a cause(s) of death may sometimes require modification when evidence suggests that such modifications will improve the quality of cause-of-death data. Prior to 1999, such modifications were made only when a new revision of the ICD was implemented. A process for updating the ICD was introduced with ICD–10 that allows for mid-revision changes. These changes, however, may affect comparability of data between years for select causes of death. Minor changes may be implemented every year, while major changes may be implemented every 3 years (e.g., 2003 data year).

The ICD not only details disease classification but also provides definitions, tabulation lists, the format of the death certificate, and the rules for coding cause of death. Cause-of-death data presented in this publication were coded by procedures outlined in annual issues of the *NCHS Instruction Manual* (39,40). It includes rules for selecting the underlying cause of death for tabulation purposes, definitions, tabulation lists, and regulations on the use of the ICD.

Before data for 1968, mortality medical data were based on manual coding of an underlying cause of death for each certificate in accordance with WHO rules. Effective with data year 1968, NCHS converted to computerized coding of the underlying cause and manual coding of all causes (multiple causes) on the death certificate. In this system, called "Automated Classification of Medical Entities" (ACME) (41), multiple-cause codes serve as inputs to the computer software that employs WHO rules to select the underlying cause. All cause-of-death data in this report are coded using ACME.

The ACME system is used to select the underlying cause of death for all death certificates in the United States. In addition, NCHS has developed two computer systems as inputs to ACME. Beginning with 1990 data, the Mortality Medical Indexing, Classification, and Retrieval system (MICAR) (42,43) was introduced to automate coding multiple causes of death. In addition, MICAR provides more detailed information on the conditions reported on death certificates than is available through the ICD code structure. Then, beginning with data year 1993, SuperMICAR, an enhancement of the MICAR system, was introduced. SuperMICAR allows for literal entry of the multiple cause-of-death text as reported by the certifier. This information is then automatically processed by the MICAR and ACME computer systems. Records that cannot be automatically processed by MICAR or SuperMICAR are manually multiple-cause coded and then further processed through ACME.

For 2003, all of the Nation's death records were multiple-cause coded using SuperMICAR.

In this report, tabulations of cause-of-death statistics are based solely on the underlying cause of death. The underlying cause is defined by WHO as "the disease or injury which initiated the train of events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury" (8). It is selected from

the conditions entered by the physician in the cause-of-death section of the death certificate. When more than one cause or condition is entered by the physician, the underlying cause is determined by the sequence of conditions on the certificate, provisions of the ICD, and associated selection rules and modifications. Generally, more medical information is reported on death certificates than is directly reflected in the underlying cause of death. This is captured in NCHS multiple cause-of-death statistics (44–46).

Tabulation lists and cause-of-death ranking

Tabulation lists for ICD–10 are published in the NCHS Instruction Manual, Part 9, ICD–10 Cause-of-Death Lists for Tabulating Mortality Statistics (updated October 2002) (47). For this report, two tabulation lists are used, namely, the List of 113 Selected Causes of Death used for deaths of all ages, and the List of 130 Selected Causes of Infant Death used for infants. These lists are also used to rank leading causes of death for the two population groups. For the List of 113 Selected Causes of Death, the group titles Major cardiovascular diseases (ICD–10 codes I00–I78) and Symptoms, signs, and abnormal clinical and laboratory findings, not elsewhere classified (ICD–10 codes R00–R99) are not ranked. In addition, category titles that begin with the words "Other" and "All other" are not ranked to determine the leading causes of death. When one of the titles that represents a subtotal is ranked (for example, Tuberculosis (ICD–10 codes A16–A19)), its component parts are not ranked (in this case, Respiratory tuberculosis (ICD–10 code A16) and Other tuberculosis (ICD–10 codes A17–A19)). For the List of 130 Selected Causes of Infant Death, the same ranking procedures are used, except that the category Major cardiovascular diseases is not in the list. More detail regarding ranking procedures can be found in "*Deaths: Leading Causes for 2003*" (4).

Leading cause-of-death trends, discussed in this report, are based on cause-of-death data according to ICD–10 for 1999–2003, and on data for the most comparable ICD–9 cause-of-death titles for 1979–98. Tables showing ICD–9 categories that are comparable to the ICD–10 titles in the List of 113 Selected Causes of Death may be found in "Comparability of Cause of Death Between ICD–9 and ICD–10: Preliminary Estimates" (20) and "Deaths: Final Data for 1999" (22). Although in some cases categories from the list of 113 selected causes are identical to those in the old list of 72 selected causes of death used with ICD–9, it is important to note that many of these categories are not comparable with categories in the list of 72 selected causes even though the cause-of-death titles may be the same.

Trend data for 1978–98 that is classified by ICD–9 but is sorted into the list of 113 selected causes of death developed for ICD–10 can be found on the mortality Web site available from: http://www.cdc.gov/nchs/data/statab/hist001r.pdf.

Revision of the ICD and resulting changes in classification and rules for selecting the underlying cause of death have important implications for the analysis of mortality trends by cause of death. For some causes of death, the discontinuity in trend can be substantial (20,21). Therefore, considerable caution should be used in analyzing cause-of-death trends for periods of time that extend across more than one revision of the ICD.

Codes for terrorism

Beginning with data for 2001, NCHS introduced categories *U01–*U03 for classifying and coding deaths due to acts of terrorism. The asterisks before the category codes indicate that they are not part of the *International Classification of Diseases, Tenth Revision* (ICD–10). Deaths classified to the terrorism categories are included in the categories for Assault (homicide) and Intentional self-harm (suicide) in the 113 cause-of-death list and in the category for Assault (homicide) in the 130 cause-of-death list for infants. Additional information on these new categories can be found at: http://www.cdc.gov/nchs/about/otheract/icd9/terrorism_code.htm.

Race and Hispanic origin

The 2003 revision of the U.S. Standard Certificate of Death allows the reporting of more than one race (multiple races) (33). This change was implemented to reflect the increasing diversity of the population of the United States and to be consistent with the decennial census. The race and ethnicity items on the revised certificate are compliant with the revisions to the 1977 Race and Ethnic Standards for Federal Statistics and Administrative Reporting, which were issued by the Office of Management and Budget (OMB) in 1997. The new standards mandate the collection of more than one race for Federal data (9). In addition, the new certificate is compliant with the OMB-mandated minimum set of five races to be reported for Federal data. Multiple race includes any combination of white, black or African American, American Indian or Alaska Native (AIAN), and Asian or Pacific Islander (API). If two more specific subgroups such as Korean and Chinese are reported, these count as a single race of Asian rather than as multiple races.

In 2003, multiple race was reported on the revised death certificates of California, Idaho, Montana, and New York, as well as on the unrevised certificates of Hawaii, Maine, and Wisconsin. More than one race was reported for 0.6 percent of the records in the seven States for which multiple race reporting has been implemented (Table I). While still uncommon, multiple races were reported more often for younger decedents than older decedents (3.1 percent of decedents under 25 years of age versus 0.4 percent of decedents 65 years of age and older). No decedent was reported as having more than four races. Of those records where more than one race was reported, the Pacific Islander category was mentioned in combination with another race (53.9 percent) more often than the other categories (white, 0.5; black, 1.0; Asian, 5.1; and American Indian, 26.9 percent).

Data from the vital records of the remaining 43 States and the District of Columbia are based on the 1989 revision of the U.S. Standard Certificate of Death, which follows the 1977 OMB standard, allowing only a single race to be reported (10,34). In addition, these States report a minimum set of four races as stipulated in the 1977 standard. These are white, black or African American, AIAN, and API.

In order to provide uniformity and comparability of the data during the transition period before all or most of the data are available in the new multiple-race format, it was necessary to "bridge" the responses of those for whom more than one race was reported (multiple race) to one, single race. The bridging procedure is similar to the procedure

Table I. Deaths by race: California, Idaho, Montana, New York, Hawaii, Maine, and Wisconsin, 2003

[By State of occurrence]

Race	Deaths	Percent of deaths
Total	480,370	100.0
One race[1]	477,543	99.4
White	403,768	84.1
Black	42,067	8.8
American Indian	2,186	0.5
Asian	24,031	5.0
Pacific Islander	1,128	0.2
Two or more races	2,827	0.6
Two races	2,465	0.5
Black and white	258	0.1
Black and American Indian	86	0.0
Black and Asian	42	0.0
Black and Pacific Islander	7	*
American Indian and white	654	0.1
American Indian and Asian	13	*
American Indian and Pacific Islander	3	*
Asian and white	412	0.1
Asian and Pacific Islander	495	0.1
Pacific Islander and white	495	0.1
Three races	348	0.1
Black, American Indian, and white	26	0.0
Black, American Indian, and Asian	1	*
Black, Asian, and white	10	*
Black, Asian, and Pacific Islander	2	*
Black, Pacific Islander, and white	4	*
American Indian, Asian, and white	4	*
American Indian, Asian, and Pacific Islander	1	*
American Indian, Pacific Islander, and white	7	*
Asian, Pacific Islander, and white	293	0.1
Four races	14	*
Black, American Indian, Pacific Islander, and white	1	*
Black, Asian, Pacific Islander, and white	3	*
American Indian, Asian, Pacific Islander, and white	10	*

* Figure does not meet standards of reliability or precision; see "Random variation" section.
[1]Includes records for which race was reported as "Other." Further processing assigns "Other" race to one of the recognized categories. Other race comprises a wide variety of responses; however, the most common is to check "Other" and not provide further specification or to report a Hispanic group as a race.

used to bridge multiracial population estimates (12,13). Multiracial decedents are imputed to a single race (either white, black, AIAN, or API) according to their combination of races, Hispanic origin, sex, and age indicated on the death certificate. The imputation procedure is described in detail at: http://www.cdc.gov/nchs/data/dvs/Multiple_race_docu_5-10-04.pdf.

Race and Hispanic origin are reported separately on the death certificate. Therefore, data shown by race include persons of Hispanic and non-Hispanic origin, and data for Hispanic origin include persons of any race. In this report, unless otherwise specified, deaths of Hispanic origin are included in the totals for each race group—white, black, AIAN, and API—according to the decedent's race as reported on the death certificate. Data shown for Hispanic persons include all persons of Hispanic origin of any race.

Mortality data for the Hispanic-origin population are based on deaths to residents of all 50 States and the District of Columbia. Data year 1997 was the first year that mortality data for the Hispanic population were available for the entire United States.

Quality of race and Hispanic origin data—Death rates for Hispanic, AIAN, and API persons should be interpreted with caution because of inconsistencies in reporting Hispanic origin or race on the death certificate as compared with race or Hispanic origin on censuses, surveys, and birth certificates. Studies have shown underreporting on death certificates of AIAN, API, and Hispanic decedents; and undercounts of these groups in the censuses (17,48).

A number of studies have been conducted on the reliability of race reported on the death certificate by comparing race on the death certificate with that reported on another data collection instrument, such as the census or a survey. Differences may arise because of differences in who provides race information on the compared records. Race information on the death certificate is reported by the funeral director as provided by an informant or in the absence of an informant, on the basis of observation. In contrast, race on the census or on the Current Population Survey (CPS) is obtained while the individual is alive and is self-reported or reported by another member of the household familiar with the individual and, therefore, may be considered more valid. A high level of agreement between the death certificate and the census or survey report is essential to ensure unbiased death rates by race.

Studies (48,49) show that a person self-reported as American Indian or Asian on census or survey records was sometimes reported as white on the death certificate. The net effect of misclassification is an underestimation of deaths and death rates for races other than white and black. In addition, undercoverage of minority groups in the census and resultant population estimates, introduces biases into death rates by race (7,17,50). Estimates of the approximate effect of the combined bias due to race misclassification on death certificates and underenumeration on the 1990 census are as follows: white, –1.0 percent; black, –5.0; American Indian, +20.6; API, +10.7 (17).

The National Longitudinal Mortality Study (NLMS) examined the reliability of Hispanic origin reported on 43,520 death certificates with that reported on a total of 12 CPSs conducted by the U.S. Bureau of the Census for the years 1979–85 (17). In this study, agreement—on a record-by-record basis—was 89.7 percent for any report of Hispanic origin. The ratio of deaths for CPS divided by deaths for death certificate was 1.07 indicating net underreporting of Hispanic origin on death certificates by 7 percent as compared with self-reports on the surveys. Death rates for the Hispanic-origin population are also affected by undercoverage of this population group in the census and resultant population estimates. Because of these two reporting problems, the death rates shown in this report may be approximately 1.6 percent understated (17,50).

In 2003, data on Central and South American and Other Hispanic origin reflects some processing problems for several areas. New York City and California have fewer records identifying decedents as being of Central and South American origin and more as Other Hispanic origin because literal text reported on the death certificates was not submitted to NCHS. In contrast, Arizona identifies more records as being of Central and South American origin and fewer as Other Hispanic origin because of a coding practice in one county where deaths that were reported as Other Hispanic with Spanish specified were incorrectly counted as Central and South American origin instead of Other Hispanic.

Other races and race not stated—Beginning in 1992, all records coded as "Other races" (0.18 percent of the total deaths in 2003) were assigned to the specified race of the previous record. Records for which race was unknown, not stated, or not classifiable (0.07 percent) were assigned the racial designation of the previous record.

Infant and maternal mortality rates—For 1989–2003, as in previous years, infant and maternal deaths continue to be tabulated by the race of the decedent. However, beginning with the 1989 data year, the method of tabulating live births by race was changed from race of parents to race of mother as stated on the birth certificate. This change affects infant and maternal mortality rates because live births are the denominators of these rates (35,51). To improve continuity and ease of interpretation, trend data by race in this report have been retabulated by race of mother for all years beginning with the 1980 data year.

Quantitatively, the change in the basis for tabulating live births by race results in more white births and fewer black births and births of other races. Consequently, infant and maternal mortality rates under the new tabulating procedure tend to be about 2 percent lower for white infants and about 5 percent higher for black infants than when they are computed by the previous method of tabulating live births by race of parents. Rates for most other minority races also are higher when computed by race of mother (51,52).

Infant mortality rates for the Hispanic-origin population are based on numbers of resident infant deaths reported to be of Hispanic origin and numbers of resident live births by Hispanic origin of mother for the United States. In computing infant mortality rates, deaths and live births of unknown origin are not distributed among the specified Hispanic and non-Hispanic groups. In 2003, the percentage of infant deaths of unknown origin was 1.0 and the percentage of live births to mothers of unknown origin was 0.7 for the United States.

Infant mortality rates calculated from the general mortality file for specified race and Hispanic origin contain errors because of reporting problems that affect the classification of race and Hispanic origin on the birth and death certificates for the same infant. Infant mortality rates by specified race and Hispanic origin are more accurate when based on the linked file of infant deaths and live births (32). The linked file computes infant mortality rates using the race and Hispanic origin of the mother from the birth certificate in both the numerator and denominator of the rate. In addition, mother's race and Hispanic origin from the birth certificate are considered to be more accurately reported than infant's race and Hispanic origin from the death certificate because, on the birth certificate, race is generally reported by the mother at the time of delivery whereas, on the death certificate, infant's race and Hispanic origin is reported by an informant, usually the mother but sometimes by the funeral director. Estimates of reporting errors have been made by comparing rates based on the linked files with those in which the race of infant death is based on information from the death certificate (17,32).

Life tables

The life table provides a comprehensive measure of the effect of mortality on life expectancy. It is composed of sets of values showing the mortality experience of a hypothetical group of infants born at the same time and subject throughout their lifetime to the age-specific death rates of a particular time period, usually a given year. Beginning with final data reported for 1997, the life table methodology was changed from previous annual reports. Previously, U.S. life tables were abridged and constructed by reference to a standard table (53). In addition, the age range for these life tables was limited to 5-year age groups ending with the age group 85 years and over.

Beginning with 1997 mortality data, a revised life table methodology was used to construct complete life tables by single years of age that extend to age 100 (54) using a methodology similar to that of the decennial life tables (55). The advantages of the new methodology over the previous one are its comparability with decennial life table methodology, greater accuracy, and greater age detail. A comparison of the two methods shows small differences in resulting values for life expectancy (54). Although the new method produces complete life tables, that is, life tables by single years of age, life table data shown in this report are summarized in 5-year age groupings. To calculate the probability of dying at each age, the revised methodology uses vital statistics death rates for ages under 85 years and mortality data from the Medicare program for ages over 85 years. Medicare data were used to model the probability of dying at ages 85 and over because the data are shown to be significantly more reliable than vital statistics data at the oldest ages (56).

The life tables presented in this report use a slight modification of the new life table method introduced in 1997 as a result of a change in the age detail of populations received from the U.S. Census Bureau. Populations for 2000 through 2003 were provided by single year of age up to age 84, followed by "85 years and over," and as a result, it was not possible to apply the same smoothing technique that has been used when population figures in single years of age up to ages "100 years and over" were available. Accordingly, Medicare data were used to estimate the probability of dying by single year of age for ages up to "100 years and over."

Revised life expectancies for 1991–99, consistent with the 2000 census, are scheduled to be produced in 2006.

Causes of death contributing to changes in life expectancy

Causes of death contributing to changes in life expectancy were estimated using a life table partitioning technique. The method partitions changes into component additive parts. This method identifies the causes of death having the greatest influence, positive or negative, on changes in life expectancy (18,57).

Injury mortality by mechanism and intent

Injury mortality data are presented using an alternative framework, the External cause-of-injury mortality matrix for ICD–10, in Table 18. In this framework, causes of injury deaths are organized principally by mechanism (e.g., firearm or poisoning), and secondarily by manner, or intent of death (e.g., unintentional, suicide, homicide, etc.).

In addition, the number of deaths for selected causes in this framework may differ from those shown in tables that use the standard mortality tabulation lists. Following WHO conventions, standard mortality tabulations such as Table 10 present external causes of death (ICD–10 codes *U01–*U03,V01–Y89). In contrast, the alternative framework (Table 18) excludes deaths classified to Complications of medical and surgical care (ICD–10 codes Y40–Y84,Y88). For additional information on injury data presented in this framework, see http://www.cdc.gov/nchs/about/otheract/ice/matrix10.htm and "Deaths: Injuries, 2002" (5).

Codes for firearm deaths

Causes of death attributable to firearm mortality include ICD–10 codes *U01.4, Terrorism involving firearms (homicide); W32–W34, Accidental discharge of firearms; X72–X74, Intentional self-harm (suicide) by discharge of firearms; X93–X95, Assault (homicide) by discharge of firearms; Y22–Y24, Discharge of firearms, undetermined intent; and Y35.0, Legal intervention involving firearm discharge. Deaths from injury by firearms exclude deaths due to explosives and other causes indirectly related to firearms.

Codes for drug-induced deaths

The list of codes included in drug-induced causes was expanded in the 2003 data year to be more comprehensive. Specifically, the following 37 ICD–10 codes were added to the list of drug-induced codes: D52.1, D59.0, D59.2, D61.1, D64.2, E06.4, E16.0, E23.1, E24.2 , E27.3, E66.1, G21.1, G24.0, G25.1, G25.4, G25.6, G44.4, G62.0, G72.0, I95.2, J70.2, J70.3, J70.4, L10.5, L27.0, L27.1, M10.2, M32.0, M80.4, M81.4, M83.5, M87.1, R78.1, R78.2, R78.3, R78.4, and R78.5.

The complete list of causes of death attributable to drug-induced mortality now includes ICD–10 codes D52.1, Drug-induced folate deficiency anemia; D59.0, Drug-induced hemolytic anemia; D59.2, Drug-induced nonautoimmune hemolytic anemia; D61.1, Drug-induced aplastic anemia; D64.2, Secondary sideroblastic anemia due to drugs and toxins; E06.4, Drug-induced thyroiditis; E16.0, Drug-induced hypoglycemia without coma; E23.1, Drug-induced hypopituitarism; E24.2, Drug-induced Cushing's syndrome; E27.3, Drug-induced adrenocortical insufficiency; E66.1, Drug-induced obesity; selected codes from the ICD–10 title Mental and behavioral disorders due to psychoactive substance use, specifically, F11.0–F11.5, F11.7–F11.9, F12.0–F12.5, F12.7–F12.9, F13.0–F13.5,F13.7–F13.9, F14.0–F14.5, F14.7–F14.9, F15.0–F15.5, F15.7–F15.9, F16.0–F16.5, F16.7–F16.9, F17.0, F17.3–F17.5, F17.7–F17.9, F18.0–F18.5, F18.7–F18.9, F19.0–F19.5, F19.7–F19.9; G21.1, Other drug-induced secondary parkinsonism; G24.0, Drug-induced dystonia; G25.1, Drug-induced tremor; G25.4, Drug-induced chorea; G25.6, Drug-induced tics and other tics of organic origin; G44.4, Drug-induced headache, not elsewhere classified; G62.0, Drug-induced polyneuropathy; G72.0, Drug-induced myopathy; I95.2, Hypotension due to drugs; J70.2, Acute drug-induced interstitial lung disorders; J70.3, Chronic drug-induced interstitial lung disorders; J70.4, Drug-induced interstitial lung disorder, unspecified; L10.5, Drug-induced pemphigus; L27.0, Generalized skin eruption due to drugs and medicaments; L27.1, Localized skin eruption due to drugs and medicaments; M10.2, Drug-induced gout; M32.0, Drug-induced systemic lupus erythematosus; M80.4, Drug-induced osteoporosis with pathological fracture; M81.4, Drug-induced osteoporosis; M83.5, Other drug-induced osteomalacia in adults; M87.1, Osteonecrosis due to drugs; R78.1, Finding of opiate drug in blood; R78.2, Finding of cocaine in blood; R78.3, Finding of hallucinogen in blood; R78.4, Finding of other drugs of addictive potential in blood; R78.5, Finding of psychotropic drug in blood; X40–X44, Accidental poisoning by and exposure to drugs, medicaments, and biological substances; X60–X64, Intentional self-poisoning (suicide) by and exposure to drugs, medicaments, and biological substances; X85, Assault (homicide) by drugs, medicaments, and biological substances; and Y10–Y14, Poisoning by and exposure to drugs, medicaments and biological substances, undetermined intent. Drug-induced causes exclude accidents, homicides, and other causes indirectly related to drug use. Also excluded are newborn deaths associated with mother's drug use.

Numbers of deaths and death rates based on the newly modified list of causes may differ slightly from those previously published. For example, for 2002, the addition of the 37 codes increased the total number of deaths from drug-induced causes from 26,018 to 26,040 (an increase of 22); the total crude and age-adjusted death rates were unaffected.

Codes for alcohol-induced deaths

The list of codes included in alcohol-induced causes was expanded in the 2003 data year to be more comprehensive. Specifically, the following three ICD–10 codes were added to the list of alcohol-induced codes: E24.4, G72.1, and K86.0.

The complete list of causes of death attributable to alcohol-induced mortality now includes ICD–10 codes E24.4, Alcohol-induced pseudo-Cushing's syndrome; F10, Mental and behavioral disorders due to alcohol use; G31.2, Degeneration of nervous system due to alcohol; G62.1, Alcoholic polyneuropathy; G72.1, Alcoholic myopathy; I42.6, Alcoholic cardiomyopathy; K29.2, Alcoholic gastritis; K70, Alcoholic liver disease; K86.0, Alcohol-induced chronic pancreatitis; R78.0, Finding of alcohol in blood; X45, Accidental poisoning by and exposure to alcohol; X65, Intentional self-poisoning by and exposure to alcohol; and Y15, Poisoning by and exposure to alcohol, undetermined intent. Alcohol-induced causes exclude accidents, homicides, and other causes indirectly related to alcohol use. This category also excludes newborn deaths associated with maternal alcohol use.

Numbers of deaths and death rates based on the newly modified list of causes may differ slightly from those previously published. For example, for 2002, the addition of the three codes increased the total number of deaths from alcohol-induced causes from 19,928 to 20,218 (an increase of 290) and increased the total crude death rate, although not significantly, from 6.9 to 7.0. The total age-adjusted rate remained the same.

Marital status

Age-specific and age-adjusted death rates by marital status are shown in Table 25 by sex. Mortality data by marital status is generally of high quality. A study of death certificate data using the 1986 National Mortality Followback Survey showed a high level of consistency in reporting marital status (49). Age-adjusted death rates by marital status were computed based on the age-specific rates and the standard population for ages 25 years and over. Although age-specific death rates by marital status are shown for the age group 15–24 years, they are not included in the computation of the age-adjusted rate because of their high variability, particularly for the widowed population. Also, the age groups 75–84 and 85 years and over are combined due to high variability in death rates in the 85 year and over age group, particularly for the never married population.

In reports of final mortality data prior to 2002, population estimates from the CPS were used to calculate death rates for marital status by race. Beginning in 2002, CPS respondents were given the option of choosing more than one racial group to identify themselves. Because mortality data for 2003 are not nationally available for racial categories

comparable to those used in the CPS, population estimates are not available to calculate death rates for marital status by race. Therefore, mortality data by marital status showing race and Hispanic origin detail are not shown in this report. However, the number of deaths for 2003 by marital status for previously shown race and Hispanic origin categories are available on the 2003 mortality data set (see the NCHS Web site available from: http://www.cdc.gov/nchs/products/elec_prods/subject/mortucd.htm).

Educational attainment

Beginning in 2003, some registration areas adopted a revised educational attainment item on highest grade completed or degree received, which replaces the item on highest grade of school completed. The subject of the item continues to focus on collegiate track education and does not capture vocational training. The item was changed to be consistent with the census data, to improve the ability to identify specific degrees, to improve the ability to identify persons who had completed 12 years of education but did not hold either a GED or high school diploma, and to replace the old item which was inappropriately and inaccurately used to infer degree status. According to testing by the Census Bureau, the new item identifies about 2 percent more individuals with less than a high school diploma or equivalent, 13 percent fewer individuals with a high school diploma, and 8 percent more individuals with at least some college (58). Because only 4 States have adopted the preferred question, Table 26 is still shown using the old education item. However, Table II shows a comparison of the percent distribution of deaths by measures of educational attainment in use in 2002 and 2003 for States using the new item in 2003.

Table 26 is based on data from 43 States and the District of Columbia that continue to use the unrevised educational attainment item, and whose data were approximately 80 percent or more complete on a place of occurrence basis. Data for Georgia, Rhode Island, and South Dakota were excluded because the educational attainment item was not on their certificates. Data for California, Idaho, Montana, and New York were excluded because these States used the revised educational attainment item, and their data would not be comparable to data based on the unrevised item.

Age-specific and age-adjusted death rates by educational attainment are shown in Table 26. Age-adjusted death rates by educational attainment were computed based on the age-specific rates and the standard population for ages 25–64 years. Data for age groups 65 years and over are not shown because reporting quality is poorer at older than younger ages (59).

Rates by educational attainment are affected by differences in measurement of education for the numerator and the denominator. The numerator is based on number of years of education completed as reported on the death certificate, whereas the denominator is based on highest degree completed as reported on census surveys (58).

Injury at work

Information on deaths attributed to injuries at work is derived from a separate item on the death certificate that asks the medical certifier whether the death resulted from an injury sustained at work. The item is on the death certificate of all States. Number of deaths, age-specific death rates, and age-adjusted death rates for injury at work are shown in Tables 27 and 28. Deaths, crude death rates, and age-adjusted death rates for injury at work are shown for ages 15 years and over. Age-adjusted death rates for injury at work were computed using age-specific death rates and the U.S. standard population based on year 2000 standard for ages 15 years and over. See section on "Computing rates."

Figures shown in Table 28 of this report for data year 2002 may differ from those published in Table 28 of *Deaths: Final Data for 2002* because the previously published figures for 2002 erroneously included figures for age not stated.

Infant mortality

Infant mortality rates are the most commonly used index for measuring the risk of dying during the first year of life. The rates presented in this report are calculated by dividing the number of infant deaths in a calendar year by the number of live births registered for the same period and are presented as rates per 1,000 or per 100,000 live births. For final birth figures used in the denominator for infant mortality rates, see *Births: Final Data for 2003* (60). In contrast to infant mortality rates based on live births, infant death rates are based on the estimated population under 1 year of age. Infant death rates that appear in tabulations of age-specific death rates in this report are calculated by dividing the number of infant deaths by the July 1, 2003 population estimate of persons under 1 year of age, based on 2000 census populations. These rates are presented as rates per 100,000 population in this age group. Because of differences in the denominators, infant death rates may differ from infant mortality rates.

Another data source is available for infant mortality. The linked file of live births and infant deaths differs from the infant mortality data presented in this report in the following ways: the linked file includes

Table II. Percent distribution of deaths by education items: California, Idaho, Montana, and New York, 2002–03

[By State of occurrence. Excludes nonresidents of the United States. Due to rounding, the sum of the subgroups may not add to the total]

2002		2003	
Years of school completed	Percent distribution	Educational attainment	Percent distribution
Total	100.0	Total	100.0
Under 12 years	24.3	Less than high school diploma or GED	29.5
12 years	42.6	High school diploma or GED	37.8
13 years or more	29.5	Some college or collegiate degree	29.9
Not stated	3.5	Not stated	2.9

NOTE: GED is General Education Development high school equivalency diploma.

only events in which both the birth and the death occur in the United States and the linked file includes late filed births. During the processing of the linked file, there is an additional opportunity to exclude infant records because of duplicate records or those with additional information that raise questions about their age. Therefore, although the differences are normally miniscule, infant mortality rates based on the linked file tend to be somewhat smaller than those based on data from the general mortality file as presented in this report. Tests of statistical significance may differ between the two sources even though the differences in the measures are close. The linked file uses the mother's self-reported race from the child's birth certificate (32). Because the self-report is of better quality than infant's race from the death certificate and because the numerator and denominator are referring to the same individual's race, the linked file is the preferred source for infant mortality by race.

Maternal mortality

Maternal mortality rates are computed on the basis of the number of live births. The maternal mortality rate indicates the likelihood of a pregnant woman dying of maternal causes. They are calculated by dividing the number of maternal deaths in a calendar year by the number of live births registered for the same period and are presented as rates per 100,000 live births. The number of live births used in the denominator is an approximation of the population of pregnant women who are at risk of a maternal death.

"Maternal deaths" are defined by the World Health Organization as "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes" (8). Included in these deaths are ICD–10 codes A34, O00–O95, and O98–O99.

Some State death certificates include a separate question regarding pregnancy status. A positive response to the question is interpreted as if "pregnant" was reported in Part II of the cause-of-death section of the death certificate. If a specified length of time is not provided by the medical certifier, it is assumed that the pregnancy terminated 42 days or less prior to death. Further, if only indirect maternal causes of death (i.e., a previously existing disease or a disease that developed during pregnancy which was not due to direct obstetric causes but was aggravated by physiologic effects of pregnancy) are reported in Part I and pregnancy is reported in either Part I or Part II, the death is classified as a maternal death.

In 2003, 21 States have a separate question related to pregnancy status of female decedents around the time of their death, and 2 States have a prompt encouraging certifiers to report recent pregnancies on the death certificate; however, there are at least 6 different questions used. The 2003 revision of the U.S. Standard Certificate of Death introduced a standard question format with categories designed to utilize additional codes available in ICD–10 for deaths associated with pregnancy, childbirth, and the puerperium. As States revise their certificates, most States are expected to introduce the standard item or replace pre-existing questions with the standard item, so that there will be wider adoption of a pregnancy status item across the country and greater standardization of the particular item used.

A separate pregnancy status item on the death certificate results in the identification of more maternal deaths. Table III shows that maternal mortality rates tend to be consistently greater in areas with a separate item on the death certificate (7 percent greater for 1996–98 and 1999–2001). In 2002–03, the rates for areas with a separate question are 11 percent greater than those for areas without a separate question.

An evaluation study for the 1995–97 period found that 35 percent more maternal deaths are identified through surveillance efforts than solely by the death certificate. A number of explanations account for the underascertainment including lack of information reported in the cause-of-death section, use of fewer sources, and some differences in identification (61). This differential will conceivably decrease as a result of the increasing use of a pregnancy status checkbox on death certificates and changes in the coding of indirect maternal causes under ICD–10, which contributed to the nearly 13 percent increase in maternal deaths in ICD–10 compared to ICD–9.

Quality of reporting and processing cause of death

One index of the quality of reporting causes of death is the proportion of death certificates coded to Chapter XVIII; Symptoms, signs, and abnormal clinical and laboratory findings, not elsewhere classified (ICD–10 codes R00–R99). Although deaths occur for which the underlying causes are impossible to determine, this proportion indicates the care and consideration given to the cause-of-death statement by the medical certifier. This proportion also may be used as a rough measure of the specificity of the medical diagnoses made by the certifier in various areas. The percentage of all reported deaths in the United States assigned to Symptoms, signs, and abnormal clinical and laboratory findings, not elsewhere classified,

Table III. Maternal mortality rates by question type: United States, 1996–2003

[By State or area of residence. Rates are the sum of deaths for each individual year divided by the sum of the live births for each individual year times 100,000. The numbers shown in parentheses are the confidence intervals for the rates]

Question type	1996–98	1996–98 modified[1]	1999–2001	2002–03
United States	7.7 (7.2–8.2)	8.7 (8.1–9.2)	9.8 (9.3–10.4)	10.5 (9.8–11.2)
Registration areas with a separate question	8.0 (7.2–8.8)	9.0 (8.1–9.9)	10.2 (9.4–11.1)	11.0 (10.0–12.0)
Registration areas without a separate question	7.5 (6.8–8.2)	8.4 (7.7–9.2)	9.5 (8.8–10.3)	9.9 (8.9–10.9)

[1]Rates were modified with the comparability ratio of 1.1263.

was 1.28 in 2003, slightly higher than in 2002 (1.23 percent) but lower than in 2000 and 2001 (1.33 and 1.34 percent, respectively). From 1990 through 1999, the percentage of deaths from this cause for all ages combined generally was fairly stable, between 1.08 and 1.18 percent.

Rules for coding a cause(s) of death may sometimes require modification when evidence suggests that such modifications will improve the quality of cause-of-death data. These changes, however, may affect comparability of data between years for select causes of death.

The large decrease in Birth trauma (ICD–10 codes P10–P15) and concurrent increase in Neonatal hemorrhage (ICD–10 codes P50–P52,P54), among infants for 2003, is largely due to a coding rule change that resulted in deaths that would have previously been assigned to Intracranial laceration and hemorrhage due to birth injury (ICD–10 code P10) instead were assigned Intracranial nontraumatic hemorrhage of fetus and newborn (ICD–10 code P52).

Rare causes of death

Selected causes of death considered to be of public health concern are routinely confirmed by the States according to agreed upon procedures between the State vital statistics programs and the National Center for Health Statistics. These causes, termed "Infrequent and rare causes of death," are listed in the NCHS instruction manuals Parts 2a, 11, and 20 (39,62,63).

For data year 2003, complete confirmation of deaths from infrequent and rare causes was not provided by the following States: California, Illinois, Kentucky, Louisiana, Michigan, Nevada, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania, Texas, Washington, and West Virginia.

Population bases for computing rates

Populations used for computing death rates and life tables shown in this report represent the population residing in the United States, enumerated as of April 1 for census years and estimated as of July 1 for all other years. Population estimates used to compute death rates for the United States for 2003 are shown by race for 10-year age groups in table IV and are available by single years of age on the mortality Web site available from: http://www.cdc.gov/nchs/about/major/dvs/popbridge/popbridge.htm (64).

Population estimates in Table V for Mexicans, Puerto Ricans, Cubans, and Other Hispanics, and population estimates by marital status in Tables VI, are based on the CPS adjusted to resident population control totals for the United States (65) and, as such, are subject to sampling variation (see "Random variation"). The control totals used are 2000-based population estimates for the United States for July 1, 2003 (64).

Population estimates by educational attainment, shown in Table VII, are also based on the CPS adjusted to resident population control totals (65), and are also subject to sampling variation (see "Random variation"). The control totals used are 2000-based population estimates for 43 States and the District of Columbia for July 1, 2003 (64).

Population estimates for each State, shown in Table VIII, were estimated from State-level postcensal population estimates based on the 2000 census, estimated as of July 1, 2003 (64). Population estimates for Puerto Rico, Virgin Islands, Guam, American Samoa, and Northern Marianas, also shown in Table VIII, are based on the 2000 census, estimated as of July 1, 2003 (66). Population estimates for each State and territory are based on demographic analysis and, therefore, are not subject to sampling variation.

Death rates, shown in this report, for 1991–2003 are based on populations that are consistent with the 2000 census levels (64,67–77). These estimates were produced under a collaborative arrangement with the U.S. Census Bureau and are based on the 2000 census counts by age, race, and sex, modified to be consistent with U.S. Office of Management and Budget racial categories as of 1977 and historical categories for death data (10). The modification procedures are described in detail elsewhere (12,13).

Computing rates

Except for infant and maternal mortality rates, rates are on an annual basis per 100,000 estimated population residing in the specified area. Infant and maternal mortality rates are per 1,000 or per 100,000 live births. Comparisons made in the text among rates, unless otherwise specified, are statistically significant at the 0.05 level of significance. Lack of comment in the text about any two rates does not mean that the difference was tested and found not to be significant at this level.

Age-adjusted rates (R') are used to compare relative mortality risks among groups and over time. However, they should be viewed as relative indexes rather than as actual measures of mortality risk. They were computed by the direct method, that is, by applying age-specific death rates (R_i) to the U.S. standard population age distribution (Table IX)

$$R' = \sum_i w_i R_i$$

where P_{si} is the standard population for age group i, and P_s is the total U.S. standard population (all ages combined).

Beginning with the 1999 data year, a new population standard was adopted by NCHS for use in age-adjusting death rates. Based on the projected year 2000 population of the United States, the new standard replaces the 1940 standard population that had been used for over 50 years. The new population standard affects levels of mortality and to some extent trends and group comparisons. Of particular note are the effects on race comparison of mortality. For detailed discussion see *Age Standardization of Death Rates: Implementation of the Year 2000 Standard* (79). Beginning with 2003 data, the traditional standard million population along with corresponding standard weights to six decimal places were replaced by the projected year 2000 population age distribution (see Table IX). A forthcoming report will describe the change in more detail. The effect of the change is negligible and does not significantly affect comparability with age-adjusted rates calculated using the previous method.

All age-adjusted rates shown in this report are based on the year 2000 standard population. The year 2000 standard population used for computing age-adjusted rates and standard errors, excluding those by marital status, education, injury at work, and the U.S. territories, is shown in Table IX.

Age-adjusted rates by marital status were computed by applying the age-specific death rates to the U.S. standard population for ages

Table IV. Estimated population by 10-year age groups, specified race, and sex: United States, 2003

[Populations are postcensal estimates based on the 2000 census, estimated as of July 1, 2003; see "Technical Notes"]

Age	All races			White			Black			American Indian			Asian or Pacific Islander		
	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female
Total	290,810,789	143,037,290	147,773,499	236,349,420	116,875,095	119,474,325	38,148,112	18,190,193	19,957,919	3,111,067	1,552,954	1,558,113	13,202,190	6,419,048	6,783,142
Under 1 year	4,003,606	2,045,536	1,958,070	3,118,782	1,593,997	1,524,785	659,622	336,168	323,454	42,098	21,394	20,704	183,104	93,977	89,127
1–4 years	15,765,673	8,059,879	7,705,794	12,294,184	6,295,669	5,998,515	2,561,526	1,301,042	1,260,484	188,934	96,001	92,933	721,029	367,167	353,862
5–14 years	40,968,637	20,976,656	19,991,981	31,810,245	16,322,405	15,487,840	6,781,013	3,444,485	3,336,528	578,782	293,246	285,536	1,798,597	916,520	882,077
15–24 years	41,206,163	21,182,602	20,023,561	32,384,417	16,726,062	15,658,355	6,319,922	3,180,005	3,139,917	571,946	293,890	278,056	1,929,878	982,645	947,233
25–34 years	39,872,598	20,222,486	19,650,112	31,468,909	16,158,842	15,310,067	5,474,621	2,612,885	2,861,736	464,050	239,645	224,405	2,465,018	1,211,114	1,253,904
35–44 years	44,370,594	22,133,659	22,236,935	35,942,205	18,128,882	17,813,323	5,757,698	2,705,308	3,052,390	466,559	231,882	234,677	2,204,132	1,067,587	1,136,545
45–54 years	40,804,599	20,043,656	20,760,943	33,840,582	16,806,854	17,033,728	4,797,101	2,217,649	2,579,452	384,941	186,781	198,160	1,781,975	832,372	949,603
55–64 years	27,899,736	13,424,324	14,475,412	23,853,194	11,589,706	12,263,488	2,763,036	1,231,617	1,531,419	222,746	107,337	115,409	1,060,760	495,664	565,096
65–74 years	18,337,044	8,349,361	9,987,683	15,883,607	7,308,099	8,575,508	1,709,175	710,590	998,585	115,490	53,233	62,257	628,772	277,439	351,333
75–84 years	12,868,672	5,154,207	7,714,465	11,496,397	4,637,828	6,858,569	981,628	354,533	627,095	56,662	23,514	33,148	333,985	138,332	195,653
85 years and over	4,713,467	1,444,924	3,268,543	4,256,898	1,306,751	2,950,147	342,770	95,911	246,859	18,859	6,031	12,828	94,940	36,231	58,709

SOURCE: National Center for Health Statistics. Estimates of the July 1, 2003, United States resident population by age, sex, race, and Hispanic origin, prepared under a collaborative arrangement with the U.S. Census Bureau. 2004.

Table V. Estimated population by 10-year age groups, according to specified Hispanic origin, race for non-Hispanic population, and sex: United States, 2003

[Populations for all origins, Hispanic, non-Hispanic, non-Hispanic white, and non-Hispanic black are postcensal estimates based on the 2000 census, estimated as of July 1, 2003; populations for Mexican, Puerto Rican, Cuban, Central and South American, and other and unknown Hispanic are based on the Current Population Survey adjusted to resident population control totals. The control totals are 2000-based population estimates for the United States for July 1, 2003; see "Technical Notes"]

Hispanic origin, race for non-Hispanic population, and sex	Total	Under 1 year	1–4 years	5–14 years	15–24 years	25–34 years	35–44 years	45–54 years	55–64 years	65–74 years	75–84 years	85 years and over
All origins	290,810,789	4,003,606	15,765,673	40,968,637	41,206,163	39,872,598	44,370,594	40,804,599	27,899,736	18,337,044	12,868,672	4,713,467
Male	143,037,290	2,045,536	8,059,879	20,976,656	21,182,602	20,222,486	22,133,659	20,043,656	13,424,324	8,349,361	5,154,207	1,444,924
Female	147,773,499	1,958,070	7,705,794	19,991,981	20,023,561	19,650,112	22,236,935	20,760,943	14,475,412	9,987,683	7,714,465	3,268,543
Hispanic	39,899,063	865,596	3,292,324	7,490,896	6,993,659	7,378,671	5,916,558	3,818,332	2,087,702	1,221,855	640,506	192,964
Male	20,599,115	441,790	1,681,598	3,831,589	3,758,587	4,015,504	3,101,439	1,910,346	990,630	541,901	260,767	64,964
Female	19,299,948	423,806	1,610,726	3,659,307	3,235,072	3,363,167	2,815,119	1,907,986	1,097,072	679,954	379,739	128,000
Mexican	26,526,961	632,129	2,418,367	5,267,224	4,790,186	5,060,794	3,767,854	2,303,842	1,200,734	627,052	359,702	99,077
Male	13,887,087	314,174	1,227,906	2,682,314	2,585,304	2,790,122	2,041,934	1,177,093	598,965	285,771	148,652	34,852
Female	12,639,874	317,955	1,190,461	2,584,910	2,204,882	2,270,672	1,725,920	1,126,749	601,769	341,281	211,050	64,225
Puerto Rican	3,861,862	68,151	279,689	806,811	645,958	616,886	572,005	396,316	253,500	141,330	57,621	23,595
Male	1,889,835	42,444	137,499	415,046	328,948	286,034	272,316	206,376	109,046	62,148	20,595	9,383
Female	1,972,027	25,707	142,190	391,765	317,010	330,852	299,689	189,940	144,454	79,182	37,026	14,212
Cuban	1,496,974	13,868	72,050	185,045	142,413	167,502	231,922	171,623	174,108	178,495	115,407	44,541
Male	772,826	5,660	39,372	99,853	79,666	97,758	123,512	91,544	76,182	88,263	57,568	13,448
Female	724,148	8,208	32,678	85,192	62,747	69,744	108,410	80,079	97,926	90,232	57,839	31,093
Other Hispanic[1]	8,013,241	151,446	522,210	1,231,823	1,415,104	1,533,491	1,344,781	946,538	459,340	274,984	107,777	25,747
Male	4,049,332	79,507	276,822	634,380	764,665	841,589	663,678	435,315	206,425	105,722	33,953	7,276
Female	3,963,909	71,939	245,388	597,443	650,439	691,902	681,103	511,223	252,915	169,262	73,824	18,471
Non-Hispanic[2]	250,911,726	3,138,010	12,473,349	33,477,741	34,212,504	32,493,927	38,454,036	36,986,267	25,812,034	17,115,189	12,228,166	4,520,503
Male	122,438,175	1,603,746	6,378,281	17,145,067	17,424,015	16,206,982	19,032,220	18,133,310	12,433,694	7,807,460	4,893,440	1,379,960
Female	128,473,551	1,534,264	6,095,068	16,332,674	16,788,489	16,286,945	19,421,816	18,852,957	13,378,340	9,307,729	7,334,726	3,140,543
White	199,214,378	2,293,830	9,206,655	24,921,740	25,909,690	24,580,493	30,425,992	30,285,757	21,896,215	14,731,190	10,888,874	4,073,942
Male	97,659,515	1,172,989	4,718,411	12,797,144	13,236,567	12,392,937	15,225,383	15,024,652	10,660,423	6,796,054	4,389,772	1,245,183
Female	101,554,863	1,120,841	4,488,244	12,124,596	12,673,123	12,187,556	15,200,609	15,261,105	11,235,792	7,935,136	6,499,102	2,828,759
Black	36,508,902	632,489	2,433,709	6,425,853	6,023,230	5,186,293	5,522,294	4,640,854	2,683,111	1,664,696	960,203	336,170
Male	17,384,854	322,268	1,235,914	3,263,734	3,027,618	2,472,529	2,592,246	2,143,428	1,194,909	691,814	346,535	93,859
Female	19,124,048	310,221	1,197,795	3,162,119	2,995,612	2,713,764	2,930,048	2,497,426	1,488,202	972,882	613,668	242,311

[1]Includes Central and South American and Other and unknown Hispanic. [2]Includes races other than white and black.

SOURCE: Population estimates for specified Hispanic subgroups based on unpublished tabulations prepared by the Housing and Household Economic Statistics Division, U.S. Census Bureau. Population estimates for All origins, Hispanic, non-Hispanic, non-Hispanic white, and non-Hispanic black were prepared under a collaborative arrangement with the U.S. Census Bureau. See references 5 and 79.

Table VI. Estimated population for ages 15 years and over by marital status, 10-year age groups, and sex: United States, 2003

[Population estimates are based on the Current Population Survey adjusted to resident population controls for the United States. The control totals used are 2000-based population estimates for the United States for July 1, 2003]

Marital status and sex	15 years and over	15–24 years	25–34 years	35–44 years	45–54 years	55–64 years	65–74 years	75 years and over
All races	230,072,909	41,206,153	39,872,616	44,370,598	40,804,629	27,899,739	18,337,034	17,582,140
Never married	66,304,187	36,823,313	15,001,634	7,360,584	4,123,693	1,588,261	734,032	672,670
Ever married	163,768,722	4,382,840	24,870,982	37,010,014	36,680,936	26,311,478	17,603,002	16,909,470
Married	126,911,192	4,060,024	22,263,632	30,985,187	29,330,342	20,307,098	12,139,937	7,824,972
Widowed	14,912,163	29,302	134,980	399,703	843,369	1,777,126	3,584,577	8,143,106
Divorced	21,945,367	293,514	2,472,370	5,625,124	6,507,225	4,227,254	1,878,488	941,392
All races, male	111,955,243	21,182,602	20,222,498	22,133,653	20,043,677	13,424,323	8,349,355	6,599,135
Never married	36,477,727	19,564,360	8,833,421	4,401,133	2,267,824	783,717	382,038	245,234
Ever married	75,477,516	1,618,242	11,389,077	17,732,520	17,775,853	12,640,606	7,967,317	6,353,901
Married	63,548,270	1,492,111	10,311,282	15,229,858	14,740,384	10,643,141	6,531,796	4,599,698
Widowed	2,781,219	6,878	35,524	88,179	205,167	295,907	692,607	1,456,957
Divorced	9,148,027	119,253	1,042,271	2,414,483	2,830,302	1,701,558	742,914	297,246
All races, female	118,117,666	20,023,551	19,650,118	22,236,945	20,760,952	14,475,416	9,987,679	10,983,005
Never married	29,826,460	17,258,953	6,168,213	2,959,451	1,855,869	804,544	351,994	427,436
Ever married	88,291,206	2,764,598	13,481,905	19,277,494	18,905,083	13,670,872	9,635,685	10,555,569
Married	63,362,922	2,567,913	11,952,350	15,755,329	14,589,958	9,663,957	5,608,141	3,225,274
Widowed	12,130,944	22,424	99,456	311,524	638,202	1,481,219	2,891,970	6,686,149
Divorced	12,797,340	174,261	1,430,099	3,210,641	3,676,923	2,525,696	1,135,574	644,146

SOURCE: Population estimates based on unpublished tabulations prepared by the Housing and Household Economic Statistics Division of the U.S. Census Bureau. 2005.

Table VII. Estimated population for ages 25–64, by educational attainment and sex: Total of 43 reporting States and the District of Columbia, 2003

[Population estimates based on the Current Population Survey adjusted to resident population controls. The control totals used are 2000-based population estimates for 43 States and the District of Columbia for July 1, 2003; see "Technical Notes"]

Years of school completed and sex	25–64 years	25–34 years	35–44 years	45–54 years	55–64 years
All Races					
Both sexes	117,106,192	30,242,077	33,765,158	31,440,530	21,658,427
Under 12 years	13,462,206	3,735,380	3,629,115	3,066,819	3,030,892
12 years	37,812,585	9,012,330	11,110,139	10,127,702	7,562,414
13 or more years	65,831,401	17,494,367	19,025,904	18,246,009	11,065,121
Male	58,111,873	15,307,882	16,872,008	15,532,285	10,399,698
Under 12 years	7,281,391	2,113,035	2,041,408	1,643,167	1,483,781
12 years	18,663,727	4,847,953	5,767,589	4,826,373	3,221,812
13 or more years	32,166,755	8,346,894	9,063,011	9,062,745	5,694,105
Female	58,994,319	14,934,195	16,893,150	15,908,245	11,258,729
Under 12 years	6,180,815	1,622,345	1,587,707	1,423,652	1,547,111
12 years	19,148,858	4,164,377	5,342,550	5,301,329	4,340,602
13 or more years	33,664,646	9,147,473	9,962,893	9,183,264	5,371,016

SOURCE: Population estimates based on unpublished tabulations prepared by the Housing and Household Economic Statistics Division, U.S. Census Bureau. 2005.

25 years and over. Although age-specific death rates by marital status are shown for the age group 15–24 years, they are not included in the calculation of age-adjusted rates because of their high variability, particularly for the widowed population. Also, the age groups 75–84 and 85 years and over are combined because of high variability in death rates in the 85 years and over age group, particularly for the never married population. The year 2000 standard population used for computing age-adjusted rates and standard errors by marital status is shown in Table X.

Age-adjusted rates by educational attainment were computed by applying the age-specific death rates to the U.S. standard population for ages 25–64 years. Data for age groups 65 years and over are not shown because reporting quality is poorer for older than for younger ages (59). The year 2000 standard population used for computing age-adjusted rates and standard errors by education is shown in Table XI.

Age-adjusted rates for injury at work were computed by applying the age-specific death rates to the U.S. standard population for ages 15 years and over. The year 2000 standard population used for computing age-adjusted rates and standard errors for injury at work is shown in Table XII.

Age-adjusted rates for Puerto Rico, Virgin Islands, Guam, American Samoa, and Northern Marianas were computed by applying the age-specific death rates to the U.S. standard population. Age groups for 75 years and over were combined because population counts were unavailable by age group for ages over 75 years. The

Table VIII. Estimated population for the United States, each State, Puerto Rico, Virgin Islands, Guam, American Samoa, and Northern Marianas, 2003

[Populations for the United States are postcensal estimates produced in 2003 based on the 2000 census estimated as of July 1, 2003. Populations for each State, Puerto Rico, Virgin Islands, Guam, American Samoa, and Northern Marianas are postcensal estimates produced in 2003 based on the 2000 census estimated as of July 1, 2003. State populations do not add to United States total]

Area	Total	Area	Total
United States	290,810,789		
Alabama	4,500,752	Nevada	2,241,154
Alaska	648,820	New Hampshire	1,287,689
Arizona	5,580,811	New Jersey	8,638,396
Arkansas	2,725,715	New Mexico	1,874,614
California	35,484,453	New York	19,190,115
Colorado	4,550,688	North Carolina	8,407,248
Connecticut	3,483,375	North Dakota	633,840
Delaware	817,491	Ohio	11,435,799
District of Columbia	564,353	Oklahoma	3,511,532
Florida	17,019,068	Oregon	3,559,596
Georgia	8,684,715	Pennsylvania	12,365,459
Hawaii	1,257,613	Rhode Island	1,076,166
Idaho	1,366,332	South Carolina	4,147,153
Illinois	12,653,544	South Dakota	764,309
Indiana	6,195,643	Tennessee	5,841,748
Iowa	2,944,062	Texas	22,118,509
Kansas	2,723,508	Utah	2,351,467
Kentucky	4,117,827	Vermont	619,116
Louisiana	4,496,334	Virginia	7,386,330
Maine	1,305,732	Washington	6,131,445
Maryland	5,508,909	West Virginia	1,810,357
Massachusetts	6,433,422	Wisconsin	5,472,299
Michigan	10,079,985	Wyoming	501,242
Minnesota	5,059,375	Puerto Rico	3,878,532
Mississippi	2,881,283	Virgin Islands	108,814
Missouri	5,704,484	Guam	163,593
Montana	917,621	American Samoa	57,844
Nebraska	1,739,291	Northern Marianas	76,129

SOURCE: U.S. Census Bureau. See References 64 and 66.

Table IX. United States standard population

Age	Population
All ages	274,633,642
Under 1 year	3,794,901
1–4 years	15,191,619
5–14 years	39,976,619
15–24 years	38,076,743
25–34 years	37,233,437
35–44 years	44,659,185
45–54 years	37,030,152
55–64 years	23,961,506
65–74 years	18,135,514
75–84 years	12,314,793
85 years and over	4,259,173

Table X. United States standard population for ages 25 years and over

Age	Population
25 years and over	177,593,760
25–34 years	37,233,437
35–44 years	44,659,185
45–54 years	37,030,152
55–64 years	23,961,506
65–74 years	18,135,514
75 years and over	16,573,966

Table XI. United States standard population for ages 25–64 years

Age	Population
25–64 years	142,884,280
25–34 years	37,233,437
35–44 years	44,659,185
45–54 years	37,030,152
55–64 years	23,961,506

Table XII. United States standard population for ages 15 years and over

Age	Population
15 years and over	215,670,503
15–24 years	38,076,743
25–34 years	37,233,437
35–44 years	44,659,185
45–54 years	37,030,152
55–64 years	23,961,506
65 years and over	34,709,480

year 2000 standard population used for computing age-adjusted rates and standard errors for the territories is shown in Table XIII.

Using the same standard population, death rates for the total population and for each race-sex group were adjusted separately. The age-adjusted rates were based on 10-year age groups. It is important not to compare age-adjusted death rates with crude rates.

Death rates for the Hispanic population are based only on events to persons reported as Hispanic. Rates for non-Hispanic white persons are based on the sum of all events to white decedents reported as non-Hispanic and white decedents with origin not stated. Hispanic origin is not imputed if it is not reported.

Random variation

The mortality data presented in this report, with the exception of data for 1972, are not subject to sampling error. In 1972, mortality data were based on a 50 percent sample of deaths because of resource constraints. Mortality data, even based on complete counts, may be affected by random variation. That is, the number of deaths that actually occurred may be considered as one of a large series of possible results that could have arisen under the same circumstances (80,81). When the number of deaths is small (perhaps less than 100), random variation tends to be relatively large. Therefore, considerable caution must be observed in interpreting statistics based on small numbers of deaths.

Measuring random variability—To quantify the random variation associated with mortality statistics, one must make an assumption regarding the appropriate underlying distribution. Deaths, as infrequent events, can be viewed as deriving from a Poisson probability distribution. The Poisson distribution is simple conceptually and computationally and provides reasonable, conservative variance estimates for mortality statistics when the probability of dying is relatively low (81). Using the properties of the Poisson distribution, the standard error (SE) associated with the number of deaths (D) is

$$1.\quad \mathrm{SE}(D) = \sqrt{\mathrm{var}(D)} = \sqrt{D}$$

where var(D) denotes the variance of D.

The standard error associated with crude and age-specific death rates (R) assumes that the population denominator (P) is a constant and is

$$2.\quad \mathrm{SE}(R) = \sqrt{\mathrm{var}\left(\frac{D}{P}\right)} = \sqrt{\frac{1}{P^2}\mathrm{var}(D)} = \sqrt{\frac{D}{P^2}} = \frac{R}{\sqrt{D}}$$

The coefficient of variation or relative standard error (RSE) is a useful measure of relative variation. The RSE is calculated by dividing the statistic (e.g., number of deaths, death rate) into its standard error and multiplying by 100. For the number of deaths

$$\mathrm{RSE}(D) = 100\,\frac{\mathrm{SE}(D)}{D} = 100\,\frac{\sqrt{D}}{D} = 100\sqrt{\frac{1}{D}}$$

For crude and age-specific death rates

$$\mathrm{RSE}(R) = 100\,\frac{\mathrm{SE}(R)}{R} = 100\,\frac{R/\sqrt{D}}{R} = 100\sqrt{\frac{1}{D}}$$

Thus,

$$3.\quad \mathrm{RSE}(D) = \mathrm{RSE}(R) = 100\sqrt{\frac{1}{D}}$$

The standard error of the age-adjusted death rate (R') is

$$4.\quad \mathrm{SE}(R') = \sqrt{\sum_i \left(\frac{P_{si}}{P_s}\right)^2 \mathrm{var}\,(R_i)} = \sqrt{\sum_i \left\{\left(\frac{P_{si}}{P_s}\right)^2 \left(\frac{R_i^2}{D_i}\right)\right\}}$$

where

R_i = age-specific rate for the ith age group
P_{si} = age-specific standard population for the ith age group from the U.S. standard population age distribution (see Table IX and age-adjusted death rate under "Definition of terms")
P_s = total U.S. standard population (all ages combined)
D_i = number of deaths for the ith age group

The RSE for the age-adjusted rate, RSE (R'), can easily be calculated by dividing SE (R') from formula 4 by the age-adjusted death rate, R', and multiplying by 100.

$$\mathrm{RSE}(R') = 100\,\frac{\mathrm{SE}(R')}{R'}$$

For tables showing infant and maternal mortality rates based on live births (B) in the denominator, calculation of the standard error assumes random variability in both the numerator and denominator. The standard error for the infant mortality rate (IMR) is

$$5.\quad \mathrm{SE}(IMR) = \sqrt{\frac{\mathrm{var}(D) + IMR \cdot \mathrm{var}(B)}{E(B)^2}} = \sqrt{\frac{D}{B^2} + \frac{D^2}{B^3}}$$

where the number of births, B, is also assumed to be distributed according to a Poisson distribution and $E(B)$ is the expectation of B.

The RSE for the IMR is

$$6.\quad \mathrm{RSE}(IMR) = 100\,\frac{\mathrm{SE}(IMR)}{IMR} = 100\sqrt{\frac{1}{D} + \frac{1}{B}}$$

For maternal mortality rates, formulas 5 and 6 may be used substituting the maternal mortality rate for the IMR.

Table XIII. United States standard population for use with the territories

Age	Population
All ages	274,633,642
Under 1 year	3,794,901
1–4 years	15,191,619
5–14 years	39,976,619
15–24 years	38,076,743
25–34 years	37,233,437
35–44 years	44,659,185
45–54 years	37,030,152
55–64 years	23,961,506
65–74 years	18,135,514
75 years and over	16,573,966

Formulas 1–6 may be used for all tables presented in this report except for death rates and age-adjusted death rates shown in Tables 5, 25, and 26, which are calculated using population figures that are subject to sampling error (see the following subsection).

Tables 5, 25, and 26—Death rates for Mexicans, Puerto Ricans, Cubans, and Other Hispanics in Table 5, rates by marital status in Table 25, and rates by educational attainment in Table 26 are based on population estimates derived from the U.S. Census Bureau's Current Population Survey (CPS) for 2003 and adjusted to resident population control totals. As a result, the rates are subject to sampling variability in the denominator as well as random variability in the numerator.

For crude and age-specific death rates (R) the standard error is calculated as

$$7. \quad SE(R) = R\sqrt{\frac{1}{D} + 0.67\left(a + \frac{b}{P}\right)}$$

For age-adjusted death rates (R')

$$8. \quad SE(R') = \sqrt{\sum_i \left\{\left(\frac{P_{si}}{P_s}\right)^2 R_i^2 \left[\frac{1}{D_i} + 0.67\left(a + \frac{b}{P_i}\right)\right]\right\}}$$

where *a* and *b* in formulas 7 and 8 represent parameters presented in Table XIV, which are derived from the CPS data for 2002 and 2003 and vary depending on the subgroup of interest (82,83).

Suppression of unreliable rates—Beginning with 1989 data, an asterisk is shown in place of a crude or age-specific death rate based on fewer than 20 deaths, the equivalent of an RSE of 23 percent or more. The limit of 20 deaths is a convenient, if somewhat arbitrary, benchmark, below which rates are considered to be too statistically unreliable for presentation. For infant and maternal mortality rates, the same criterion (less than 20 deaths) is used to determine whether an asterisk is presented in place of the rate. For age-adjusted death rates, the suppression criterion is based on the sum of the age-specific deaths; i.e., if the sum of the age-specific deaths is less than 20, an asterisk is presented in place of the rate. These procedures are used throughout this report except for death rates shown in Tables 5, 25, and 26.

For death rates shown in Tables 5, 25, and 26, sampling variability in the population denominator has a substantial impact on the overall variability in the rate. Therefore, the number of deaths in the numerator is not used as the sole suppression factor. RSEs for rates shown in Tables 5, 25, and 26 are derived from formulas 7 and 8 by dividing the results of formulas 7 and 8, by the crude/age-specific rate and age-adjusted rate, respectively, and multiplying by 100. Rates are replaced by asterisks if the calculated RSE is 23 percent or more. In some cases, for smaller population subgroups, the estimated sample population from the CPS may be zero, even though deaths are presented for these same subgroups. In these cases, the death rate is incalculable and is automatically replaced with an asterisk.

Confidence intervals and statistical tests based on 100 deaths or more—When the number of deaths is large, a normal approximation may be used in the calculation of confidence intervals and statistical tests. How large is to some extent a subjective judgment. In general, for crude and age-specific death rates and for infant and maternal mortality rates, the normal approximation performs quite well when the number of deaths is 100 or greater. For age-adjusted rates, the criterion for use of the normal approximation is somewhat more complicated (7,79,84). Formula 9 is used to calculate 95 percent confidence limits for the death rate when the normal approximation is appropriate.

$$9. \quad L(R) = R - 1.96(SE(R)) \text{ and } U(R) = R + 1.96(SE(R))$$

where *L(R)* and *U(R)* are the lower and upper limits of the confidence interval, respectively. The resulting 95 percent confidence interval can be interpreted to mean that the chances are 95 in 100 that the "true" death rate falls between *L(R)* and *U(R)*. For example, suppose that the crude death rate for Malignant neoplasms is 191.5 per 100,000 population based on 556,902 deaths. Lower and upper 95 percent confidence limits using formula 9 are calculated as

$L(191.5) = 191.5 - 1.96(.26) = 191.0$ and
$U(191.5) = 191.5 + 1.96(.26) = 192.0$

Thus, the chances are 95 in 100 that the true death rate for malignant neoplasms is between 191.0 and 192.0. Formula 9 can also be used

Table XIV. Current Population Survey standard error parameters for death rates in Tables 5, 25, and 26

Characteristic	Total		White, black, non-Hispanic white, or non-Hispanic black		Hispanic	
	a	b	a	b	a	b
Table 5						
All origins	0.000000	0	0.000000	0	0.000000	0
Hispanic subgroups (Mexican, Puerto Rican, Cuban, and Other Hispanic)	...	...	...	...	–0.000096	3,809
Table 25						
All marital status groups combined	0.000000	0	...	...	...	...
Marital status subgroups (Never married, Ever married, Married, Widowed, Divorced)	–0.000009	2,652	...	...	...	...
Table 26						
All education groups	0.000000	0	...	...	...	...
Education subgroups (Under 12 years, 12 years, 13 years or over)	–0.000005	1,206	...	...	...	...

... Category not applicable.

SOURCE: The a and b parameters are the average of the 2003 and 2004 Current Population Survey standard error parameters. See references 82 and 83.

to calculate 95 percent confidence intervals for the number of deaths, age-adjusted death rates, infant mortality rates, and other mortality statistics when the normal approximation is appropriate by replacing R with D, R', IMR, etc.

When testing the difference between two rates, R_1 and R_2 (each based on 100 or more deaths), the normal approximation may be used to calculate a test statistic, z, such that

$$10. \quad z = \frac{R_1 - R_2}{\sqrt{\mathrm{SE}(R_1)^2 + \mathrm{SE}(R_2)^2}}$$

If $|z| \geq 1.96$ then the difference between the rates is statistically significant at the 0.05-level. If $|z| < 1.96$ then the difference is not statistically significant. Formula 10 can also be used to perform tests for other mortality statistics when the normal approximation is appropriate (when both statistics being compared meet the normal criteria) by replacing R_1 and R_2 with D_1 and D_2, R'_1 and R'_2, etc. Suppose that the female age-adjusted death rate for Malignant neoplasms of trachea, bronchus, and lung (lung cancer) is 41.6 per 100,000 U.S. standard population in 2002 (R_1) and 41.3 per 100,000 U.S. standard population in 2003 (R_2). The standard error for each of these figures, SE(R_1) and SE(R_2), is calculated using formula 4. Using formula 10, one can test if the decrease in the age-adjusted rate is statistically significant.

$$z = \frac{41.6 - 41.3}{\sqrt{(0.161)^2 + (0.159)^2}} = 1.33$$

Because $|z| = 1.33 < 1.96$, the increase from 2002 to 2003 in the female age-adjusted death rate for lung cancer is not statistically significant.

Confidence intervals and statistical tests based on less than 100 deaths—When the number of deaths is not large (less than 100), the Poisson distribution cannot be approximated by the normal distribution. The normal distribution is a symmetric distribution with a range from from – 4 to + 4. As a result, confidence intervals based on the normal distribution also have this range. The number of deaths or the death rate, however, cannot be less than zero. When the number of deaths is very small, approximating confidence intervals for deaths and death rates using the normal distribution will sometimes produce lower confidence limits that are negative. The Poisson distribution, in contrast, is an asymmetric distribution with zero as a lower bound. Thus, confidence limits based on this distribution will never be less than zero. A simple method based on the more general family of gamma distributions, of which the Poisson is a member, can be used to approximate confidence intervals for deaths and death rates when the number of deaths is small (79,84). For more information regarding how the gamma method is derived, see *Derivation of the gamma method* at the end of this section.

Calculations using the gamma method can be made using commonly available spreadsheet programs or statistical software (e.g., Excel, SAS) that include an inverse gamma function. In Excel, the function "gammainv(probability, alpha, beta)" returns values associated with the inverse gamma function for a given probability between 0 and 1. For 95 percent confidence limits, the probability associated with the lower limit is. 05/2 = .025 and the probability associated with the upper limit is 1-(.05/2) = .975. Alpha and beta are parameters associated with the gamma distribution. For the number of deaths and crude and age-specific death rates, alpha = D (the number of deaths) and beta = 1. In Excel, the following formulas can be used to calculate lower and upper 95 percent confidence limits for the number of deaths and crude and age-specific death rates

$L(D)$ = GAMMAINV(.025, D, 1) and $U(D)$ = GAMMAINV(.975, D+1, 1)

Confidence limits for the death rate are then calculated by dividing $L(D)$ and $U(D)$ by the population (P) at risk of dying (see formula 17).

Alternatively, 95 percent confidence limits can be estimated using the lower and upper confidence limit factors shown in Table XV. For the number of deaths, D, and the death rate, R,

$$11. \quad L(D) = L \times D \quad \text{and} \quad U(D) = U \times D$$

$$12. \quad L(R) = L \times R \quad \text{and} \quad U(R) = U \times R$$

where L and U in formulas 11 and 12 are the lower and upper confidence limit factors which correspond to the appropriate number of deaths, D, in Table XV. For example, suppose that the death rate for American Indian males aged 10–14 is 36.2 per 100,000 and based on 56 deaths. Applying formula 12, values for L and U from Table XV for 56 deaths are multiplied by the death rate, 36.2, such that

$L(R) = L(36.2) = 0.755389 \times 36.2 = 27.3$ and

$U(R) = U(36.2) = 1.298583 \times 36.2 = 47.0$

These confidence limits indicate that the chances are 95 out of 100 that the actual death rate for American Indian males aged 10–14 is between 27.4 and 47.0 per 100,000.

Although the calculations are similar, confidence intervals based on small numbers for age-adjusted death rates, infant and maternal mortality rates, and rates that are subject to sampling variability in the denominator are somewhat more complicated (7,79). Refer to the most recent version of the Mortality Technical Appendix for more details available from: http://www.cdc.gov/nchs/datawh/statab/pubd/ta.htm.

When comparing the difference between two rates, R_1 and R_2 where one or both of the rates are based on fewer than 100 deaths, a comparison of 95 percent confidence intervals may be used as a statistical test. If the 95 percent confidence intervals do not overlap, then the difference can be said to be statistically significant at the 0.05 level. A simple rule of thumb is: if $R_1 > R_2$ then test if $L(R_1) > U(R_2)$ or if $R_2 > R_1$ then test if $L(R_2) > U(R_1)$. Positive tests denote statistical significance at the 0.05 level. For example, suppose that American Indian males aged 10–14 have a death rate (R_1) of 36.2 based on 56 deaths, and Asian and Pacific Islander (API) males aged 10–14 have a death rate (R_2) of 18.2 per 100,000 based on 84 deaths. The 95 percent confidence limits for R_1 and R_2 calculated using formula 12 would be

$L(R_{1)} = L(36.2) = 0.755389 \times 36.2 = 27.3$ and

$U(R_1) = U(36.2) = 1.298583 \times 36.2 = 47.0$

$L(R_2) = L(18.2) = 0.797639 \times 18.2 = 14.5$ and

$U(R_2) = U(18.2) = 1.238068 \times 18.2 = 22.5$

Table XV. Lower and upper 95-percent confidence limit factors for the number of deaths and death rate when the number of deaths is less than 100

Number of deaths (D)	Lower confidence limit (L)	Upper confidence limit (U)	Number of deaths (D)	Lower confidence limit (L)	Upper confidence limit (U)
1	0.025318	5.571643	51	0.744566	1.314815
2	0.121105	3.612344	52	0.746848	1.311367
3	0.206224	2.922424	53	0.749069	1.308025
4	0.272466	2.560397	54	0.751231	1.304783
5	0.324697	2.333666	55	0.753337	1.301637
6	0.366982	2.176579	56	0.755389	1.298583
7	0.402052	2.060382	57	0.757390	1.295616
8	0.431729	1.970399	58	0.759342	1.292732
9	0.457264	1.898311	59	0.761246	1.289927
10	0.479539	1.839036	60	0.763105	1.287198
11	0.499196	1.789276	61	0.764921	1.284542
12	0.516715	1.746799	62	0.766694	1.281955
13	0.532458	1.710030	63	0.768427	1.279434
14	0.546709	1.677830	64	0.770122	1.276978
15	0.559692	1.649348	65	0.771779	1.274582
16	0.571586	1.623937	66	0.773400	1.272245
17	0.582537	1.601097	67	0.774986	1.269965
18	0.592663	1.580431	68	0.776539	1.267738
19	0.602065	1.561624	69	0.778060	1.265564
20	0.610826	1.544419	70	0.779549	1.263440
21	0.619016	1.528606	71	0.781008	1.261364
22	0.626695	1.514012	72	0.782438	1.259335
23	0.633914	1.500491	73	0.783840	1.257350
24	0.640719	1.487921	74	0.785215	1.255408
25	0.647147	1.476197	75	0.786563	1.253509
26	0.653233	1.465232	76	0.787886	1.251649
27	0.659006	1.454947	77	0.789184	1.249828
28	0.664493	1.445278	78	0.790459	1.248045
29	0.669716	1.436167	79	0.791709	1.246298
30	0.674696	1.427562	80	0.792938	1.244587
31	0.679451	1.419420	81	0.794144	1.242909
32	0.683999	1.411702	82	0.795330	1.241264
33	0.688354	1.404372	83	0.796494	1.239650
34	0.692529	1.397400	84	0.797639	1.238068
35	0.696537	1.390758	85	0.798764	1.236515
36	0.700388	1.384422	86	0.799871	1.234992
37	0.704092	1.378368	87	0.800959	1.233496
38	0.707660	1.372578	88	0.802029	1.232028
39	0.711098	1.367033	89	0.803082	1.230586
40	0.714415	1.361716	90	0.804118	1.229170
41	0.717617	1.356613	91	0.805138	1.227778
42	0.720712	1.351709	92	0.806141	1.226411
43	0.723705	1.346993	93	0.807129	1.225068
44	0.726602	1.342453	94	0.808102	1.223747
45	0.729407	1.338079	95	0.809060	1.222448
46	0.732126	1.333860	96	0.810003	1.221171
47	0.734762	1.329788	97	0.810933	1.219915
48	0.737321	1.325855	98	0.811848	1.218680
49	0.739806	1.322053	99	0.812751	1.217464
50	0.742219	1.318375			

Because $R_1 > R_2$ and $L(R_1) > U(R_2)$, it can be concluded that the difference between the death rates for American Indian males 10–14 and API males of the same age is statistically significant at the .05 level. That is, taking into account random variability, API males 10–14 have a death rate that is significantly lower than that for American Indian males of the same age.

This test may also be used to perform tests for other statistics when the normal approximation is not appropriate for one or both of the statistics being compared by replacing R_1 and R_2 with D_1 and D_2, R'_1 and R'_2, etc.

Users of the method of comparing confidence intervals should be aware that this method 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 (85). Thus, caution should be observed when interpreting a nonsignificant difference between two rates, especially when the lower and upper limits being compared overlap only slightly.

Derivation of the gamma method—For a random variable X that follows a gamma distribution $\Gamma(y,z)$, where y and z are the parameters that determine the shape of the distribution, $E(X) = yz$ and $Var(X) = yz^2$ (86). For the number of deaths, D, $E(D) = D$ and $Var(D) = D$. It follows that $y = D$ and $z = 1$ and thus,

$$13. \quad D \sim \Gamma(D,1)$$

From equation 13, it is clear that the shape of the distribution of deaths depends only on the number of deaths.

For the death rate, R, $E(R) = R$ and $Var(R) = D/P^2$. It follows, in this case, that $y = D$ and $z = P^{-1}$ and thus,

14. $R \sim \Gamma(D,P^{-1})$.

A useful property of the gamma distribution is that for $X \sim \Gamma(y,Z)$, one can divide X by z such that $X/z \sim \Gamma(y,1)$. This converts the gamma distribution into a simplified, standard form dependent only on parameter y. Expressing equation 14 in its simplified form gives

15. $$\frac{R}{P^{-1}} = D \sim \Gamma(D,1)$$

From equation 15, it is clear that the shape of the distribution of the death rate is also dependent solely on the number of deaths.

Using the results of equations 13 and 15, one can use the inverse gamma distribution to calculate upper and lower confidence limits. Lower and upper 100 (1-α) percent confidence limits for the number of deaths, $L(D)$ and $U(D)$, are estimated as

16. $$L(D) = \Gamma^{-1}_{(D,1)}(\alpha / 2) \text{ and } U(D) = \Gamma^{-1}_{(D+1,1)}(1 - \alpha / 2)$$

where Γ^{-1} represents the inverse of the gamma distribution and D+1 in the formula for $U(D)$ reflects a continuity correction made necessary by the fact that D is a discrete random variable and the gamma distribution is a continuous distribution. For a 95 percent confidence interval, α=.05. For the death rate, it can be shown that

17. $$L(R) = \frac{L(D)}{P} \text{ and } U(R) = \frac{U(D)}{P}$$

For more detail regarding the derivation of the gamma method and its application to age-adjusted death rates and other mortality statistics, see references 7, 79, and 84.

Availability of mortality data

Mortality data are available in publications, unpublished tables, and electronic products as described on the mortality Web site available from: http://www.cdc.gov/nchs/deaths.htm. More detailed analysis than provided in this report is possible by using the Mortality public-use data set issued each data year. Since 1991, the data set is available through NCHS in CD-ROM format. Data are also available in the *Vital Statistics of the United States*, Mortality, and *Vital and Health Statistics*, Series 20 reports, and the *National Vital Statistics Reports* through NCHS.

Definitions of terms

Infant deaths—Deaths of infants aged under 1 year.

Neonatal deaths—Deaths of infants aged 0–27 days.

Postneonatal deaths—Deaths of infants aged 28 days–1 year.

Crude death rate—Total deaths per 100,000 population for a specified period. The crude death rate represents the average chance of dying during a specified period for persons in the entire population.

Age-specific death rate—Deaths per 100,000 population in a specified age group, such as 1–4 years or 5–9 years for a specified period.

Age-adjusted death rate—The death rate used to make comparisons of relative mortality risks across groups and over time. This rate should be viewed as a construct or an index rather than as direct or actual measure of mortality risk. Statistically, it is a weighted average of the age-specific death rates, where the weights represent the fixed population proportions by age (86).

caution because of inconsistencies between reporting Hispanic origin on death certificates and on censuses and surveys; see "Technical Notes."

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