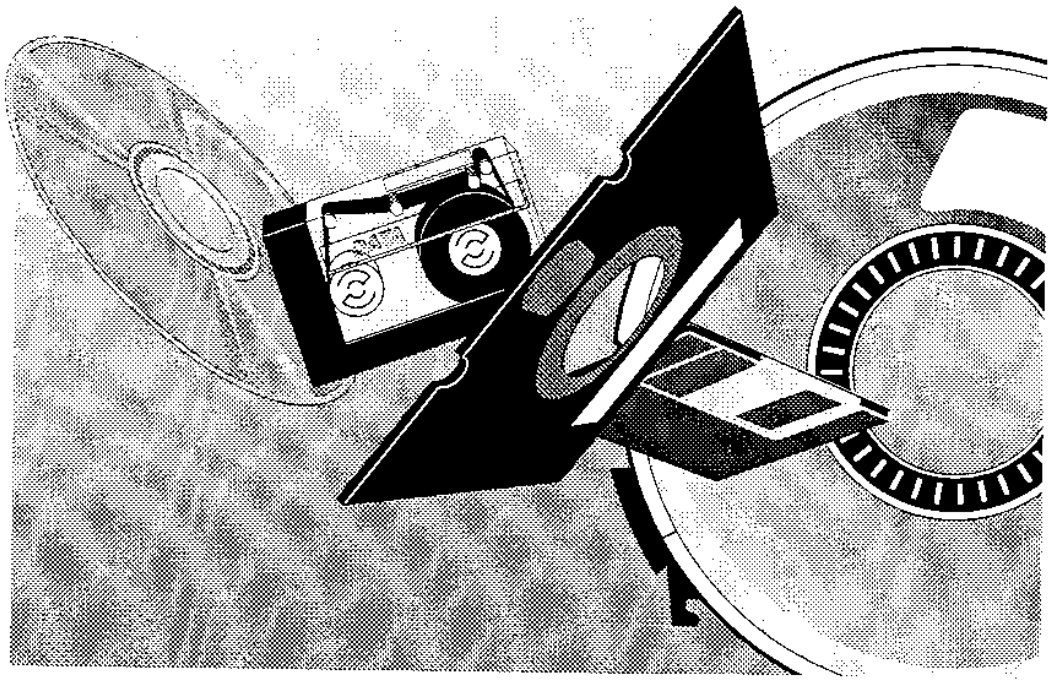
Public Use Data File Documentation

1999 Period Linked Birth/Infant Death Data Set



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

Hyattsville, Maryland
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PUBLIC USE FILE DOCUMENTATION
LINKED BIRTH/INFANT DEATH TAPE FILES
1999 PERIOD DATA

SPECIAL NOTICE

EFFECTIVE WITH THE 1999 DEATH DATA, CAUSE OF DEATH CODING IS BASED ON THE TENTH REVISION, INTERNATIONAL CLASSIFICATION OF DISEASES, 1992

BIRTHS AND DEATHS FOR PUERTO RICO, VIRGIN ISLANDS AND GUAM ARE INCLUDED IN SEPARATE DATA FILES

1999 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 1999 period linked file. Beginning with 1995 data, the period linked files have formed the basis for all official NCHS linked file statistics (except for special cohort studies). Differences between period and birth cohort data are outlined below.

Period data - The numerator for the 1999 period linked file consists of all infant deaths occurring in 1999 linked to their corresponding birth certificates, whether the birth occurred in 1999 or 1998. The denominator file for this data set is the 1999 natality file, that is, all births occurring in 1999.

Birth cohort data - The numerator for the 1999 birth cohort linked file consists of deaths to infants born in 1999 whether the death occurred in 1999 or 2000. The denominator file is the 1999 natality file, that is, all births occurring in 1999.

The 1999 period linked birth/infant death data set includes several data files. The first file includes all US infant deaths which occurred in the 1999 data year linked to their corresponding birth certificates, whether the birth occurred in 1999 or in 1998 - 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 1999 NCHS natality file for the US in compressed format, 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 are also effective for 1999 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:

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

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 have not been 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 3.81% to 1.42% in the numerator file, and from

0.12% to 0.06% in the denominator file, thus reducing (but not eliminating) the potential for underestimation when computing birthweight-specific infant mortality rates. The change from a birth cohort to a period format was discussed in detail on page one.

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 identical between the 1999 period linked file and the 1999 vital statistics mortality file. The differences can be traced to three different causes: 1) geographic differences; 2) additional quality control; and 3) weighting.

Geographic differences - To be included in the linked file for the 50 States and D.C., the birth and death must both occur inside the 50 States and D.C. In contrast, for the vital statistics mortality file, deaths which occur in the 50 States and D.C. to infants born inside and outside of the 50 States and D.C. are included. Similarly, to be included in the linked data file for Puerto Rico, the Virgin Islands, and Guam, the birth and death must both occur in Puerto Rico, the Virgin Islands or Guam. In contrast, for the vital statistics mortality file, deaths which occurred in Puerto Rico, the Virgin Islands, and Guam to infants born inside and outside of Puerto Rico, the Virgin Islands and Guam are included.

Additional quality control - The second reason for differences between the two files is that the linkage process subjects infant death records to an additional round of quality control review. Every year, a few records are voided from the file at this stage because they are found to be fetal deaths, deaths at ages greater than 1 year, or duplicate death certificates.

Weighting - The third reason to the weighting procedures added to the 1995 and subsequent linked files. Beginning with 1995 data, linked file records are now weighted to compensate for the 2-3 percent of infant death records which could not be linked to their corresponding birth certificates. Although every effort has been made to design weights which will accurately reflect the distribution of deaths by characteristics, weighting may contribute to small differences in numbers and rates by specific variables between the linked file and the vital statistics mortality files.

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 Appendices and Addenda included in this document.

Characteristics of Unlinked File

For the 1999 linked file 633, or 2.3% 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, tape locations 1-210, reserved for information from the matching birth certificate, are blank since no matching birth certificate could be found for these records. The sex field (tape location 79) 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 (tape location 36-37) 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 Comparison of race data from birth and death certificates in the Mortality Technical Appendix 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. (see section on Comparison of race data from birth and death certificates in the Mortality Technical Appendix included in this documentation).

Percent of Records Linked

The 1999 linked file includes 27,281 linked infant death records and 633 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 27,914. While the overall percent linked for infant deaths in the 1999 file is 97.7%, there are differences in percent linked by certain variables. These differences have important implications for how the data is analyzed.

Table 1 shows the percent of infant deaths linked by State of occurrence of death. While most States link a high percentage of infant deaths, linkage rates for some States are well below the national average. Note in particular the percent linked for the District of Columbia (94.8%), New York State (95.7%), New Mexico (91.8%), Ohio (91.0%) and Oklahoma (91.0%). 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.

The percent of infant deaths linked by age at death is shown in Table 2. In general, a slightly higher percentage of postneonatal (98.3%) than neonatal (97.5%) deaths were linked. Variations in percent linked by underlying cause of death have also been noted (data not shown). 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 1990 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 11 of these files.

Table 1. Percent of infant deaths linked by state of occurrence of death: United States, 1999 linked file

United States	97.7%	Nebraska	99.4%
Alabama	100.0%	Nevada	97.4%
Alaska	98.0%	New Hampshire	100.0%
Arizona	98.4%	New Jersey	96.2%
Arkansas	98.5%	New Mexico	91.8%
California	97.1%	New York State	95.7%
Colorado	99.1%	New York City	97.3%

Connecticut	100.0%	North Carolina	99.8%
Delaware	99.1%	North Dakota	98.3%
District of Columbia	94.3%	Ohio	90.9%
Florida	99.2%	Oklahoma	91.0%
Georgia	99.9%	Oregon	99.6%
Hawaii	96.7%	Pennsylvania	97.7%
Idaho	99.1%	Rhode Island	100.0%
Illinois	97.5%	South Carolina	99.8%
Indiana	98.6%	South Dakota	100.0%
Iowa	100.0%	Tennessee	100.0%
Kansas	98.3%	Texas	97.2%
Kentucky	98.6%	Utah	96.3%
Louisiana	97.6%	Vermont	100.0%
Maine	96.9%	Virginia	98.5%
Maryland	99.4%	Washington	99.0%
Massachusetts	97.1%	West Virginia	98.8%
Michigan	97.3%	Wisconsin	100.0%
Minnesota	100.0%	Wyoming	100.0%
Mississippi	100.0%	Puerto Rico	99.4%
Missouri	98.7%	Virgin Islands	100.0%
Montana	98.5%	Guam	100.0%

Table 2. Percent of infant deaths linked by age at death: United States, 1999 linked file (Infant deaths are under 1 year; neonatal, under 28 days, and postneonatal, 28 days-under 1 year)

Infant	97.7%
Neonatal	97.5%
Postneonatal	98.3%

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, 4105 Hopson Road, 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, 1999. 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, 1999. 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, 1999. NCHS Instruction Manual, Part 2c. Hyattsville, Maryland: Public Health Service.

D. National Center for Health Statistics. Vital statistics, NCHS Procedures for Mortality Medical Data System File Preparation and Maintenance, Effective 1999. NCHS Instruction Manual, Part 2d. Hyattsville, Maryland: Public Health Service.

E. National Center for Health Statistics. Vital statistics, ICD-10 TRANSAX Disease Reference Tables for Classifying Multiple Causes-of-Death, 1999. NCHS Instruction Manual, Part 2f. Hyattsville, Maryland: Public Health Service.

F. 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.

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

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

I. National Center for Health Statistics. Vital statistics, Computer Edits for Mortality Data, Effective 1999. NCHS Instruction Manual Part 11. Hyattsville, Maryland: Public Health Service.

Change in Cause-of-Death Classification

For data year 1999, a new classification system for coding causes of death was implemented in the United States: the Tenth Revision of the International Classification of Diseases (ICD-10), developed by the World Health Organization (WHO). Information about the new system can be obtained at the following address: http://www.cdc.gov/nchs/about/major/dvs/icd10des.htm

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.

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 a 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, 1999) 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.

1999 Period Linked Birth/Infant Death Data Set

Data File Characteristics:

The data were processed using the SAS language on an IBM 9672.
Codes may be numeric, alphabets, or blank.

I. Denominator File:

United States Data Set

A. Record count:	3,963,465	
B. Record length:	210	
C. Data counts:	a. By occurrence:	3,963,465
	b. By residence:	3,959,417
	c. To foreign residents:	4,048

Territories Data Set

A. Record count:	65,493	
B. Record length:	210	

Puerto Rico

Data counts:	a. By occurrence:	59,684
	b. By occurrence and residence:	59,563
	c. To foreign residents:	121

Virgin Islands

Data counts:	a. By occurrence:	1,772
	b. By occurrence and residence:	1,671
	c. To foreign residents:	101

Guam

Data counts:	a. By occurrence:	4,037
	b. By occurrence and residence	4,021
	c. To foreign residents:	16

1999 Period Linked Birth/Infant Death Data Set

II. Numerator File:

United States Data Set

A. Record count:	27,281	
B. Record length:	535	
C. Data counts:	a. By occurrence:	27,281
	b. By residence:	27,261
	c. To foreign residents:	20

Territories Data Set

A. Record count:	678	
B. Record length:	535	

Puerto Rico

Data counts:	a. By occurrence:	627
	b. By occurrence and residence:	627
	c. To foreign residents:	0

Virgin Islands

Data counts:	a. By occurrence:	16
	b. By occurrence and residence:	16
	c. To foreign residents:	0

Guam

Data counts:	a. By occurrence:	35
	b. By occurrence and residence:	35
	c. To foreign residents:	0

1999 Period Linked Birth/Infant Death Data Set

III. Unlinked File:

United States Data Set

A. Record count:	633	
B. Record length:	535	
C. Data counts:	a. By occurrence:	633
	b. By residence:	627
	c. To foreign residents:	6

Territories Data Set

A. Record count:	4	
B. Record length:	535	

Puerto Rico

Data counts:	a. By occurrence:	4
	b. By occurrence and residence:	2
	c. To foreign residents:	2

Virgin Islands

Data counts:	a. By occurrence:	0
	b. By occurrence and residence:	0
	c. To foreign residents:	0

Guam

Data counts:	a. By occurrence:	0
	b. By occurrence and residence:	0
	c. To foreign residents:	0

1999 Period Linked Birth/Infant Death Data Set
List of Data Elements and Locations

Data Items	Denominator File	Numerator Birth	File Death	Unlinked File
1. General				
a. Year of birth	7-10	7-10	--	--
b. Year of death	--	--	524-527	524-527
c. Resident status	11	11	505	505
d. Record weight	--	--	223-230	--
e. Flag for records included in both numerator and denominator	210	--	--	--
2. Occurrence				
a. FIPS state	14-15	14-15	508-509	508-509
b. FIPS county	16-18	16-18	510-512	510-512
3. Residence				
a. FIPS state	19-20	19-20	513-514	513-514
b. FIPS county	21-23	21-23	515-517	515-517
c. FIPS place	24-28	24-28	518-522	518-522
d. NCHS state	12-13	12-13	506-507	506-507
4. Infant				
a. Age	--	--	211-214	211-214+
b. Race	--	--	--	35-38*
c. Sex	78-79	78-79	--	78-79*
d. Gestation	70-77	70-77	--	--
e. Birthweight	80-87	80-87	--	--
f. Plurality	88-89	88-89	--	--
g. Apgar score	90-91	90-91	--	--
h. Day of week of birth/death	209	209	532	532
i. Month of birth/death	205-206	205-206	528-529	528-529
5. Mother				
a. Age	29-32	29-32	--	--
b. Race	35-38	35-38	--	--
c. Education	39-41	39-41	--	--
d. Marital status	42-43	42-43	--	--
e. Place of birth	44-46	44-46	--	--
f. Hispanic origin	33-34	33-34	--	--
6. Father				
a. Age	60-62	60-62	--	--
b. Race	65-66	65-66	--	--
c. Hispanic origin	63-64	63-64	--	--

1999 Period Linked Birth/Infant Death Data Set
List of Data Elements and Locations

Data Items	Denominator File	Numerator File: Birth	Numerator File: Death	Unlinked File
7. Pregnancy items				
a. Month prenatal care began	51-53	51-53	--	--
b. Number of prenatal visits	54-55	54-55	--	--
c. Adequacy of care recode56	56	--	--	
d. Total birth order	47-48	47-48	--	--
e. Live birth order	49-50	49-50	--	--
8. Medical and Health Data				
a. Method of delivery	92-99	92-99	--	--
b. Medical risk factors	100-117	100-117	--	--
c. Other risk factors				
Tobacco	118-121	118-121	--	--
Alcohol	122-125	122-125	--	--
Weight gain during pregnancy	126-128	126-128	--	--
d. Obstetric procedures	129-136	129-136	--	--
e. Complications of labor and/or delivery	137-153	137-153	--	--
f. Abnormal conditions of the newborn	154-163	154-163	--	--
g. Congenital anomalies	164-186	164-186	--	--
h. Underlying cause of death			216-219	216-219
i. 130 Infant cause recode			220-222	220-222
j. Multiple conditions			261-504	261-504
9. Other items				
a. Place of delivery	67	67	--	--
b. Attendant at birth	68	68	--	--
c. Hospital and patient status	--	--	523	523
e. Place of accident	--	--	215	215
f. Residence reporting flags	187-203	187-203	--	--

\+ For the unlinked file, date of birth as reported on the death certificate is used to generate age at death. See section on Changes Beginning with the 1995 Data Year for explanation.

* For the unlinked file, these items are from the death certificate. See section on Changes Beginning with the 1995 Data Year for explanation.

Locations 7-210 of the linked file contain data from the Birth Certificate.
Locations 211-535 of linked file contain data from the Death Certificate.

Residence items in the Denominator Record and in the natality section of the Numerator (linked) Record refer to the usual place of residence of the Mother; whereas in the mortality section of the Numerator (Linked) Record, these items refer to the residence of the Decedent.

Item Location	Item Length	Variable Name, Item and Code Outline
1-6	6	**R0** **Reserved Positions**
7-10	4	**BIRYR** **Year of Birth** 1998 ... Born in 1998 (This code valid for numerator (linked) file file only). 1999 ... Born in 1999
11	1	**RESSTATB** **Resident Status - Birth** **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 50 States and D.C. 4 ... FOREIGN RESIDENTS: State of occurrence is one of the 50 States or the District of Columbia, but place of residence of mother is outside of the 50 States and D.C. **Puerto Rico 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. 4 ... FOREIGN RESIDENTS: Occurred in Puerto Rico to a resident of any other place. **Virgin Islands 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. 4 ... FOREIGN RESIDENTS: Occurred in the 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. 4 ... FOREIGN RESIDENTS: Occurred in Guam to a resident of any place other than Guam or the U.S.

Item Location	Item Length	Variable Name, Item and Code Outline
12-13	2	**BRSTATE** **Expanded State of Residence - NCHS Codes - Birth**

This item is designed to separately identify New York City records from other New York State records.

United States Occurrence

01	...	Alabama
02	...	Alaska
03	...	Arizona
04	...	Arkansas
05	...	California
06	...	Colorado
07	...	Connecticut
08	...	Delaware
09	...	District of Columbia
10	...	Florida
11	...	Georgia
12	...	Hawaii
13	...	Idaho
14	...	Illinois
15	...	Indiana
16	...	Iowa
17	...	Kansas
18	...	Kentucky
19	...	Louisiana
20	...	Maine
21	...	Maryland
22	...	Massachusetts
23	...	Michigan
24	...	Minnesota
25	...	Mississippi
26	...	Missouri
27	...	Montana
28	...	Nebraska
29	...	Nevada
30	...	New Hampshire
31	...	New Jersey
32	...	New Mexico
33	...	New York
34	...	New York city
35	...	North Carolina
36	...	North Dakota
37	...	Ohio
38	...	Oklahoma
39	...	Oregon
40	...	Pennsylvania
41	...	Rhode Island
42	...	South Carolina
43	...	South Dakota
44	...	Tennessee
45	...	Texas
46	...	Utah

Item Location	Item Length	Variable Name, Item and Code Outline
12-13	2	**BRSTATE** **Expanded State of Residence - NCHS Codes - Birth (Cont'd)**

This item is designed to separately identify New York City records from other New York State records.

United States Occurrence

47	...	Vermont
48	...	Virginia
49	...	Washington
50	...	West Virginia
51	...	Wisconsin
52	...	Wyoming
53-58,60	...	Foreign Residents
53	...	Puerto Rico
54	...	Virgin Islands
55	...	Guam
56	...	Canada
57	...	Cuba
58	...	Mexico
60	...	Remainder of the World

Puerto Rico Occurrence

53	...	Puerto Rico
01-52,54-58,60	...	Foreign Residents: Refer to U.S. for specific code structure.

Virgin Islands Occurrence

54	...	Virgin Islands
01-53,55-58,60	...	Foreign Residents: Refer to U.S. for specific code structure.

Guam Occurrence

55	...	Guam
01-52	...	U.S. resident is also considered a resident of Guam.
53,54,58,60	...	Foreign Residents: Refer to U.S. for specific code structure.

FIPSOCCB
Federal Information Processing Standards (FIPS) Geographic Codes (Occurrence) - Birth

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.

Item Location	Item Length	Variable Name, Item and Code Outline
14-15	2	**STOCCFIPB** **State of Occurrence (FIPS) - Birth**

United States

01	...	Alabama
02	...	Alaska
04	...	Arizona
05	...	Arkansas
06	...	California
08	...	Colorado
09	...	Connecticut
10	...	Delaware
11	...	District of Columbia
12	...	Florida
13	...	Georgia
15	...	Hawaii
16	...	Idaho
17	...	Illinois
18	...	Indiana
19	...	Iowa
20	...	Kansas
21	...	Kentucky
22	...	Louisiana
23	...	Maine
24	...	Maryland
25	...	Massachusetts
26	...	Michigan
27	...	Minnesota
28	...	Mississippi
29	...	Missouri
30	...	Montana
31	...	Nebraska
32	...	Nevada
33	...	New Hampshire
34	...	New Jersey
35	...	New Mexico
36	...	New York
37	...	North Carolina
38	...	North Dakota
39	...	Ohio
40	...	Oklahoma
41	...	Oregon
42	...	Pennsylvania
44	...	Rhode Island
45	...	South Carolina
46	...	South Dakota
47	...	Tennessee
48	...	Texas

Item Location	Item Length	Variable Name, Item and Code Outline
14-15	2	**STOCCFIPB** **State of Occurrence (FIPS) - Birth (Cont'd)**

United States

49	...	Utah
50	...	Vermont
51	...	Virginia
53	...	Washington
54	...	West Virginia
55	...	Wisconsin
56	...	Wyoming

Puerto Rico

72	...	Puerto Rico

Virgin Islands

78	...	Virgin Islands

Guam

66	...	Guam

16-18 3 **CNTOCFIPB**
County of Occurrence (FIPS) - Birth

001-nnn	...	Counties and county equivalents (independent and coextensive cities) are numbered alphabetically within each State. (Note: To uniquely identify a county, both the State and county codes must be used.)
999	...	County with less than 250,000 population

19-23 5 **FIPSRESB**
Federal Information Processing Standards (FIPS) Geographic Codes (Residence) - Birth

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.

Item Location	Item Length	Variable Name, Item and Code Outline
19-20	2	**STRESFIPB** **State of Residence (FIPS) - Birth**

United States Occurrence

00	...	Foreign residents
01	...	Alabama
02	...	Alaska
04	...	Arizona
05	...	Arkansas
06	...	California
08	...	Colorado
09	...	Connecticut
10	...	Delaware
11	...	District of Columbia
12	...	Florida
13	...	Georgia
15	...	Hawaii
16	...	Idaho
17	...	Illinois
18	...	Indiana
19	...	Iowa
20	...	Kansas
21	...	Kentucky
22	...	Louisiana
23	...	Maine
24	...	Maryland
25	...	Massachusetts
26	...	Michigan
27	...	Minnesota
28	...	Mississippi
29	...	Missouri
30	...	Montana
31	...	Nebraska
32	...	Nevada
33	...	New Hampshire
34	...	New Jersey
35	...	New Mexico
36	...	New York
37	...	North Carolina
38	...	North Dakota
39	...	Ohio
40	...	Oklahoma
41	...	Oregon
42	...	Pennsylvania
44	...	Rhode Island
45	...	South Carolina
46	...	South Dakota
47	...	Tennessee

Item Location	Item Length	Variable Name, Item and Code Outline
19-20	2	**STRESFIPB** **State of Residence (FIPS) - Birth Cont'd)**

United States Occurrence

48	...	Texas
49	...	Utah
50	...	Vermont
51	...	Virginia
53	...	Washington
54	...	West Virginia
55	...	Wisconsin
56	...	Wyoming

Puerto Rico Occurrence

00-56,66,78	...	Foreign Residents: Refer to U.S. for specific code structure
72	...	Puerto Rico

Virgin Islands Occurrence

00-56,66,72	...	Foreign Residents: Refer to U.S. for specific code structure
78	...	Virgin Islands

Guam Occurrence

00,72,78	...	Foreign Residents: Refer to U.S. for specific code structure
01-56	...	U.S. Resident is also considered a resident of Guam. Refer to U.S. for specific code structure
66	...	Guam

21-23	3	**CNTYRFPB** **County of Residence (FIPS) - Birth**

000	...	Foreign residents
001-nnn	...	Counties and county equivalents (independent and coextensive cities) are numbered alphabetically within each State (Note: To uniquely identify a county, both the State and county codes must be used.)
999	...	County with less than 250,000 population

24-28	5	**PLRES** **Place (City) of Residence (FIPS)**

A complete list of cities is shown in the Geographic Code Outline further back in this document.

00000	...	Foreign residents
00001-nnnnn	...	Code range
99999	...	Balance of county; or city less than 250,000 population

Item Location	Item Length	Variable Name, Item and Code Outline
29	1	**MAGEFLG** **Age of Mother Flag** This position is flagged whenever age is imputed or the mother's reported age is used. The reported age is used, if valid, when computed age derived from the date of birth is not available or when it is outside the 10-54 code range. Blank ... Not imputed and reported age is not used 1 ... Reported age is used 2 ... Age is imputed
30-31	2	**DMAGE** **Age of Mother** This item is: a) computed using dates of birth of mother and of delivery; b) reported; or c) imputed. This is the age item used in NCHS publications. 10-54 ... Age in single years
32	1	**MAGER9** **Age of Mother Recode 9** 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
33	1	**ORMOTH** **Hispanic Origin of Mother** Hispanic origin is reported for all areas except Puerto Rico. 0 ... Non-Hispanic 1 ... Mexican 2 ... Puerto Rican 3 ... Cuban 4 ... Central or South American 5 ... Other and unknown Hispanic 9 ... Origin unknown or not stated

Item Location	Item Length	Variable Name, Item and Code Outline

34 1

ORRACEM
Hispanic Origin and Race of Mother Recode

Hispanic origin is reported for all areas except Puerto Rico.

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

35 1

MRACEIMP
Race of Mother Imputation Flag

Blank	...	Race is not imputed
1	...	Race is imputed
2	...	All other races, formerly code 09, is imputed

36-37 2

MRACE
Race of Mother - Birth Record or for Unlinked Records Race of Decedent from Death Record

Beginning with 1992 data, some areas started reporting additional Asian or Pacific Islander codes for race. Codes 18-68 replace old code 08 for these areas. Code 78 replaces old code 08 for all other areas. For consistency with Census race code 09 (all other races) used prior to 1992 has been imputed.

United States Occurrence

01	...	White
02	...	Black
03	...	American Indian (includes Aleuts and Eskimos)
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 codes 18-68 for areas that do not report them separately

Item Location	Item Length	Variable Name, Item and Code Outline
36-37	2	**MRACE** **Race of Mother - Birth Record or for Unlinked Records Race of Decedent from Death Record (Cond't)**

Puerto Rico Occurrence

00	...	Other races
01	...	White
02	...	Black

Virgin Islands Occurrence

01	...	White
02	...	Black
03	...	American Indian (includes Aleuts and Eskimos)
04	...	Chinese
05	...	Japanese
06	...	Hawaiian (includes part-Hawaiian)
07	...	Filipino
08	...	Other Asian or Pacific Islander

Guam Occurrence

01	...	White
02	...	Black
03	...	American Indian (includes Aleuts and Eskimos)
04	...	Chinese
05	...	Japanese
06	...	Hawaiian (includes part-Hawaiian)
07	...	Filipino
08	...	Other Asian or Pacific Islander
58	...	Guamanian

38	1	**MRACE3** **Race of Mother Recode**

1	...	White
2	...	Races other than White or Black
3	...	Black

Item Location	Item Length	Variable Name, Item and Code Outline

39-40 2 **DMEDUC**
Education of Mother Detail

All areas report education of mother.

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

41 1 **MEDUC6**
Education of Mother Recode

1	...	0 - 8 years
2	...	9 - 11 years
3	...	12 years
4	...	13 - 15 years
5	...	16 years and over
6	...	Not stated

42 1 **DMARIMP**
Marital Status of Mother Imputation Flag

Blank	...	Marital status is not imputed
1	...	Marital status is imputed

43 1 **DMAR**
Marital Status of Mother

Marital status is not reported by all areas. See reporting flags.

United States/Virgin Islands/Guam Occurrence

1	...	Married
2	...	Unmarried
9	...	Unknown or not stated

Puerto Rico Occurrence

1	...	Married
2	...	Unmarried parents living together
3	...	Unmarried parents not living together
9	...	Unknown or not stated

Item Location	Item Length	Variable Name, Item and Code Outline		
44-45	2	**MPLBIR**		
		Place of Birth of Mother		
		01	...	Alabama
		02	...	Alaska
		03	...	Arizona
		04	...	Arkansas
		05	...	California
		06	...	Colorado
		07	...	Connecticut
		08	...	Delaware
		09	...	District of Columbia
		10	...	Florida
		11	...	Georgia
		12	...	Hawaii
		13	...	Idaho
		14	...	Illinois
		15	...	Indiana
		16	...	Iowa
		17	...	Kansas
		18	...	Kentucky
		19	...	Louisiana
		20	...	Maine
		21	...	Maryland
		22	...	Massachusetts
		23	...	Michigan
		24	...	Minnesota
		25	...	Mississippi
		26	...	Missouri
		27	...	Montana
		28	...	Nebraska
		29	...	Nevada
		30	...	New Hampshire
		31	...	New Jersey
		32	...	New Mexico
		33	...	New York
		34	...	North Carolina
		35	...	North Dakota
		36	...	Ohio
		37	...	Oklahoma
		38	...	Oregon
		39	...	Pennsylvania
		40	...	Rhode Island
		41	...	South Carolina
		42	...	South Dakota
		43	...	Tennessee
		44	...	Texas
		45	...	Utah
		46	...	Vermont
		47	...	Virginia
		48	...	Washington
		49	...	West Virginia

Item Location	Item Length	Variable Name, Item and Code Outline
44-45	2	**MPLBIR** **Place of Birth of Mother (Cont'd)**

50	...	Wisconsin
51	...	Wyoming
52	...	Puerto Rico
53	...	Virgin Islands
54	...	Guam
55	...	Canada
56	...	Cuba
57	...	Mexico
59	...	Remainder of the World
99	...	Not Classifiable

46 1 **MPLBIRR**
Place of Birth of Mother Recode

United States Occurrence

1	...	Born in the 50 States and D.C.
2	...	Born outside the 50 States and DC
3	...	Unknown or not stated

Puerto Rico/Virgin Island/ Guam Occurrence

Blank	...	This item not recorded

47-48 2 **DTOTORD**
Detail Total Birth Order

Sum of live birth order and other terminations of pregnancy. If either item is unknown, this item is made unknown.

01-40	...	Total number of live births and other terminations of pregnancy
99	...	Unknown

49-50 2 **DLIVORD**
Detail Live Birth Order

Sum of live births now living and now dead plus one. If either item is unknown, this item is made unknown.

00-31	...	Number of children born alive to mother
99	...	Unknown

Item Location	Item Length	Variable Name, Item and Code Outline
51-52	2	**MONPRE** **Detail Month of Pregnancy Prenatal Care Began** 00 ... No prenatal care 01 ... 1st month 02 ... 2nd month 03 ... 3rd month 04 ... 4th month 05 ... 5th month 06 ... 6th month 07 ... 7th month 08 ... 8th month 09 ... 9th month 99 ... Unknown or not stated
53	1	**MPRE5** **Month Prenatal Care Began Recode 5** 1 ... 1st Trimester (1st-3rd month) 2 ... 2nd Trimester (4th-6th month) 3 ... 3rd Trimester (7th-9th month) 4 ... No prenatal care 5 ... Unknown or not stated
54-55	2	**NPREVIST** **Total Number of Prenatal Visits** 00 ... No prenatal visits 01-48 ... Stated number of visits 49 ... 49 or more visits 99 ... Unknown or not stated
56	1	**ADEQUACY** **Adequacy of Care Recode (Kessner Index)** This code is based on a modified Kessner criterion. Month Prenatal Care Began, Number of Prenatal Visits, and Gestation are the items used to generate this recode. 1 ... Adequate 2 ... Intermediate 3 ... Inadequate 4 ... Unknown
57-59	3	**R1** **Reserved Positions**

Item Location	Item Length	Variable Name, Item and Code Outline
60	1	**FAGERFLG** **Reported Age of Father Used Flag** This position is flagged whenever the Father's reported age in years is used. The reported age is used, if valid, when age derived from date of birth is not available or when it is less than 10. Blank ... Reported age is not used 1 ... Reported age is used
61-62	2	**DFAGE** **Age of Father** This item is either computed from date of birth of father and of child or is the reported age. This is the age item used in NCHS publications. 10-98 ... Age in single years 99 ... Unknown or not stated
63	1	**ORFATH** **Hispanic Origin of Father** Hispanic origin is reported for all areas except Puerto Rico. 0 ... Non-Hispanic 1 ... Mexican 2 ... Puerto Rican 3 ... Cuban 4 ... Central or South American 5 ... Other and unknown Hispanic 9 ... Origin unknown or not stated
64	1	**ORRACEF** **Hispanic Origin and Race of Father Recode** Hispanic origin is reported for all areas except Puerto Rico. 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 or unknown race 9 ... Origin unknown or not stated

Item Location	Item Length	Variable Name, Item and Code Outline
65-66	2	**FRACE** **Race of Father**

Beginning with 1992 data, some areas started reporting additional Asian or Pacific Islander codes for race. See reporting flags. Codes 18 -68 replace old code 08 for these areas. Code 78 replaces old code 08 for all other areas. Code 09 (all other races) has been changed to 99.

United States Occurrence

01	...	White
02	...	Black
03	...	American Indian (includes Aleuts and Eskimos)
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 codes 18-68 for areas that do not report them separately
99	...	Unknown or not stated

Puerto Rico Occurrence

00	...	Other races
01	...	White
02	...	Black
99	...	Unknown or not stated

Virgin Islands Occurrence

01	...	White
02	...	Black
03	...	American Indian (includes Aleuts and Eskimos)
04	...	Chinese
05	...	Japanese
06	...	Hawaiian (includes part-Hawaiian)
07	...	Filipino
08	...	Other Asian or Pacific Islander
99	...	Unknown or not stated

Item Location	Item Length	Variable Name, Item and Code Outline
65-66	2	**FRACE** **Race of Father (Cont'd)** **Guam Occurrence** 01 ... White 02 ... Black 03 ... American Indian (includes Aleuts and Eskimos) 04 ... Chinese 05 ... Japanese 06 ... Hawaiian (includes part-Hawaiian) 07 ... Filipino 08 ... Other Asian or Pacific Islander 58 ... Guamanian 99 ... Unknown or not stated
67	1	**PLDEL** **Place or Facility of Delivery** 1 ... Hospital 2 ... Freestanding Birthing Center 3 ... Clinic or Doctor's Office 4 ... A Residence 5 ... Other 9 ... Unknown or not stated
68	1	**BIRATTND** **Attendant at Delivery** 1 ... Doctor of Medicine (M.D.) 2 ... Doctor of Osteopathy (D.O.) 3 ... Certified Nurse Midwife (C.N.M.) 4 ... Other Midwife 5 ... Other 9 ... Unknown or not stated
69	1	**R2** **Reserved position**
70	1	**GESTESTM** **Clinical Estimate of Gestation Used Flag** This position is flagged whenever the clinical estimate of gestation is used. It is used when gestation could not be computed or when the computed gestation is outside the 17-47 code range. Blank ... Clinical Estimate is not used 1 ... Clinical Estimate is used

Item Location	Item Length	Variable Name, Item and Code Outline
71-72	2	**CLINGEST** **Clinical Estimate of Gestation** Clinical estimate is not reported by all areas. See reporting flags. 17-47 ... Estimated gestation in weeks 99 ... Unknown or not stated
73	1	**GESTIMP** **Gestation Imputation Flag** Blank ... Gestation is not imputed 1 ... Gestation is imputed
74-75	2	**GESTAT** **Gestation - Detail in Weeks** This item is: a) computed using dates of birth of child and last normal menses; b) imputed from LMP date; c) the clinical estimate; or d) unknown when there is insufficient data to impute or no valid clinical estimate. This is the gestation item used in NCHS publications. 17-47 ... 17th through 47th week of gestation 99 ... Unknown
76-77	2	**GESTAT 10** **GESTATION RECODE 10** 01 ... Under 20 weeks 02 ... 20 - 27 weeks 03 ... 28 - 31 weeks 04 ... 32 - 35 weeks 05 ... 36 weeks 06 ... 37 - 39 weeks 07 ... 40 weeks 08 ... 41 weeks 09 ... 42 weeks and over 10 ... Not stated
78	1	**CSEXIMP** **Sex Imputation Flag** Blank ... Sex is not imputed 1 ... Sex is imputed
79	1	**CSEX** **Sex** 1 ... Male 2 ... Female

Item Location	Item Length	Variable Name, Item and Code Outline
80-87	8	**BIRTHWEIGHT**

Beginning in 1995, an imputation for not-stated birthweight was added to reduce potential bias in the data (see section on changes beginning with the 1995 data year in the introductory text to this documentation). The following imputation flag can be used to delete imputed values for those researchers wishing to use only reported birthweight data.

80 1 **BWIF**
Birthweight Imputation Flag

Blank	...	Birthweight is not imputed
1	...	Birthweight is imputed

81-84 4 **DBIRWT**
Birthweight Detail in Grams (Imputed)

0227-8165	...	Number of grams
9999	...	Not stated birth weight

85-86 2 **BIRWT12**
Birthweight Recode 12 (Imputed)

01	...	499 grams or less
02	...	500-999 grams
03	...	1000-1499 grams
04	...	1500-1999 grams
05	...	2000-2499 grams
06	...	2500-2999 grams
07	...	3000-3499 grams
08	...	3500-3999 grams
09	...	4000-4499 grams
10	...	4500-4999 grams
11	...	5000-8165 grams
12	...	Unknown or not stated

87 1 **BIRWT4**
Birthweight Recode 4 (Imputed)

1	...	1499 grams or less
2	...	1500-2499 grams
3	...	2500 grams or more
4	...	Unknown or not stated

88 1 **PLURIMP**
Plurality Imputation Flag

Blank	...	Plurality is not imputed
1	...	Plurality is imputed

Item Location	Item Length	Variable Name, Item and Code Outline
89	1	**DPLURAL** **Plurality** 1 ... Single 2 ... Twin 3 ... Triplet 4 ... Quadruplet 5 ... Quintuplet or higher
90-91	2	**FMAPS** **Five-Minute Apgar Score** Apgar score is not reported by all areas. See reporting flags. 00-10 ... A score of 0-10 99 ... Unknown or not stated
92-186	95	**MEDINFO** **Medical and Health Data** Some States do not report an entire item while other States do not report all of the categories within an item. If an item is not reported, it is indicated by code zero in the appropriate reporting flag. If a category within an item is not reported it is indicated by code 8 in the position for that category.
92-99	8	**DELMETH** **Method of Delivery** Each method is assigned a separate position, and the code structure for each method (position) is: 1 ... The method was used 2 ... The method was not used 8 ... Method not on certificate 9 ... Method unknown or not stated
92	1	**VAGINAL** **Vaginal**
93	1	**VBAC** **Vaginal Birth After Previous C-Section**
94	1	**PRIMAC** **Primary C-Section**
95	1	**REPEAC** **Repeat C-Section**
96	1	**FORCEP** **Forceps**

Item Location	Item Length	Variable Name, Item and Code Outline
97	1	**VACUUM** **Vacuum**
98	1	**R3** **Reserved Position**
99	1	**DELMETH5** **Method of Delivery Recode** 1 ... Vaginal (excludes Vaginal after previous C-section) 2 ... Vaginal birth after previous C section 3 ... Primary C-section 4 ... Repeat C-Section 5 ... Not stated
100-117	18	**MEDRISK** **Medical Risk Factors** Each risk factor is assigned a separate position, and the code structure for each risk factor (position) is: 1 ... Factor reported 2 ... Factor not reported 8 ... Factor not on certificate 9 ... Factor not classifiable
100	1	**MRFLAG** **No Medical Risk Factors Reported Flag** Blank ... One or more medical risk factors coded, one, eight, or nine 2 ... No medical risk factors reported. Each factor is coded a two.
101	1	**ANEMIA** **Anemia (Hct.<30/Hgb.<10)**
102	1	**CARDIAC** **Cardiac disease**
103	1	**LUNG** **Acute or chronic lung disease**
104	1	**DIABETES** **Diabetes**
105	1	**HERPES** **Genital herpes**
106	1	**HYDRA** **Hydramnios/Oligohydramnios**

Item Location	Item Length	Variable Name, Item and Code Outline
107	1	**HEMO** **Hemoglobinopathy**
108	1	**CHYPER** **Hypertension, chronic**
109	1	**PHYPER** **Hypertension, pregnancy-associated**
110	1	**ECLAMP** **Eclampsia**
111	1	**INCERVIX** **Incompetent cervix**
112	1	**PRE4000** **Previous infant 4000+ grams**
113	1	**PRETERM** **Previous preterm or small-for-gestational-age infant**
114	1	**RENAL** **Renal disease**
115	1	**RH** **Rh sensitization**
116	1	**UTERINE** **Uterine bleeding**
117	1	**OTHERMR** **Other Medical Risk Factors**
118-128	11	**OTHERRSK** **Other Risk Factors for this Pregnancy**
118-121	4	**TOBACRSK** **Tobacco Risks**
118	1	**TOBACCO** **Tobacco Use During Pregnancy** 1 ... Yes 2 ... No 9 ... Unknown or not stated
119-120	2	**CIGAR** **Average Number of Cigarettes Per Day** 00-97 ... As stated 98 ... 98 or more cigarettes per day 99 ... Unknown or not stated

Item Location	Item Length	Variable Name, Item and Code Outline		
121	1	**CIGAR6** **Average Number of Cigarettes Per Day Recode**		
		0	...	Nonsmoker
		1	...	1-5 cigarettes per day
		2	...	6-10 cigarettes per day
		3	...	11-20 cigarettes per day
		4	...	21-40 cigarettes per day
		5	...	41 or more cigarettes per day
		6	...	Unknown or not stated
122-125	4	**ALCOHRSK** **Alcohol**		
122	1	**ALCOHOL** **Alcohol Use During Pregnancy**		
		1	...	Yes
		2	...	No
		9	...	Unknown or not stated
123-124	2	**DRINK** **Average Number of Drinks Per Week**		
		00-97	...	As stated
		98	...	98 or more drinks per week
		99	...	Unknown or not stated
125	1	**DRINK5** **Average Number of Drinks Per Week Recode**		
		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
126-128	3	**WTGANRSK** **Weight Gain During Pregnancy**		
126-127	2	**WTGAIN** **Weight Gain**		
		00-97	...	Stated number of pounds
		98	...	98 pounds or more
		99	...	Unknown or not stated

Item Location	Item Length	Variable Name, Item and Code Outline
128	1	**WTGAIN9** **Weight Gain Recode** 1 ... Less than 16 pounds 2 ... 16-20 pounds 3 ... 21-25 pounds 4 ... 26-30 pounds 5 ... 31-35 pounds 6 ... 36-40 pounds 7 ... 41-45 pounds 8 ... 46 or more pounds 9 ... Unknown or not stated
129-136	8	**OBSTETRC** **Obstetric Procedures** Each procedure is assigned a separate position, and the code structure for each procedure (position) is: 1 ... Procedure reported 2 ... Procedure not reported 8 ... Procedure not on certificate 9 ... Procedure not classifiable
129	1	**OBFLAG** **Obstetric Flag** Blank ... One or more obstetric procedures coded, one, eight, or nine 2 ... No obstetric procedures reported. Each factor is coded a two.
130	1	**AMNIO** **Amniocentesis**
131	1	**MONITOR** **Electronic fetal monitoring**
132	1	**INDUCT** **Induction of labor**
133	1	**STIMULA** **Stimulation of labor**
134	1	**TOCOL** **Tocolysis**
135	1	**ULTRAS** **Ultrasound**
136	1	**OTHEROB** **Other Obstetric Procedures**

Item Location	Item Length	Variable Name, Item and Code Outline
137-153	17	**LABOR** **Complications of Labor and/or Delivery** Each complication is assigned a separate position, and the code structure for each complication (position) is: 1 ... Complication reported 2 ... Complication not reported 8 ... Complication not on certificate 9 ... Complication not classifiable
137	1	**FBFLAG** **Labor Flag** Blank ... One or more labor and/or delivery complications coded, one, eight, or nine 2 ... No labor and/or delivery complication reported. Each factor is coded a two.
138	1	**FEBRILE** **Febrile (>100 degrees F. or 38 degrees C.)**
139	1	**MECONIUM** **Meconium, moderate/heavy**
140	1	**RUPTURE** **Premature rupture of membrane (>12 hours)**
141	1	**ABRUPTIO** **Abruptio placenta**
142	1	**PREPLACE** **Placenta previa**
143	1	**EXCEBLD** **Other excessive bleeding**
144	1	**SEIZURE** **Seizures during labor**
145	1	**PRECIP** **Precipitous labor (<3 hours)**
146	1	**PROLONG** **Prolonged labor (>20 hours)**
147	1	**DYSFUNC** **Dysfunctional labor**
148	1	**BREECH** **Breech/Malpresentation**

Item Location	Item Length	Variable Name, Item and Code Outline
149	1	**CEPHALO** **Cephalopelvic disproportion**
150	1	**CORD** **Cord prolapse**
151	1	**ANESTHE** **Anesthetic complications**
152	1	**DISTRESS** **Fetal distress**
153	1	**OTHERLB** **Other Complications of Labor and/or Delivery**
154-163	10	**NEWBORN** **Abnormal conditions of the Newborn** Each condition is assigned a separate position, and the code structure for each condition (position)is: 1 ... Condition reported 2 ... Condition not reported 8 ... Condition not on certificate 9 ... Condition not classifiable
154	1	**NBFLAG** **Newborn Flag** Blank ... One or more abnormal conditions of the newborn coded, one, eight, or nine 2 ... No abnormal condition of the newborn reported. Each factor is coded a two.
155	1	**NANEMIA** **Anemia Hct.>39/Hgb.<13)**
156	1	**INJURY** **Birth injury**
157	1	**ALCOSYN** **Fetal alcohol syndrome**
158	1	**HYALINE** **Hyaline membrane disease**
159	1	**MECONSYN** **Meconium aspiration syndrome**
160	1	**VENL30** **Assisted ventilation, less than 30 minutes**

Item Location	Item Length	Variable Name, Item and Code Outline
161	1	**VEN30M** **Assisted ventilation, 30 minutes or more**
162	1	**NSEIZ** **Seizures**
163	1	**OTHERAB** **Other Abnormal Conditions of the Newborn**
164-186	23	**CONGENIT** **Congenital Anomalies** Each anomaly is assigned a separate position, and the code structure for each anomaly (position) is: 1 ... Anomaly reported 2 ... Anomaly not reported 8 ... Anomaly not on certificate 9 ... Anomaly not classifiable
164	1	**CGFLAG** **Congenital Flag** Blank ... One or more congenital anomalies coded, one, eight, or nine 2 ... No congenital anomaly is reported. Each factor is coded a two.
165	1	**ANEN** **Anencephalus**
166	1	**SPINA** **Spina bifida/Meningocele**
167	1	**HYDRO** **Hydrocephalus**
168	1	**MICROCE** **Microcephalus**
169	1	**NERVOUS** **Other central nervous system anomalies**
170	1	**HEART** **Heart malformations**
171	1	**CIRCUL** **Other circulatory/respiratory anomalies**
172	1	**RECTAL** **Rectal atresia/stenosis**

Item Location	Item Length	Variable Name, Item and Code Outline
173	1	**TRACHEO** **Tracheo-esophageal fistula/Esophageal atresia**
174	1	**OMPHALO** **Omphalocele/Gastroschisis**
175	1	**GASTRO** **Other gastrointestinal anomalies**
176	1	**GENITAL** **Malformed genitalia**
177	1	**RENALAGE** **Renal agenesis**
178	1	**UROGEN** **Other urogenital anomalies**
179	1	**CLEFTLP** **Cleft lip/palate**
180	1	**ADACTYLY** **Polydactyly/Syndactyly/Adactyly**
181	1	**CLUBFOOT** **Club foot**
182	1	**HERNIA** **Diaphragmatic hernia**
183	1	**MUSCULO** **Other musculoskeletal/integumental anomalies**
184	1	**DOWNS** **Down's syndrome**
185	1	**CHROMO** **Other chromosomal anomalies**
186	1	**OTHERCON** **Other congenital anomalies**
187-203	17	**FLRES** **Reporting Flags for Place of Residence** These positions contain flags to indicate whether or not the specified item is included on the birth certificate of the State of residence or of the SMSA of residence. The code structure of each flag (position) is: 0 ... The item is not reported 1 ... The item is reported or partially reported.

Item Location	Item Length	Variable Name, Item and Code Outline
187	1	**ORIGM** **Origin of mother**
188	1	**ORIGF** **Origin of father**
189	1	**EDUCM** **Education of mother**
190	1	**R4** **Reserved Position**
191	1	**GESTE** **Clinical estimate of gestation**
192	1	**R5** **Reserved position**
193	1	**FMAPSRF** **5-minute Apgar score**
194	1	**DELMETRF** **Method of delivery**
195	1	**MEDRSK** **Medical risk factors**
196	1	**TOBUSE** **Tobacco use**
197	1	**ALCUSE** **Alcohol use**
198	1	**WTGN** **Weight gain**
199	1	**OBSTRC** **Obstetric procedures**
200	1	**CLABOR** **Complications of labor and/or delivery**
201	1	**ABNML** **Abnormal conditions of newborn**
202	1	**CONGAN** **Congenital anomalies**
203	1	**API flag** **Race codes 18-68 reported (beginning with 1992 data)**

Item Location	Item Length	Variable Name, Item and Code Outline
204	1	**CDOBMIMP** **Month of Birth of Child Imputation Flag** Blank ... Month is not imputed 1 ... Month is imputed
205-206	2	**BIRMON** **Month of Birth** 01 ... January 02 ... February 03 ... March 04 ... April 05 ... May 06 ... June 07 ... July 08 ... August 09 ... September 10 ... October 11 ... November 12 ... December
207-208	2	**R6** **Reserved Position**
209	1	**WEEKDAYB** **Day of Week Child Born** 1 ... Sunday 2 ... Monday 3 ... Tuesday 4 ... Wednesday 5 ... Thursday 6 ... Friday 7 ... Saturday
210	1	**FLGND** **Flag Indicating Records Included in Both Numerator and Denominator Files** This variable is included in the denominator file only, and identifies a record which is also included in the numerator file. Please note that not all infant deaths in the numerator file are represented in the denominator file, because some of the infants who died in 1999 were born in 1998. 1 ... Record also included in numerator file Blank ... Record not included in numerator file

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

Locations 211-535 contain data from the Death Certificate. Residence items in the Denominator Record and in the natality section of the Numerator (Linked) Record refer to the usual place of residence of the Mother; whereas in the mortality section of the Numerator (Linked) Record, these items refer to the place of residence of the Decedent.

Item Location	Item Length	Variable Name, Item and Code Outline
211-213	3	**AGED** **Age at Death in Days** The generated age at death in days is calculated from the date of death on the death certificate minus the date of birth on the birth certificate unless the reported age of death is less than 2 days, then the reported age is used. If the exact date of birth and/or death is unknown, the age is imputed. 000-364 ... Number of days
214	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)
215	1	**ACCIDPL** **Place of Accident for Causes W00-Y34, except Y06.- and Y07.-** Blank ... Causes other than 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
216-219	4	**UCOD** **ICD Code (10th Revision)** See the International Classification of Diseases, 1992 Revision, Volume 1.

Item Location	Item Length	Variable Name, Item and Code Outline
220-222	3	**UCODR130** **130 Infant Cause Recode** A recode of the ICD cause code into 130 groups for NCHS publications. Further back in this document is a complete list of recodes and the causes included. 001-158 ... Code range (not inclusive)
223-230	8	**RECWT** **Record weight** Beginning in 1995, a record weight was added to the linked file to adjust for the approximately 2-3% of records each year which cannot be linked to their corresponding birth certificates (see introduction to this tape documentation for further details). These weights are used to produce all NCHS linked file tables, including Documentation tables 1-5 included in this tape documentation. The general format for this record weight is the number one followed by a decimal point and six decimal places as follows: 1.XXXXXX

Item Location	Item Length	Variable Name, Item and Code Outline
261-504	244	**MULTCOND** **Multiple Conditions** See the "International Classification of Diseases", 1992 Revision, Volume 1. Both the entity-axis and record-axis conditions are coded according to this revision (10th).
261-262	2	**EANUM** **Number of Entity-Axis Conditions** 00-20 ... Code range
263-402	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 (ICD 10th Revision) Position 7: Nature of Injury Flag 1 ... Indicates that the code in positions 3-6 is a Nature of Injury code 0 ... All other codes
263-269	7	**1st Condition**
270-276	7	**2nd Condition**
277-283	7	**3rd Condition**
284-290	7	**4th Condition**
291-297	7	**5th Condition**

Item Location	Item Length	Variable Name, Item and Code Outline
298-304	7	**6th Condition**
305-311	7	**7th Condition**
312-318	7	**8th Condition**
319-325	7	**9th Condition**
326-332	7	**10th Condition**
333-339	7	**11th Condition**
340-346	7	**12th Condition**
347-353	7	**13th Condition**
354-360	7	**14th Condition**
361-367	7	**15th Condition**
368-374	7	**16th Condition**
375-381	7	**17th Condition**
382-388	7	**18th Condition**
389-395	7	**19th Condition**
396-402	7	**20th Condition**
403-404	2	**RANUM** **Number of Record-Axis Conditions** 00-20 ... Code range
405-504	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 (ICD 10th Revision) Position 5: Nature of Injury Flag 1 ... Indicates that the code in positions 1-4 is a Nature of Injury code 0 ... All other codes

Item Location	Item Length	Variable Name, Item and Code Outline
405-409	5	**1st Condition**
410-414	5	**2nd Condition**
415-419	5	**3rd Condition**
420-424	5	**4th Condition**
425-429	5	**5th Condition**
430-434	5	**6th Condition**
435-439	5	**7th Condition**
440-444	5	**8th Condition**
445-449	5	**9th Condition**
450-454	5	**10th Condition**
455-459	5	**11th Condition**
460-464	5	**12th Condition**
465-469	5	**13th Condition**
470-474	5	**14th Condition**
475-479	5	**15th Condition**
480-484	5	**16th Condition**
485-489	5	**17th Condition**
490-494	5	**18th Condition**
495-499	5	**19th Condition**
500-504	5	**20th Condition**
505	1	**RESSTATD** **Resident Status - Death** **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 50 States and D.C. 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 50 States and D.C.

Item Location	Item Length	Variable Name, Item and Code Outline

505 1 **RESSTATD**

Resident Status - Death (Cont'd)

Puerto Rico 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.
4 ... FOREIGN RESIDENTS: Occurred in Puerto Rico to a resident of any other place.

Virgin Islands 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.
4 ... FOREIGN RESIDENTS: Occurred in the 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.
4 ... FOREIGN RESIDENTS: Occurred in Guam to a resident of any place other than Guam or the U.S.

506-507 2 **DRSTATE**

Expanded State of Residence - NCHS Codes - Deaths

This item is designed to separately identify New York City records from other New York State records.

United States Occurrence

01 ... Alabama
02 ... Alaska
03 ... Arizona
04 ... Arkansas
05 ... California
06 ... Colorado
07 ... Connecticut
08 ... Delaware
09 ... District of Columbia
10 ... Florida
11 ... Georgia
12 ... Hawaii
13 ... Idaho
14 ... Illinois
15 ... Indiana
16 ... Iowa
17 ... Kansas
18 ... Kentucky
19 ... Louisiana
20 ... Maine

Item Location	Item Length	Variable Name, Item and Code Outline
506-507	2	**DRSTATE** **Expanded State of Residence - NCHS Codes - Deaths (Cont'd)**

United States Occurrence

21	...	Maryland
22	...	Massachusetts
23	...	Michigan
24	...	Minnesota
25	...	Mississippi
26	...	Missouri
27	...	Montana
28	...	Nebraska
29	...	Nevada
30	...	New Hampshire
31	...	New Jersey
32	...	New Mexico
33	...	New York
34	...	New York City
35	...	North Carolina
36	...	North Dakota
37	...	Ohio
38	...	Oklahoma
39	...	Oregon
40	...	Pennsylvania
41	...	Rhode Island
42	...	South Carolina
43	...	South Dakota
44	...	Tennessee
45	...	Texas
46	..	Utah
47	...	Vermont
48	...	Virginia
49	...	Washington
50	...	West Virginia
51	...	Wisconsin
52	...	Wyoming
53-58,60	...	Foreign Residents
53	...	Puerto Rico
54	...	Virgin Islands
55	...	Guam
56	...	Canada
57	...	Cuba
58	...	Mexico
60	...	Remainder of the World

Puerto Rico Occurrence

53	...	Puerto Rico
01-52,54-58,60	...	Foreign Residents: Refer to U.S. for specific code structure.

Item Location	Item Length	Variable Name, Item and Code Outline
506-507	2	**DRSTATE** **Expanded State of Residence - NCHS Codes - Deaths (Cont'd)**

Virgin Islands Occurrence

54	...	Virgin Islands
01-53,55-58,60	...	Foreign Residents: Refer to U.S. for specific code structure.

Guam Occurrence

55	...	Guam
01-52	...	U.S. resident is also considered a resident of Guam.
53,54,58,60	...	Foreign Residents: Refer to U.S. for specific code structure.

508-512 5 **FIPSOCCD**
Federal Information Processing Standards (FIPS) Geographic Codes (Occurrence) - Death

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.

508-509 2 **STOCCFIPD**
State of Occurrence (FIPS) - Death

United States

01	...	Alabama
02	...	Alaska
04	...	Arizona
05	...	Arkansas
06	...	California
08	...	Colorado
09	...	Connecticut
10	...	Delaware
11	...	District of Columbia
12	...	Florida
13	...	Georgia
15	...	Hawaii
16	...	Idaho
17	...	Illinois
18	...	Indiana
19	...	Iowa
20	...	Kansas
21	...	Kentucky
22	...	Louisiana
23	...	Maine
24	...	Maryland
25	...	Massachusetts
26	...	Michigan
27	...	Minnesota
28	...	Mississippi
29	...	Missouri
30	...	Montana

Item Location	Item Length	Variable Name, Item and Code Outline
508-509	2	**STOCCFIPD** **State of Occurrence (FIPS) - Death (Cont'd)**

United States

31	...	Nebraska
32	...	Nevada
33	...	New Hampshire
34	...	New Jersey
35	...	New Mexico
36	...	New York
37	...	North Carolina
38	...	North Dakota
39	...	Ohio
40	...	Oklahoma
41	...	Oregon
42	...	Pennsylvania
44	...	Rhode Island
45	...	South Carolina
46	...	South Dakota
47	...	Tennessee
48	...	Texas
49	...	Utah
50	...	Vermont
51	...	Virginia
53	...	Washington
54	...	West Virginia
55	...	Wisconsin
56	...	Wyoming

Puerto Rico

72	...	Puerto Rico

Virgin Islands

78	...	Virgin Islands

Guam

66	...	Guam

510-512	3	**CNTOCFIPD** **County of Occurrence (FIPS) - Death**

001-nnn	...	Counties and county equivalents (independent and coextensive cities) are numbered alphabetically within each State. (Note: To uniquely identify a county, both the State and county codes must be used.)
999	...	County with less than 250,000 population

Item Location	Item Length	Variable Name, Item and Code Outline
513-517	5	**FIPSRESD** **Federal Information Processing Standards (FIPS) Geographic Codes (Residence) - Death** 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.
513-514	2	**STRESFIPD** **State of Residence (FIPS) - Death**

United States Occurrence

00	...	Foreign residents
01	...	Alabama
02	...	Alaska
04	...	Arizona
05	...	Arkansas
06	...	California
08	...	Colorado
09	...	Connecticut
10	...	Delaware
11	...	District of Columbia
12	...	Florida
13	...	Georgia
15	...	Hawaii
16	...	Idaho
17	...	Illinois
18	...	Indiana
19	...	Iowa
20	...	Kansas
21	...	Kentucky
22	...	Louisiana
23	...	Maine
24	...	Maryland
25	...	Massachusetts
26	...	Michigan
27	...	Minnesota
28	...	Mississippi
29	...	Missouri
30	...	Montana
31	...	Nebraska
32	...	Nevada
33	...	New Hampshire
34	...	New Jersey
35	...	New Mexico
36	...	New York
37	...	North Carolina
38	...	North Dakota
39	...	Ohio
40	...	Oklahoma

Item Location	Item Length	Variable Name, Item and Code Outline
513-514	2	**STRESFIPD** **State of Residence (FIPS) - Death (Cont'd)**

United States Occurrence

41	...	Oregon
42	...	Pennsylvania
44	...	Rhode Island
45	...	South Carolina
46	...	South Dakota
47	...	Tennessee
48	...	Texas
49	...	Utah
50	...	Vermont
51	...	Virginia
53	...	Washington
54	...	West Virginia
55	...	Wisconsin
56	...	Wyoming

Puerto Rico Occurrence

72	...	Puerto Rico
00-56, 66,78	...	Foreign resident: Refer to U.S. for specific code structure.

Virgin Islands Occurrence

78	...	Virgin Islands
00-56, 66,72	...	Foreign resident: Refer to U.S. for specific code structure.

Guam Occurrence

66	...	Guam
01-56, 00,72,78	...	Foreign resident: Refer to U.S. for specific code structure.

515-517	3	**CNTYRFPD** **County of Residence (FIPS) - Death**

000	...	Foreign residents
001-nnn	...	Counties and county equivalents (independent and coextensive cities) are numbered alphabetically within each State (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.
999	...	County with less than 250,000 population

Item Location	Item Length	Variable Name, Item and Code Outline
518-522	5	**PLRES** **Place (City) of Residence (FIPS)** A complete list of cities is shown in the Geographic code outline further back in this document. 00000 ... Foreign residents 00001-nnnnn ... Code range 99999 ... Balance of county; or city less than 250,000 population
523	1	**HOSPD** **Hospital and Patient 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 ... Hospital, Clinic or Medical Center - Patient status unknown 5 ... Nursing home 6 ... Residence 7 ... Other 9 ... Place of death unknown
524-527	4	**DTHYR** **Year of Death** 1998 ... Death occurred in 1998
528-529	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 11 ... November 12 ... December
530-531	2	**R9** **Reserved Position**

1999 Period Linked Birth/Infant Death Data Set

Geographic Code Outline

The following pages show the geographic codes used by the Division of Vital Statistics in the processing of vital event data occurring in the United States. For the linked data set, counties and cities with a population of 250,000 or more are identified.

Federal Information Processing Standards (FIPS) State, County, and City/Place Codes: For the 1999 linked file, the county and city/place codes and the State code immediately preceding them are FIPS codes. These codes were effective with the 1994 data year and are based on the results of the 1990 Census. County and county equivalents (independent and coextensive cities) are numbered alphabetically within each State. When an event occurs to a nonresident of the United States, residence data are coded only to the "State" level, or to the remainder of the world. For an explanation of FIPS codes, reference should be made to various National Bureau of Standards (NBS) publications.

Listings of Counties Identified in the Linked Data Set
Vital Statistics Geographic Code Outline Effective With 1999 Data

State	County	State and County Name
01		Alabama
	073	Jefferson
	097	Mobile
02		Alaska
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
	095	Solano
	097	Sonoma
	099	Stanislaus
	107	Tulare
	111	Ventura
08		Colorado
	001	Adams
	005	Arapahoe
	031	Denver, coext. with Denver city
	041	El Paso
	059	Jefferson

State	County	State and County Name
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
	025	Dade
	031	Duval
	033	Escambia
	057	Hillsborough
	071	Lee
	095	Orange
	099	Palm Beach
	101	Pasco
	103	Pinellas
	105	Polk
	115	Sarasota
	117	Seminole
	127	Volusia
13		Georgia
	067	Cobb
	089	De Kalb
	121	Fulton
	135	Gwinnett
15		Hawaii
	003	Honolulu
16		Idaho

State	County	State and County Name
17		Illinois
	031	Cook
	043	Du Page
	089	Kane
	097	Lake
	163	St. Clair
	197	Will
	201	Winnebago
18		Indiana
	003	Allen
	089	Lake
	097	Marion
19		Iowa
	153	Polk
20		Kansas
	091	Johnson
	173	Sedgwick
21		Kentucky
	111	Jefferson
22		Louisiana
	033	East Baton Rouge
	051	Jefferson
	071	Orleans, coext. with New Orleans city
23		Maine
24		Maryland
	003	Anne Arundel
	005	Baltimore
	510	Baltimore city
	031	Montgomery
	033	Prince George's
25		Massachusetts
	005	Bristol
	009	Essex
	013	Hampden
	017	Middlesex
	021	Norfolk
	023	Plymouth
	025	Suffolk

	027	Worcester

State	County	State and County Name
26		Michigan
	049	Genesee
	065	Ingham
	081	Kent
	099	Macomb
	125	Oakland
	161	Washtenaw
	163	Wayne
27		Minnesota
	037	Dakota
	053	Hennepin
	123	Ramsey
28		Mississippi
	049	Hinds
29		Missouri
	095	Jackson
	189	St. Louis
	510	St. Louis city
30		Montana
31		Nebraska
	055	Douglas
32		Nevada
	003	Clark
	031	Washoe
33		New Hampshire
	011	Hillsborough
34		New Jersey
	003	Bergen
	005	Burlington
	007	Camden
	013	Essex
	017	Hudson
	021	Mercer
	023	Middlesex

State	County	State and County Name
	025	Monmouth
	027	Morris
	029	Ocean
34		New Jersey
	031	Passaic
	039	Union
35		New Mexico
	001	Bernalillo
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
	065	Oneida
	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

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

	157	Shelby
48		Texas
	029	Bexar
	061	Cameron
	085	Collin

State	County	State and County Name
48		Texas
	113	Dallas
	121	Denton
	141	El Paso
	201	Harris
	215	Hidalgo
	355	Nueces
	439	Tarrant
	453	Travis
49		Utah
	035	Salt Lake
	049	Utah
50		Vermont
51		Virginia
	059	Fairfax
	710	Norfolk city
	810	Virginia Beach city
53		Washington
	033	King
	053	Pierce
	061	Snohomish
	063	Spokane
54		West Virginia
55		Wisconsin
	025	Dane
	079	Milwaukee
	133	Waukesha
56		Wyoming

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 1999 Data

State	FIPS Codes City/Place	State and City/Place Name
01		Alabama
	07000	Birmingham
02		Alaska
04		Arizona
	46000	Mesa
	55000	Phoenix
	77000	Tucson
05		Arkansas
06		California
	02000	Anaheim
	27000	Fresno
	43000	Long Beach
	44000	Los Angeles
	53000	Oakland
	64000	Sacramento
	66000	San Diego
	67000	San Francisco
	68000	San Jose
	69000	Santa Ana
08		Colorado
	16000	Colorado Springs
	20000	Denver
09		Connecticut
10		Delaware
11		District of Columbia
	50000	Washington
12		Florida
	35000	Jacksonville
	45000	Miami
	71000	Tampa
13		Georgia
	04000	Atlanta

FIPS Codes

State	City/Place	State and City/Place Name
15		Hawaii
	17000	Honolulu
16		Idaho
17		Illinois
	14000	Chicago
18		Indiana
	36000	Indianapolis
19		Iowa
20		Kansas
	79000	Wichita
21		Kentucky
	48000	Louisville
22		Louisiana
	55000	New Orleans
23		Maine
24		Maryland
	04000	Baltimore
25		Massachusetts
	07000	Boston
26		Michigan
	22000	Detroit
27		Minnesota
	43000	Minneapolis
	58000	St. Paul
28		Mississippi
29		Missouri
	38000	Kansas City
	65000	St. Louis

State	City/Place	FIPS Codes

State	City/Place	State and City/Place Name
30		Montana
31		Nebraska
	37000	Omaha
32		Nevada
	4000	Las Vegas
33		New Hampshire
34		New Jersey
	51000	Newark
35		New Mexico
	02000	Albuquerque
36		New York
	51000	Bronx borough, Bronx county
	11000	Buffalo
	51000	Manhattan borough, New York county
	51000	Queens borough, Queens county
	51000	Staten Island borough, Richmond county
37		North Carolina
	12000	Charlotte
38		North Dakota
39		Ohio
	15000	Cincinnati
	16000	Cleveland
	18000	Columbus
	77000	Toledo
40		Oklahoma
	55000	Oklahoma City
	75000	Tulsa
41		Oregon
	59000	Portland

FIPS Codes
State City/Place State and City/Place Name

42		Pennsylvania
	60000	Philadelphia
	61000	Pittsburgh
44		Rhode Island
45		South Carolina
46		South Dakota
47		Tennessee
	48000	Memphis
	52010	Nashville-Davidson
48		Texas
	04000	Arlington
	05000	Austin
	17000	Corpus Christ
	19000	Dallas
	24000	El Paso
	27000	Fort Worth
	35000	Houston
	65000	San Antonio
49		Utah
50		Vermont
51		Virginia
	57000	Norfolk
	82000	Virginia Beach
53		Washington
	63000	Seattle
54		West Virginia
55		Wisconsin
	53000	Milwaukee
56		Wyoming

FIPS Codes		
State	City/Place	State and City/Place Name

72	00000	Puerto Rico
78	00000	Virgin Islands
66	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

***** 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)
056				Influenza (J10-J11)
057				Pneumonia (J12-J18)

ST: 1 = Subtotal Limited: Sex: 1 = Males; 2 = Females
Age: 1 = 5 and over; 2 = 10-54; 3 = 28 days and over

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

130 Recode	S T	Limited Sex	Age	Cause Title and ICD-10 Codes Included
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-N98)
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-N98)
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 birth weight, not elsewhere classified (P07)
089				Extremely low birth weight or extreme immaturity (P07.0,P07.2)
090				Other low birth weight or preterm (P07.1,P07.3)
091				Disorders related to long gestation and high birth weight (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)
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)

ST: 1 = Subtotal Limited: Sex: 1 = Males; 2 = Females
Age: 1 = 5 and over; 2 = 10-54; 3 = 28 days and over

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

130 Recode	S T	Limited Sex	Age	Cause Title and ICD-10 Codes Included
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 (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,Y86)
152	1			Assault (homicide) (X85-Y09)
153				Assault (homicide) by hanging, strangulation and suffocation (X91)
154				Assault (homicide) by discharge of firearms (X93-X95)
155				Neglect, abandonment and other maltreatment syndromes (Y06-Y07)
156				Assault (homicide) by other and unspecified means (X85-X90,X92,X96-X99,Y00-Y05,Y08-Y09)
157				Complications of medical and surgical care (Y40-Y84)
158				Other external causes (X60-X84,Y10-Y36)

DOCUMENTATION TABLE 1
LIVE BIRTHS AND INFANT DEATHS BY STATE OF OCCURRENCE AND BY STATE OF RESIDENCE
UNITED STATES, PUERTO RICO, VIRGIN ISLANDS, AND GUAM - 1999 PERIOD DATA

(RESIDENCE OF BIRTH IS OF THE MOTHER)

State	LIVE BIRTHS		INFANT DEATHS			
			Unweighted		Weighted 1/	
	Occurrence	Residence	Occurrence	Residence	Occurrence	Residence
UNITED STATES 2/	3,963,465	3,959,417	27,281	27,261	27,914	27,865
ALABAMA	61,337	62,122	605	602	605	602
ALASKA	9,843	9,950	56	59	57	60
ARIZONA	81,208	81,145	540	540	549	543
ARKANSAS	35,629	36,729	251	289	255	293
CALIFORNIA	519,102	518,508	2,717	2,709	2,800	2,796
COLORADO	62,387	62,167	413	408	417	411
CONNECTICUT	43,253	43,310	261	258	261	260
DELAWARE	11,306	10,676	90	77	91	80
DISTRICT OF COLUMBIA	14,655	7,522	174	111	187	126
FLORIDA	197,153	197,023	1,447	1,431	1,459	1,436
GEORGIA	127,581	126,717	1,036	1,037	1,037	1,039
HAWAII	17,096	17,038	119	119	123	121
IDAHO	19,413	19,872	112	130	113	133
ILLINOIS	179,094	182,068	1,472	1,521	1,509	1,553
INDIANA	86,211	86,031	659	676	668	694
IOWA	37,701	37,558	209	213	209	213
KANSAS	38,231	38,782	274	286	278	286
KENTUCKY	52,829	54,403	360	392	365	404
LOUISIANA	67,419	67,136	615	607	631	623
MAINE	13,393	13,616	63	66	65	67
MARYLAND	67,605	71,967	526	593	529	599
MASSACHUSETTS	81,767	80,939	411	408	424	421
MICHIGAN	132,307	133,607	1,043	1,050	1,072	1,074
MINNESOTA	65,787	65,970	405	408	405	408
MISSISSIPPI	41,747	42,684	400	427	400	431
MISSOURI	77,371	75,432	633	570	642	580
MONTANA	10,747	10,785	69	69	70	71
NEBRASKA	24,210	23,907	163	157	164	158
NEVADA	28,892	29,362	192	190	197	192
NEW HAMPSHIRE	13,684	14,041	68	82	68	82
NEW JERSEY	110,992	114,105	710	739	737	761
NEW MEXICO	26,870	27,191	169	172	185	186
NEW YORK STATE	133,425	136,276	771	813	805	829
NEW YORK CITY	123,713	119,336	788	758	811	795
NORTH CAROLINA	114,885	113,795	1,048	1,032	1,050	1,035
NORTH DAKOTA	8,879	7,639	65	52	66	52
OHIO	153,257	152,584	1,180	1,153	1,296	1,245
OKLAHOMA	47,908	49,010	374	383	410	420
OREGON	46,106	45,204	271	258	272	258
PENNSYLVANIA	145,882	145,347	1,054	1,034	1,079	1,068
RHODE ISLAND	13,223	12,366	95	71	95	71
SOUTH CAROLINA	52,594	54,948	536	562	537	562
SOUTH DAKOTA	10,673	10,524	99	93	99	93
TENNESSEE	82,963	77,803	699	602	699	603
TEXAS	352,970	349,245	2,086	2,083	2,145	2,143
UTAH	47,261	46,290	235	217	244	226
VERMONT	6,220	6,567	37	36	37	36
VIRGINIA	93,293	95,469	654	675	664	680
WASHINGTON	79,062	79,586	385	394	389	395
WEST VIRGINIA	21,376	20,728	172	152	174	154
WISCONSIN	67,192	68,208	442	455	442	455
WYOMING	5,763	6,129	28	42	28	42
FOREIGN RESIDENTS	-	3,873	-	20	-	20
PUERTO RICO 3/	59,684	59,563	627	623	-	-
VIRGIN ISLANDS 3/	1,772	1,671	16	16	-	-
GUAM 3/	4,037	4,021	35	35	-	-

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 OCCURRENCES.
3/ DATA FROM THE PUERTO RICO, VIRGIN ISLANDS, AND GUAM FILE.

DOCUMENTATION TABLE 2

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY RACE OF MOTHER, SEX AND BIRTHWEIGHT OF CHILD:
UNITED STATES, 1999 PERIOD DATA
(INFANT DEATHS 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 1/										
BOTH SEXES										
LIVE BIRTHS.....	3,959,417	6,318	11,344	11,738	13,314	15,513	59,599	184,287	3,654,764	2,540
INFANT DEATHS...	27,864	5,408	5,507	1,779	930	756	1,714	2,179	9,197	395
INF.MORT.RATE...	7.0	856.0	485.5	151.6	69.9	48.7	28.8	11.8	2.5	155.4
MALE										
LIVE BIRTHS.....	2,026,854	3,194	5,743	6,049	6,879	7,848	29,063	84,848	1,881,893	1,337
INFANT DEATHS...	15,596	2,786	3,171	1,117	574	422	896	1,104	5,280	246
INF.MORT.RATE...	7.7	872.1	552.2	184.6	83.5	53.8	30.8	13.0	2.8	184.1
FEMALE										
LIVE BIRTHS.....	1,932,563	3,124	5,601	5,689	6,435	7,665	30,536	99,439	1,772,871	1,203
INFANT DEATHS...	12,268	2,623	2,336	663	356	334	818	1,075	3,916	148
INF.MORT.RATE...	6.3	839.5	417.1	116.5	55.3	43.5	26.8	10.8	2.2	123.4
WHITE										
BOTH SEXES										
LIVE BIRTHS.....	3,132,501	3,495	6,597	7,297	8,674	10,398	41,091	128,583	2,924,576	1,790
INFANT DEATHS...	18,136	2,997	3,292	1,143	632	541	1,191	1,507	6,622	210
INF.MORT.RATE...	5.8	857.5	499.0	156.7	72.8	52.0	29.0	11.7	2.3	117.6
MALE										
LIVE BIRTHS.....	1,605,603	1,789	3,356	3,814	4,517	5,366	20,268	59,735	1,505,807	951
INFANT DEATHS...	10,238	1,564	1,887	727	401	303	635	774	3,827	120
INF.MORT.RATE...	6.4	874.1	562.4	190.5	88.7	56.5	31.3	13.0	2.5	126.2
FEMALE										
LIVE BIRTHS.....	1,526,898	1,706	3,241	3,483	4,157	5,032	20,823	68,848	1,418,769	839
INFANT DEATHS...	7,898	1,433	1,404	417	231	238	556	733	2,796	90
INF.MORT.RATE...	5.2	840.1	433.3	119.6	55.6	47.3	26.7	10.6	2.0	107.8
BLACK										
BOTH SEXES										
LIVE BIRTHS.....	605,970	2,590	4,300	3,971	4,045	4,382	15,542	44,805	525,898	437
INFANT DEATHS...	8,480	2,214	1,998	557	268	186	429	565	2,104	159
INF.MORT.RATE...	14.0	855.0	464.6	140.3	66.2	42.4	27.6	12.6	4.0	364.6
MALE										
LIVE BIRTHS.....	307,670	1,291	2,145	1,984	2,036	2,102	7,261	20,013	270,586	252
INFANT DEATHS...	4,689	1,128	1,158	340	154	103	220	281	1,189	116
INF.MORT.RATE...	15.2	873.7	539.7	171.2	75.8	49.2	30.3	14.0	4.4	460.4
FEMALE										
LIVE BIRTHS.....	298,300	1,299	2,155	1,987	2,009	2,280	8,281	24,792	255,312	185
INFANT DEATHS...	3,790	1,086	840	217	113	82	209	284	914	43
INF.MORT.RATE...	12.7	836.3	389.8	109.4	56.5	36.1	25.2	11.5	3.6	234.1

1/ INCLUDES RACES OTHER THAN WHITE AND BLACK

DOCUMENTATION TABLE 3

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTHWEIGHT, RACE OF MOTHER, AND GESTATIONAL AGE:
UNITED STATES, 1999 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 1/										
TOTAL										
LIVE BIRTHS.....	3,959,417	28,959	47,938	215,529	168,427	1,899,742	841,824	429,214	284,844	42,940
INFANT DEATHS.....	27,864	11,808	2,284	2,533	978	5,546	1,929	1,004	826	956
INF. MORT. RATE....	7.0	407.8	47.7	11.8	5.8	2.9	2.3	2.3	2.9	22.3
LESS THAN 2,500 GRAMS										
LIVE BIRTHS.....	302,113	27,943	36,403	100,712	34,331	76,016	11,099	5,214	6,293	4,102
INFANT DEATHS.....	18,273	11,797	2,177	1,826	468	1,125	200	122	138	420
INF. MORT. RATE....	60.5	422.2	59.8	18.1	13.6	14.8	18.0	23.4	22.0	102.4
LESS THAN 500 GRAMS										
LIVE BIRTHS.....	6,318	5,846	233	23	2	8	1	1	1	203
INFANT DEATHS.....	5,408	5,103	143	17	1	2	1	1	-	140
INF. MORT. RATE....	856.0	872.8	614.6	759.0	515.4	254.1	1008.3	1035.4	-	688.8
500-749 GRAMS										
LIVE BIRTHS.....	11,344	9,528	1,405	136	9	23	5	4	6	228
INFANT DEATHS.....	5,507	4,955	386	40	4	8	1	3	2	108
INF. MORT. RATE....	485.5	520.0	274.8	291.8	455.9	352.2	200.0	776.0	346.5	473.3
750-999 GRAMS										
LIVE BIRTHS.....	11,738	6,990	3,839	457	40	108	45	17	23	219
INFANT DEATHS.....	1,779	1,251	386	71	1	11	4	-	5	49
INF. MORT. RATE....	151.6	179.0	100.7	156.1	26.2	103.5	91.6	-	222.5	222.1
1,000-1,249 GRAMS										
LIVE BIRTHS.....	13,314	3,063	7,176	2,110	138	347	101	54	94	231
INFANT DEATHS.....	930	287	416	146	14	25	9	3	5	25
INF. MORT. RATE....	69.9	93.8	57.9	69.1	104.1	70.8	89.5	56.9	54.6	108.5
1,250-1,499 GRAMS										
LIVE BIRTHS.....	15,513	916	8,166	4,755	384	698	140	70	123	261
INFANT DEATHS.....	756	105	345	190	27	53	7	5	4	20
INF. MORT. RATE....	48.7	114.8	42.2	40.0	69.2	76.2	50.6	73.1	32.8	75.1
1,500-1,999 GRAMS										
LIVE BIRTHS.....	59,599	928	11,357	31,912	5,004	7,248	961	509	852	828
INFANT DEATHS.....	1,714	63	371	676	144	301	47	29	42	42
INF. MORT. RATE....	28.8	68.3	32.6	21.2	28.8	41.5	48.8	56.2	48.9	50.2

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, 1999 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 1/										
2,000-2,499 GRAMS										
LIVE BIRTHS.....	184,287	672	4,227	61,319	28,754	67,584	9,846	4,559	5,194	2,132
INFANT DEATHS.....	2,179	32	130	685	277	725	131	81	80	37
INF. MORT. RATE....	11.8	47.4	30.8	11.2	9.6	10.7	13.3	17.8	15.4	17.5
2,500-2,999 GRAMS										
LIVE BIRTHS.....	653,618	1,016	4,141	54,506	61,417	366,971	87,083	37,983	33,784	6,717
INFANT DEATHS.....	3,010	11	68	415	276	1,504	377	157	162	40
INF. MORT. RATE....	4.6	11.2	16.4	7.6	4.5	4.1	4.3	4.1	4.8	5.9
3,000-3,499 GRAMS										
LIVE BIRTHS.....	1,470,522	-	4,835	38,362	49,654	791,738	318,143	147,760	105,591	14,439
INFANT DEATHS.....	3,585	-	26	189	168	1,786	738	340	289	50
INF. MORT. RATE....	2.4	-	5.3	4.9	3.4	2.3	2.3	2.3	2.7	3.5
3,500-3,999 GRAMS										
LIVE BIRTHS.....	1,137,786	-	2,559	17,385	18,378	515,360	309,743	164,754	98,450	11,157
INFANT DEATHS.....	1,916	-	14	75	51	863	438	275	167	34
INF. MORT. RATE....	1.7	-	5.5	4.3	2.8	1.7	1.4	1.7	1.7	3.0
4,000-4,499 GRAMS										
LIVE BIRTHS.....	332,995	-	-	3,866	3,916	128,202	98,737	61,097	33,866	3,311
INFANT DEATHS.....	536	-	-	21	12	214	136	87	60	5
INF. MORT. RATE....	1.6	-	-	5.5	3.1	1.7	1.4	1.4	1.8	1.6
4,500-4,999 GRAMS										
LIVE BIRTHS.....	53,773	-	-	600	638	19,150	15,494	11,177	6,131	583
INFANT DEATHS.....	103	-	-	4	2	36	33	18	6	4
INF. MORT. RATE....	1.9	-	-	6.9	3.2	1.9	2.1	1.6	1.0	7.2
5,000 GRAMS OR MORE										
LIVE BIRTHS.....	6,070	-	-	98	93	2,305	1,525	1,229	729	91
INFANT DEATHS.....	47	-	-	3	1	19	7	5	4	8
INF. MORT. RATE....	7.7	-	-	30.8	10.8	8.0	4.7	4.2	5.5	89.4
NOT STATED										
LIVE BIRTHS.....	2,540	-	-	-	-	-	-	-	-	2,540
INFANT DEATHS.....	395	-	-	-	-	-	-	-	-	395
INF. MORT. RATE....	155.4	-	-	-	-	-	-	-	-	155.4

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, 1999 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
WHITE										
TOTAL										
LIVE BIRTHS.....	3,132,501	16,805	31,869	155,999	127,394	1,504,419	682,583	351,794	228,098	33,540
INFANT DEATHS.....	18,136	6,882	1,490	1,828	682	3,993	1,367	729	590	574
INF. MORT. RATE....	5.8	409.5	46.8	11.7	5.4	2.7	2.0	2.1	2.6	17.1
LESS THAN 2,500 GRAMS										
LIVE BIRTHS.....	206,135	16,236	24,210	71,684	24,236	51,773	7,385	3,554	4,184	2,873
INFANT DEATHS.....	11,303	6,874	1,425	1,311	316	789	135	84	87	281
INF. MORT. RATE....	54.8	423.4	58.8	18.3	13.0	15.2	18.3	23.7	20.9	97.9
LESS THAN 500 GRAMS										
LIVE BIRTHS.....	3,495	3,197	138	16	2	4	-	-	-	138
INFANT DEATHS.....	2,997	2,803	92	12	1	1	-	-	-	87
INF. MORT. RATE....	857.5	876.9	670.0	767.9	515.4	258.3	-	-	-	629.3
500-749 GRAMS										
LIVE BIRTHS.....	6,597	5,452	855	93	7	20	5	-	5	160
INFANT DEATHS.....	3,292	2,946	225	30	4	6	1	-	2	78
INF. MORT. RATE....	499.0	540.3	263.4	318.7	586.1	303.5	200.0	-	415.8	485.9
750-999 GRAMS										
LIVE BIRTHS.....	7,297	4,249	2,438	314	26	77	32	12	14	135
INFANT DEATHS.....	1,143	807	239	53	1	6	3	-	2	32
INF. MORT. RATE....	156.7	189.9	97.9	169.0	40.2	79.5	96.6	-	146.8	238.6
1,000-1,249 GRAMS										
LIVE BIRTHS.....	8,674	1,937	4,698	1,397	86	237	59	35	61	164
INFANT DEATHS.....	632	186	281	105	10	17	7	3	2	20
INF. MORT. RATE....	72.8	96.1	59.8	75.3	119.8	72.8	119.2	87.7	34.0	120.9
1,250-1,499 GRAMS										
LIVE BIRTHS.....	10,398	549	5,507	3,233	255	448	95	45	83	183
INFANT DEATHS.....	541	80	238	141	19	38	6	4	1	13
INF. MORT. RATE....	52.0	145.2	43.2	43.8	76.2	84.7	63.8	90.9	12.2	73.4
1,500-1,999 GRAMS										
LIVE BIRTHS.....	41,091	493	7,839	22,354	3,380	4,880	638	341	565	601
INFANT DEATHS.....	1,191	35	259	484	100	216	29	22	22	24
INF. MORT. RATE....	29.0	70.4	33.0	21.7	29.7	44.3	44.8	63.1	39.6	40.2

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, 1999 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
WHITE										
2,000-2,499 GRAMS										
LIVE BIRTHS.....	128,583	359	2,735	44,277	20,480	46,107	6,556	3,121	3,456	1,492
INFANT DEATHS.....	1,507	18	91	485	179	504	89	56	58	27
INF. MORT. RATE....	11.7	49.2	33.1	11.0	8.8	10.9	13.7	17.8	16.7	18.1
2,500-2,999 GRAMS										
LIVE BIRTHS.....	468,901	569	2,557	39,787	45,886	262,990	61,150	27,210	23,913	4,839
INFANT DEATHS.....	2,052	7	41	300	197	1,029	250	102	103	24
INF. MORT. RATE....	4.4	12.8	16.1	7.5	4.3	3.9	4.1	3.7	4.3	4.9
3,000-3,499 GRAMS										
LIVE BIRTHS.....	1,151,179	-	3,191	27,607	38,670	622,788	249,376	116,358	81,859	11,330
INFANT DEATHS.....	2,586	-	13	138	119	1,313	518	238	215	31
INF. MORT. RATE....	2.2	-	4.2	5.0	3.1	2.1	2.1	2.0	2.6	2.7
3,500-3,999 GRAMS										
LIVE BIRTHS.....	959,764	-	1,911	13,223	14,768	436,245	262,352	139,509	82,455	9,301
INFANT DEATHS.....	1,441	-	11	57	39	643	323	219	132	18
INF. MORT. RATE....	1.5	-	5.8	4.3	2.6	1.5	1.2	1.6	1.6	2.0
4,000-4,499 GRAMS										
LIVE BIRTHS.....	291,909	-	-	3,117	3,244	111,914	87,181	54,010	29,617	2,826
INFANT DEATHS.....	428	-	-	17	9	182	104	68	43	4
INF. MORT. RATE....	1.5	-	-	5.6	2.8	1.6	1.2	1.3	1.4	1.5
4,500-4,999 GRAMS										
LIVE BIRTHS.....	47,584	-	-	505	520	16,765	13,798	10,061	5,427	508
INFANT DEATHS.....	83	-	-	4	2	23	31	13	6	3
INF. MORT. RATE....	1.7	-	-	8.2	3.9	1.4	2.2	1.3	1.1	6.1
5,000 GRAMS OR MORE										
LIVE BIRTHS.....	5,239	-	-	76	70	1,944	1,341	1,092	643	73
INFANT DEATHS.....	34	-	-	1	1	14	6	5	4	2
INF. MORT. RATE....	6.4	-	-	13.2	14.3	7.4	4.6	4.7	6.3	27.7
NOT STATED										
LIVE BIRTHS.....	1,790	-	-	-	-	-	-	-	-	1,790
INFANT DEATHS.....	210	-	-	-	-	-	-	-	-	210
INF. MORT. RATE....	117.6	-	-	-	-	-	-	-	-	117.6

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, 1999 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
BLACK										
TOTAL										
LIVE BIRTHS.....	605,970	10,977	13,840	48,511	31,882	284,513	112,664	55,929	42,690	4,964
INFANT DEATHS.....	8,480	4,477	701	611	246	1,243	450	237	200	316
INF. MORT. RATE....	14.0	407.8	50.7	12.6	7.7	4.4	4.0	4.2	4.7	63.6
LESS THAN 2,500 GRAMS										
LIVE BIRTHS.....	79,635	10,605	10,628	24,043	8,122	19,248	2,982	1,390	1,769	848
INFANT DEATHS.....	6,217	4,472	669	443	125	270	51	31	46	111
INF. MORT. RATE....	78.1	421.7	62.9	18.4	15.4	14.0	17.0	22.0	25.8	130.3
LESS THAN 500 GRAMS										
LIVE BIRTHS.....	2,590	2,433	86	6	-	4	1	1	1	58
INFANT DEATHS.....	2,214	2,109	49	4	-	1	1	1	-	50
INF. MORT. RATE....	855.0	866.7	566.4	683.4	-	250.0	1008.3	1035.4	-	857.2
500-749 GRAMS										
LIVE BIRTHS.....	4,300	3,712	489	38	1	3	-	1	1	55
INFANT DEATHS.....	1,998	1,820	142	8	-	2	-	1	-	24
INF. MORT. RATE....	464.6	490.4	291.4	211.3	-	676.6	-	1035.4	-	432.8
750-999 GRAMS										
LIVE BIRTHS.....	3,971	2,456	1,271	119	12	27	12	4	9	61
INFANT DEATHS.....	557	391	128	17	-	5	1	-	3	11
INF. MORT. RATE....	140.3	159.2	101.0	145.0	-	187.4	86.0	-	340.2	184.9
1,000-1,249 GRAMS										
LIVE BIRTHS.....	4,045	985	2,175	618	40	95	35	19	32	46
INFANT DEATHS.....	268	92	124	35	1	7	2	-	3	3
INF. MORT. RATE....	66.2	93.6	57.2	55.9	25.3	76.8	57.4	-	95.7	67.9
1,250-1,499 GRAMS										
LIVE BIRTHS.....	4,382	333	2,316	1,263	113	211	36	20	39	51
INFANT DEATHS.....	186	22	96	42	5	11	1	1	2	5
INF. MORT. RATE....	42.4	67.1	41.6	33.0	45.1	52.8	28.5	51.5	51.8	101.2
1,500-1,999 GRAMS										
LIVE BIRTHS.....	15,542	395	2,985	8,045	1,349	1,948	270	147	242	161
INFANT DEATHS.....	429	25	96	164	34	65	13	6	16	10
INF. MORT. RATE....	27.6	62.2	32.1	20.4	24.9	33.4	49.1	41.0	67.1	63.7

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, 1999 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
BLACK										
2,000-2,499 GRAMS										
LIVE BIRTHS.....	44,805	291	1,306	13,954	6,607	16,960	2,628	1,198	1,445	416
INFANT DEATHS.....	565	13	32	173	86	178	32	21	21	7
INF. MORT. RATE....	12.6	45.4	24.9	12.4	13.0	10.5	12.3	17.9	14.8	17.3
2,500-2,999 GRAMS										
LIVE BIRTHS.....	139,324	372	1,361	11,977	11,991	77,047	19,467	8,216	7,858	1,035
INFANT DEATHS.....	801	4	22	98	66	387	110	49	53	12
INF. MORT. RATE....	5.8	10.9	16.5	8.2	5.5	5.0	5.6	6.0	6.7	11.8
3,000-3,499 GRAMS										
LIVE BIRTHS.....	229,856	-	1,368	8,572	8,431	120,134	48,790	22,906	18,105	1,550
INFANT DEATHS.....	823	-	8	47	41	393	170	89	59	16
INF. MORT. RATE....	3.6	-	5.9	5.4	4.8	3.3	3.5	3.9	3.3	10.5
3,500-3,999 GRAMS										
LIVE BIRTHS.....	124,040	-	483	3,269	2,743	54,984	32,453	17,761	11,503	844
INFANT DEATHS.....	374	-	2	17	11	164	93	48	29	10
INF. MORT. RATE....	3.0	-	4.2	5.3	4.1	3.0	2.9	2.7	2.6	12.0
4,000-4,499 GRAMS										
LIVE BIRTHS.....	27,918	-	-	557	496	11,196	7,749	4,795	2,925	200
INFANT DEATHS.....	76	-	-	4	3	17	23	16	12	-
INF. MORT. RATE....	2.7	-	-	7.3	6.1	1.5	3.0	3.4	4.2	-
4,500-4,999 GRAMS										
LIVE BIRTHS.....	4,206	-	-	78	83	1,659	1,110	766	474	36
INFANT DEATHS.....	16	-	-	-	-	9	2	4	-	1
INF. MORT. RATE....	3.9	-	-	-	-	5.5	1.8	5.3	-	30.5
5,000 GRAMS OR MORE										
LIVE BIRTHS.....	554	-	-	15	16	245	113	95	56	14
INFANT DEATHS.....	12	-	-	2	-	3	1	-	-	6
INF. MORT. RATE....	22.1	-	-	134.1	-	12.6	8.9	-	-	436.9
NOT STATED										
LIVE BIRTHS.....	437	-	-	-	-	-	-	-	-	437
INFANT DEATHS.....	159	-	-	-	-	-	-	-	-	159
INF. MORT. RATE....	364.6	-	-	-	-	-	-	-	-	364.6

1/ INCLUDES RACES OTHER THAN WHITE AND BLACK

– DATA NOT AVAILABLE.

DOCUMENTATION TABLE 4

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF MOTHER, AND AGE AT DEATH:
UNITED STATES, 1999 PERIOD DATA
(INFANT DEATHS 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)

BIRTH WEIGHT AND RACE OF MOTHER	LIVE BIRTHS	INFANT	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
ALL RACES1/						
TOTAL (ALL BIRTH WEIGHTS)...NUMBER..	3,959,417	27,864	18,701	14,874	3,827	9,164
RATE..		7.0	4.7	3.8	1.0	2.3
LESS THAN 2,500 GRAMS.....NUMBER..	302,113	18,280	14,966	12,531	2,435	3,314
RATE..		60.5	49.5	41.5	8.1	11.0
LESS THAN 500 GRAMS.....NUMBER..	6,318	5,444	5,352	5,170	182	92
RATE..		861.7	847.1	818.3	28.8	14.6
500-749 GRAMS.....NUMBER..	11,344	5,500	4,806	3,903	903	694
RATE..		484.9	423.7	344.1	79.6	61.2
750-999 GRAMS.....NUMBER..	11,738	1,771	1,324	902	422	447
RATE..		150.8	112.8	76.8	35.9	38.1
1,000-1,249 GRAMS.....NUMBER..	13,314	920	678	481	197	241
RATE..		69.1	51.0	36.2	14.8	18.1
1,250-1,499 GRAMS.....NUMBER..	15,513	748	527	402	125	221
RATE..		48.2	34.0	25.9	8.1	14.3
1,500-1,999 GRAMS.....NUMBER..	59,599	1,718	1,116	859	257	602
RATE..		28.8	18.7	14.4	4.3	10.1
2,000-2,499 GRAMS.....NUMBER..	184,287	2,180	1,163	814	349	1,017
RATE..		11.8	6.3	4.4	1.9	5.5
2,500-2,999 GRAMS.....NUMBER..	653,618	3,004	1,205	722	483	1,799
RATE..		4.6	1.8	1.1	.7	2.8
3,000-3,499 GRAMS.....NUMBER..	1,470,522	3,584	1,197	687	510	2,387
RATE..		2.4	.8	.5	.3	1.6
3,500-3,999 GRAMS.....NUMBER..	1,137,786	1,918	659	374	285	1,259
RATE..		1.7	.6	.3	.3	1.1
4,000-4,499 GRAMS.....NUMBER..	332,995	533	224	139	85	309
RATE..		1.6	.7	.4	.3	.9
4,500-4,999 GRAMS.....NUMBER..	53,773	103	44	31	13	59
RATE..		1.9	.8	.6	.2	1.1
5,000 GRAMS OR MORE.....NUMBER..	6,070	47	31	27	4	16
RATE..		7.7	5.1	4.4	.7	2.7
NOT STATED.....NUMBER..	2,540	395	374	363	11	20
RATE..		155.3	147.3	142.9	4.4	8.0

DOCUMENTATION TABLE 4

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF MOTHER, AND AGE AT DEATH:
UNITED STATES, 1999 PERIOD DATA
(INFANT DEATHS 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)-Continued

BIRTH WEIGHT AND RACE OF MOTHER	LIVE BIRTHS	INFANT	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
WHITE						
TOTAL (ALL BIRTH WEIGHTS)...NUMBER..	3,132,501	18,135	12,186	9,635	2,551	5,949
RATE..		5.8	3.9	3.1	.8	1.9
LESS THAN 2,500 GRAMS.....NUMBER..	206,135	11,305	9,362	7,868	1,494	1,943
RATE..		54.8	45.4	38.2	7.2	9.4
LESS THAN 500 GRAMS.....NUMBER..	3,495	3,012	2,966	2,873	93	46
RATE..		861.7	848.6	822.0	26.6	13.1
500-749 GRAMS.....NUMBER..	6,597	3,290	2,945	2,435	510	346
RATE..		498.8	446.4	369.1	77.2	52.4
750-999 GRAMS.....NUMBER..	7,297	1,141	902	638	264	239
RATE..		156.3	123.6	87.5	36.1	32.7
1,000-1,249 GRAMS.....NUMBER..	8,674	625	477	352	125	148
RATE..		72.0	55.0	40.6	14.4	17.0
1,250-1,499 GRAMS.....NUMBER..	10,398	536	401	321	80	135
RATE..		51.5	38.5	30.9	7.7	13.0
1,500-1,999 GRAMS.....NUMBER..	41,091	1,195	817	637	180	377
RATE..		29.1	19.9	15.5	4.4	9.2
2,000-2,499 GRAMS.....NUMBER..	128,583	1,507	854	612	243	653
RATE..		11.7	6.6	4.8	1.9	5.1
2,500-2,999 GRAMS.....NUMBER..	468,901	2,050	916	552	364	1,134
RATE..		4.4	2.0	1.2	.8	2.4
3,000-3,499 GRAMS.....NUMBER..	1,151,179	2,586	940	554	386	1,646
RATE..		2.2	.8	.5	.3	1.4
3,500-3,999 GRAMS.....NUMBER..	959,764	1,443	527	310	217	916
RATE..		1.5	.5	.3	.2	1.0
4,000-4,499 GRAMS.....NUMBER..	291,909	424	188	117	71	237
RATE..		1.5	.6	.4	.2	.8
4,500-4,999 GRAMS.....NUMBER..	47,584	83	34	25	9	49
RATE..		1.7	.7	.5	.2	1.0
5,000 GRAMS OR MORE.....NUMBER..	5,239	34	20	16	4	13
RATE..		6.4	3.9	3.1	.8	2.5
NOT STATED.....NUMBER..	1,790	210	199	192	7	11
RATE..		117.5	111.3	107.3	4.0	6.3

DOCUMENTATION TABLE 4

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF MOTHER, AND AGE AT DEATH:
UNITED STATES, 1999 PERIOD DATA
(INFANT DEATHS 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)-Continued

BIRTH WEIGHT AND RACE OF MOTHER	LIVE BIRTHS	INFANT	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
BLACK						
TOTAL (ALL BIRTH WEIGHTS)...NUMBER..	605,970	8,480	5,739	4,617	1,122	2,741
RATE..		14.0	9.5	7.6	1.9	4.5
LESS THAN 2,500 GRAMS.....NUMBER..	79,635	6,222	4,994	4,143	851	1,228
RATE..		78.1	62.7	52.0	10.7	15.4
LESS THAN 500 GRAMS.....NUMBER..	2,590	2,233	2,186	2,102	84	47
RATE..		862.1	844.1	811.7	32.4	18.0
500-749 GRAMS.....NUMBER..	4,300	1,995	1,669	1,311	358	327
RATE..		464.0	388.0	304.8	83.3	76.0
750-999 GRAMS.....NUMBER..	3,971	551	361	221	140	190
RATE..		138.7	91.0	55.7	35.3	47.7
1,000-1,249 GRAMS.....NUMBER..	4,045	264	175	110	65	90
RATE..		65.4	43.2	27.2	16.0	22.2
1,250-1,499 GRAMS.....NUMBER..	4,382	184	111	65	45	73
RATE..		41.9	25.3	14.9	10.3	16.7
1,500-1,999 GRAMS.....NUMBER..	15,542	429	241	177	64	188
RATE..		27.6	15.5	11.4	4.1	12.1
2,000-2,499 GRAMS.....NUMBER..	44,805	566	252	157	95	314
RATE..		12.6	5.6	3.5	2.1	7.0
2,500-2,999 GRAMS.....NUMBER..	139,324	797	221	124	97	576
RATE..		5.7	1.6	.9	.7	4.1
3,000-3,499 GRAMS.....NUMBER..	229,856	822	209	113	96	613
RATE..		3.6	.9	.5	.4	2.7
3,500-3,999 GRAMS.....NUMBER..	124,040	375	112	52	60	263
RATE..		3.0	.9	.4	.5	2.1
4,000-4,499 GRAMS.....NUMBER..	27,918	76	29	18	11	47
RATE..		2.7	1.1	.7	.4	1.7
4,500-4,999 GRAMS.....NUMBER..	4,206	16	9	6	3	7
RATE..		3.9	2.2	1.5	.7	1.7
5,000 GRAMS OR MORE.....NUMBER..	554	12	10	10	-	2
RATE..		22.1	18.4	18.4	-	3.7
NOT STATED.....NUMBER..	437	159	154	150	4	5
RATE..		364.5	352.7	343.4	9.3	11.8

1/ INCLUDES RACES OTHER THAN WHITE AND BLACK

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DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTHWEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTHWEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1999 PERIOD DATA

(INFANT DEATHS 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 DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
ALL RACES 1/, ALL BIRTHWEIGHTS							
ALL CAUSES	NUMBER...	3,959,417	27,864	18,700	14,874	3,827	9,164
	RATE.....		703.7	472.3	375.6	96.7	231.4
CONGENITAL MALFORMATIONS (Q00-Q99)	NUMBER...		5,480	3,903	2,976	927	1,577
	RATE.....		138.4	98.6	75.2	23.4	39.8
SHORT GESTATION AND LOW BIRTHWEIGHT NEC (P07)	NUMBER...		4,377	4,304	4,186	118	73
	RATE.....		110.5	108.7	105.7	3.0	1.9
SUDDEN INFANT DEATH SYNDROME (R95)	NUMBER...		2,643	203	28	175	2,440
	RATE.....		66.8	5.1	.7	4.4	61.6
MATERNAL COMPLICATIONS OF PREGNANCY (P01)	NUMBER...		1,387	1,379	1,369	10	8
	RATE.....		35.0	34.8	34.6	.3	.2
RESPIRATORY DISTRESS OF NEWBORN (P22)	NUMBER...		1,127	1,068	857	210	59
	RATE.....		28.5	27.0	21.7	5.3	1.5
COMPLICATIONS OF PLACENTA, CORD, MEMBRANES (P02)	NUMBER...		1,017	1,002	955	47	15
	RATE.....		25.7	25.3	24.1	1.2	.4
ACCIDENTS (UNINTENTIONAL INJURIES) (V01-X59)	NUMBER...		839	104	37	67	735
	RATE.....		21.2	2.6	.9	1.7	18.6
BACTERIAL SEPSIS OF NEWBORN (P36)	NUMBER...		694	662	276	386	31
	RATE.....		17.5	16.7	7.0	9.7	.8
DISEASES OF THE CIRCULATORY SYSTEM (I00-I99)	NUMBER...		667	273	161	112	394
	RATE.....		16.9	6.9	4.1	2.8	10.0
ATELECTASIS (P28.0-P28.1)	NUMBER...		659	650	595	55	9
	RATE.....		16.6	16.4	15.0	1.4	.2
ALL OTHER CAUSES	NUMBER...		8,974	5,153	3,433	1,720	3,821
	RATE.....		226.6	130.1	86.7	43.4	96.5

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTHWEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTHWEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1999 PERIOD DATA

(INFANT DEATHS 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 DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
ALL RACES 1/,							
LESS THAN 2,500 GRAMS							
ALL CAUSES	NUMBER...	302,113	18,273	14,960	12,527	2,433	3,313
	RATE.....		6,048.4	4,951.9	4,146.6	805.3	1,096.5
CONGENITAL MALFORMATIONS (Q00-Q99)	NUMBER...		3,047	2,412	2,021	391	635
	RATE.....		1,008.6	798.4	669.1	129.3	210.2
SHORT GESTATION AND LOW BIRTHWEIGHT NEC (P07)	NUMBER...		4,185	4,113	3,999	114	71
	RATE.....		1,385.1	1,361.5	1,323.8	37.8	23.6
SUDDEN INFANT DEATH SYNDROME (R95)	NUMBER...		539	31	3	28	507
	RATE.....		178.3	10.4	1.0	9.3	167.9
MATERNAL COMPLICATIONS OF PREGNANCY (P01)	NUMBER...		1,308	1,302	1,292	9	6
	RATE.....		432.9	430.8	427.8	3.0	2.1
RESPIRATORY DISTRESS OF NEWBORN (P22)	NUMBER...		1,070	1,019	822	197	51
	RATE.....		354.2	337.4	272.1	65.3	16.8
COMPLICATIONS OF PLACENTA, CORD, MEMBRANES (P02)	NUMBER...		872	863	831	32	9
	RATE.....		288.7	285.7	275.2	10.5	3.0
ACCIDENTS (UNINTENTIONAL INJURIES) (V01-X59)	NUMBER...		133	22	14	7	112
	RATE.....		44.1	7.1	4.8	2.3	37.0
BACTERIAL SEPSIS OF NEWBORN (P36)	NUMBER...		587	560	225	335	27
	RATE.....		194.4	185.3	74.3	111.0	9.1
DISEASES OF THE CIRCULATORY SYSTEM (I00-I99)	NUMBER...		282	123	85	37	160
	RATE.....		93.5	40.6	28.2	12.4	52.9
ATELECTASIS (P28.0-P28.1)	NUMBER...		611	603	552	52	8
	RATE.....		202.4	199.7	182.6	17.1	2.7
ALL OTHER CAUSES	NUMBER...		5,638	3,912	2,682	1,230	1,726
	RATE.....		1,866.3	1,295.0	887.7	407.3	571.3

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTHWEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTHWEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1999 PERIOD DATA

(INFANT DEATHS 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 DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
ALL RACES 1/,							
2,500 GRAMS OR MORE							
ALL CAUSES	NUMBER...	3,654,764	9,197	3,366	1,983	1,383	5,831
	RATE.....		251.6	92.1	54.3	37.8	159.5
CONGENITAL MALFORMATIONS (Q00-Q99)	NUMBER...		2,396	1,460	926	534	935
	RATE.....		65.5	40.0	25.3	14.6	25.6
SHORT GESTATION AND LOW BIRTHWEIGHT NEC (P07)	NUMBER...		51	50	46	4	1
	RATE.....		1.4	1.4	1.3	.1	.0
SUDDEN INFANT DEATH SYNDROME (R95)	NUMBER...		2,103	172	25	147	1,931
	RATE.....		57.5	4.7	.7	4.0	52.8
MATERNAL COMPLICATIONS OF PREGNANCY (P01)	NUMBER...		28	26	25	1	2
	RATE.....		.8	.7	.7	.0	.1
RESPIRATORY DISTRESS OF NEWBORN (P22)	NUMBER...		45	37	24	13	8
	RATE.....		1.2	1.0	.6	.4	.2
COMPLICATIONS OF PLACENTA, CORD, MEMBRANES (P02)	NUMBER...		101	94	79	15	6
	RATE.....		2.8	2.6	2.2	.4	.2
ACCIDENTS (UNINTENTIONAL INJURIES) (V01-X59)	NUMBER...		704	80	21	60	623
	RATE.....		19.3	2.2	.6	1.6	17.1
BACTERIAL SEPSIS OF NEWBORN (P36)	NUMBER...		104	100	51	50	4
	RATE.....		2.9	2.7	1.4	1.4	.1
DISEASES OF THE CIRCULATORY SYSTEM (I00-I99)	NUMBER...		380	146	74	73	233
	RATE.....		10.4	4.0	2.0	2.0	6.4
ATELECTASIS (P28.0-P28.1)	NUMBER...		40	39	36	3	1
	RATE.....		1.1	1.1	1.0	.1	.0
ALL OTHER CAUSES	NUMBER...		3,245	1,160	677	483	2,085
	RATE.....		88.8	31.8	18.5	13.2	57.0

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTHWEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTHWEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1999 PERIOD DATA

(INFANT DEATHS 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 DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
ALL RACES 1/, NOT STATED BIRTHWEIGHT							
ALL CAUSES	NUMBER...	2,540	395	374	363	11	20
	RATE.....		15,535.4	14,733.4	14,292.0	441.4	802.0
CONGENITAL MALFORMATIONS (Q00-Q99)	NUMBER...		38	30	28	2	7
	RATE.....		1,480.2	1,200.4	1,121.2	79.2	279.8
SHORT GESTATION AND LOW BIRTHWEIGHT NEC (P07)	NUMBER...		141	140	140	-	1
	RATE.....		5,570.9	5,529.8	5,529.8	-	41.0
SUDDEN INFANT DEATH SYNDROME (R95)	NUMBER...		1	-	-	-	1
	RATE.....		39.4	-	-	-	39.4
MATERNAL COMPLICATIONS OF PREGNANCY (P01)	NUMBER...		52	52	52	-	-
	RATE.....		2,035.4	2,035.4	2,035.4	-	-
RESPIRATORY DISTRESS OF NEWBORN (P22)	NUMBER...		11	11	11	-	-
	RATE.....		449.5	449.5	449.5	-	-
COMPLICATIONS OF PLACENTA, CORD, MEMBRANES (P02)	NUMBER...		45	45	45	-	-
	RATE.....		1,754.3	1,754.3	1,754.3	-	-
ACCIDENTS (UNINTENTIONAL INJURIES) (V01-X59)	NUMBER...		2	2	2	-	-
	RATE.....		80.0	80.0	80.0	-	-
BACTERIAL SEPSIS OF NEWBORN (P36)	NUMBER...		2	2	1	1	-
	RATE.....		83.2	83.2	41.0	42.2	-
DISEASES OF THE CIRCULATORY SYSTEM (I00-I99)	NUMBER...		5	4	2	2	1
	RATE.....		204.1	164.3	85.6	78.7	39.8
ATELECTASIS (P28.0-P28.1)	NUMBER...		7	7	7	-	-
	RATE.....		290.0	290.0	290.0	-	-
ALL OTHER CAUSES	NUMBER...		90	80	74	6	10
	RATE.....		3,548.5	3,146.5	2,905.2	241.3	402.0

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTHWEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTHWEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1999 PERIOD DATA

(INFANT DEATHS 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 DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
WHITE, ALL BIRTHWEIGHTS							
ALL CAUSES	NUMBER...	3,132,501	18,136	12,186	9,635	2,551	5,950
	RATE.....		579.0	389.0	307.6	81.4	189.9
CONGENITAL MALFORMATIONS (Q00-Q99)	NUMBER...		4,204	3,071	2,363	708	1,133
	RATE.....		134.2	98.0	75.4	22.6	36.2
SHORT GESTATION AND LOW BIRTHWEIGHT NEC (P07)	NUMBER...		2,366	2,329	2,264	65	38
	RATE.....		75.5	74.3	72.3	2.1	1.2
SUDDEN INFANT DEATH SYNDROME (R95)	NUMBER...		1,741	141	22	119	1,601
	RATE.....		55.6	4.5	.7	3.8	51.1
MATERNAL COMPLICATIONS OF PREGNANCY (P01)	NUMBER...		871	868	862	6	3
	RATE.....		27.8	27.7	27.5	.2	.1
RESPIRATORY DISTRESS OF NEWBORN (P22)	NUMBER...		716	677	558	119	39
	RATE.....		22.9	21.6	17.8	3.8	1.2
COMPLICATIONS OF PLACENTA, CORD, MEMBRANES (P02)	NUMBER...		627	621	592	29	6
	RATE.....		20.0	19.8	18.9	.9	.2
ACCIDENTS (UNINTENTIONAL INJURIES) (V01-X59)	NUMBER...		571	83	33	50	489
	RATE.....		18.2	2.6	1.1	1.6	15.6
BACTERIAL SEPSIS OF NEWBORN (P36)	NUMBER...		419	402	169	233	16
	RATE.....		13.4	12.8	5.4	7.5	.5
DISEASES OF THE CIRCULATORY SYSTEM (I00-I99)	NUMBER...		457	195	108	87	262
	RATE.....		14.6	6.2	3.4	2.8	8.4
ATELECTASIS (P28.0-P28.1)	NUMBER...		459	453	420	32	6
	RATE.....		14.6	14.4	13.4	1.0	.2
ALL OTHER CAUSES	NUMBER...		5,704	3,347	2,244	1,103	2,357
	RATE.....		182.1	106.8	71.6	35.2	75.3

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTHWEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTHWEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1999 PERIOD DATA

(INFANT DEATHS 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 DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
WHITE, LESS THAN 2,500 GRAMS							
ALL CAUSES	NUMBER...	206,135	11,303	9,361	7,868	1,493	1,942
	RATE.....		5,483.2	4,541.0	3,816.9	724.1	942.2
CONGENITAL MALFORMATIONS (Q00-Q99)	NUMBER...		2,272	1,855	1,571	283	417
	RATE.....		1,102.1	899.7	762.2	137.5	202.4
SHORT GESTATION AND LOW BIRTHWEIGHT NEC (P07)	NUMBER...		2,259	2,221	2,161	61	38
	RATE.....		1,095.8	1,077.5	1,048.2	29.4	18.2
SUDDEN INFANT DEATH SYNDROME (R95)	NUMBER...		313	19	2	17	293
	RATE.....		151.7	9.3	1.0	8.3	142.3
MATERNAL COMPLICATIONS OF PREGNANCY (P01)	NUMBER...		824	823	818	5	1
	RATE.....		399.6	399.1	396.7	2.4	.5
RESPIRATORY DISTRESS OF NEWBORN (P22)	NUMBER...		677	645	534	111	32
	RATE.....		328.4	313.1	259.2	53.9	15.3
COMPLICATIONS OF PLACENTA, CORD, MEMBRANES (P02)	NUMBER...		536	532	513	19	4
	RATE.....		260.0	258.0	248.7	9.3	2.0
ACCIDENTS (UNINTENTIONAL INJURIES) (V01-X59)	NUMBER...		91	18	13	4	73
	RATE.....		44.0	8.5	6.5	2.0	35.5
BACTERIAL SEPSIS OF NEWBORN (P36)	NUMBER...		342	329	131	198	13
	RATE.....		165.8	159.4	63.4	96.0	6.4
DISEASES OF THE CIRCULATORY SYSTEM (I00-I99)	NUMBER...		189	83	57	26	106
	RATE.....		91.5	40.2	27.5	12.8	51.3
ATELECTASIS (P28.0-P28.1)	NUMBER...		421	416	387	29	5
	RATE.....		204.4	202.0	187.8	14.2	2.4
ALL OTHER CAUSES	NUMBER...		3,380	2,420	1,681	739	960
	RATE.....		1,639.8	1,174.0	815.7	358.3	465.9

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTHWEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTHWEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1999 PERIOD DATA

(INFANT DEATHS 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 DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
WHITE, 2,500 GRAMS OR MORE							
ALL CAUSES	NUMBER...	2,924,576	6,622	2,626	1,575	1,051	3,996
	RATE.....		226.4	89.8	53.9	35.9	136.6
CONGENITAL MALFORMATIONS (Q00-Q99)	NUMBER...		1,904	1,193	771	422	711
	RATE.....		65.1	40.8	26.4	14.4	24.3
SHORT GESTATION AND LOW BIRTHWEIGHT NEC (P07)	NUMBER...		38	38	34	4	-
	RATE.....		1.3	1.3	1.1	.1	-
SUDDEN INFANT DEATH SYNDROME (R95)	NUMBER...		1,428	121	19	102	1,306
	RATE.....		48.8	4.1	.7	3.5	44.7
MATERNAL COMPLICATIONS OF PREGNANCY (P01)	NUMBER...		19	17	16	1	2
	RATE.....		.7	.6	.6	.0	.1
RESPIRATORY DISTRESS OF NEWBORN (P22)	NUMBER...		31	24	15	8	7
	RATE.....		1.0	.8	.5	.3	.2
COMPLICATIONS OF PLACENTA, CORD, MEMBRANES (P02)	NUMBER...		72	70	60	10	2
	RATE.....		2.5	2.4	2.0	.3	.1
ACCIDENTS (UNINTENTIONAL INJURIES) (V01-X59)	NUMBER...		479	63	18	46	416
	RATE.....		16.4	2.2	.6	1.6	14.2
BACTERIAL SEPSIS OF NEWBORN (P36)	NUMBER...		76	73	37	36	3
	RATE.....		2.6	2.5	1.3	1.2	.1
DISEASES OF THE CIRCULATORY SYSTEM (I00-I99)	NUMBER...		266	111	51	60	155
	RATE.....		9.1	3.8	1.8	2.0	5.3
ATELECTASIS (P28.0-P28.1)	NUMBER...		33	32	29	3	1
	RATE.....		1.1	1.1	1.0	.1	.0
ALL OTHER CAUSES	NUMBER...		2,278	885	525	360	1,393
	RATE.....		77.9	30.3	17.9	12.3	47.6

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTHWEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTHWEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1999 PERIOD DATA

(INFANT DEATHS 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 DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
WHITE, NOT STATED BIRTHWEIGHT							
ALL CAUSES	NUMBER...	1,790	210	199	192	7	11
	RATE.....		11,756.8	11,129.3	10,730.5	398.9	627.5
CONGENITAL MALFORMATIONS (Q00-Q99)	NUMBER...		28	23	21	2	5
	RATE.....		1,583.2	1,298.5	1,186.1	112.4	284.7
SHORT GESTATION AND LOW BIRTHWEIGHT NEC (P07)	NUMBER...		70	70	70	-	-
	RATE.....		3,903.5	3,903.5	3,903.5	-	-
SUDDEN INFANT DEATH SYNDROME (R95)	NUMBER...		1	-	-	-	1
	RATE.....		55.9	-	-	-	55.9
MATERNAL COMPLICATIONS OF PREGNANCY (P01)	NUMBER...		28	28	28	-	-
	RATE.....		1,564.3	1,564.3	1,564.3	-	-
RESPIRATORY DISTRESS OF NEWBORN (P22)	NUMBER...		8	8	8	-	-
	RATE.....		464.0	464.0	464.0	-	-
COMPLICATIONS OF PLACENTA, CORD, MEMBRANES (P02)	NUMBER...		20	20	20	-	-
	RATE.....		1,098.2	1,098.2	1,098.2	-	-
ACCIDENTS (UNINTENTIONAL INJURIES) (V01-X59)	NUMBER...		2	2	2	-	-
	RATE.....		113.5	113.5	113.5	-	-
BACTERIAL SEPSIS OF NEWBORN (P36)	NUMBER...		1	1	1	-	-
	RATE.....		58.2	58.2	58.2	-	-
DISEASES OF THE CIRCULATORY SYSTEM (I00-I99)	NUMBER...		2	1	-	1	1
	RATE.....		112.3	55.9	-	55.9	56.5
ATELECTASIS (P28.0-P28.1)	NUMBER...		4	4	4	-	-
	RATE.....		229.2	229.2	229.2	-	-
ALL OTHER CAUSES	NUMBER...		46	42	38	4	4
	RATE.....		2,574.7	2,344.2	2,113.6	230.6	230.5

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTHWEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTHWEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1999 PERIOD DATA

(INFANT DEATHS 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 DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
BLACK, ALL BIRTHWEIGHTS							
ALL CAUSES	NUMBER...	605,970	8,480	5,739	4,616	1,122	2,741
	RATE.....		1,399.4	947.0	761.8	185.2	452.4
CONGENITAL MALFORMATIONS (Q00-Q99)	NUMBER...		1,002	645	472	173	357
	RATE.....		165.3	106.5	77.9	28.5	58.9
SHORT GESTATION AND LOW BIRTHWEIGHT NEC (P07)	NUMBER...		1,842	1,810	1,763	47	33
	RATE.....		304.0	298.6	291.0	7.7	5.4
SUDDEN INFANT DEATH SYNDROME (R95)	NUMBER...		787	55	5	49	732
	RATE.....		129.9	9.0	.9	8.1	120.9
MATERNAL COMPLICATIONS OF PREGNANCY (P01)	NUMBER...		465	460	455	4	5
	RATE.....		76.7	75.8	75.2	.7	.9
RESPIRATORY DISTRESS OF NEWBORN (P22)	NUMBER...		373	354	268	86	18
	RATE.....		61.5	58.5	44.3	14.2	3.0
COMPLICATIONS OF PLACENTA, CORD, MEMBRANES (P02)	NUMBER...		344	335	319	16	9
	RATE.....		56.7	55.2	52.7	2.6	1.5
ACCIDENTS (UNINTENTIONAL INJURIES) (V01-X59)	NUMBER...		235	19	4	15	216
	RATE.....		38.8	3.2	.7	2.5	35.7
BACTERIAL SEPSIS OF NEWBORN (P36)	NUMBER...		255	241	97	143	14
	RATE.....		42.0	39.7	16.0	23.7	2.3
DISEASES OF THE CIRCULATORY SYSTEM (I00-I99)	NUMBER...		173	65	44	21	108
	RATE.....		28.5	10.7	7.2	3.5	17.8
ATELECTASIS (P28.0-P28.1)	NUMBER...		185	182	162	20	3
	RATE.....		30.5	30.0	26.7	3.3	.5
ALL OTHER CAUSES	NUMBER...		2,820	1,574	1,026	548	1,246
	RATE.....		465.3	259.7	169.3	90.4	205.6

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTHWEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTHWEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1999 PERIOD DATA

(INFANT DEATHS 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 DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
BLACK, LESS THAN 2,500 GRAMS							
ALL CAUSES	NUMBER...	79,635	6,217	4,990	4,140	850	1,227
	RATE.....		7,806.6	6,265.7	5,198.5	1,067.2	1,540.8
CONGENITAL MALFORMATIONS (Q00-Q99)	NUMBER...		617	436	346	90	181
	RATE.....		774.2	547.0	433.9	113.0	227.3
SHORT GESTATION AND LOW BIRTHWEIGHT NEC (P07)	NUMBER...		1,762	1,730	1,683	47	32
	RATE.....		2,212.1	2,172.3	2,113.9	58.4	39.8
SUDDEN INFANT DEATH SYNDROME (R95)	NUMBER...		215	12	1	11	203
	RATE.....		269.9	15.1	1.3	13.9	254.8
MATERNAL COMPLICATIONS OF PREGNANCY (P01)	NUMBER...		438	433	429	4	5
	RATE.....		550.0	543.5	538.3	5.2	6.5
RESPIRATORY DISTRESS OF NEWBORN (P22)	NUMBER...		357	340	259	81	17
	RATE.....		448.6	426.9	325.3	101.6	21.7
COMPLICATIONS OF PLACENTA, CORD, MEMBRANES (P02)	NUMBER...		296	291	280	11	5
	RATE.....		371.9	365.6	351.2	14.4	6.3
ACCIDENTS (UNINTENTIONAL INJURIES) (V01-X59)	NUMBER...		40	4	1	3	36
	RATE.....		49.7	5.1	1.3	3.8	44.6
BACTERIAL SEPSIS OF NEWBORN (P36)	NUMBER...		229	216	86	130	13
	RATE.....		287.8	271.3	107.6	163.7	16.5
DISEASES OF THE CIRCULATORY SYSTEM (I00-I99)	NUMBER...		83	31	22	9	52
	RATE.....		104.8	39.5	28.1	11.4	65.2
ATELECTASIS (P28.0-P28.1)	NUMBER...		178	175	154	20	3
	RATE.....		223.1	219.2	193.7	25.5	3.9
ALL OTHER CAUSES	NUMBER...		2,002	1,322	879	443	680
	RATE.....		2,514.4	1,660.2	1,103.9	556.3	854.1

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTHWEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTHWEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1999 PERIOD DATA

(INFANT DEATHS 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 DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
BLACK, 2,500 GRAMS OR MORE							
ALL CAUSES	NUMBER...	525,898	2,104	595	326	268	1,509
	RATE.....		400.0	113.1	62.0	51.0	286.9
CONGENITAL MALFORMATIONS (Q00-Q99)	NUMBER...		381	206	124	83	175
	RATE.....		72.5	39.3	23.5	15.8	33.2
SHORT GESTATION AND LOW BIRTHWEIGHT NEC (P07)	NUMBER...		12	12	12	-	-
	RATE.....		2.3	2.3	2.3	-	-
SUDDEN INFANT DEATH SYNDROME (R95)	NUMBER...		572	43	4	38	529
	RATE.....		108.8	8.1	.8	7.3	100.7
MATERNAL COMPLICATIONS OF PREGNANCY (P01)	NUMBER...		8	8	8	-	-
	RATE.....		1.6	1.6	1.6	-	-
RESPIRATORY DISTRESS OF NEWBORN (P22)	NUMBER...		12	11	6	5	1
	RATE.....		2.3	2.1	1.2	1.0	.2
COMPLICATIONS OF PLACENTA, CORD, MEMBRANES (P02)	NUMBER...		26	22	18	4	4
	RATE.....		4.9	4.1	3.4	.8	.8
ACCIDENTS (UNINTENTIONAL INJURIES) (V01-X59)	NUMBER...		196	15	3	12	181
	RATE.....		37.2	2.9	.6	2.3	34.3
BACTERIAL SEPSIS OF NEWBORN (P36)	NUMBER...		24	23	11	12	1
	RATE.....		4.6	4.5	2.2	2.3	.2
DISEASES OF THE CIRCULATORY SYSTEM (I00-I99)	NUMBER...		87	32	21	11	56
	RATE.....		16.6	6.0	3.9	2.1	10.6
ATELECTASIS (P28.0-P28.1)	NUMBER...		5	5	5	-	-
	RATE.....		1.0	1.0	1.0	-	-
ALL OTHER CAUSES	NUMBER...		779	217	114	103	562
	RATE.....		148.2	41.3	21.7	19.6	106.9

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTHWEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTHWEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1999 PERIOD DATA

(INFANT DEATHS 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 DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
BLACK, NOT STATED BIRTHWEIGHT							
ALL CAUSES	NUMBER...	437	159	154	150	4	5
	RATE.....		36,457.7	35,282.0	34,350.3	931.7	1,175.7
CONGENITAL MALFORMATIONS (Q00-Q99)	NUMBER...		4	3	3	-	1
	RATE.....		929.1	697.8	697.8	-	231.2
SHORT GESTATION AND LOW BIRTHWEIGHT NEC (P07)	NUMBER...		68	67	67	-	1
	RATE.....		15,653.1	15,414.6	15,414.6	-	238.5
SUDDEN INFANT DEATH SYNDROME (R95)	NUMBER...		-	-	-	-	-
	RATE.....		-	-	-	-	-
MATERNAL COMPLICATIONS OF PREGNANCY (P01)	NUMBER...		19	19	19	-	-
	RATE.....		4,246.9	4,246.9	4,246.9	-	-
RESPIRATORY DISTRESS OF NEWBORN (P22)	NUMBER...		3	3	3	-	-
	RATE.....		711.9	711.9	711.9	-	-
COMPLICATIONS OF PLACENTA, CORD, MEMBRANES (P02)	NUMBER...		22	22	22	-	-
	RATE.....		5,010.1	5,010.1	5,010.1	-	-
ACCIDENTS (UNINTENTIONAL INJURIES) (V01-X59)	NUMBER...		-	-	-	-	-
	RATE.....		-	-	-	-	-
BACTERIAL SEPSIS OF NEWBORN (P36)	NUMBER...		1	1	-	1	-
	RATE.....		245.2	245.2	-	245.2	-
DISEASES OF THE CIRCULATORY SYSTEM (I00-I99)	NUMBER...		2	2	1	1	-
	RATE.....		457.7	457.7	228.8	228.8	-
ATELECTASIS (P28.0-P28.1)	NUMBER...		2	2	2	-	-
	RATE.....		507.8	507.8	507.8	-	-
ALL OTHER CAUSES	NUMBER...		38	35	33	2	3
	RATE.....		8,696.0	7,990.1	7,532.4	457.7	706.0

1/ INCLUDES RACES OTHER THAN WHITE AND BLACK

DOCUMENTATION TABLE 6

UNLINKED INFANT DEATHS BY RACE, AGE AT DEATH, AND STATE OF RESIDENCE:
UNITED STATES, PUERTO RICO, VIRGIN ISLANDS, GUAM -- 1999 BIRTH PERIOD DATA

(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)

(DATA IN THIS TABLE IS FOR INFANT DEATHS IN 1999 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.)

Area and Race of Child 1/	Infant	Total NeoNatal	Early NeoNatal	Late NeoNatal	Post-NeoNatal
United States 2/	627	469	428	41	158
WHITE	374	267	245	22	107
BLACK	222	177	164	13	45
Alabama	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
Alaska	1	-	-	-	1
WHITE	1	-	-	-	1
BLACK	-	-	-	-	-
Arizona	8	3	2	1	5
WHITE	5	2	1	1	3
BLACK	1	-	-	-	1
Arkansas	4	2	2	-	2
WHITE	3	1	1	-	2
BLACK	1	1	1	-	-
California	86	75	70	5	11
WHITE	60	52	49	3	8
BLACK	12	9	8	1	3
Colorado	5	3	2	1	2
WHITE	5	3	2	1	2
BLACK	-	-	-	-	-
Connecticut	2	-	-	-	2
WHITE	2	-	-	-	2
BLACK	-	-	-	-	-
Delaware	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
District of Columbia	6	6	6	-	-
WHITE	1	1	1	-	-
BLACK	5	5	5	-	-
Florida	9	1	1	-	8
WHITE	5	-	-	-	5
BLACK	4	1	1	-	3
Georgia	1	1	1	-	-
WHITE	-	-	-	-	-
BLACK	1	1	1	-	-
Hawaii	2	2	1	1	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
Idaho	3	3	2	1	-
WHITE	1	1	1	-	-
BLACK	1	1	-	1	-
Illinois	35	28	27	1	7
WHITE	15	11	11	-	4
BLACK	19	17	16	1	2
Indiana	13	9	9	-	4
WHITE	9	6	6	-	3
BLACK	4	3	3	-	1
Iowa	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-

DOCUMENTATION TABLE 6

UNLINKED INFANT DEATHS BY RACE, AGE AT DEATH, AND STATE OF RESIDENCE:
UNITED STATES, PUERTO RICO, VIRGIN ISLANDS, GUAM -- 1999 BIRTH PERIOD DATA

(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)

(DATA IN THIS TABLE IS FOR INFANT DEATHS IN 1999 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.)

Area and Race of Child 1/	Infant	Total NeoNatal	Early NeoNatal	Late NeoNatal	Post-NeoNatal
Kansas	4	-	-	-	4
WHITE	4	-	-	-	4
BLACK	-	-	-	-	-
Kentucky	14	8	6	2	6
WHITE	10	5	3	2	5
BLACK	4	3	3	-	1
Louisiana	14	8	8	-	6
WHITE	5	2	2	-	3
BLACK	8	6	6	-	2
Maine	2	1	1	-	1
WHITE	2	1	1	-	1
BLACK	-	-	-	-	-
Maryland	8	3	2	1	5
WHITE	3	1	-	1	2
BLACK	5	2	2	-	3
Massachusetts	12	11	11	-	1
WHITE	9	8	8	-	1
BLACK	3	3	3	-	-
Michigan	28	24	22	2	4
WHITE	15	12	11	1	3
BLACK	13	12	11	1	1
Minnesota	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
Mississippi	3	1	-	1	2
WHITE	2	-	-	-	2
BLACK	1	1	-	1	-
Missouri	8	7	6	1	1
WHITE	6	5	4	1	1
BLACK	2	2	2	-	-
Montana	1	-	-	-	1
WHITE	1	-	-	-	1
BLACK	-	-	-	-	-
Nebraska	1	1	1	-	-
WHITE	1	1	1	-	-
BLACK	-	-	-	-	-
Nevada	4	1	-	1	3
WHITE	3	1	-	1	2
BLACK	1	-	-	-	1
New Hampshire	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
New Jersey	27	23	22	1	4
WHITE	12	8	8	-	4
BLACK	15	15	14	1	-
New Mexico	15	12	12	-	3
WHITE	13	11	11	-	2
BLACK	-	-	-	-	-

DOCUMENTATION TABLE 6

UNLINKED INFANT DEATHS BY RACE, AGE AT DEATH, AND STATE OF RESIDENCE:
UNITED STATES, PUERTO RICO, VIRGIN ISLANDS, GUAM -- 1999 BIRTH PERIOD DATA

(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)

(DATA IN THIS TABLE IS FOR INFANT DEATHS IN 1999 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.)

Area and Race of Child 1/	Infant	Total NeoNatal	Early NeoNatal	Late NeoNatal	Post-NeoNatal
New York State	57	36	32	4	21
WHITE	27	20	20	-	7
BLACK	26	12	12	-	14
New York City	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
North Carolina	2	1	1	-	1
WHITE	1	-	-	-	1
BLACK	1	1	1	-	-
North Dakota	1	1	1	-	-
WHITE	1	1	1	-	-
BLACK	-	-	-	-	-
Ohio	101	79	74	5	22
WHITE	51	37	34	3	14
BLACK	50	42	40	2	8
Oklahoma	36	30	25	5	6
WHITE	24	21	19	2	3
BLACK	10	8	5	3	2
Oregon	1	-	-	-	1
WHITE	1	-	-	-	1
BLACK	-	-	-	-	-
Pennsylvania	26	20	20	-	6
WHITE	12	8	8	-	4
BLACK	14	12	12	-	2
Rhode Island	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
South Carolina	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
South Dakota	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
Tennessee	1	1	-	1	-
WHITE	1	1	-	1	-
BLACK	-	-	-	-	-
Texas	60	50	45	5	10
WHITE	42	33	30	3	9
BLACK	18	17	15	2	1
Utah	6	4	4	-	2
WHITE	5	3	3	-	2
BLACK	-	-	-	-	-
Vermont	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
Virginia	14	11	9	2	3
WHITE	10	8	6	2	2
BLACK	3	3	3	-	-
Washington	4	1	1	-	3
WHITE	4	1	1	-	3
BLACK	-	-	-	-	-

DOCUMENTATION TABLE 6

UNLINKED INFANT DEATHS BY RACE, AGE AT DEATH, AND STATE OF RESIDENCE:
UNITED STATES, PUERTO RICO, VIRGIN ISLANDS, GUAM -- 1999 BIRTH PERIOD DATA

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Area and Race of Child 1/	Infant	Total NeoNatal	Early NeoNatal	Late NeoNatal	Post-NeoNatal
West Virginia	2	2	2	-	-
WHITE	2	2	2	-	-
BLACK	-	-	-	-	-
Wisconsin	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
Wyoming	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
Foreign Residents	6	4	1	3	2
WHITE	2	1	-	1	1
BLACK	2	2	1	1	-
Puerto Rico 3/	2	1	1	-	1
WHITE	2	1	1	-	1
BLACK	-	-	-	-	-
Virgin Islands 3/	2	1	-	1	1
WHITE	2	1	-	1	1
BLACK	-	-	-	-	-
Guam 3/	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-

/1 TOTALS FOR GEOGRAPHIC AREAS INCLUDE RACES OTHER THAN WHITE AND BLACK.
/2 EXCLUDES DATA FOR FORIEGN RESIDENTS, PUERTO RICO, VIRGIN ISLANDS, AND GUAM.
/3 DATA FROM THE PUERTO RICO, VIRGIN ISLANDS, AND GUAM FILE.

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Infant Mortality Statistics from the 1999 Period Linked Birth/Infant Death Data Set

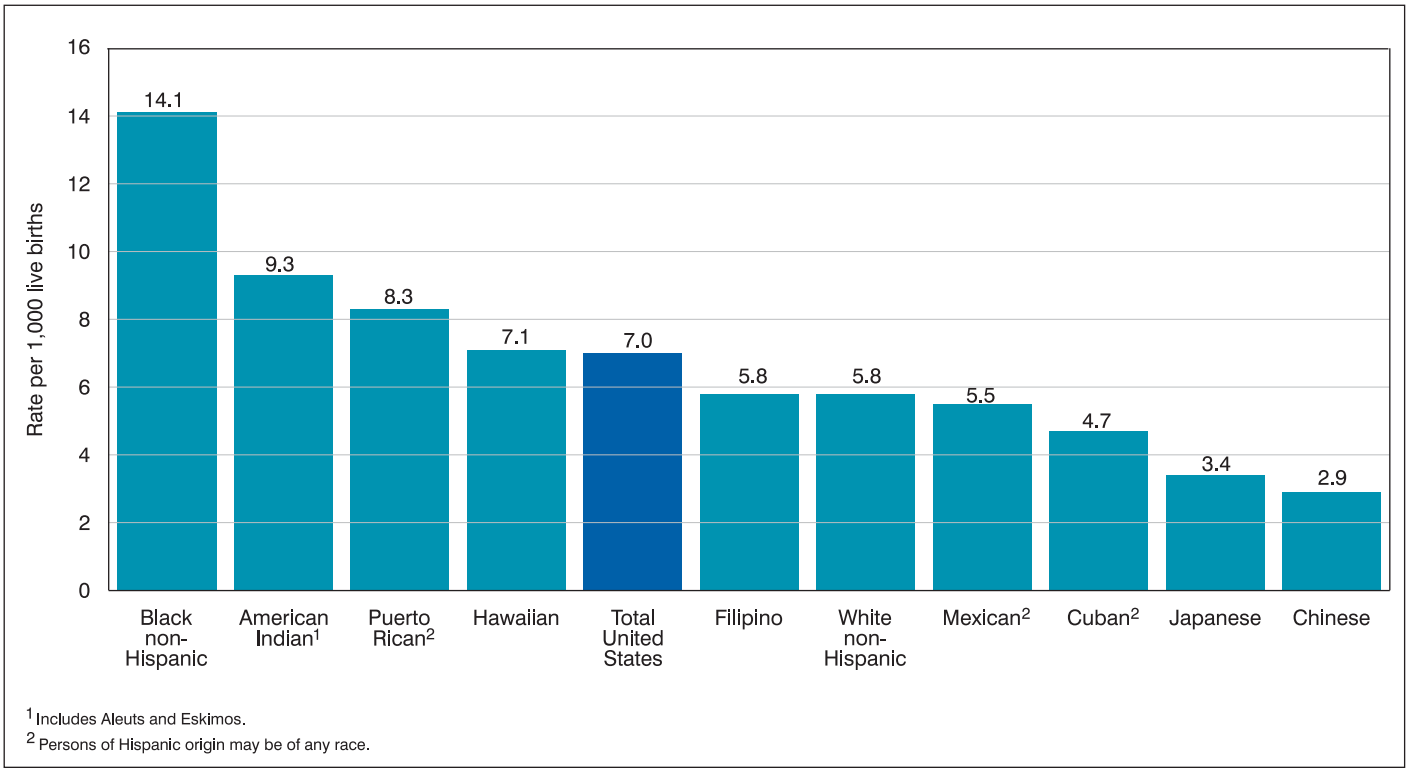
by T.J. Mathews, M.S., Marian F. MacDorman, Ph.D., and Fay Menacker, Dr.P.H., Division of Vital Statistics

Abstract

Objectives—This report presents 1999 period infant mortality statistics from the linked birth/infant death data set (linked file) by a variety of maternal and infant characteristics.

Methods—Descriptive tabulations of data are presented.

Results—In general, mortality rates were lowest for infants born to Chinese and Japanese mothers (2.9 and 3.4 per 1,000, respectively). Infants of Cuban, Central and South American, Mexican, and non-Hispanic white mothers had low rates, while rates were higher for infants of Puerto Rican and highest for non-Hispanic black mothers (13.9). Filipino mothers also had low rates. Rates were high for infants of Hawaiian and American Indian mothers. Infant mortality rates were higher for those infants whose mothers had no prenatal care, were teenagers, had 9–11 years of education, were unmarried, or smoked during pregnancy. Infant mortality was also higher for male infants, multiple births, and infants born preterm or at low birthweight. The three leading causes of infant death—Congenital malformations, low birthweight, and Sudden infant death syndrome (SIDS)–taken together accounted for 45 percent all infant deaths in the United States in 1999. Cause-specific mortality rates varied considerably by race and Hispanic origin. For infants of black mothers, the infant mortality rate for low



1 Includes Aleuts and Eskimos.
2 Persons of Hispanic origin may be of any race.

Figure 1. Infant mortality rates by race and ethnicity, 1999

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birthweight was four times that for white mothers. For infants of American Indian mothers, the SIDS rate was 2.4 times that for non-Hispanic white mothers. SIDS rates for infants of Hispanic and Asian or Pacific Islander mothers, were 40–50 percent lower than those for non-Hispanic white mothers.

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

Introduction

This report presents infant mortality data from the 1999 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 1999. 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, marital status, mother's place of birth, maternal smoking during pregnancy, age at death, and underlying cause of death (tables 1–7). Other variables that are 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; weight gain during pregnancy; and many medical and health measurements. Another report, based on data from the vital statistics mortality file, provides more detailed information on trends in infant mortality and on causes of infant death (2).

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 (VSCP), each State provided to the Centers for Disease Control and Prevention, 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 1999. 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 1999, 97.7 percent of all infant death records were successfully matched to their corresponding birth records. This is lower than in 1998 (98.4) but nearly the same as 1997 (97.9). A record weight was added to the linked file in 1999 to compensate for the 2.2 percent of infant death records that were not linked to their corresponding birth certificates. See the Technical notes for more information on the weighting of the linked file.

Cause-of-death statistics in this publication are classified in accordance with the *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision* (ICD–10) (3). Previous issues of this report 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) (4).

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 for detailed race of mother and for mothers of Hispanic origin groups. The linked file is particularly useful for computing accurate infant mortality rates for this purpose because the race 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 data—the more "traditional" source of infant mortality data—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 (1,5). Race information reported on the birth certificate is considered to be more accurate than that on the death certificate. On the birth certificate, the race of each parent is usually reported by the mother at the time of delivery, whereas on the death certificate, race of the deceased infant is reported by the funeral director based on information provided by an informant or on observation. This difference in the method of reporting race data and using only the race of the mother in the numerator and the denominator has a larger impact for races other than white and black and can lead to differences in race-specific infant mortality rates between the two data sources (5,6).

Rates for total Asian or Pacific Islander and for Chinese, Japanese, Filipino, and other Asian or Pacific Islander mothers are reported for all 50 States and the District of Columbia. In addition, infant mortality rates for five detailed Asian or Pacific Islander groups, including Vietnamese, Asian Indian, Korean, Samoan, and Guamanian mothers, are presented for an 11-State reporting area: California, Hawaii, Illinois, Minnesota, Missouri, New Jersey, New York, Texas, Virginia, Washington, and West Virginia. In 1990, more than 66 percent of the U.S. population for each of these additional Asian or Pacific Islander groups lived in the 11-State reporting area: Asian Indian, Korean, and Vietnamese, 67–72 percent; Guamanian, 77 percent; and Samoan, 87 percent (7,8).

Race and Hispanic origin of mother are reported as separate items on the birth certificate; thus, a mother of Hispanic origin may be of any race. Although the overwhelming majority of Hispanic-origin births are to white women (9), there are notable differences in infant mortality trends between Hispanic and non-Hispanic white women. Therefore, race-specific data for non-Hispanic mothers are presented for comparison in tables showing data for Hispanic mothers. Data for infants of Asian or Pacific Islanders and American Indian mothers are not shown separately by Hispanic origin because the vast majority of these populations are non-Hispanic. Race and ethnic differentials in infant mortality rates may reflect differences in income, educational levels, access to health care, health insurance, and other factors.

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

Infant mortality by race and Hispanic origin of mother

The overall 1999 infant mortality rate from the linked file was 7.0 infant deaths per 1,000 live births, 3 percent lower than the 1998 level (7.2) (10). The rate as reported from the linked file differs slightly from the 1999 vital statistics mortality file, 7.1 (7.2 in 1998); see Technical notes (2). In 1990 the infant mortality rate was 8.9. There was wide variation in infant mortality rates by the race of the mother with the highest rate, 14.0 for infants of black mothers, more than four times higher than the groups with the lowest rates, 2.9 for infants of Chinese mothers and 3.4 for infants of Japanese mothers. Rates were intermediate for infants of non-Hispanic white (5.8) and Filipino mothers (5.8), but higher for American Indian (9.3) and Hawaiian mothers (7.1) (tables A and B and figure 1).

The neonatal mortality rate (less than 28 days) for infants of black mothers (9.5) was significantly higher than for all other racial groups. Infants of black and American Indian mothers had the highest postneonatal rates (28 days to 1 year) of any group, 4.5 and 4.3, respectively. In general, the neonatal mortality rates were about twice the postneonatal rates for nearly all groups in which both rates could be reliably computed. The exception was infants of American Indian mothers whose neonatal mortality rate was not significantly different from the postneonatal rate (5.0 versus 4.3). Figure 1 shows the infant mortality rate by race and ethnicity for selected race/Hispanic groups.

Data for the expanded Asian or Pacific Islander subgroups in the 11-State reporting area show infant mortality rates of 4.6 for infants of Korean, 4.4 for Asian Indian, and 4.1 for Vietnamese mothers (table C). Reliable infant mortality rates for Samoan and Guamanian mothers could not be computed due to the small numbers of infant deaths for these groups (14 and 1 infant deaths, respectively).

There was wide variation in infant mortality rates for Hispanic subgroups with the rates high for infants of Puerto Rican mothers (8.3) and low for Cuban as well as Central and South American mothers (4.7). Rates were intermediate for infants of Mexican mothers (5.5) (table B). Neonatal mortality rates followed a similar pattern.

Infant mortality by State

Infant mortality rates for 1997–99 varied widely both by State and within States by race and Hispanic origin of mother (table 1). Rates are computed for a 3-year average to improve reliability and stability. Rates were generally highest for States in the South and lowest for States in the West and Northeast. Infant mortality rates ranged from 10.3 for Mississippi to 4.8 for New Hampshire. Although the highest rate (14.1) was noted for the District of Columbia, it is more appropriately compared with rates for other large U.S. cities because of the high concentrations of high-risk women in these areas.

Mortality rates for infants of non-Hispanic black mothers were the highest, generally more than twice those for non-Hispanic white mothers. Mortality rates for infants of non-Hispanic black mothers

Table A. Infant, neonatal, and postneonatal deaths and mortality rates by specified race or national origin of mother: United States, 1999 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	3,959,417	27,864	18,700	9,164	7.0	4.7	2.3
White	3,132,501	18,136	12,186	5,950	5.8	3.9	1.9
Black	605,970	8,480	5,739	2,741	14.0	9.5	4.5
American Indian[1]	40,170	373	202	171	9.3	5.0	4.3
Asian or Pacific Islander	180,776	876	574	302	4.8	3.2	1.7
Chinese	28,853	85	51	34	2.9	1.8	1.2
Japanese	8,722	30	24	6	3.4	2.8	*
Hawaiian	6,093	43	30	13	7.1	4.9	*
Filipino	30,677	179	120	59	5.8	3.9	1.9
Other Asian or Pacific Islander	106,431	539	348	190	5.1	3.3	1.8

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

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, 1999 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]	3,959,417	27,864	18,700	9,164	7.0	4.7	2.3
Total Hispanic	764,339	4,362	2,982	1,380	5.7	3.9	1.8
Mexican	540,674	2,979	2,015	963	5.5	3.7	1.8
Puerto Rican	57,138	477	339	138	8.3	5.9	2.4
Cuban	13,088	61	46	15	4.7	3.5	*
Central and South American	103,307	483	342	140	4.7	3.3	1.4
Other and unknown Hispanic	50,132	363	240	123	7.2	4.8	2.5
Non-Hispanic total[2]	3,147,580	23,022	15,349	7,673	7.3	4.9	2.4
Non-Hispanic white	2,346,450	13,522	8,987	4,535	5.8	3.8	1.9
Non-Hispanic black	588,981	8,327	5,634	2,693	14.1	9.6	4.6
Not stated	47,498	480	369	111	...	...	...

* Figure does not meet standard 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.

Table C. Infant, neonatal, and postneonatal deaths and mortality rates by race or national origin of mother: Total of 11 States, 1999 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	1,773,761	11,217	7,533	3,684	6.3	4.2	2.1
Total Asian or Pacific Islander	129,729	612	396	216	4.7	3.1	1.7
Chinese	23,291	71	47	25	3.0	2.0	1.1
Japanese	6,982	22	17	5	3.2	*	*
Filipino	25,533	148	99	49	5.8	3.9	1.9
Vietnamese	14,271	59	29	30	4.1	2.0	2.1
Asian Indian	22,060	98	71	27	4.4	3.2	1.2
Korean	8,906	41	26	15	4.6	2.9	*
Hawaiian	5,562	40	27	13	7.2	4.9	*
Samoan	1,660	14	7	7	*	*	*
Guamanian	502	1	-	1	*	*	*
Remaining Asian or Pacific Islander	20,962	117	73	44	5.6	3.5	2.1
White	1,408,897	7,550	5,085	2,465	5.4	3.6	1.7
Black	226,258	2,982	2,013	970	13.2	8.9	4.3
American Indian[1]	8,877	73	39	34	8.2	4.4	3.8

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

NOTE: States included are California, Hawaii, Illinois, Minnesota, Missouri, New Jersey, New York, Texas, Virginia, Washington, and West Virginia.

ranged from 17.4 in the District of Columbia to 8.8 in Oregon. West Virginia had the highest infant mortality rate for infants of non-Hispanic white mothers and New Jersey had the lowest rate (8.2 and 4.3, respectively).

Mortality rates for infants of American Indian and Asian or Pacific Islander mothers could be reliably computed for only 15 and 27 States, respectively. Mortality rates for infants of American Indian mothers were highest in South Dakota (15.2) and lowest in New Mexico (7.7). Overall, infant mortality rates for infants of Asian or Pacific Islander mothers were the lowest, ranging from 3.5 for Massachusetts to 7.4 for Hawaii.

Sex of infant

In 1999 the overall infant mortality rate for male infants was 7.7 per 1,000, 22 percent higher than the rate for female infants (6.3) (tables 2 and 3). With the exception of infants of Cuban mothers, infant mortality rates were higher for male than female infants in each racial and Hispanic origin group. Differences were not statistically significant for infants of American Indian and Asian or Pacific Islander mothers.

Multiple births

For plural births, the infant mortality rate was 32.9, more than five times the rate of 6.2 for single births (table 2 and figure 2). Infant mortality rates for plural births were higher than rates for single births for all race and Hispanic-origin groups. The risk of infant death increases with the increasing number of infants in the pregnancy (11). In 1999, the infant mortality rate for triplet and higher order births (69.8) was more than twice the rate for twin births (30.5), and more than 10 times the rate for single births (6.2) (tabular data not shown).

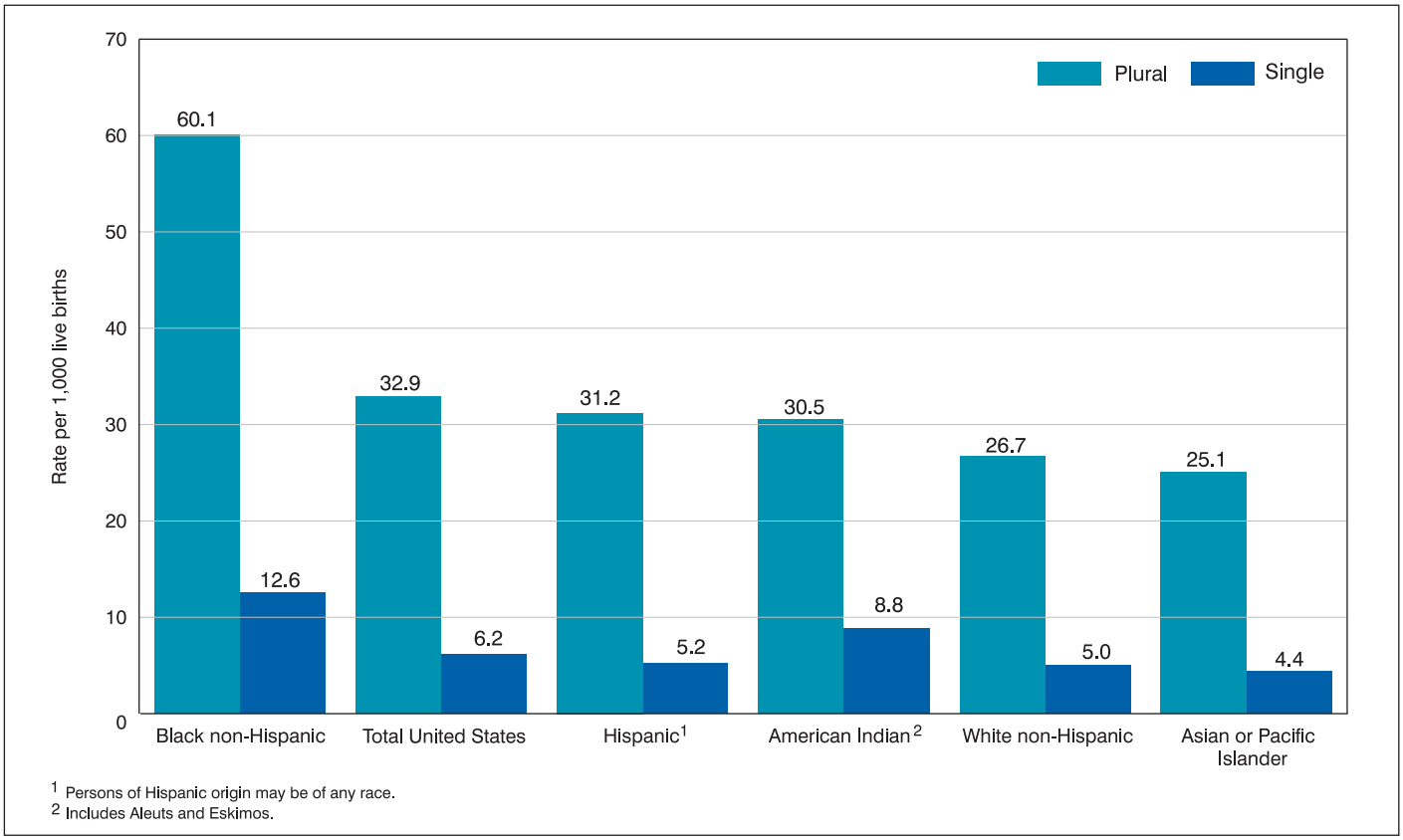

Figure 2. Infant mortality rates by plurality and race and ethnicity, 1999

The number of multiple births has skyrocketed in recent years—up nearly a third in the decade since 1989 (9). Factors associated with the rapid increase in multiple births include an increase in births to older women (older women are more likely to have a multiple birth even without the use of fertility therapy), and the more widespread use of fertility-enhancing therapies (fertility drugs and techniques such as in vitro fertilization) (11–13).

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 (14–16). The percent of infants born at low birthweight ranged from a low of 5.2 percent for births to Chinese mothers to a high of 13.2 percent for births to black mothers (tables 4 and 5). The percent of preterm births (those born before 37 completed weeks of gestation) ranged from a low of 7.6 percent for births to Chinese mothers to a high of 17.5 percent for births to black mothers.

Infant mortality rates were much higher for low birthweight infants than for infants with birthweights of 2,500 grams or more for all race and ethnic groups studied. Overall, the infant mortality rate for very low birthweight infants (those with birthweights of less than 1,500 grams) was 247.0, over nearly 100 times the rate of 2.5 for infants with birthweights of 2,500 grams or more. The rate for moderately low birthweight infants (those with birthweights of 1,500–2,499 grams) was 16.0, more than six times the rate for infants with birthweights of 2,500 grams or more.

Similarly, the infant mortality rate for very preterm infants (those born at less than 32 weeks of gestation) was 183.3, nearly 68 times the rate of 2.7 for infants born at term (37–41 weeks of gestation). The infant mortality rate for moderately preterm infants (those born at 32–36 weeks of gestation) was 9.1, more than three times the rate for term births (tables 2 and 3).

Infant mortality rates for more detailed birthweight categories are presented in table 6. Eighty-six percent of infants with birthweights of less than 500 grams died within the first year of life—most within the first few days of life. An infant's chances of survival increase rapidly with increasing birthweight. At birthweights of 1,250–1,499 grams, about 95 out of 100 infants survive the first year of life. Infant mortality rates are lowest at birthweights of 3,500–4,999 grams.

From 1995 to 1999, infants weighing 1,000–1,249 grams had the largest decline, 18.2 percent, in the infant mortality rate by specified birthweight (from 85.5 to 69.9). The only nonsignificant declines were for infants weighing 4,500–4,999, and 5,000 grams or more. For infants of white mothers, the largest significant decline was for infants weighing 1,000–1,249 grams (19.8 percent). The largest significant decline by specified birthweight for infants of black mothers was for those 4,000–4,499 grams (37.2 percent).

Prenatal care

Improvements in the timing and quality of prenatal care are often the focus of efforts to decrease infant mortality, especially among women with risk factors for a poor outcome (17,18). This includes programs that focus on prenatal management of specific maternal risk factors (e.g., diabetes) (19). In 1999, infants of mothers who

began prenatal care after the first trimester of pregnancy or not at all had an infant mortality rate of 8.9 per 1,000, which was 44 percent higher than the rate for those whose care began in the first trimester (6.2). With the exception of infants of Mexican mothers, for each race and Hispanic-origin group, infant mortality rates were higher for mothers who began prenatal care after the first trimester or received no care than for those who received early care (tables 2 and 3). These differences were significant for all but infants of Puerto Rican, and Central and South American mothers. Because of an insufficient number of infant deaths, rates could not be calculated for infants of Cuban mothers.

Overall, the infant mortality rate for infants whose mothers began care in the third trimester (6.2) was lower than for those who began care in the second trimester (7.2). 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. The relationship between month of initiation of prenatal care and length of gestation is complex. Therefore, prenatal care data are often grouped into two categories: mothers who began care in the first trimester and those who began care after the first trimester or not at all (20).

Maternal age

Infant mortality rates are highest for infants of teenage mothers, lowest for mothers in their late twenties and early thirties, and again higher for mothers in their forties and over (tables 2 and 3). Among teen births, rates were higher for the younger teens. In 1999, the mortality rate for infants of mothers 15–17 years of age was 17.6, compared with a rate of 11.2 for mothers 18–19 years of age (tabular data not shown). A mortality rate for infants of mothers less than 15 years of age could not be computed because of insufficient numbers of infant deaths.

For all infants, and for infants of non-Hispanic white mothers, mortality rates were higher for teenage mothers than for mothers 40–54 years of age. For infants of non-Hispanic black, Mexican, and Central and South American mothers, mortality rates were higher for infants of mothers 40–54 years of age than for teenagers, although differences were not statistically significant.

Studies suggest that the higher mortality risk for infants of younger mothers may be related to the preponderance of teenage mothers who are from disadvantaged backgrounds, while for older mothers, both biological and sociological factors may play a role (21–25).

Maternal education

The percent of births to mothers who had completed high school or more was 45 percent for Mexican mothers. Ninety-eight percent of Japanese mothers completed high school or more (tables 4 and 5). Infant mortality rates generally decreased with increasing educational level (tables 2 and 3). This pattern may reflect not only the education itself but also socioeconomic differences because women with more education tend to have higher family income levels (26).

Among infants of non-Hispanic white, non-Hispanic black, and Puerto Rican mothers, infant mortality rates declined steadily with increasing educational level with the highest mortality rates occurring among infants of mothers with 0–8 years of education (statistically significant for infants of non-Hispanic white mothers only). In contrast, for infants of Central and South American mothers, mortality rates were lower for infants of mothers with 0–8 years of education than for those with 9–11 years of education, although the difference was not statistically significant. This may be due in part to the very different population composition of women with 0–8 years of education, most of whom were born outside the 50 States and the District of Columbia (27) (see section on "Nativity"). This comparison could not be made for Cuban mothers due to small numbers of infant deaths in each education subgroup.

Live-birth order

Infant mortality rates were generally higher for first births than for second births, and then increased as birth order increased (tables 2 and 3). Overall, the infant mortality rate for first births (6.9) was 11 percent higher than for second births (6.2). The rate for fifth and higher order births (11.1) was almost 80 percent higher than the rate for second births.

Marital status

Marital status has been associated with health effects for both the mother and infant, and is seen as a proxy measure of the availability of social and economic support (28,29). The infant mortality rate for infants of married mothers was 5.5 per 1,000 in 1999, this rate was 5.7 in 1998. The infant mortality rate for infants of unmarried mothers was the same as in 1998, 10.2, almost 80 percent higher than the rate for infants of married mothers. Infant mortality rates were significantly higher for infants of unmarried mothers in each race and Hispanic origin group. A similar comparison could not be made for infants of Cuban mothers due to an insufficient number of infant deaths.

Nativity

In 1999 the infant mortality rate for mothers born in the 50 States and the District of Columbia (7.3) was 38 percent higher than the rate for mothers born outside of the 50 States and the District of Columbia (5.3). For each race and Hispanic-origin group, infant mortality rates were higher for infants of mothers born in the 50 States and the District of Columbia than for those born elsewhere, although the differences were not statistically significant for infants of Puerto Rican, Cuban, and Central and South American mothers. A similar comparison could not be made for infants of American Indian mothers due to insufficient number of mothers born outside the 50 States and the District of Columbia.

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 the level of familial integration and social support for new mothers (30–33). Also, women born outside the 50 States and the District of Columbia have been shown to have different characteristics than women born within the 50 States and the District of Columbia with regard to socioeconomic and educational status, and risk behaviors such as smoking and alcohol use (33,34).

Maternal smoking

The infant mortality rate for infants of smokers was 10.5 in 1999, 59 percent higher than the rate of 6.6 for nonsmokers. The

percentage of women who smoked during pregnancy ranged from a low of 0.5 percent for Chinese mothers to a high of 20.2 percent for American Indian mothers (tables 4 and 5). 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, although the difference was not statistically significant for Asian or Pacific Islander mothers (tables 2 and 3).

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 (35–38).

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. Beginning with 1999 data, cause-of-death data in the United States are coded according to the 10th revision of the *International Statistical Classification of Diseases and Related Health Problems* (ICD–10) (3). From 1979–98 causes of death were classified according to the Ninth Revision (ICD–9) (4). This change in classification has created discontinuities in analyzing trend data by cause of death; see Technical notes (2).

The leading cause of infant death in the United States in 1999 was Congenital malformations, deformations and chromosomal abnormalities (congenital malformations), accounting for 20 percent of all infant deaths. Disorders related to short gestation and low birthweight, not elsewhere classified (low birthweight) was second, accounting for 16 percent of all infant deaths, followed by Sudden infant death syndrome (SIDS) accounting for 9 percent of infant deaths. The fourth and fifth leading causes—Newborn affected by maternal complications of pregnancy (maternal complications), and Respiratory distress of newborn, accounted for 5 and 4 percent, respectively, of all infant deaths in 1999. Together the five leading causes accounted for 54 percent of all infant deaths in the United States in 1999.

The rank order of 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 infants of black and Puerto Rican mothers, for whom low birthweight was the leading cause.

Infant mortality rates for Congenital malformations were 26 percent higher for infants of black mothers than for infants of non-Hispanic white mothers. The rate was also higher for infants of American Indian mothers, although the difference was not statistically significant. Infants of Asian or Pacific Islander mothers had rates of congenital malformations that were 14 percent lower than the rate of infants of non-Hispanic white mothers.

Infants of black mothers had the highest mortality rates from low birthweight, with a rate that was four times the rate for infants of non-Hispanic white mothers. Infant mortality rates from low birthweight were also elevated for infants of Puerto Rican mothers. American Indian mothers also had high rates. The rate for infants of Puerto Rican mothers was 2.4 times the rate for infants of non-Hispanic white mothers, while the rate for infants of American Indian mothers was 1.5 times the rate for infants of non-Hispanic white mothers.

For SIDS, infant mortality rates were highest among infants of American Indian mothers, and were also elevated for infants of black mothers, compared with those for infants of non-Hispanic white mothers. SIDS rates for infants of American Indian mothers were 2.6 times and those for infants of black mothers were 2.4 times those for infants of non-Hispanic white mothers. As most SIDS deaths occur during the postneonatal period, the high SIDS rates for infants of American Indian and black mothers account for much of their elevated risk of postneonatal mortality. For infants of Asian or Pacific Islander mothers the SIDS rate of 31.0 was about one-half the non-Hispanic white rate of 62.1. For infants of Mexican mothers, the SIDS rate of 33.3 was 46 percent lower than the rate of 62.1 for infants of non-Hispanic white mothers.

Infants of black and Puerto Rican mothers had the highest mortality rates from Respiratory distress of newborn and maternal complications, which are both causes of death primarily found among low birthweight infants.

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 between these groups. For example, 28 percent of the elevated infant mortality rate for infants of black mothers, when compared with infants of non-Hispanic white mothers, can be accounted for by their higher infant mortality rate due to low birthweight, and a further 8 percent can be accounted for by differences in SIDS. In other words, if black infant mortality rates for low birthweight and SIDS could be reduced to non-Hispanic white levels, the difference in the infant mortality rate between black and non-Hispanic white mothers would be reduced by 36 percent.

For infants of American Indian mothers, nearly one-fourth (24 percent) of their elevated infant mortality rate, when compared with infants of non-Hispanic white mothers, can be accounted for by their higher SIDS rates, 13 percent by higher rates for Congenital malformations, and 11 percent by low birthweight. If American Indian infant mortality 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 almost half.

Similarly, 39 percent of the difference between Puerto Rican and non-Hispanic white infant mortality rates can be accounted for by differences in low birthweight, and 12 percent by respiratory distress of newborn. If Puerto Rican infant mortality for these two causes could be reduced to non-Hispanic white levels, the difference in the infant mortality rate between infants of Puerto Rican and non-Hispanic white mothers would be reduced by one-half (51 percent). In addition to helping to explain differences in infant mortality rates between various groups, comparisons such as these can be helpful in targeting prevention efforts.

References

1. National Center for Health Statistics. Public Use Data File Documentation: 1999 period linked birth/infant death data set. National Center for Health Statistics, Hyattsville, Maryland. Forthcoming.
2. Hoyert DL, Arias E, Smith BL, Murphy SL, Kochanek KD. Deaths: Final data for 1999. National vital statistics reports: vol 49 no 8. Hyattsville, Maryland: National Center for Health Statistics. 2001.
3. World Health Organization. International Statistical Classification of Diseases and Related Health Problems, Tenth Revision. Geneva: World Health Organization. 1992.

4. World Health Organization. Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, Ninth Revision. Geneva: World Health Organization. 1977.
5. Rosenberg HM, Maurer JD, Sorlie PD, Johnson NJ, et al. Quality of death rates by race and Hispanic origin: A summary of current research, 1999. National Center for Health Statistics. Vital Health Stat 2(128). 1999.
6. Prager K. Infant mortality by birthweight and other characteristics: United States, 1985 birth cohort. National Center for Health Statistics. Vital Health Stat 20(24). 1994.
7. U.S. Bureau of the Census. 1990 census of population. General population characteristics (1990 CP1–1). Washington: Department of Commerce. 1992.
8. Martin JA. Birth characteristics for Asian or Pacific Islander subgroups, 1992. Monthly vital statistics report; vol 43 no 10, suppl. Hyattsville, Maryland: National Center for Health Statistics. 1995.
9. Ventura SJ, Martin JA, Curtin SC, Menacker F, Hamilton BE. Births: Final data for 1999. National vital statistics report; vol 49 no 1. Hyattsville, Maryland: National Center for Health Statistics. 2001.
10. Mathews TJ, Curtin SC, MacDorman MF. Infant mortality statistics from the 1998 period linked birth/infant death data set. National vital statistics report; vol 48 no 12. Hyattsville, Maryland: National Center for Health Statistics. 2000.
11. Martin JA, MacDorman MF, Mathews TJ. Triplet births: Trends and outcomes 1971–94. National Center for Health Statistics. Vital Health Stat 21(55). 1997.
12. Kiely JL, Kleinman JC, Kiely M. Triplets and higher-order multiple births: Time trends and infant mortality. AJDC 146:862.8. 1992.
13. Wilcox LS, Kiely JL, Melvin CL, Martin MC. Assisted reproductive technologies: Estimates of their contribution to multiple births and newborn hospital days in the United States. Fertility and Sterility 65(2):361–6. 1996.
14. Xu B, Rantakallio P, Marjo-Riita J. Mortality and hospitalizations of 24-year-old members of the low-birthweight cohort in Northern Finland. Epidemiol 9:662–5. 1998.
15. Botting N, Powls A, Cooke RWI, Marlow N. Cognitive and educational outcome of very-low-birthweight children in early adolescence. Dev Med Child Neurol 40:652–60. 1998.
16. Ericson A, Kallen B. Very low birthweight boys at the age of 19. Arch Dis Child Fetal Neonatal Ed 78:F171–4. 1998.
17. Pagnini DL, Reichman NE. Physchosocial factors and the timing of prenatal care among women in New Jersey's HealthStart program. Fam Plann Perspect Mar–Apr; 32(2):56–64. 2000.
18. Centers for Disease Control and Prevention. Early entry into prenatal care. MMWR 49(18): 393–98. 2000.
19. McElvy SS, Miodovnik M, Rosenn B, Khoury JC, Siddiqi T, Dignan PS, Tsang RC. A focused preconceptional and early pregnancy program in women with type 1 diabetes reduces perinatal mortality and malformation rates to general population levels. J Matern Fetal Med Jan–Feb; 9(1):14–20. 2000.
20. Pastore LM, MacDorman MF. Infant mortality by Hispanic origin of mother: 20 states, 1985–87 birth cohorts. National Center for Health Statistics. Vital Health Stat 20(27). 1995.
21. Geronimus AT, Korenman S. Maternal youth or family background? On the health disadvantages of infants with teenage mothers. Am J Epidemiol 137:213–25. 1993.
22. Strobino DM, Ensminger ME, Kim YJ, Nanda J. Mechanisms for maternal age differences in birthweight. Am J Epidemiol 142:504–14. 1995.
23. Geronimus AT. The weathering hypothesis and the relationship of maternal age to birth outcome: Evidence and speculations. Ethnic Dis 2:207–21. 1992.
24. Seidman DS, Samueloff S, Mor-Yosef S, Schenker JG. The effect of maternal age and socioeconomical background on neonatal outcome. Int J Gynecol Obstet 33:7–12. 1990.
25. Reichman NE, Pagnini DL. Maternal age and birth outcomes: Data from New Jersey. Fam Plann Perspect 268–72, 295. 1997.
26. U.S. Bureau of the Census. Table 8. Income in 1999 by Educational Attainment for People 18 Years Old and Over, by Age, Sex, Race, And Hispanic Origin: March 2000. Available at: http://www.census.gov/population/www/socdemo/education/p20–536.html
27. Mathews TJ, Ventura SJ. Birth and fertility rates by educational attainment: United States, 1994. Monthly vital statistics report; vol 45 no 10, supp. Hyattsville, Maryland: National Center for Health Statistics. 1997.
28. Gaudino JA, Jenkins B, Rochat RW. No fathers' names: A risk factor for infant mortality in the State of Georgia, USA. Soc Sci Med 48:253–65. 1999.
29. Bennett T, Braverman P, Egerter S, Kiely JL. Maternal marital status as a risk factor for infant mortality. Fam Plann Perspect 26:252–6, 271. 1994.
30. English PB, Kharrazi M, Guendelman S. Pregnancy outcomes and risk factors in Mexican Americans: The effect of language use and mother's birthplace. Ethnicity Dis 7(3):229–40. 1997.
31. Scribner R, Dwyer JH. Acculturation and low birthweight among Latinos in the Hispanic HANES. Am J Public Health 79: 1263–76. 1989.
32. Engel T, Alexander GR, Leland NL. Pregnancy outcomes of U.S.-born Puerto Ricans: The role of maternal nativity status. Amer J Prev Med 11(1):34–9. 1995.
33. Singh GK, Yu SM. Adverse pregnancy outcomes: Differences between U.S.- and foreign-born women in major U.S. racial and ethnic groups. Am J Public Health 86:837–43. 1996.
34. David RJ, Collins JW. Differing birthweight among infants of U.S.-born blacks, African-born blacks, and U.S.-born whites. N Engl J Med 337:1209–14. 1997.
35. Wilcox AJ. Birthweight and perinatal mortality: The effect of maternal smoking. Am J Epidemiol 137:1098–1104. 1993.
36. English PB, Eskenazi B. Reinterpreting the effects of maternal smoking on infant birthweight and perinatal mortality: A multivariate approach to birthweight standardization. Int J Epidemiol 21:1097–1105. 1992.
37. Floyd RL, Zahniser SC, Gunter EP, Kendrick JS. Smoking during pregnancy: Prevalence, effects, and intervention strategies. Birth 18(1):48–53. 1991.
38. U.S. Department of Health and Human Services. Women and smoking—A report of the Surgeon General. Rockville, Maryland: Public Health Service. 2001.
39. Buehler JW, Prager K, Hogue CJR. The role of linked birth and infant death certificates in maternal and child health epidemiology in the United States. Am J Prev Med 19(1S):3–11. 2000.
40. Alexander GR, Allen MC. Conceptualization, measurement, and use of gestational age. I. Clinical and Public Health Practice. J Perinatol 16(1):53-9. 1996.
41. National Center for Health Statistics. Computer edits for natality data, effective 1993. Instruction manual, part 12. Hyattsville, Maryland: National Center for Health Statistics. 1995.
42. National Center for Health Statistics. Vital statistics, instructions for classifying the underlying cause of death. NCHS instruction manual; part 2a. Hyattsville, Maryland: Public Health Service. Published annually.
43. National Center for Health Statistics. Vital statistics, instructions for classifying multiple causes of death. NCHS instruction manual; part 2b. Hyattsville, Maryland: Public Health Service. Published annually.
44. Israel RA, Rosenberg HM, Curtin LR. Analytical potential for multiple cause-of-death data. Am J Epidemiol 124(2): 161–79. 1986.

45. National Center for Health Statistics. Public use data file documentation: Multiple cause of death for ICD–10, 1999 data. Hyattsville, Maryland: Public Health Service. 2001. (forthcoming).
46. Anderson RN, Miniño AM, Hoyert DL, Rosenberg HM. Comparability of cause of death between ICD–9 and ICD–10: Preliminary estimates. National vital statistics reports; vol 49 no 2. Hyattsville, Maryland: National Center for Health Statistics. 2001.
47. National Center for Health Statistics. ICD–10 cause-of-death lists for tabulating mortality statistics, effective 1999. NCHS instruction manual; part 9. Hyattsville, Maryland: Public Health Service. 1999.
48. Chiang CL. Standard error of the age-adjusted death rate. Vital statistics-Special report. Vol 47 no 9. National Center for Health Statistics. Washington: Public Health Service. 1961.

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Table 1. Infant mortality rates by race and Hispanic origin of mother: United States and each State, Puerto Rico, Virgin Islands, and Guam, 1997-99 linked files

[By place of residence]

State	Total[1]	Race and Hispanic origin of mother						
		Race				Hispanic origin		
		White	Black	American Indian[2]	Asian/Pacific Islander	Hispanic	Non-Hispanic White	Non-Hispanic Black
United States [3]	7.1	5.9	13.8	9.1	5.1	5.8	5.9	13.9
Alabama	9.8	7.4	14.8	*	*	7.5	7.3	14.8
Alaska	6.5	5.5	*	9.1	*	*	5.5	*
Arizona	7.1	6.7	13.9	8.6	6.1	7.1	6.5	13.7
Arkansas	8.5	7.4	12.8	*	*	6.2	7.5	12.8
California	5.7	5.2	12.2	8.9	4.9	5.3	5.0	12.2
Colorado	6.8	6.4	13.9	*	5.9	7.0	6.3	13.7
Connecticut	6.7	5.8	13.9	*	*	8.9	4.8	13.4
Delaware	8.3	5.8	15.9	*	*	*	6.0	16.1
District of Columbia	14.1	5.2	17.5	*	*	*	*	17.4
Florida	7.2	5.7	12.5	8.5	4.5	4.7	6.0	12.5
Georgia	8.4	5.9	13.3	*	5.0	4.9	6.0	13.3
Hawaii	6.9	5.6	*	*	7.4	7.0	5.8	*
Idaho	6.8	6.7	*	*	*	7.0	6.6	*
Illinois	8.5	6.4	17.1	*	6.3	6.9	6.2	17.1
Indiana	7.9	7.1	15.2	*	6.4	7.4	7.0	15.2
Iowa	6.1	5.8	16.4	*	*	5.6	5.7	17.2
Kansas	7.3	6.9	12.1	*	6.8	5.8	7.1	12.0
Kentucky	7.4	6.9	12.2	*	*	*	6.9	12.2
Louisiana	9.3	6.3	13.6	*	*	*	6.4	13.7
Maine	5.5	5.5	*	*	*	*	5.6	*
Maryland	8.6	5.5	14.8	*	5.2	5.4	5.5	14.8
Massachusetts	5.2	4.7	10.0	*	3.5	6.3	4.4	10.8
Michigan	8.1	6.4	16.2	8.8	6.0	7.0	6.1	16.1
Minnesota	6.0	5.4	12.7	10.9	7.0	7.0	5.4	12.5
Mississippi	10.3	6.6	14.5	*	*	*	6.7	14.5
Missouri	7.6	6.1	16.4	*	5.7	5.6	6.1	16.4
Montana	7.0	6.4	*	12.0	*	*	6.2	*
Nebraska	7.2	6.5	17.1	*	*	8.7	6.3	17.0
Nevada	6.8	6.4	12.2	*	4.7	5.6	6.8	11.8
New Hampshire	4.8	4.8	*	*	*	*	4.4	*
New Jersey	6.5	4.9	13.5	*	4.4	6.4	4.3	13.9
New Mexico	6.7	6.6	*	7.7	*	6.5	6.7	*
New York	6.4	5.2	11.5	*	4.0	5.9	4.6	11.9
North Carolina	9.2	6.8	15.9	13.7	5.8	6.7	6.9	15.9
North Dakota	7.3	6.7	*	13.8	*	*	6.7	*
Ohio	8.0	6.9	14.4	*	4.9	8.8	6.8	14.5
Oklahoma	8.2	7.7	13.1	8.0	*	5.1	7.9	13.4
Oregon	5.6	5.5	9.0	*	5.2	6.2	5.4	8.8
Pennsylvania	7.4	6.0	15.9	*	4.7	8.2	5.8	16.0
Rhode Island	6.7	5.8	14.7	*	*	8.3	4.8	12.4
South Carolina	9.8	6.6	15.8	*	*	7.5	6.5	15.8
South Dakota	8.5	7.1	*	15.2	*	*	7.1	*
Tennessee	8.2	6.3	15.0	*	5.8	7.0	6.2	15.0
Texas	6.3	5.7	11.0	8.6	4.4	5.5	5.8	11.1
Utah	5.4	5.4	*	*	6.5	5.9	5.3	*
Vermont	6.2	6.1	*	*	*	*	6.0	*
Virginia	7.5	5.8	13.3	*	5.2	5.0	5.8	13.3
Washington	5.4	5.0	12.4	9.6	4.9	5.0	4.9	11.4
West Virginia	8.3	8.2	12.7	*	*	*	8.2	12.7
Wisconsin	6.8	5.8	15.7	9.2	5.7	9.2	5.6	15.7
Wyoming	6.7	6.6	*	*	*	*	6.3	*
Puerto Rico	10.7	10.8	10.0	---	---	---	---	---
Virgin Islands	10.6	*	12.2	*	*	*	*	12.4
Guam	8.1	*	*	*	8.9	*	*	*

* Figure does not meet standard of reliability or precision; based on fewer than 20 deaths in the numerator.
--- Data not available.
1 Includes non-Hispanic births of other races and births with origin not stated; not shown separately.
2 Includes Aleuts and Eskimos.
3 Excludes data for Puerto Rico, Virgin Islands, and Guam.

Table 2. Infant mortality rates, live births, and infant deaths by selected characteristics and specified race of mother: United States, 1999 linked file

Characteristics	All races	Race of mother			
		White	Black	American Indian[1]	Asian/ Pacific Islander
	Infant mortality rates per 1,000 live births in specified group				
Total	7.0	5.8	14.0	9.3	4.8
Age at death:					
Total neonatal	4.7	3.9	9.5	5.0	3.2
Early neonatal (< 7 days)	3.8	3.1	7.6	3.6	2.6
Late neonatal (7-27 days)	1.0	0.8	1.9	1.5	0.5
Postneonatal	2.3	1.9	4.5	4.3	1.7
Sex:					
Male	7.7	6.4	15.2	10.2	5.0
Female	6.3	5.2	12.7	8.4	4.7
Plurality:					
Single births	6.2	5.1	12.4	8.8	4.4
Plural births	32.9	27.7	59.7	30.5	25.1
Birthweight:					
Less than 1,500 grams	247.0	236.0	270.8	276.5	209.3
1,500-2,499 grams	16.0	15.9	16.5	22.4	12.9
2,500 grams or more	2.5	2.3	4.0	4.6	1.8
Period of gestation:					
Less than 32 weeks	183.3	172.0	208.6	166.1	157.3
32-36 weeks	9.1	8.9	10.7	9.6	6.5
37-41 weeks	2.7	2.4	4.3	5.2	2.0
42 weeks or more	2.9	2.6	4.7	*	*
Trimester of pregnancy prenatal care began:					
First trimester	6.2	5.2	12.7	7.8	4.3
After first trimester or no care	8.9	7.1	14.7	10.9	5.9
Second trimester	7.2	6.0	11.2	10.3	5.2
Third trimester	6.2	5.4	8.7	9.4	*
No prenatal care	34.6	26.4	51.7	*	24.8
Age of mother:					
Under 20 years	10.3	8.6	15.2	10.0	6.7
20-24 years	7.8	6.3	13.5	9.0	6.1
25-29 years	6.0	4.9	13.4	8.0	4.4
30-34 years	5.8	4.9	14.0	9.6	4.3
35-39 years	6.5	5.7	13.9	11.6	4.7
40-54 years	8.7	7.7	17.2	*	6.5
Educational attainment of mother:					
0-8 years	7.5	6.8	16.5	13.9	6.7
9-11 years	9.5	8.0	15.1	11.0	5.4
12 years	7.6	6.1	13.9	8.5	5.6
13-15 years	5.9	4.8	12.0	8.5	4.4
16 years and over	4.4	3.9	10.2	*	3.8
Live-birth order:					
1	6.9	5.8	14.0	8.6	4.6
2	6.2	5.1	12.5	8.6	4.4
3	7.0	5.8	13.4	9.3	4.6
4	8.6	6.9	15.3	9.0	7.0
5 or more	11.1	8.5	18.4	12.8	9.5
Marital status:					
Married	5.5	5.0	11.8	8.2	4.5
Unmarried	10.2	7.9	15.0	10.1	7.0
Mother's place of birth:					
Born in the 50 States and D.C.	7.3	5.8	14.2	9.4	6.5
Born elsewhere	5.3	5.0	9.2	*	4.4
Maternal smoking during pregnancy:[2]					
Smoker	10.5	9.2	19.9	12.6	6.4
Nonsmoker	6.6	5.2	13.2	7.7	4.9

See footnotes at end of table.

Table 2. Infant mortality rates, live births, and infant deaths by selected characteristics and specified race of mother: United States, 1999 linked file--Con.

Characteristics	All races	Race of mother			
		White	Black	American Indian[1]	Asian/ Pacific Islander
		Live births			
Total	3,959,417	3,132,501	605,970	40,170	180,776
Sex:					
Male	2,026,854	1,605,603	307,670	20,370	93,211
Female	1,932,563	1,526,898	298,300	19,800	87,565
Plurality:					
Single births	3,837,789	3,035,757	586,027	39,285	176,720
Plural births	121,628	96,744	19,943	885	4,056
Birthweight:					
Less than 1,500 grams	58,227	36,461	19,288	510	1,968
1,500-2,499 grams	243,886	169,674	60,347	2,370	11,495
2,500 grams or more	3,654,764	2,924,576	525,898	37,243	167,047
Not stated	2,540	1,790	437	47	266
Period of gestation:					
Less than 32 weeks	76,897	48,674	24,817	813	2,593
32-36 weeks	383,956	283,393	80,393	4,280	15,890
37-41 weeks	3,170,780	2,538,796	453,106	30,874	148,004
42 weeks or more	284,844	228,098	42,690	3,644	10,412
Not stated	42,940	33,540	4,964	559	3,877
Trimester of pregnancy prenatal care began:					
First trimester	3,198,714	2,597,095	429,639	26,901	145,079
After first trimester or no care	646,377	456,073	150,171	11,794	28,339
Second trimester	499,928	357,303	111,678	8,606	22,341
Third trimester	102,202	71,262	23,943	2,452	4,545
No prenatal care	44,247	27,508	14,550	736	1,453
Not stated	114,326	79,333	26,160	1,475	7,358
Age of mother:					
Under 20 years	485,104	342,627	125,143	8,113	9,221
20-24 years	981,929	748,371	193,211	13,225	27,122
25-29 years	1,078,252	873,654	138,868	9,641	56,089
30-34 years	892,400	739,948	91,486	5,701	55,265
35-39 years	434,294	356,959	47,277	2,844	27,214
40-54 years	87,438	70,942	9,985	646	5,865
Educational attainment of mother:					
0-8 years	222,661	197,659	15,345	1,727	7,930
9-11 years	623,934	460,112	139,104	10,924	13,794
12 years	1,254,283	960,003	234,181	15,493	44,606
13-15 years	858,068	674,961	137,265	8,260	37,582
16 years and over	937,071	794,890	67,430	2,838	71,913
Not stated	63,400	44,876	12,645	928	4,951
Live-birth order:					
1	1,588,639	1,262,603	228,027	14,369	83,640
2	1,285,592	1,034,524	179,502	10,931	60,635
3	653,070	517,012	106,259	7,063	22,736
4	250,404	190,472	48,822	3,778	7,332
5 or more	163,562	113,329	40,798	3,841	5,594
Not stated	18,150	14,561	2,562	188	839
Marital status:					
Married	2,650,857	2,292,949	188,494	16,493	152,921
Unmarried	1,308,560	839,552	417,476	23,677	27,855
Mother's place of birth:					
Born in the 50 States and D.C.	3,148,902	2,546,383	534,134	38,460	29,925
Born elsewhere	797,279	577,700	68,452	1,596	149,531
Not stated	13,236	8,418	3,384	114	1,320
Maternal smoking during pregnancy:[2]					
Smoker	426,036	363,374	52,418	6,804	3,440
Nonsmoker	2,957,167	2,301,012	512,215	26,940	117,000
Not stated	47,182	37,903	5,845	1,520	1,914

See footnotes at end of table.

Table 2. Infant mortality rates, live births, and infant deaths by selected characteristics and specified race of mother: United States, 1999 linked file--Con.

Characteristics	All races	Race of mother			
		White	Black	American Indian[1]	Asian/ Pacific Islander
		Infant deaths			
Total	27,864	18,136	8,480	373	876
Age at death:					
Total neonatal	18,700	12,186	5,739	202	574
Early neonatal (< 7 days)	14,874	9,635	4,616	143	479
Late neonatal (7-27 days)	3,827	2,551	1,122	59	95
Postneonatal	9,164	5,950	2,741	171	302
Sex:					
Male	15,596	10,238	4,689	208	462
Female	12,268	7,898	3,790	166	414
Plurality:					
Single births	23,864	15,456	7,288	346	774
Plural births	4,000	2,680	1,191	27	102
Birthweight:					
Less than 1,500 grams	14,380	8,605	5,223	141	412
1,500-2,499 grams	3,893	2,698	994	53	148
2,500 grams or more	9,197	6,622	2,104	172	299
Not stated	395	210	159	8	17
Period of gestation:					
Less than 32 weeks	14,092	8,372	5,178	135	408
32-36 weeks	3,511	2,510	857	41	103
37-41 weeks	8,479	6,090	1,930	162	297
42 weeks or more	826	590	200	19	18
Not stated	956	574	316	17	49
Trimester of pregnancy prenatal care began:					
First trimester	19,809	13,522	5,458	209	620
After first trimester or no care	5,763	3,256	2,212	128	166
Second trimester	3,602	2,147	1,251	89	116
Third trimester	630	383	209	23	14
No prenatal care	1,530	727	752	16	36
Not stated	2,292	1,358	809	36	89
Age of mother:					
Under 20 years	5,003	2,955	1,904	81	62
20-24 years	7,625	4,737	2,604	119	165
25-29 years	6,460	4,275	1,862	77	247
30-34 years	5,177	3,606	1,280	55	237
35-39 years	2,836	2,018	659	33	127
40-54 years	763	545	172	8	38
Educational attainment of mother:					
0-8 years	1,680	1,350	253	24	53
9-11 years	5,946	3,658	2,094	120	74
12 years	9,542	5,895	3,265	132	251
13-15 years	5,091	3,209	1,646	70	166
16 years and over	4,107	3,136	688	12	270
Not stated	1,499	888	534	15	63
Live-birth order:					
1	11,016	7,315	3,192	124	385
2	7,923	5,318	2,244	94	267
3	4,587	2,990	1,426	66	104
4	2,142	1,313	745	34	51
5 or more	1,811	959	750	49	53
Not stated	386	241	123	6	15
Marital status:					
Married	14,547	11,501	2,229	135	681
Unmarried	13,318	6,634	6,250	238	194

See footnotes at end of table.

Table 2. Infant mortality rates, live births, and infant deaths by selected characteristics and specified race of mother: United States, 1999 linked file--Con.

Characteristics	All races	Race of mother			
		White	Black	American Indian[1]	Asian/ Pacific Islander
		Infant deaths			
Mother's place of birth:					
Born in the 50 States and D.C.	22,962	14,823	7,584	361	194
Born elsewhere	4,190	2,891	631	11	657
Not stated	713	423	264	1	25
Maternal smoking during pregnancy:[2]					
Smoker	4,481	3,329	1,044	86	22
Nonsmoker	19,571	12,028	6,758	208	576
Not stated	923	627	241	28	28

* Figure does not meet standard of reliability or precision; based on fewer than 20 deaths in the numerator.
1 Includes Aleuts and Eskimos.
2 Excludes data for California and South Dakota, which do 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 groups for rate computations.

Table 3. 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, 1999 linked file

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 mortality rates per 1,000 live births in specified group										
Total	7.0	5.7	5.5	8.3	4.7	4.7	7.2	7.3	5.8	14.1	...
Age at death:											
Total neonatal	4.7	3.9	3.7	5.9	3.5	3.3	4.8	4.9	3.8	9.6	...
Early neonatal (< 7 days)	3.8	3.1	2.9	5.0	2.3	2.5	3.8	3.9	3.0	7.7	...
Late neonatal (7-27 days)	1.0	0.8	0.8	0.9	*	0.8	1.0	1.0	0.8	1.9	...
Postneonatal	2.3	1.8	1.8	2.4	*	1.4	2.5	2.4	1.9	4.6	...
Sex:											
Male	7.7	6.2	6.0	9.3	4.5	5.2	7.8	8.0	6.4	15.4	...
Female	6.3	5.2	5.0	7.4	4.7	4.1	6.6	6.6	5.1	12.8	...
Plurality:											
Single births	6.2	5.2	5.0	7.3	4.0	4.2	6.6	6.4	5.0	12.6	...
Plural births	32.9	31.2	30.2	44.9	*	25.4	38.2	32.9	26.7	60.1	...
Birthweight:											
Less than 1,500 grams	247.0	246.9	248.7	271.5	164.1	215.3	272.9	245.1	229.7	270.5	...
1,500-2,499 grams	16.0	15.4	16.1	13.6	*	15.0	12.0	16.0	16.0	16.5	...
2,500 grams or more	2.5	2.1	2.2	2.3	*	1.5	2.9	2.6	2.3	4.0	...
Period of gestation:											
Less than 32 weeks	183.3	163.4	158.3	198.4	133.0	148.2	189.6	185.8	172.7	208.8	...
32-36 weeks	9.1	7.9	7.9	9.5	*	6.7	6.9	9.4	9.2	10.6	...
37-41 weeks	2.7	2.2	2.3	2.5	*	1.6	2.9	2.8	2.4	4.3	...
42 weeks or more	2.9	2.5	2.5	*	*	*	*	3.0	2.6	4.6	...
Trimester of pregnancy prenatal care began:											
First trimester	6.2	5.3	5.3	7.7	4.4	4.2	5.9	6.4	5.2	12.9	...
After first trimester or no care	8.9	5.6	5.3	8.1	*	5.0	7.4	10.3	8.2	14.9	...
Second trimester	7.2	4.7	4.5	6.6	*	4.4	5.4	8.2	6.9	11.3	...
Third trimester	6.2	3.8	3.4	*	*	*	*	7.3	6.7	8.9	...
No prenatal care	34.6	21.0	19.1	33.5	*	*	38.0	40.0	30.7	51.9	...
Age of mother:											
Under 20 years	10.3	6.9	6.3	9.8	*	6.1	9.7	11.5	9.6	15.4	...
20-24 years	7.8	5.6	5.5	7.7	*	4.5	6.4	8.4	6.6	13.6	...
25-29 years	6.0	4.9	4.6	7.1	*	4.1	6.6	6.2	4.9	13.6	...
30-34 years	5.8	5.4	5.3	7.7	*	4.5	7.5	5.8	4.7	14.2	...
35-39 years	6.5	6.4	7.0	9.8	*	4.5	5.9	6.5	5.4	14.0	...
40-54 years	8.7	9.6	8.5	*	*	8.6	*	8.6	7.4	16.6	...
Educational attainment of mother:											
0-8 years	7.5	5.7	5.7	13.3	*	4.6	6.6	11.9	10.9	17.5	...
9-11 years	9.5	6.1	5.7	9.6	*	4.8	9.0	11.3	9.5	15.3	...
12 years	7.6	5.4	5.1	7.7	*	4.8	6.6	8.1	6.4	14.1	...
13-15 years	5.9	5.1	5.0	7.1	*	4.3	4.7	6.1	4.7	12.1	...
16 years and over	4.4	4.1	4.2	4.2	*	3.6	3.9	4.4	3.9	10.3	...
Live-birth order:											
1	6.9	5.8	5.7	8.1	4.0	4.9	6.7	7.1	5.7	14.2	...
2	6.2	5.0	4.8	7.6	*	3.8	6.5	6.4	5.2	12.6	...
3	7.0	5.2	5.0	7.9	*	4.3	6.7	7.5	6.0	13.6	...
4	8.6	6.8	6.1	10.9	*	7.5	8.4	9.2	7.0	15.3	...
5 or more	11.1	7.9	7.7	11.8	*	5.6	10.6	12.2	8.7	18.5	...
Marital status:											
Married	5.5	5.1	5.0	7.0	5.1	4.0	6.4	5.5	5.0	11.9	...
Unmarried	10.2	6.6	6.2	9.3	*	5.5	8.3	11.3	8.6	15.1	...
Mother's place of birth:											
Born in the 50 States and D.C.	7.3	6.5	6.1	8.3	5.0	6.1	7.2	7.4	5.7	14.3	...
Born elsewhere	5.3	5.0	5.0	8.2	4.2	4.5	4.6	5.5	4.9	9.8	...
Maternal smoking during pregnancy:[3]											
Smoker	10.5	9.8	8.8	11.8	*	*	9.8	10.5	9.1	19.8	...
Nonsmoker	6.6	5.8	5.6	8.0	4.3	4.5	6.9	6.8	5.1	13.4	...

See footnotes at end of table.

Table 3. 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, 1999 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	3,959,417	764,339	540,674	57,138	13,088	103,307	50,132	3,147,580	2,346,450	588,981	47,498
Sex:											
Male	2,026,854	389,881	275,680	29,001	6,666	53,014	25,520	1,612,665	1,204,489	299,090	24,308
Female	1,932,563	374,458	264,994	28,137	6,422	50,293	24,612	1,534,915	1,141,961	289,891	23,190
Plurality:											
Single births	3,837,789	748,368	530,148	55,600	12,612	100,948	49,060	3,043,503	2,266,577	569,500	45,918
Plural births	121,628	15,971	10,526	1,538	476	2,359	1,072	104,077	79,873	19,481	1,580
Birthweight:											
Less than 1,500 grams	58,227	8,812	5,682	1,068	195	1,189	678	48,674	27,334	18,989	741
1,500-2,499 grams	243,886	40,009	26,503	4,251	696	5,400	3,159	201,122	128,712	59,141	2,755
2,500 grams or more	3,654,764	715,221	508,281	51,793	12,194	96,697	46,256	2,896,115	2,189,322	510,522	43,428
Not stated	2,540	297	208	26	3	21	39	1,669	1,082	329	574
Period of gestation:											
Less than 32 weeks	76,897	12,536	8,299	1,386	218	1,673	960	63,435	35,809	24,401	926
32-36 weeks	383,956	72,827	50,256	6,416	1,279	9,969	4,907	307,246	209,350	78,633	3,883
37-41 weeks	3,170,780	603,348	425,397	44,715	10,769	82,784	39,683	2,529,793	1,917,885	439,816	37,639
42 weeks or more	284,844	58,360	41,905	4,337	777	7,392	3,949	223,272	168,364	41,462	3,212
Not stated	42,940	17,268	14,817	284	45	1,489	633	23,834	15,042	4,669	1,838
Trimester of pregnancy prenatal care began:											
First trimester	3,198,714	548,580	383,902	41,523	11,839	75,690	35,626	2,614,456	2,030,575	418,140	35,678
After first trimester or no care	646,377	188,323	141,507	11,908	1,108	21,819	11,981	451,311	267,167	145,934	6,743
Second trimester	499,928	142,091	106,198	9,235	927	16,736	8,995	352,885	214,732	108,654	4,952
Third trimester	102,202	33,598	25,430	1,836	129	3,980	2,223	67,581	37,826	23,105	1,023
No prenatal care	44,247	12,634	9,879	837	52	1,103	763	30,845	14,609	14,175	768
Not stated	114,326	27,436	15,265	3,707	141	5,798	2,525	81,813	48,708	24,907	5,077
Age of mother:											
Under 20 years	485,104	127,402	94,235	12,078	1,005	10,294	9,790	352,938	214,971	122,175	4,764
20-24 years	981,929	231,475	169,899	18,289	2,420	25,850	15,017	740,611	514,386	188,247	9,843
25-29 years	1,078,252	203,985	146,115	13,616	3,659	28,472	12,123	861,802	663,569	134,784	12,465
30-34 years	892,400	131,369	86,834	8,607	3,629	23,759	8,540	748,604	600,830	88,403	12,427
35-39 years	434,294	58,146	36,182	3,765	2,027	12,259	3,913	369,586	294,590	45,746	6,562
40-54 years	87,438	11,962	7,409	783	348	2,673	749	74,039	58,104	9,626	1,437
Educational attainment of mother:											
0-8 years	222,661	158,351	131,992	2,778	182	19,620	3,779	63,398	40,289	14,069	912
9-11 years	623,934	208,350	159,900	16,533	1,422	18,467	12,028	410,474	252,023	135,306	5,110
12 years	1,254,283	223,122	151,187	18,815	4,311	31,566	17,243	1,018,788	733,181	228,332	12,373
13-15 years	858,068	102,507	59,774	12,223	3,213	17,590	9,707	746,793	568,737	133,984	8,768
16 years and over	937,071	55,076	26,277	5,769	3,897	13,303	5,830	869,956	730,628	65,779	12,039
Not stated	63,400	16,933	11,544	1,020	63	2,761	1,545	38,171	21,592	11,511	8,296
Live-birth order:											
1	1,588,639	283,116	195,036	22,359	5,723	39,477	20,521	1,287,491	971,745	221,337	18,032
2	1,285,592	232,784	161,317	17,783	4,828	33,300	15,556	1,037,940	794,532	174,340	14,868
3	653,070	141,471	102,687	9,722	1,830	18,681	8,551	504,463	372,667	103,413	7,136
4	250,404	61,448	46,439	4,023	468	7,194	3,324	186,191	127,988	47,666	2,765
5 or more	163,562	41,056	31,825	2,706	221	4,317	1,987	120,309	71,391	39,971	2,197
Not stated	18,150	4,464	3,370	545	18	338	193	11,186	8,127	2,254	2,500
Marital status:											
Married	2,650,857	442,028	324,024	23,080	9,632	58,131	27,161	2,174,803	1,828,159	182,179	34,026
Unmarried	1,308,560	322,311	216,650	34,058	3,456	45,176	22,971	972,777	518,291	406,802	13,472
Mother's place of birth:											
Born in the 50 States and D.C.	3,148,902	298,808	208,977	36,806	5,414	10,750	36,861	2,808,756	2,219,624	526,660	41,338
Born elsewhere	797,279	463,329	330,739	20,135	7,668	92,205	12,582	328,947	121,376	59,249	5,003
Not stated	13,236	2,202	958	197	6	352	689	9,877	5,450	3,072	1,157
Maternal smoking during pregnancy:[3]											
Smoker	426,036	19,058	8,388	5,686	406	1,124	3,454	400,678	339,724	51,402	6,300
Nonsmoker	2,957,167	489,930	310,667	48,703	11,952	76,959	41,649	2,432,865	1,796,892	497,821	34,372
Not stated	47,182	5,808	4,050	723	41	480	514	37,460	28,993	5,420	3,914

See footnotes at end of table.

Table 3. 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, 1999 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	27,864	4,363	2,979	477	61	483	363	23,023	13,522	8,327	480
Age at death:											
Total neonatal	18,700	2,982	2,015	339	46	342	240	15,350	8,987	5,634	369
Early neonatal (< 7 days)	14,874	2,357	1,592	287	30	258	190	12,177	7,059	4,535	339
Late neonatal (7-27 days)	3,827	625	424	53	15	84	49	3,172	1,927	1,099	30
Postneonatal	9,164	1,379	963	138	15	140	123	7,673	4,535	2,693	111
Sex:											
Male	15,596	2,430	1,652	270	30	278	200	12,890	7,665	4,603	277
Female	12,268	1,932	1,327	207	30	205	163	10,132	5,857	3,724	204
Plurality:											
Single births	23,864	3,863	2,660	408	51	422	322	19,603	11,392	7,156	397
Plural births	4,000	498	318	69	10	60	41	3,420	2,130	1,171	83
Birthweight:											
Less than 1,500 grams	14,380	2,176	1,413	290	32	256	185	11,932	6,278	5,136	271
1,500-2,499 grams	3,893	615	427	58	11	81	38	3,219	2,056	975	58
2,500 grams or more	9,197	1,514	1,101	121	16	144	132	7,560	5,055	2,062	123
Not stated	395	55	38	7	1	1	8	312	133	154	27
Period of gestation:											
Less than 32 weeks	14,092	2,048	1,314	275	29	248	182	11,789	6,186	5,096	256
32-36 weeks	3,511	574	399	61	13	67	34	2,897	1,927	837	41
37-41 weeks	8,479	1,351	975	112	14	134	116	7,017	4,683	1,895	110
42 weeks or more	826	148	105	12	2	15	14	661	434	192	16
Not stated	956	242	186	18	2	19	17	657	292	305	57
Trimester of pregnancy prenatal care began:											
First trimester	19,809	2,927	2,031	318	52	315	211	16,630	10,467	5,375	252
After first trimester or no care	5,763	1,058	757	97	5	110	89	4,631	2,186	2,170	74
Second trimester	3,602	664	480	61	1	73	49	2,901	1,484	1,228	37
Third trimester	630	128	87	8	4	18	11	495	254	205	6
No prenatal care	1,530	265	189	28	-	19	29	1,234	448	736	31
Not stated	2,292	378	191	62	4	58	63	1,761	869	782	155
Age of mother:											
Under 20 years	5,003	873	591	118	6	63	95	4,067	2,053	1,887	62
20-24 years	7,625	1,298	933	141	11	117	96	6,210	3,391	2,554	118
25-29 years	6,460	993	679	97	19	118	80	5,366	3,224	1,833	100
30-34 years	5,177	712	460	66	14	108	64	4,354	2,828	1,251	111
35-39 years	2,836	373	253	37	5	55	23	2,390	1,598	641	75
40-54 years	763	115	63	19	5	23	5	634	428	160	13
Educational attainment of mother:											
0-8 years	1,680	909	754	37	2	91	25	757	440	246	12
9-11 years	5,946	1,273	913	158	6	88	108	4,626	2,382	2,064	47
12 years	9,542	1,202	774	145	18	151	114	8,255	4,678	3,221	86
13-15 years	5,091	521	299	87	13	76	46	4,529	2,681	1,625	41
16 years and over	4,107	224	110	24	19	48	23	3,822	2,868	676	61
Not stated	1,499	234	130	26	2	29	47	1,033	473	495	233
Live-birth order:											
1	11,016	1,655	1,121	180	23	193	138	9,188	5,566	3,143	173
2	7,923	1,157	775	135	18	128	101	6,628	4,092	2,198	137
3	4,587	734	509	77	10	81	57	3,795	2,231	1,404	57
4	2,142	415	285	44	4	54	28	1,709	899	727	18
5 or more	1,811	325	244	32	4	24	21	1,462	624	739	25
Not stated	386	75	44	9	1	3	18	239	110	114	70
Marital status:											
Married	14,547	2,249	1,633	161	49	233	173	12,024	9,069	2,171	276
Unmarried	13,318	2,113	1,345	316	12	250	190	10,999	4,453	6,156	205

See footnotes at end of table.

Table 3. 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, 1999 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 D.C.	22,962	1,941	1,276	307	27	66	265	20,695	12,688	7,506	324
Born elsewhere	4,190	2,330	1,660	165	32	415	58	1,822	589	580	38
Not stated	713	89	42	5	1	2	39	505	245	240	118
Maternal smoking during pregnancy:[3]											
Smoker	4,481	187	74	67	4	8	34	4,219	3,098	1,020	75
Nonsmoker	19,571	2,826	1,750	388	51	348	289	16,473	9,079	6,655	272
Not stated	923	73	43	10	1	7	12	757	476	230	92

··· Category not applicable.
* Figure does not meet standard of reliability or precision; based on fewer than 20 deaths in the numerator.
- Quantity zero.
1 Origin of mother not stated included in "All origins" but not distributed among origins.
2 Includes races other than black or white.
3 Excludes data for California and South Dakota, which do 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 groups for rate computations.

Table 4. Percent of live births with selected maternal and infant characteristics by specified race of mother: United States, 1999 linked file

Characteristic	All races	White	Black	American Indian[1]	Asian or Pacific Islander					
					Total	Chinese	Japanese	Hawaiian	Filipino	Other
Birthweight:										
Less than 1,500 grams	1.5	1.2	3.2	1.3	1.1	0.7	0.9	1.4	1.4	1.1
Less than 2,500 grams	7.6	6.6	13.2	7.2	7.5	5.2	8.0	7.7	8.3	7.8
Preterm births[2]	11.8	10.7	17.5	12.9	10.4	7.6	9.3	12.3	12.4	10.7
Prenatal care beginning in the first trimester	83.2	85.1	74.1	69.5	83.7	88.5	90.7	79.6	84.2	81.8
Births to mothers under 20 years	12.3	10.9	20.7	20.2	5.1	0.9	2.1	18.2	5.9	5.5
Fourth and higher order births	10.5	9.7	14.9	19.1	7.2	2.3	3.9	14.3	7.2	8.4
Births to unmarried mothers	33.0	26.8	68.9	58.9	15.4	6.9	9.9	50.4	21.1	14.5
Mothers completing 12 or more years of school	78.3	78.7	74.0	67.8	87.6	88.0	98.0	83.2	93.7	85.2
Mothers born in the 50 States and D.C.	79.8	81.5	88.6	96.0	16.7	9.7	41.3	97.8	20.1	10.9
Mother smoked during pregnancy[3]	12.6	13.6	9.3	20.2	2.9	0.5	4.5	14.7	3.3	2.3

1 Includes births to Aleuts and Eskimos.
2 Born prior to 37 completed weeks of gestation.
3 Excludes data for California and South Dakota, which do not report tobacco use on the birth certificate.

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, 1999 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	1.9	1.5	1.2	1.4	1.5	1.2	3.2
Less than 2,500 grams	7.6	6.4	6.0	9.3	6.8	6.4	7.7	7.9	6.7	13.3
Preterm births[3]	11.8	11.4	11.1	13.7	11.5	11.4	11.9	11.9	10.5	17.6
Prenatal care beginning in the first trimester	83.2	74.4	73.1	77.7	91.4	77.6	74.8	85.3	88.4	74.1
Births to mothers under 20 years	12.3	16.7	17.4	21.1	7.7	10.0	19.5	11.2	9.2	20.7
Fourth and higher order births	10.5	13.5	14.6	11.9	5.3	11.2	10.6	9.8	8.5	14.9
Births to unmarried mothers	33.0	42.2	40.1	59.6	26.4	43.7	45.8	30.9	22.1	69.1
Mothers completing 12 or more years of school	78.3	50.9	44.8	65.6	87.7	62.1	67.5	84.8	87.4	74.1
Mothers born in the 50 States and D.C.	79.8	39.2	38.7	64.6	41.4	10.4	74.6	89.5	94.8	89.9
Mother smoked during pregnancy[4]	12.6	3.7	2.6	10.5	3.3	1.4	7.7	14.1	15.9	9.4

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 California and South Dakota, which do not report tobacco use on the birth certificate.

Table 6. Live births, infant, neonatal, and postneonatal deaths and mortality rates by race of mother and birthweight: United States, 1999 linked file, and percent change in birthweight-specific infant mortality, 1995-99 linked file

Race and birthweight	Number in 1999				Mortality rate per 1,000 live births in 1999			Percent change in infant mortality rate 1995-99
	Live births	Infant deaths	Neonatal deaths	Postneonatal deaths	Infant	Neonatal	Postneonatal	
All races [1]	3,959,417	27,864	18,700	9,164	7.0	4.7	2.3	-7.9
Less than 2,500 grams	302,113	18,273	14,960	3,313	60.5	49.5	11.0	-6.3
Less than 1,500 grams	58,227	14,380	12,684	1,696	247.0	217.8	29.1	-8.0
Less than 500 grams	6,318	5,408	5,316	92	856.0	841.4	14.6	-5.3
500-749 grams	11,344	5,507	4,814	693	485.5	424.4	61.1	-8.1
750-999 grams	11,738	1,779	1,332	447	151.6	113.5	38.1	-16.7
1,000-1,249 grams	13,314	930	688	242	69.9	51.7	18.2	-18.2
1,250-1,499 grams	15,513	756	534	221	48.7	34.4	14.2	-10.8
1,500-1,999 grams	59,599	1,714	1,114	600	28.8	18.7	10.1	-13.3
2,000-2,499 grams	184,287	2,179	1,162	1,017	11.8	6.3	5.5	-12.6
2,500 grams or more	3,654,764	9,197	3,366	5,831	2.5	0.9	1.6	-16.7
2,500-2,999 grams	653,618	3,010	1,211	1,798	4.6	1.9	2.8	-14.8
3,000-3,499 grams	1,470,522	3,585	1,197	2,387	2.4	0.8	1.6	-17.2
3,500-3,999 grams	1,137,786	1,916	656	1,260	1.7	0.6	1.1	-15.0
4,000-4,499 grams	332,995	536	226	310	1.6	0.7	0.9	-11.1
4,500-4,999 grams	53,773	103	44	59	1.9	0.8	1.1	-13.6
5,000 grams or more	6,070	47	31	16	7.7	5.1	*	-8.3
Not stated	2,540	395	374	20	...	...	...	...
White	3,132,501	18,136	12,186	5,950	5.8	3.9	1.9	-7.9
Less than 2,500 grams	206,135	11,303	9,361	1,942	54.8	45.4	9.4	-8.2
Less than 1,500 grams	36,461	8,605	7,692	913	236.0	211.0	25.0	-9.4
Less than 500 grams	3,495	2,997	2,951	46	857.5	844.3	13.2	-5.9
500-749 grams	6,597	3,292	2,945	347	499.0	446.4	52.6	-8.6
750-999 grams	7,297	1,143	905	238	156.6	124.0	32.6	-18.8
1,000-1,249 grams	8,674	632	484	148	72.9	55.8	17.1	-19.8
1,250-1,499 grams	10,398	541	406	135	52.0	39.0	13.0	-6.3
1,500-1,999 grams	41,091	1,191	814	376	29.0	19.8	9.2	-12.7
2,000-2,499 grams	128,583	1,507	854	653	11.7	6.6	5.1	-14.6
2,500 grams or more	2,924,576	6,622	2,626	3,996	2.3	0.9	1.4	-14.8
2,500-2,999 grams	468,901	2,052	918	1,134	4.4	2.0	2.4	-17.0
3,000-3,499 grams	1,151,179	2,586	939	1,647	2.2	0.8	1.4	-18.5
3,500-3,999 grams	959,764	1,441	525	916	1.5	0.5	1.0	-16.7
4,000-4,499 grams	291,909	428	190	238	1.5	0.7	0.8	-6.3
4,500-4,999 grams	47,584	83	34	49	1.7	0.7	1.0	-15.0
5,000 grams or more	5,239	34	20	13	6.5	3.8	*	-15.6
Not stated	1,790	210	199	11	...	...	...	...
Black	605,970	8,480	5,739	2,741	14.0	9.5	4.5	-4.1
Less than 2,500 grams	79,635	6,217	4,990	1,227	78.1	62.7	15.4	-1.4
Less than 1,500 grams	19,288	5,223	4,497	726	270.8	233.2	37.6	-5.2
Less than 500 grams	2,590	2,214	2,168	47	854.8	837.1	18.1	-4.5
500-749 grams	4,300	1,998	1,673	325	464.7	389.1	75.6	-6.9
750-999 grams	3,971	557	366	191	140.3	92.2	48.1	-13.9
1,000-1,249 grams	4,045	268	177	91	66.3	43.8	22.5	-11.0
1,250-1,499 grams	4,382	186	113	73	42.4	25.8	16.7	-12.8
1,500-1,999 grams	15,542	429	242	187	27.6	15.6	12.0	-14.8
2,000-2,499 grams	44,805	565	251	314	12.6	5.6	7.0	-6.7
2,500 grams or more	525,898	2,104	595	1,509	4.0	1.1	2.9	-11.1
2,500-2,999 grams	139,324	801	225	576	5.7	1.6	4.1	-8.1
3,000-3,499 grams	229,856	823	210	614	3.6	0.9	2.7	-12.2
3,500-3,999 grams	124,040	374	111	263	3.0	0.9	2.1	-14.3
4,000-4,499 grams	27,918	76	29	47	2.7	1.0	1.7	-37.2
4,500-4,999 grams	4,206	16	9	7	*	*	*	*
5,000 grams or more	554	12	10	2	*	*	*	*
Not stated	437	159	154	5	...	...	...	...

* Figure does not meet standard of reliability or precision; based on fewer than 20 deaths in the numerator.
... Category not apllicable.
[1] Includes races other than white or black.

NOTE: Infant deaths are weighted so numbers may not exactly add to totals due to rounding.

Table 7. Infant deaths and mortality rates for the five leading causes of infant death by race and Hispanic origin of mother: United States, 1999 linked file

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

Cause of death (Based on the Tenth Revision, International Classification of Diseases, 1992)	All races			White			Black			American Indian[1,2]			Asian and Pacific Islander[3]		
	Rank	Number	Rate	Rank	Number	Rate	Rank	Number	Rate	Rank	Number	Rate	Rank	Number	Rate
All causes	...	27,864	703.7	...	18,136	579.0	...	8,480	1399.4	...	373	928.6	...	876	484.6
Congenital malformations, deformations and chromosomal abnormalities (Q00-Q99)	1	5,480	138.4	1	4,204	134.2	2	1,002	165.4	1	71	176.7	1	204	112.8
Disorders related to short gestation and low birth weight, not elsewhere classified (P07)	2	4,377	110.5	2	2,366	75.5	1	1,842	304.0	3	44	109.5	2	124	68.6
Sudden infant death syndrome (R95)	3	2,643	66.8	3	1,741	55.6	3	787	129.9	2	59	146.9	3	56	31.0
Newborn affected by maternal complications of pregnancy (P01)	4	1,387	35.0	4	871	27.8	4	465	76.7	4	12	*	4	39	21.6
Respiratory distress of newborn (P22)	5	1,127	28.5	5	716	22.9	5	373	61.6	7	9	*	7	29	16.0

Cause of death (Based on the Tenth Revision International Classification of Diseases, 1992)	Total Hispanic[4]			Mexican			Puerto Rican			Central and South American[5]			Non-Hispanic White		
	Rank	Number	Rate	Rank	Number	Rate	Rank	Number	Rate	Rank	Number	Rate	Rank	Number	Rate
All causes	...	4,363	570.8	...	2,979	551.0	...	477	834.8	...	483	467.5	...	13,522	576.3
Congenital malformations, deformations and chromosomal abnormalities (Q00-Q99)	1	1,073	140.4	1	793	146.7	2	77	134.8	1	130	125.8	1	3,082	131.3
Disorders related to short gestation and low birth weight, not elsewhere classified (P07)	2	643	84.1	2	421	77.9	1	98	171.5	2	54	52.3	2	1,666	71.0
Sudden infant death syndrome (R95)	3	284	37.2	3	180	33.3	3	38	66.5	4	19	*	3	1,457	62.1
Newborn affected by maternal complications of pregnancy (P01)	5	172	22.5	5	109	20.2	4	30	52.5	7	12	*	4	682	29.1
Respiratory distress of newborn (P22)	4	195	25.5	4	112	20.7	4	30	52.5	3	32	31.0	5	511	21.8

..., Category not applicable.
* Figure does not meet standard of reliability or precision; based on fewer than 20 deaths in the numerator.
1 Includes Aleuts and Eskimos.
2 For American Indians, Necrotizing enterocolotis of newborn (P77) and Accidents (unintentional injuries) (V01-X59) were tied for the fifth leading cause of death; however with only 11 deaths each, reliable infant mortality rates could not be computed.
3 For Asian and Pacific Islanders, Newborn affected by complications of placenta, cord and membranes (P02) was the fifth leading cause of death, with 38 deaths and a rate of 21.1.
4 Includes Cuban and other and unknown Hispanic.
5 For Central and South Americans, Intrauterine hypoxia and birth asphyxia (P20-P21) was the fifth leading cause of death, however with only 16 deaths, a reliable infant mortality rate could not be computed.

NOTE: Reliable cause-specific infant mortality rates cannot be computed for Cubans because of the small number of infant deaths (61).

Technical notes

Differences between period and cohort data

From 1983–91, NCHS produced linked files in a birth cohort format (39). Beginning with 1995 data, linked files are produced first using a period format and then subsequently using a birth cohort format. Thus, the 1999 period linked file contains a numerator file that consists of all infant deaths occurring in 1999 that have been linked to their corresponding birth certificates, whether the birth occurred in 1999 or in 1998. This cross-sectional approach is used to improve timeliness of the file release. In contrast, the 1999 birth cohort linked file will contain a numerator file that consists of all infant deaths to babies born in 1999 whether the death occurred in 1999 or 2000. In both the cohort and the period file, the denominator file is the 1999 natality file, which contains all births occurring in 1999. In practice, there is very little difference in rates between the period and the cohort files.

The release of linked file data in two different formats allows NCHS to meet demands for more timely linked files while still meeting the needs of data users who prefer the birth cohort format. While the birth cohort format has methodological advantages, it creates substantial delays in data availability, since it is necessary to wait until the close of the following data year to include all infant deaths to the birth cohort. Beginning with 1995 data, the period linked file is the basis for all official NCHS linked file statistics (except for special cohort studies).

Weighting

A record weight is added to the linked file to compensate for the 2.3 percent (in 1999) 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 91.0–100.0 percent with all but eight areas—the District of Columbia, Hawaii, New Jersey, New Mexico, New York, Ohio, Oklahoma, and Utah at 97 percent or higher) (table I). The percent linked also varied by age at death, from 97.1 percent for infants who died during the early neonatal period (within the first 7 days of life), to 98.3 percent for infants who died during the postneonatal period (28 days–11 months of age). 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 residence at birth and age at death (less than 1 day, 1–27 days, and 28 days–11 months). The addition of the weight greatly reduced the potential for bias in comparing infant mortality rates by characteristics.

The 1999 linked file includes 27,281 unweighted infant death records. An additional 633 records could not be linked to their corresponding birth certificates because the birth certificate could not be identified. Thus, the linked file was weighted to match the total of 27,914 linked plus unlinked records. Since the data included in this report are tabulated by place of residence of the mother, 50 infant deaths to mothers whose usual place of residence is outside of the United States were excluded from tables shown in this report, leading to a weighted total of 27,864 infant deaths.

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, 1999 linked file

State	Percent linked by State of occurrence of death
United States [1]	97.7
Alabama	100.0
Alaska	98.0
Arizona	98.4
Arkansas	98.5
California	97.1
Colorado	99.1
Connecticut	100.0
Delaware	99.1
District of Columbia	94.3
Florida	99.2
Georgia	99.9
Hawaii	96.7
Idaho	99.1
Illinois	97.5
Indiana	98.6
Iowa	100.0
Kansas	98.3
Kentucky	98.6
Louisiana	97.6
Maine	96.9
Maryland	99.4
Massachusetts	97.1
Michigan	97.3
Minnesota	100.0
Mississippi	100.0
Missouri	98.7
Montana	98.5
Nebraska	99.4
Nevada	97.4
New Hampshire	100.0
New Jersey	96.2
New Mexico	91.8
New York	96.5
North Carolina	99.8
North Dakota	98.3
Ohio	90.9
Oklahoma	91.0
Oregon	99.6
Pennsylvania	97.7
Rhode Island	100.0
South Carolina	99.8
South Dakota	100.0
Tennessee	100.0
Texas	97.2
Utah	96.3
Vermont	100.0
Virginia	98.5
Washington	99.0
West Virginia	98.8
Wisconsin	100.0
Wyoming	100.0
Puerto Rico	99.4
Virgin Islands	100.0
Guam	100.0

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

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

The overall infant mortality rate from the 1999 period linked file of 7.0 is 0.1 lower than from the 1999 vital statistics mortality file (7.1) (2). The number of infant deaths also differs slightly (2). Differences in numbers of infant deaths between the two data sources can be traced to three different causes:

1. geographic coverage differences
2. additional quality control
3. weighting

Differences in geographic coverage are due to the fact that 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, the linkage process subjects infant death records to an additional round of quality control review. Every year, a few records are voided from the file at this stage because they are found to be fetal deaths, deaths at ages greater than 1 year, or duplicate death certificates. Finally, 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.

Age of mother

Age of mother is computed in most cases from the mother's and infant's dates of birth as reported on the birth certificate. The mother's age is directly reported by five States (Kentucky, Nevada, North Dakota, Virginia, and Wyoming). From 1964–96, 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 if less than 10 or greater than 54 years. 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 over were to women aged 50–54 years. The numbers of births and infant deaths to women aged 50–54 years are too small for computing age-specific infant mortality rates.

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. Beginning in 1997, California added a direct question to their birth certificate; thus by 1997, all but four States (Connecticut, Michigan, Nevada, and New York) included a direct question on their birth certificates. Beginning in 1997, the marital status of women giving birth in California and Nevada is determined by a direct question in the birth registration process. 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 1999, 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 1999* (9).

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 (40–41).

The U.S. Standard Certificate of Live Birth contains an item, "clinical estimate of gestation," which is being 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 5.1 percent of the births in 1999 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 350 births or less than 0.01 percent of all birth records in 1999 (9).

For the linked file not stated birthweight was imputed for 2,276 records, or 0.06 percent of the birth records in 1999 when birthweight was not stated and 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 (2,540 records in 1999) the not stated value for birthweight was retained. This imputation was done to improve the accuracy of birthweight-specific infant mortality rates, since the percent of records with not stated birthweight was higher for infant deaths (3.82 percent before imputation) than for live births (0.12 percent before imputation). The imputation reduced the percent of not stated records to 1.42 percent for infant deaths, and 0.06 percent for births. The not stated birthweight cases in the natality/birth file, as distinct from the linked file, are not imputed (9).

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*. The ICD provides the basic guidance used in virtually all countries to code and classify causes of death. The ICD not only details disease classifications 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 the 1999 issue of the *NCHS Instruction Manual* (42–43).

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" (3). 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 (44–45).

Changes in Cause-of-Death Classification

About every 10–20 years, the *International Classification of Diseases* 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) (3); during the period 1979–98, causes were coded and classified according to the Ninth Revision (ICD–9) (4). ICD–10 has many changes from ICD–9(3). As a result, it can be difficult to compare cause-of-death data for 1999 with that for previous years. To assist in this comparison, **comparability ratios** are computed, and are shown in table II for causes of death shown in this report. Comparability ratios measure the net effect of the new revision on statistics for a particular cause of death and can be used as a factor to adjust mortality statistics for causes of death classified by a previous revision to be comparable to those for the same cause classified by the new revision. A comparability ratio near 1.0 indicates little or no net change in cause-of-death classification for the category. Ratios divergent from 1.0 indicate a greater discontinuity. For more information on the computation and uses of comparability ratios, see *Comparability of cause of death between ICD-9 and ICD-10: Preliminary estimates* (46).

Tabulation lists and cause-of-death ranking

Tabulation lists for ICD–10 were developed to maximize continuity with ICD–9. This continuity is especially useful in trend analysis and in identifying causes of death, which are of public health and medical importance. 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" (47). Briefly, ranking of causes of infant death is based on the List of 130 Selected Causes of Infant Death. 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 (J12–18)).

Computation of rates

Infant mortality rates are the most commonly used index for measuring the risk of dying during the first year of life. 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. Infant mortality rates use the number of live births in the denominator to approximate the population at risk of dying before the first birthday. For all variables, not stated responses were shown in tables of frequencies, but were dropped before rates were computed.

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. For the Virgin Islands and Guam, the infant death records are not weighted due to the small number of cases for the Virgin Islands and Guam. However, the percent of records linked has been very high (greater than 99 percent) for Puerto Rico as well as the Virgin Islands and Guam, and thus the effect of not weighting the data have been minimal. The infant death records are also not weighted for Puerto Rico. There is no linked file data for American Samoa and the Commonwealth of the Northern Marianas.

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 (48). As a result, numbers of births, deaths, and infant mortality rates

Table II. List of ICD-10 five leading causes of infant death for 1999, comparable ICD-9 causes of infant death, and estimated comparability ratios

ICD–10 cause of death	ICD–9 cause of death	Estimated comparability ratio
Congenital malformations, deformations and chromosomal abnormalities . . . . . (Q00–Q99)	Congenital anomalies . . . . . (740–759)	0.9064
Disorders related to short gestation and low birthweight, not elsewhere classified . . . . . (P07)	Disorders relating to short gestation and unspecified low birthweight . . . . . (765)	1.1060
Sudden infant death syndrome . . . . . (R95)	Sudden infant death syndrome . . . . . (798.0)	1.0362
Newborn affected by maternal complications of pregnancy . . . . . (P01)	Newborn affected by maternal complications of pregnancy . . . . . (761)	1.0295
Respiratory distress of newborn . . . . . (P22)	Respiratory distress syndrome . . . . . (769)	1.0257

Source: Anderson RN, Miniño AM, Hoyert DL. Comparability of cause of death between ICD–9 and ICD–10: Preliminary estimates. National vital statistics reports; vol 49 no 2. Hyattsville, Maryland: National Center for Health Statistics. 2001.

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. Estimates of relative standard errors (RSE's) and 95-percent confidence intervals are shown below.

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

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

where D is the number of deaths and

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

where B is the number of births.

For example, let us say that for group A the number of infant deaths was 104 while the number of live births was 27,380 yielding an infant mortality rate of 3.8 infant deaths per 1,000 live births.

$$\text{The RSE of the deaths} = 100 \bullet \sqrt{\frac{1}{104}} = 9.81,$$

$$\text{while the RSE of the births} = 100 \bullet \sqrt{\frac{1}{27{,}830}} = 0.60$$

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

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

$$\text{The RSE of the IMR} = 100 \bullet \sqrt{\frac{1}{104} + \frac{1}{27{,}380}} = 9.82$$

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:

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

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

Thus, for Group A:

$$\text{Lower: } 3.8 - 1.96 \bullet 3.8 \bullet \frac{9.82}{100} = 3.1$$

$$\text{Upper: } 3.8 + 1.96 \bullet 3.8 \bullet \frac{9.82}{100} = 4.5$$

Thus the chances are 95 out of 100 that the true infant mortality rate for Group A lies somewhere in the 3.1–4.5 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 III.

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

$$\text{Upper: IMR} \bullet U\ (.95,\ D_{adj})$$

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 III corresponding to the value of D_{adj}.

For example, let us say that for Group B the number of infant deaths was 47, the number of live births was 8,901, and the infant mortality rate was 5.3.

$$D_{adj} = \frac{(47 \bullet 8{,}901)}{(47 + 8{,}901)} = 47$$

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

$$\text{Lower: } 5.3 \bullet 0.73476 = 3.9$$

$$\text{Upper: } 5.3 \bullet 1.32979 = 7.0$$

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 $z \leq 1.96$, the difference is not significant.

Availability of linked file data

Linked file data are available on CD-ROM from the National Technical Information Service (NTIS) and the Government Printing Office (GPO). Data are also available in selected issues of the *Vital and Health Statistics*, Series 20 reports, the *Monthly Vital Statistics Reports* and the *National Vital Statistics Report* through NCHS. Additional unpublished tabulations are available from NCHS or through our Internet site at http://www.cdc.gov/nchswww. Selected variables from the linked file are also available for tabulation on CDC WONDER at http://wonder.cdc.gov/lbdj.shtml.

Table III. 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			

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TECHNICAL APPENDIX FROM

VITAL STATISTICS OF THE UNITED STATES

1999

NATALITY

U.S. DEPARTMENT OF
HEALTH AND HUMAN SERVICES

CENTERS FOR DISEASE CONTROL AND PREVENTION
NATIONAL CENTER FOR HEALTH STATISTICS
Hyattsville, Maryland: March 2001

VITAL STATISTICS OF THE UNITED STATES: NATALITY, 1999
TECHNICAL APPENDIX

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Introduction

This document provides detailed information on the variables and the quality and completeness of the data on the public-use file for 1999 births, published by the Centers for Disease Control and Prevention's National Center for Health Statistics (1). This report supplements the Technical notes of "Births: Final Data for 1999" (2) and provides a thorough discussion of the definitions, coding, quality and completeness of the 1999 birth data (1). In addition, this report is recommended for use with the public-use file for 1999 births, available on CD-ROM from the National Center for Health Statistics, and the tabulated data of "Vital Statistics of the United States, 1999, Volume I, Natality" (in preparation).

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 and revised in 1988 by a working group formed by the American Academy of Pediatrics and the American College of Obstetricians and Gynecologists (3,4,5):

> Live birth is the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy, which, after such separation, 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; each product of such a birth is considered liveborn.

This definition distinguishes in precise terms a live birth from a fetal death (see the section on fetal deaths in the Technical Appendix of volume II, *Vital Statistics of the United States*). In the interest of comparable natality statistics, both the Statistical Commission of the United Nations and the Centers for Disease Control and Prevention's National Center for Health Statistics (NCHS) have adopted this definition (6,7).

History of birth-registration area

The national birth-registration area was proposed in 1850 and established in 1915. By 1933 all 48 States and the District of Columbia were participating in the registration system. The organized territories of Hawaii and Alaska were admitted in 1929 and 1950, respectively; data from these areas were prepared separately until they became States--Alaska in 1959 and Hawaii in 1960. 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, Puerto Rico, the U.S. Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands. 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.

The original birth-registration area of 1915 consisted of 10 States and the District of Columbia. The growth of this area is indicated in table 4-1. This table also presents for each year through 1932 the estimated midyear population of the United States and of those States included in the registration system.

Because of the growth of the area for which data have been collected and tabulated, a national series of geographically comparable data before 1933 can be obtained only by estimation. Annual estimates of births were prepared by P. K. Whelpton for 1909-34 (8). These estimates include adjustments for underregistration and for States that were not part of the birth-registration area before 1933.

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 of individual records processed by the States and provided to NCHS through the Vital Statistics Cooperative Program. NCHS receives these files from the registration offices of all States, the District of Columbia, and New York City. Information for Puerto Rico and the Virgin Islands is also received through the Vital Statistics Cooperative Program. Information for Guam is obtained from microfilm copies of original birth certificates and is based on the total file of records for all years. Data from American Samoa first became available in 1997. Data from the Commonwealth of the Northern Mariana Islands (referred to as Northern Marianas) first became available in 1998. Similar to data from Guam, the data are obtained from microfilm copies of original birth certificates and are based on the total file of records.

Birth statistics for years prior to 1951 and for 1955 are based on the total file of birth records. Statistics for 1951-54, 1956-66, and 1968-71 are based on 50-percent samples except for data for Guam and the Virgin Islands, which are based on all records filed. During the processing of the 1967 data the sampling rate was reduced from 50 percent to 20 percent. For details of this procedure and its consequences for the 1967 data see pages 3-9 to 3-11 in volume I of *Vital Statistics of the United States*, 1967. From 1972 to 1984 statistics are based on all records filed in the States submitting computer tapes and on a 50-percent sample of records in all other States.

Information for years prior to 1970 for Puerto Rico, the Virgin Islands, and Guam is published in the annual vital statistics reports of the Department of Health of the Commonwealth of Puerto Rico, the Department of Public Health of the Virgin Islands, the Department of Public Health and Social Services of the Government of Guam, and in selected *Vital Statistics of the United States* annual reports.

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 tabulations in this report. Similarly the data for Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Northern Marianas are limited to births registered in these areas.

Standard certificate of live birth

The U.S. Standard Certificate of Live Birth, issued by the Public Health Service, has served for many years as the principal means of attaining uniformity in the content of the documents used to collect information on births in the United States. 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.

The first standard certificate of birth was developed in 1900. Since then, it has been revised periodically by the national vital statistics agency through consultation with State health officers and registrars; Federal agencies concerned with vital statistics; national, State, and county medical societies; and others working in public health, social welfare, demography, and insurance. This procedure has assured careful evaluation of each item for its current and future usefulness for legal, medical, demographic, and research purposes. New items have been added when necessary, and old items have been modified to ensure better reporting or, in some cases, dropped when their usefulness appeared to be limited.

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 check boxes to obtain detailed medical and health information about the mother and child. It has been demonstrated that this format produces higher quality and more complete information than do open-ended items.

The reformatted items included "Medical Risk Factors for This Pregnancy," which combines the former items "Complications of Pregnancy" and "Concurrent Illnesses or Conditions Affecting the Pregnancy." "Complications of Labor and/or Delivery" and "Congenital Anomalies of Child" also have been revised from the open-ended format. For each of these items at least 15 specific conditions have been identified.

Several new items were added to the revised certificate. Included are items to obtain information on tobacco and alcohol use during pregnancy, weight gain during pregnancy, obstetric procedures, method of delivery, and abnormal conditions of the newborn. These items can be used to monitor the health practices of the mother that can affect pregnancy and the use of technology in childbirth, and to identify babies with specific abnormal conditions. When combined with other socioeconomic and health data, these items provide a wealth of information relevant to the etiology of low birth weight and other adverse pregnancy outcomes.

Another modification was the addition of a Hispanic identifier for the mother and father. Although NCHS had recommended that States add items to identify the Hispanic or ethnic origin of the newborn's parents, concurrent with the 1978 revision of the U.S. Standard Certificate of Live Birth and reported data from the cooperating States since that year, the items were new to the U.S. Standard Certificate for 1989.

The 1989 revised certificate also provided more detail than previously requested on the birth attendant and place of birth. This permits a more in-depth analysis of the number and characteristics of births by attendant and type of facility and a comparison of differences in outcome. For further discussion see individual sections for each item.

Classification of data

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 classified according to similarly defined systems and 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, differences between the enumeration method of obtaining population data and the registration method of obtaining vital statistics data may result in significant discrepancies.

The general rules used to classify geographic and personal items for live births are set forth in "Vital Statistics Classification and Coding Instructions for Live Birth Records, 1999," *NCHS Instruction Manual*, Part 3a (9). This material is incorporated in the basic file layout on the CD-ROM. The instruction materials are for States to use in coding the data items; they do not include any NCHS recodes. So, the file layout is a better source of information, since it provides the exact codes and recodes that are available. The classification of certain important items is discussed in the following pages. See table A for a listing of items and the percent of records that were not stated for each State, Puerto Rico, Virgin Islands, Guam, American Samoa, and the Northern Marianas.

Classification by occurrence and residence

Births to U.S. residents occurring outside this country are not reallocated to the United States. 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. From 1966 to 1969 births occurring in the United States to mothers who were nonresidents of the United States were considered as births to residents of the exact place of occurrence; in 1964 and 1965 all such births were allocated to "balance of county" of occurrence even if the birth occurred in a city. The change in coding beginning in 1970 to exclude births to nonresidents of the United States from residence data significantly affects the comparability of data with years before 1970 only for Texas.

For the total United States the tabulations by place of residence and by place of occurrence are not 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 1999.

Residence error--A nationwide test of birth-registration completeness in 1950 provided measures of residence error for natality statistics. According to this test, 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. 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 allocated 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 1999 is given in another manual, "Vital Records Geographic Classification, 1995," *NCHS Instruction Manual*, Part 8 is included with the documentation file on CD-ROM (1). The geographic code structure in use is based on results of the 1990 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.

Metropolitan statistical areas--The metropolitan statistical areas and primary metropolitan statistical areas (MSA's and PMSA's) used in this report are those established by the U.S. Office of Management and Budget as of April 1, 1990, and used by the U.S. Bureau of the Census (10) except in the New England States.

Except in the New England States, an MSA has either a city with a population of at least 50,000, or a Bureau of the Census urbanized area of at least 50,000 and a total MSA population of at least 100,000. A PMSA consists of a large urbanized county, or cluster of counties, that demonstrates very strong internal economic and social links and has a population over 1 million. When PMSA's are defined, the large area of which they are component parts is designated a Consolidated Metropolitan Statistical Area (CMSA) (11).

In the New England States the U.S. Office of Management and Budget uses towns and cities rather than counties as geographic components of MSA's and PMSA's. NCHS cannot, however, use this classification for these States because its data are not coded to identify all towns. Instead, the New England County Metropolitan Areas (NECMA's) are used. These areas are established by the U.S. Office of Management and Budget (12) and are made up of county units.

Metropolitan and nonmetropolitan counties— Independent cities and counties included in MSA's and PMSA's or NECMA's are included in data for metropolitan counties; all other counties are classified as nonmetropolitan.

Population-size groups--Beginning in 1994 vital statistics data for cities and certain other urban places have been classified according to the population enumerated in the 1990 Census of Population. Data are available for individual cities and other urban places of 100,000 or more population. Data for the remaining areas not separately identified are shown in the tables under the heading "Balance of area" or "Balance of county." Classification of areas for 1982-93 was determined by the population enumerated in the 1980 Census of Population. As a result of changes in the enumerated population between 1980 and 1990, some urban places identified in previous reports are no longer included, and a number of other urban places have been added.

Urban places other than incorporated cities for which vital statistics data are shown in the tabulated data in "Vital Statistics of the United States, Natality" include the following:

- Each town in New England, New York, and Wisconsin and each township in Michigan, New Jersey, and Pennsylvania that had no incorporated municipality as a subdivision and had either 25,000 inhabitants or more, or a population of 10,000 to 25,000 and a density of 1,000 persons or more per square mile.
- Each county in States other than those indicated above that had no incorporated municipality within its boundary and had a density of 1,000 persons or more per square mile. (Arlington County, Virginia, is the only county classified as urban under this rule.)
- Each place in Hawaii with 10,000 or more population. (There are no incorporated cities in Hawaii.)

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

Race or national origin

Beginning with the 1989 data year, birth data are tabulated primarily by race of mother. In 1988 and prior years the race or national origin shown in tabulations was that of the newborn child. The race of the child was determined for statistical purposes by an algorithm based on the race of the mother and father as reported on the birth certificate. When the parents were of the same race, the race of the child was the same as the race of the parents. When the parents were of different races and one parent was white, the child was assigned to the race of the other parent. When the parents were of different races and neither parent was white, the child was assigned to the race of the father, with one exception--if either parent was Hawaiian, the child was assigned to Hawaiian. If race was missing for one parent, the child was assigned the race of the parent for whom it was reported. When information on race was missing for both parents, the race of the child was considered not stated and the birth was allocated according to rules discussed on page 4 of the Technical Appendix, volume I, *Vital Statistics of the United States*, 1988. In 1989 the criteria for reporting the race of the parents did not change and continues to reflect the response of the informant (usually the mother). Beginning with the 1992 issue of *Vital Statistics of the United States, Volume I, Natality*, trend data for years beginning with 1980 have been retabulated by race of mother.

The most important factor influencing the decision to tabulate births by race of the mother was the decennial revision of the U.S. Standard Certificate of Live Birth in 1989. This revision included many more health questions that are directly associated with the mother, including alcohol and tobacco use, weight gain during pregnancy, medical risk factors, obstetric procedures, complications of labor and/or delivery, and method of delivery. Additionally, many of the other items that have been on the birth certificate for more than two decades also relate directly to the mother, for example, marital status, education level, and receipt of prenatal care. It is more appropriate to use the race of the mother than the race of the child in tabulating these items.

A second factor has been the increasing incidence of interracial parentage. When race is aggregated into the four categories mandated in 1977 by the Office of Management and Budget, the proportion of children born to parents of different races is 5.1 percent, more than double the percent in 1977 (2.0 percent). More than half of these births were to white mothers and fathers of another race (55 percent in 1999). There have been two major consequences of the increasing interracial parentage. One is the effect on birth rates by race. The number of white births under the former procedures has been arbitrarily limited to infants whose parents were both white (or one parent if the race of only one parent was reported). At the same time, the number of births of other races has been arbitrarily increased to include all births to white mothers and fathers of other races. Thus, prior to 1989, if race of mother had been used, birth rates per 1,000 white women in a given age group would have been higher, while comparable rates for black women and women of other races would have been lower. The other consequence of increasing interracial parentage is the impact on the racial differential in various characteristics of births, particularly in cases where there is generally a large racial disparity, such as the incidence of low birthweight. In this instance, the racial differential is larger when the data are tabulated by race of mother rather than by race of child. The same effect has been noted for characteristics such as nonmarital childbearing, preterm births, late or no prenatal care, and low educational attainment of mother.

The third factor influencing the change is the growing proportion of births with race of father not stated, 14 percent in 1999. Although this proportion has stabilized and declined slightly in the 1990's, it is still higher than in 1979, 11 percent. The high proportion of records with the father's race not reported reflects the increase in the proportion of births to unmarried women; in many cases no information is reported on the father. These births were already assigned the race of the mother because there is no alternative. Tabulating births by race of mother provides a more uniform approach, rather than a necessarily arbitrary combination of parental races.

The change in the tabulation of births by race presents some problems when analyzing birth data by race, particularly trend data. The problem is likely to be acute for races other than white and black.

The categories for race or national origin are "White," "Black," "American Indian" (including Aleuts and Eskimos), "Chinese," "Japanese," "Hawaiian," "Filipino," and "Other Asian or Pacific Islander" (including Asian Indian). Before 1992 there was also an "other" category, which is now combined with the "Not stated" category. Before 1978 the category "Other Asian or Pacific Islander" was not identified separately but included with "Other" races. The separation of this category from "other" allows identification of the category "Asian or Pacific Islander" by combining the new category "Other Asian or Pacific Islander" with Chinese, Japanese, Hawaiian, and Filipino.

Beginning in 1992, NCHS contracted with seven States with the highest API populations to code births to additional API subgroups. The API subgroups include births to Vietnamese, Asian Indian, Korean, Samoan, Guamanian, and other API women. The seven States included in this reporting area are: California, Hawaii, Illinois, New Jersey, New York, Texas, and Washington. At least two-thirds of the U.S. population of each of these additional API groups lived in the seven-State reporting area (13). The data are available on the detailed natality tapes and CD-ROMs beginning with the 1992 data year. An analytic report based on the 1992 data year is also available upon request (14). Minnesota began reporting additional API subgroups in 1996 and Virginia began reporting in 1998. Missouri and West Virginia started reporting in 1999 for a total of 11 reporting states.

The category "White" comprises births reported as white and births where race, as distinguished from Hispanic origin, is reported as Hispanic. Before 1964 all births for which race or national origin was not stated were classified as white. Beginning in 1964 changes in the procedures for allocating race when race or national origin is not stated have changed the composition of this category. (See discussion on "Race or national origin not stated.")

If the race or national origin of an Asian parent is ill-defined or not clearly identifiable with one of the categories used in the classification (for example, if "Oriental" is entered), an attempt is made to determine the specific race or national origin from the entry for place of birth. If the birthplace is China, Japan, or the Philippines, the race of the parent is assigned to that category. When race cannot be determined from birthplace, it is assigned to the category "Other Asian or Pacific Islander."

Race or national origin not stated--If the race of the mother is not defined or not identifiable with one of the categories used in the classification (0.6 percent of births in 1999) and the race of the father is known, the race of the father is assigned to the mother. Where information for both parents is missing, the race of the mother is allocated electronically according to the specific race of the mother on the preceding record with a known race of mother. Data for both parents were missing for only 0.4 percent of birth certificates for 1999. Nearly all statistics by race or national origin for the United States as a whole in 1962 and 1963 are affected by a lack of information for New Jersey, which did not report the race of the parents in those years. Birth rates by race for those years are computed on a population base that excluded New Jersey. For the method of estimating the U.S. population by age, sex, and race excluding New Jersey in 1962 and 1963, see page 4-8 in the Technical Appendix of volume I, *Vital Statistics of the United States*, 1963.

Age of mother

Beginning in 1989 an item on the birth certificate asks for "Date of Birth." In previous years, "Age (at time of this birth)" was requested. 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 1999, the mother's age was reported directly by five States (Kentucky, Nevada, North Dakota, Virginia, and Wyoming) and American Samoa. From 1964 to 1996, the age of mother was edited for 10-49 years. When the age of mother was computed to be under 10 years or

50 years or over, it was considered not stated and was assigned as described below. Beginning in 1997, age of mother is edited for ages 10-54 years. When the age of mother is computed to be under 10 years or 55 years or over, it is considered not stated and was assigned as described below. 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 number of births to women 50-54 years is too small for computing age-specific birth rates. These births have been included with births to women 45-49 for computing birth rates.

Age-specific birth rates are based on populations of women by age, prepared by the U.S. Bureau of the Census. 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. Bureau of the Census in *Current Population Reports*.

The 1990 Census of Population derived age in completed years as of April 1, 1990, from the responses to questions on age at last birthday and month and year of birth, with the latter given preference. In the 1960, 1970, and the 1980 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 (15). 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 (16).

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, volume 1, natality (at http://www.cdc.gov/nchs/datawh/statab/unpubd/natality/natab97.htm).

Not stated date of birth of mother– In 1999, age of mother was not reported on 0.02% 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 "Computer Edits for Natality Data, Effective 1993" NCHS Instruction Manual , Part 12, page 9; available on request from the Division of Vital Statistics.) In 1963 birth records with age not stated were allocated according to the age appearing on the record previously processed for a mother of identical race and parity (number of live births). For 1960-62 not stated ages were distributed in proportion to the known ages for each racial group. Before 1960 this was done for age-specific birth rates but not for the birth frequency tables, which showed a separate category for age not stated.

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 of "not stated" 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 in 14 percent of the birth certificates in 1999, one third 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 and means, not for frequency tabulations (2).

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 1999 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."

Not stated birth order--Before 1969 if both of these items were blank, the birth was considered a first birth. Beginning in 1969, births for which the pregnancy history items were not completed have been tabulated as live-birth order not stated. As a result of this revised procedure, 22,686 births in 1969 that would have been assigned to the "First birth order" category under the old rules were assigned to the "Not stated" category.

All births tabulated in the "Not stated birth order" category are excluded from the computation of percents. 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.

Date of last live birth

The date of last live birth was added to the U.S. Standard Certificate of Live Birth in 1968 for the purpose of providing information on child spacing. The interval since the last live birth is the difference between the date of last live birth and the date of present birth.

Beginning in 1995, NCHS ceased to collect information on the date of last live birth and thus the information on interval is only available from birth certificate data from 1968-94.

Educational attainment

Data on the educational attainment of both parents were collected beginning in 1968 and tabulated for publication in 1969 for the first time. Data on educational attainment is currently available only for the mother. Beginning in 1995, NCHS ceased to collect information on the educational attainment of the father and thus the information is available from birth certificate data only for 1969-94.

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 category "not stated."

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 category "Not stated" includes all records in reporting areas 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 percents.

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. Beginning in 1997, the marital status of women giving birth in California and Nevada is determined by a direct question in the birth registration process. 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 1999, a birth is inferred as nonmarital if either of these factors 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. The inferential procedures in current use represent a substantial departure from the method used before 1980 as well as those used during the 1980's to prepare national estimates of births to unmarried women, before 1980 the incidence of births to unmarried women in States with no direct question on marital status was assumed to be the same as the incidence in reporting States in the same geographic division (17). Inferential procedures in use during the 1980's relied heavily on a comparison of the surnames of the parents and the child to infer the mother's marital status. The procedures now in use depend, as noted above, on very reliable indicators, namely a paternity affidavit or missing information on the father.

The procedures for reporting marital status in California, Nevada, New York City changed beginning January 1, 1997. The methods used to determine marital status and the impact of the procedures on the data were discussed in detail in a previous report (17).

The use of inferential marital status data together with information from a direct question represents an attempt to use related information on the birth certificate to improve the quality of national data as well as to provide data for the individual nonreporting States. An evaluation of this method and its validity for California (the largest nonreporting State until 1997) has been published (18). Because of the continued substantial increases in nonmarital childbearing throughout the 1980's, the data have been intensively evaluated by the Division of Vital Statistics, NCHS (17).

The mother's marital status was not reported in 1999 on 0.03 percent of the birth records in States reporting this information from a direct question. Marital status was imputed as "married" for these records.

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.

Rates for 1940 and 1950 are based on decennial census counts. Rates for 1955-97 are based on a smoothed series of population estimates (17,19). Because of sampling error, the original U.S. Bureau of the Census population estimates by marital status fluctuate erratically from year to year; therefore, they have been smoothed so that the rates do not show similar variations. These rates differ from those published in volumes of *Vital Statistics of the United States* before 1969, which were based on the original estimates provided annually by the U.S. Bureau of the Census. Birth rates by marital status for 1971-79 have been revised and differ from rates published before 1980 in volumes of *Vital Statistics of the United States* (see "Computation of rates and other measures").

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. Prior to 1989, place of birth was classified simply as either "In hospital" or "Not in hospital." Births occurring in hospitals, institutions, clinics, centers, or homes were included in the category "In hospital." In this context the word "homes" does not refer to the mother's residence but to an institution, such as a home for unmarried women. Birthing centers were included in either category, depending on each State's assessment of the facility. 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. The 1989 certificate includes separate classifications for doctor of medicine (MD), doctor of osteopathy (DO), certified nurse midwife (CNM), other midwife, and other attendants. In earlier certificates births attended by certified nurse midwives were grouped with those attended by lay midwives. The 1989 certificate also facilitated the identification of home births, births in freestanding birthing centers, and births in clinics or physician offices.

Data for the "In hospital" category for 1975-88 include all births in clinics or maternity centers, regardless of the attendant. Data for 1975-77 published before 1980 included clinic and center births in the category "In hospital" only when the attendant was a physician. Therefore, data shown for 1975-77 published after 1980 differ from data published before 1980. As a result of this change, for 1975 an additional 12,352 births were classified as occurring in hospitals, raising the percent of births occurring in hospitals from 98.7 to 99.1. Similarly, for 1976 the number of births occurring in hospitals increased by 14,133 and the percent in hospitals raised from 98.6 to 99.1; for 1977 the increase is 15,937 and the percent in hospitals raised from 98.5 to 99.0. For 1974 and earlier the "In hospital" category includes all births in hospitals or institutions and births in clinics, centers, or maternity homes only when attended by physicians.

The "Not in hospital" category includes births for which no information is reported on place of birth. Before 1975 births for which the stated place of birth was a "doctor's office" and delivery was by a physician were included in the category ``In hospital." Beginning in 1975 these births were tabulated as "Not in hospital" and included with births delivered by physicians in this category. Although the actual number of such births is unknown, the effect of the change is minimal. In 1974, 0.3 percent of all births were delivered by physicians outside of hospitals; in 1975 this proportion was 0.4 percent.

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.

Beginning in 1993, all in-hospital births occurring in Illinois where the attendant was classified as an "other" midwife were changed to certified nurse-midwife. This was necessary because almost all of these births were delivered by midwives certified by the American College of Nurse Midwives but because Illinois does not certify midwives, many of these births were classified as "other" midwives.

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.

Birthweight

Birthweight is reported in some areas 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 *Ninth Revision of the International Classification of Diseases* (ICD-9) and remain the same for the Tenth Revision of the International Classification of Diseases (ICD-10) (4). 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

The ICD-9 defines 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 *Sixth Revision of the International Lists of Diseases and Causes of Death*.

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 birthweight is not reported are excluded from the computation of percents and medians.

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.

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, "postterm." These distinctions are according to the ICD-9 and ICD-10 (4) definitions.

The 1989 revision of the U.S. Standard Certificate of Live Birth included a new 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 clinical estimate also was used if the date of the LMP was not reported. The period of gestation for 5.1 percent of the births in 1999 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 birth weight, whereas the LMP-computed 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 if it was within 5 weeks of the clinical estimate and birth weight was reclassified as "not stated." This was necessary for 336 births, less than 0.01 percent of all birth records in 1999. If the reported birthweight was inconsistent with both the LMP-computed gestation and the clinical estimate of gestation, gestation and birthweight were classified as "not stated" if the LMP-computed gestation was not within 5 weeks of the clinical estimate. These changes result in only a very small discontinuity in the data.

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. Each such record is assigned the gestational period in weeks of the preceding record that has a complete LMP date with the same computed months of gestation and the same 500-gram birthweight interval. The effect of the imputation procedure is to increase slightly the proportion of preterm births and to lower the proportion of births at 39, 40, 41, and 42 weeks of gestation. A more complete discussion of this procedure and its implications is presented in a previous report (20).

Because of postconception bleeding or menstrual irregularities, the presumed date of LMP may be in error. In these instances the computed gestational period may be longer or shorter than the true gestational period, but the extent of such errors is unknown.

Month of pregnancy prenatal care began

For those records in which 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 item "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. Percent distributions and the median number of prenatal visits exclude births to mothers who had no prenatal care.

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 doubts about the survival and subsequent health of the infant. Beginning in 1995, NCHS only collected information 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 78 percent of all births in the United States in 1999. California and Texas did not have information on Apgar scores on their birth certificate.

Tobacco and alcohol 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. When smoking and/or drinking status is not reported or is inconsistent with the quantity of cigarettes or drinks reported, the status is changed to be consistent with the amount reported. For example, if the drinking status is reported as "no" but one or more average drinks a week are reported, the mother is classified as a drinker. If the number of cigarettes smoked per day is reported as one or more, the mother is considered a smoker. When one (or a fraction of one) drink a week is recorded, the mother is classified as a drinker. For records on which the number of drinks or number of cigarettes is reported as a span, for example, 10-15, the lower number is used. The number of drinkers and number of drinks reported on birth certificates are believed to underestimate actual alcohol use.

For 1999, information on number of cigarettes smoked per day was reported in a consistent manner for 46 States, the District of Columbia, and New York City (figure 4-A). Indiana and New York State (except for New York City) reported this information but in a format that was inconsistent with the NCHS standards. This reporting area accounted for 87 percent of all births in the U.S. in 1999. Information was not available for California and South Dakota.

Weight gained 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 item was included on the certificates of 49 States and the District of Columbia; California did not report this information. This reporting area excluding California accounted for 87 percent of all births in the United States in 1999.

Medical risk factors for this pregnancy

An item on medical risk factors was included on the 1989 birth certificate, but 2 States did not report all of the 16 risk factors in 1999. Texas did not report genital herpes or uterine bleeding, and Kansas did not report Rh sensitization.

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."

The following definitions are 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 (21).

Definitions of medical terms:

Anemia--Hemoglobin level of less than 10.0 g/dL during pregnancy or a hematocrit of less than 30 percent during pregnancy.

Cardiac disease--Disease of the heart.

Acute or chronic lung disease--Disease of the lungs during pregnancy.

Diabetes--Metabolic disorder characterized by excessive discharge of urine and persistent thirst; includes juvenile onset, adult onset, and gestational diabetes during pregnancy.

Genital herpes--Infection of the skin of the genital area by herpes simplex virus.

Hydramnios/oligohydramnios--Any noticeable excess (hydramnios) or lack (oligohydramnios) of amniotic fluid.

Hemoglobinopathy--A blood disorder caused by alteration in the genetically determined molecular structure of hemoglobin (for example, sickle cell anemia).

Hypertension, chronic--Blood pressure persistently greater than 140/90, diagnosed prior to onset of pregnancy or before the 20th week of gestation.

Hypertension, pregnancy-associated--An increase in blood pressure of at least 30 mm Hg systolic or 15 mm Hg diastolic on two measurements taken 6 hours apart after the 20th week of gestation.

Eclampsia--The occurrence of convulsions and/or coma unrelated to other cerebral conditions in women with signs and symptoms of pre-eclampsia.

Incompetent cervix--Characterized by painless dilation of the cervix in the second trimester or early in the third trimester of pregnancy, with prolapse of membranes through the cervix and ballooning of the membranes into the vagina, followed by rupture of membranes and subsequent expulsion of the fetus.

Previous infant 4,000+ grams--The birthweight of a previous live-born child was over 4,000 grams (8 lbs 13 oz).

Previous preterm or small-for-gestational-age infant--Previous birth of an infant prior to term (before 37 completed weeks of gestation) or of an infant weighing less than the 10th percentile for gestational age using a standard weight-for-age chart.

Renal disease--Kidney disease.

Rh sensitization--The process or state of becoming sensitized to the Rh factor as when an Rh-negative woman is pregnant with an Rh-positive fetus.

Uterine bleeding--Any clinically significant bleeding during the pregnancy, taking into consideration the stage of pregnancy; any second or third trimester bleeding of the uterus prior to the onset of labor.

Obstetric procedures

This item includes six specific obstetric procedures. Birth records with "Obstetric procedures" left blank are considered "not stated." Data on obstetric procedures were reported by all States and the District of Columbia in 1999.

The following definitions are 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 (21).

Definitions of medical terms:

Amniocentesis--Surgical transabdominal perforation of the uterus to obtain amniotic fluid to be used in the detection of genetic disorders, fetal abnormalities, and fetal lung maturity.

Electronic fetal monitoring--Monitoring with external devices applied to the maternal abdomen or with internal devices with an electrode attached to the fetal scalp and a catheter through the cervix into the uterus, to detect and record fetal heart tones and uterine contractions.

Induction of labor--The initiation of uterine contractions before the spontaneous onset of labor by medical and/or surgical means for the purpose of delivery.

Stimulation of labor--Augmentation of previously established labor by use of oxytocin.

Tocolysis--Use of medications to inhibit preterm uterine contractions to extend the length of pregnancy and therefore avoid a preterm birth.

Ultrasound--Visualization of the fetus and placenta by means of sound waves.

Complications of labor and/or delivery

The checkbox format allows for the selection of 15 specific complications and for the designation of more than 1 complication where appropriate. A choice of "None" is also included. Accordingly, if the item is not completed, it is classified as "not stated."

All States and the District of Columbia included this item on their birth certificates in 1999. However, Texas did not report all of the complications. Texas did not report anesthetic complications or fetal distress.

The following definitions are adapted and abbreviated from a set of definitions compiled by a committee of Federal and State health statistics officials (21).

Definitions of medical terms:

Febrile--A fever greater than 100 degrees F. or 38 C. occurring during labor and/or delivery.

Meconium, moderate/heavy--Meconium consists of undigested debris from swallowed amniotic fluid, various products of secretion, excretion, and shedding by the gastrointestinal tract; moderate to heavy amounts of meconium in the amniotic fluid noted during labor and/or delivery.

Premature rupture of membranes (more than 12 hours)--Rupture of the membranes at any time during pregnancy and more than 12 hours before the onset of labor.

Abruptio placenta--Premature separation of a normally implanted placenta from the uterus.

Placenta previa--Implantation of the placenta over or near the internal opening of the cervix.

Other excessive bleeding--The loss of a significant amount of blood from conditions other than abruptio placenta or placenta previa.

Seizures during labor--Maternal seizures occurring during labor from any cause.

Precipitous labor (less than 3 hours)--Extremely rapid labor and delivery lasting less than 3 hours.

Prolonged labor (more than 20 hours)--Abnormally slow progress of labor lasting more than 20 hours.

Dysfunctional labor--Failure to progress in a normal pattern of labor.

Breech/malpresentation--At birth, the presentation of the fetal buttocks rather than the head, or other malpresentation.

Cephalopelvic disproportion--The relationship of the size, presentation, and position of the fetal head to the maternal pelvis prevents dilation of the cervix and/or descent of the fetal head.

Cord prolapse--Premature expulsion of the umbilical cord in labor before the fetus is delivered.

Anesthetic complications--Any complication during labor and/or delivery brought on by an anesthetic agent or agents.

Fetal distress--Signs indicating fetal hypoxia (deficiency in amount of oxygen reaching fetal tissues).

Abnormal conditions of the newborn

This item provides information on eight specific abnormal conditions. 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." This item was included on the birth certificates of all States and the District of Columbia in 1999. However, four areas did not include all conditions. Nebraska and Texas did not report birth injury, New York City did not report assisted ventilation less than 30 minutes or assisted ventilation of 30 minutes or more, and Wisconsin did not report fetal alcohol syndrome.

The following definitions are adapted and abbreviated from a set of definitions compiled by a committee of Federal and State health statistics (21).

Definitions of medical terms:

Anemia--Hemoglobin level of less than 13.0 g/dL or a hematocrit of less than 39 percent.

Birth injury--Impairment of the infant's body function or structure due to adverse influences that occurred at birth.

Fetal alcohol syndrome--A syndrome of altered prenatal growth and development occurring in infants born of women who consumed excessive amounts of alcohol during pregnancy.

Hyaline membrane disease/RDS--A disorder primarily of prematurity, manifested clinically by respiratory distress and pathologically by pulmonary hyaline membranes and incomplete expansion of the lungs at birth.

Meconium aspiration syndrome--Aspiration of meconium by the fetus or newborn, affecting the lower respiratory system.

Assisted ventilation (less than 30 minutes)--A mechanical method of assisting respiration for newborns with respiratory failure.

Assisted ventilation (30 minutes or more)--Newborn placed on assisted ventilation for 30 minutes or longer.

Seizures--A seizure of any etiology.

Congenital anomalies of child

The data provided in this item relate to 21 specific anomalies or anomaly groups. It is well documented that congenital anomalies, except for the most visible and most severe, are incompletely reported on birth certificates (22). The completeness of reporting specific anomalies depends on how easily they are recognized in the short time between birth and birth-registration. Forty-nine States and the District of Columbia included this item on their birth certificates (New Mexico did not). This reporting area included 99 percent of all births in the United States in 1999. The format allows for the identification of more than one anomaly including a choice of "None" should no anomalies be evident. The category "not stated" includes birth records for which the item is not completed.

The following definitions are adapted and abbreviated from a set of definitions compiled by a committee of Federal and State health statistics officials (21).

Definitions of medical terms:

Anencephalus--Absence of the cerebral hemispheres.

Spina bifida/meningocele--Developmental anomaly characterized by defective closure of the bony encasement of the spinal cord, through which the cord and meninges may or may not protrude.

Hydrocephalus--Excessive accumulation of cerebrospinal fluid within the ventricles of the brain with consequent enlargement of the cranium.

Microcephalus--A significantly small head.

Other central nervous system anomalies--Other specified anomalies of the brain, spinal cord, and nervous system.

Heart malformations--Congenital anomalies of the heart.

Other circulatory/respiratory anomalies--Other specified anomalies of the circulatory and respiratory systems.

Rectal atresia/stenosis--Congenital absence, closure, or narrowing of the rectum.

Tracheo-esophageal fistula/Esophageal atresia--An abnormal passage between the trachea and the esophagus; esophageal atresia is the congenital absence or closure of the esophagus.

Omphalocele/gastroschisis--An omphalocele is a protrusion of variable amounts of abdominal viscera from a midline defect at the base of the umbilicus. In gastroschisis, the abdominal viscera protrude through an abdominal wall defect, usually on the right side of the umbilical cord insertion.

Other gastrointestinal anomalies--Other specified congenital anomalies of the gastrointestinal system.

Malformed genitalia--Congenital anomalies of the reproductive organs.

Renal agenesis--One or both kidneys are completely absent.

Other urogenital anomalies--Other specified congenital anomalies of the organs concerned in the production and excretion of urine, together with organs of reproduction.

Cleft lip/palate--Cleft lip is a fissure of elongated opening of the lip; cleft palate is a fissure in the roof of the mouth. These are failures of embryonic development.

Polydactyly/syndactyly/adactyly--Polydactyly is the presence of more than five digits on either hands and/or feet; syndactyly is having fused or webbed fingers and/or toes; adactyly is the absence of fingers and/or toes.

Club foot--Deformities of the foot, which is twisted out of shape or position.

Diaphragmatic hernia-- Herniation of the abdominal contents through the diaphragm into the thoracic cavity usually resulting in respiratory distress.

Other musculoskeletal/integumental anomalies--Other specified congenital anomalies of the muscles, skeleton, or skin.

Down's syndrome--The most common chromosomal defect with most cases resulting from an extra chromosome (trisomy 21).

Other chromosomal anomalies--All other chromosomal aberrations.

Method of delivery

The birth certificate contains a checkbox item on method of delivery. The 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 1999 this information was collected from the birth certificates of all States and the District of Columbia.

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 rate for vaginal birth after previous cesarean (VBAC) delivery 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 for first births exist because the rates are computed on the basis of previous pregnancies, not just live births.

Hispanic parentage

Concurrent with the 1978 revision of the U.S. Certificate of Live Birth, NCHS recommended that items to identify the Hispanic or ethnic origin of the newborn's parents be included on birth certificates and has tabulated and evaluated these data from the reporting States. The 1989 revision of the U.S. Standard Certificate of Live Births includes items to identify the Hispanic origin of the parents. All 50 States and the District of Columbia reported Hispanic origin of the parents for 1999. In 1989 Louisiana, New Hampshire, and Oklahoma did not report this information; in 1990 New Hampshire and Oklahoma did not report, and in 1991-92 New Hampshire did not report Hispanic origin.

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 origin of mother not stated (1.2 percent in 1999) were actually to Hispanic mothers. The population with origin not stated was imputed. The effect on the rates is believed to be small.

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

An estimated 99 percent of all births occurring in the United States in 1999 were registered; for white births registration was 99.4 percent complete and for all other births, 98.6 percent complete. These estimates are based on the results of the 1964-68 test of birth-registration completeness according to place of delivery (in or out of hospital) and race and on the 1999 proportions of births in these categories. The primary purpose of the test was to obtain current measures of registration completeness for births in and out of hospital by race on a national basis. Data for States were not available as they had been from the previous birth-registration tests in 1940 and 1950. A detailed discussion of the method and results of the 1964-68 birth-registration test is available (23). A more recent test has not been conducted.

The 1964-68 test has provided an opportunity to revise the estimates of birth-registration completeness for the years since the previous test in 1950 to reflect the improvement in registration. This has been done using registration completeness figures from the two tests by place of delivery and race. Estimates of registration completeness for four groups (based on place of delivery and race) for 1951-65 were computed by interpolation between the test results. (It was assumed that the data from the more recent test are for 1966, the midpoint of the test period.) The results of the 1964-68 test are assumed to prevail for 1966 and later years. These estimates were used with the proportions of births registered in these categories to obtain revised numbers of births adjusted for underregistration for each year. The overall percent of birth-registration completeness by race was then computed. Data adjusted for underregistration for 1951-59 have been revised to be consistent with the 1964-68 test results and differ slightly from data shown in annual reports for years before 1969. For these years the published number of births and birth rates for both racial groups have been revised slightly downward because the 1964-68 test indicated that previous adjustments to registered births were slightly inflated. Because registration completeness figures by age of mother and by live-birth order are not available from the 1964-68 test, it must be assumed that the relationships among these variables have not changed since 1950.

Discontinuation of adjustment for underregistration, 1960--Adjustment for underregistration of births was discontinued in 1960 when birth registration for the United States was estimated to be 99.1 percent complete. This removed a bias introduced into age-specific rates when adjusted births classified by age were used. Age-specific rates are calculated by dividing the number of births to an age group of mothers by the population of women in that age group. Tests have shown that population figures are likely to be understated through census undercounts; these errors compensate for underregistration of births. Adjustment for underregistration of births, therefore, removes the compensating effect of under enumeration, biasing the age-specific rates more than when uncorrected birth and

population data are used. (For further details see page 4-11 in the Technical Appendix of volume I, Vital Statistics of the United States, 1963.)

The age-specific rates used in the cohort fertility tables are an exception to the above statement. These rates are computed from births corrected for underregistration and population estimates adjusted for under enumeration and misstatement of age. Adjusted birth and population estimates are used for the cohort rates because they are an integral part of a series of rates, estimated with a consistent methodology. It was considered desirable to maintain consistency with respect to the cohort rates, even though it means that they will not be precisely comparable with other rates shown for 5-year age groups.

Completeness of reporting

Interpretation of these data must include evaluation of item completeness. The percent "not stated" is one measure of the quality of the data. Completeness of reporting varies among items and States. See table A for the percent of birth records on which specified items were not stated.

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 review 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 review and analysis of differences between the 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. All differences that are judged to have consequences for quality and completeness are investigated by NCHS. In the review process, statistical tests are used to call initial attention to differences for possible follow-up. 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 transmitted to NCHS in the same manner as for those corrections identified by the registration area.

Random variation and significance testing for natality data

The number of births reported for an area is essentially a complete count, since more than 99 percent of all births are registered. While 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 the number of events that actually occurred can be thought of as one in a large series of possible results that could have occurred under the same circumstances. When considered in this way, the number of births is subject to random variation. The probable range of values may be estimated from the actual figures according to certain statistical assumptions.

The **confidence interval** (CI) 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 similar circumstances.

Confidence limits for numbers, rates, and percents can be estimated from the actual number of 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.

95 percent Confidence Interval: 100 or more births

When the number of events is greater than 100, the data are assumed to be approximately normally distributed. Formulas for 95-percent confidence limits are:

$$\text{Lower limit} = B - (1.96 \times \sqrt{B})$$
$$\text{Upper limit} = B + (1.96 \times \sqrt{B})$$

where:

B = the number of births

Example

Suppose 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:

Lower limit = 14,108 - [1.96 x $\sqrt{}$ 14,108]
= 14,108 - 233
= 13,875

Upper limit = 14,108 + [1.96 x $\sqrt{}$ 14,108]
= 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 lie between 13,875 and 14,341.

95 percent Confidence Interval: 1-99 births

When the number of births is less than 100 and the rate is small, the data are assumed to follow a Poisson probability distribution. Confidence limits are estimated using the following formulas:

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

where:

B = the number of births
L = the value in Table C that corresponds to the number B, using the 95 percent CI column
U = the value in Table C that corresponds to the number B, using the 95 percent CI column

Example

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

Lower limit = B x L
= 47 x 0.73476
= 35

Upper limit = $B \times U$
= 47 x 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.

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 which occurs every 10 years, the error in intercensal population estimates is usually small, difficult to measure, and therefore not considered.

95 percent Confidence Interval: 100 or more births

In this case, use the following formula for the birth rate R based on the number of births B:

$$\text{Lower limit} = R \pm [1.96 \times R / \sqrt{B}]$$
$$\text{Upper limit} = R + [1.96 \times R / \sqrt{B}]$$

where:
R = rate (births per 1,000 population)
B = the number of births

Example

Suppose 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:

Lower limit = 1.55 - [1.96 x (1.55 / $\sqrt{}$14,108)]
= 1.55 - .026
= 1.52

Upper limit = 1.55 + [1.96 x (1.55 / $\sqrt{}$14,108)]
= 1.55 + .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.

95 percent Confidence Interval: 1-99 births

When the number of events in the numerator is less than 20, an asterisk is shown in place of the rate because there were too few births to compute a statistically reliable rate. When the number of events in the numerator is greater than 20 but less than 100, the confidence interval for a rate can be estimated using the two formulas which follow and the values in the 95 percent CI column of Table C.

Lower limit = *R x L*
Upper limit = *R x U*

where:

R = rate (births per 1,000 population)
L = the value in Table C that corresponds to the number B in the numerator of the rate
U = the value in Table C that corresponds to the number B in the numerator of the rate

Example

Suppose that the first birth rate for American Indian women 40-44 years of age was 0.54 per thousand, based on 47 births in the numerator. Using Table C:

Lower limit = 0.54 x 0.73476 = .40
Upper limit = 0.54 x 1.32979 = .72

This means that the chances are 95 out of 100 that the actual first birth rate for American Indian women 40-44 year of age lies between .40 and .72.

Computing confidence intervals for Hispanic subgroups

Tables 6, 8, 9, and 14 in "Births: Final Data for 1999" and tables 1-4 and 1-12 in Vital Statistics of the United States, part 1 Natality show birth and fertility rates for Mexicans, Puerto Ricans, Cubans, and "Other" Hispanics. Population estimates are derived from the U.S. Bureau of the Census' Current Population Survey and adjusted to resident population control totals. As a result, the rates are subject to the variability of the denominator as well as the numerator. For these Hispanic subgroups only (not for all origin, total Hispanic, total non-Hispanic, non-Hispanic white, or non-Hispanic black populations), the formulas above would be substituted by the following formulas:

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,

$$\textit{Lower limit}: \quad R - 1.96 \left(R \left(\sqrt{\left(\frac{1}{B}\right) - f\left(a - \frac{b}{P}\right)} \right.\right.$$

$$\textit{Upper limit}: \quad R - 1.96 \left(R \left(\sqrt{\left(\frac{1}{B}\right) - f\left(a - \frac{b}{P}\right)} \right.\right.$$

where

R = rate (births per 1,000 population).
B = total number of births upon which rate is based
f = factor that depends on whether the population estimate is based on demographic analysis or CPS and the number of years used, equals 0.670 for single year.
a and *b* are single year averages of the 1998 and 1999 CPS standard error parameters; a equals -0.000238 and b equals 7,486 (24,25).
P = total estimated population upon which rate is based

Example

Suppose that the fertility rate of Cuban American women 15-44 years of age was 51.2 per thousand 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:

$$\text{Lower limit} = 51.2 - 1.96 * 51.2 * \sqrt{\left(\frac{1}{13{,}088}\right) + 0.670\left[-0.000238 + \left(\frac{7{,}486}{255{,}399}\right)\right]}$$

$$= 51.2 - 1.96 * 51.2 * \sqrt{0.000076405 + (0.670 * 0.029073)}$$

$$= 51.2 - 1.96 * 51.2 * \sqrt{0.019555}$$

$$= 51.2 - 1.96 * 51.2 * 0.13984$$

$$= 37.17$$

$$\text{Upper limit} = 51.2 + 1.96 * 51.2 * \sqrt{\left(\frac{1}{13{,}088}\right) + 0.670\left[-0.000238 + \left(\frac{7{,}486}{255{,}399}\right)\right]}$$

$$= 51.2 + 1.96 * 51.2 * \sqrt{0.000076405 + (0.670 * 0.029073)}$$

$$= 51.2 + 1.96 * 51.2 * \sqrt{0.019555}$$

$$= 51.2 + 1.96 * 51.2 * 0.13984$$

$$= 65.23$$

This means that the chances are 95 out of 100 that the actual fertility rate of Cuban American women 15-44 years of age lies between 37.17 and 65.23.

Approximate 95 percent Confidence Interval: 1-99 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 which follow and the values in Table C.

For crude and age-specific birth rates,

$$\textit{Lower}: \quad R \;(\; L\;(1\&a\,'.96,\; B)\;(\;\left(1\&2.576\sqrt{f\left(\;a\;\%\;\frac{b}{P}\right)}\right)$$

$$\textit{Upper}: \quad R \;(\; U\;(1\&a\,'.96,\; B)\;(\;\left(1\%2.576\sqrt{f\left(\;a\;\%\;\frac{b}{P}\right)}\right)$$

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 = factor that depends on whether the population estimate is based on demographic analysis or CPS and the number of years used, equals 0.670 for single year.
a and b factors 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 rate is based.

Example

Suppose that the birth rate of Puerto Rican American women 45-49 years of age was 0.4 per thousand, 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:

$$\text{Lower limit} = 0.4 * 0.68419 * \left(1 - 2.576\sqrt{0.670\left(-0.000238 + \left(\frac{7{,}486}{87{,}892}\right)\right)}\right)$$

=0.4*0.68419*(1-2.576 / .056906)
= 0.4 *0.68419*(1-2.576*0.23855)
= 0.4 * 0.68419 * 0.38549
= 0.1

$$\text{Upper limit} = 0.4 * 1.41047 * \left(1 + 2.576\sqrt{0.670\left(-0.000238 + \left(\frac{7{,}486}{87{,}892}\right)\right)}\right)$$

=0.4*1.41047*(1+2.576 / .056906)

=0.4*1.41047*(1+2.576*0.23855)

= 0.4 * 1.41047 * 1.61451
= 0.9

This means that the chances are 95 out of 100 that the actual birth rate of Puerto Rican American women 45-49 years of age lies between 0.1 and 0.9.

Note: In the formulas above, the confidence limits are estimated from the nonsampling 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.

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:

$B \times p \geq 5$ 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:

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

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

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

Example

Suppose the percent of births to Hispanic women in Alabama that were to unmarried women was 23.0 percent. This was based on 310 births in the numerator and 1,345 births in the denominator. First we test to make sure we can use the normal approximation of the binomial:

1,345 *x* .230 = 309
1,345 *x* (1 - .230)
1,345 x .770 = 1,036

Both 309 and 1,036 are greater than 5 so we can proceed. The 95-percent confidence interval would be:

$$\text{Lower limit} = 0.23 - \left(1.96 * \sqrt{0.23 * \frac{0.77}{1{,}345}}\right)$$
$$= 0.23 - 0.022$$
$$= 0.208 \text{ or } 20.8 \text{ percent}$$
$$\text{Upper limit} = 0.23 + \left(1.96 * \sqrt{0.23 * \frac{0.77}{1{,}345}}\right)$$
$$= 0.23 + 0.022$$
$$= 0.252 \text{ or } 25.2 \text{ percent}$$

This means that the chances are 95 out of 100 that the actual percent of births in Alabama to Hispanic women that are to unmarried women lies between 20.8 and 25.2 percent.

Significance testing

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 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.

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

where:
R_1 = the first rate
R_2 = the second rate
N_1 = the first number of births
N_2 = the 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 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 = .47. The statistic is then calculated as follows:

$$1.96 \sqrt{\frac{1.08^2}{1{,}535} \% \frac{1.55^2}{14{,}108}}$$

= 1.96 x √[(1.166/1,535 + 2.403/14,108)]
= 1.96 x √(.00076+0.00017)
= 1.96 x √.00093
= 1.96 x .03
= .06

The difference between the rates (.47) is greater than this statistic (.06). Therefore, the difference is statistically significant at the 95-percent confidence level.

Significance Testing for Hispanic Subgroups

Tables 6, 8, 9, and 14 in "Births: Final Data for 1999" and tables 1-4 and 1-12 in "Vital Statistics United States, volume 1 natality" showing birth and fertility rates based on population estimates derived from the U.S. Bureau of the Census' Current Population Survey and adjusted to resident population control totals, the formula above would be substituted by the formula which follows.

When both rates are based on 100 or more events, the difference between the two rates 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.

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

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 say that the difference is not statistically significant at the 95-percent confidence level.

Example

Suppose the birth rate for Puerto Rican mothers 15-19 years of age (R_1) is 80.6, based on 11,978 births and an estimated population of 148,673, and the birth rate for Cuban mothers 15-19 years of age (R_2) is 27.1, based on 997 births and an estimated population of 36,782. Using the above formula, the z score is computed as follows:

$$1.96 * \sqrt{80.6^2 * \left[\left(\frac{1}{11,978}\right) + 0.670\left(-0.000238 + \frac{7,486}{148,673}\right)\right] + 27.1^2 * \left[\left(\frac{1}{997}\right) + 0.670\left(-0.000238 + \frac{7,486}{36,782}\right)\right]}$$

$$1.96 * \sqrt{6,496.36 * [0.000083486 + 0.670(-0.000238 + 0.050352)] + 734.41 * [0.0010030 + 0.670(-0.000238 + 0.20352)]}$$

$$1.96 * \sqrt{(6,496.36 * 0.033660) + (734.41 * 0.13720)}$$

$$1.96 * \sqrt{218.67 + 100.76}$$

$$1.96 * 17.87$$

$$= 35.03$$

Since the difference between the two rates of 53.5 is greater than the value above, the two rates are statistically significant at the 0.05 level of significance.

One 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

Is the first birth rate for American Indian women 40-44 years of age (.54 per 1,000) significantly lower than the comparable rate for white women (1.55)? The rate for American Indian women is based on 47 events whereas the rate for white women is based on 14,108 events. The rate for American Indian women is based on less than 100 events; therefore, the first step is to compute the confidence intervals for both rates.

	Lower Limit	Upper Limit
American Indian women	0.40	0.72
White women	1.52	1.58

These two confidence intervals do not overlap. Therefore, the first birth rate for American women 40-44 is significantly lower (at the 95-percent confidence level) than the comparable rate for white women.

Testing differences between two percents

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

$B \times p$ $5 and
$B \times q$ $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 exceeds the statistic in the formula below. This statistic equals 1.96 times the standard error for the difference between two percents.

$$1.96 \sqrt{p\ (1\&p)\ (\frac{1}{B_1}\ \%\ \frac{1}{B_2})}$$

$$p\ '\ \frac{B_1\ p_1 \%B_2\ p_2}{B_1 \%B_2}$$

where:

B_1 = the number of births in the denominator for the first percent
B_2 = the number of births in the denominator for the second percent
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 Alaska (28.8 percent) than in Alabama (23.0). The number in the denominator was 593 in Alaska and 1,345 in Alabama. The necessary conditions are met for both percents (calculations not shown). The difference between the two percents is .288 - .230 = .058. The statistic is then calculated as follows:

$$1.96 \sqrt{(.2477)\ (.7523)\ (.0024)}$$

= 1.96 x $\sqrt{}$.000447
= 1.96 x .021
= .042

The difference between the percents (.058) is greater than this statistic (.042). Therefore, the difference is statistically significant at the 95-percent confidence level.

Computation of rates and other measures

Population bases

The rates shown in this report were computed on the basis of population statistics prepared by the U.S. Bureau of the Census. Rates for 1940, 1950, 1960, 1970, 1980, and 1990 are based on the population enumerated as of April 1 in the censuses of those years. Rates for all other years are based on the estimated midyear (July 1) population for the respective years. Birth rates for the United States, individual States, and metropolitan areas are based on the total resident populations of the respective areas. Except as noted these populations exclude the Armed Forces abroad but include the Armed Forces stationed in each area. The resident population of the birth- and death-registration States for 1900-32 and for the United States for 1900-99 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.

In both the 1980 and 1990 censuses, a substantial number of persons did not specify a racial group that could be classified as any of the White, Black, American Indian, Eskimo, Aleut, Asian, or Pacific Islander categories on the census form (26). In 1980 the number of persons of "other" race was 6,758,319; in 1990 it was 9,804,847. In both censuses, the large majority of these persons were of Hispanic origin (based on response to a separate question on the form), and many wrote in their Hispanic origin, or Hispanic origin type (for example, Mexican, Puerto Rican) as their race. In both 1980 and 1990, persons of unspecified race were allocated to one of the four tabulated racial groups (white, black, American Indian, Asian or Pacific Islander), based on their response to the Hispanic origin question. These four race categories conform with the 1979 edition of OMB Directive 15 which mandates that race data must contain at least these 4 categories. These categories are also more consistent with the race categories in vital statistics.

In the allocation of unspecified race was carried out using cross-tabulations of age, sex, race, type of Hispanic origin, and county of residence. Persons of Hispanic origin and unspecified race were allocated to either white or black, based on their Hispanic origin type. Persons of "other" race and Mexican origin were categorically assumed to be white, while persons in other Hispanic categories were distributed to white and black *pro rata* within the county-age-sex group. For "other-not-specified" persons who were not Hispanic, race was allocated to white, black, or Asian and Pacific Islander, based on proportions gleaned from sample data. The 20-percent sample (respondents who were enumerated on the longer census form) provided a highly detailed coding of race, which allowed identification of otherwise unidentifiable responses with a specified race category. Allocation proportions were thus established at the State level, which were used to distribute the non-Hispanic persons of "other" race in the 100-percent tabulations.

In 1990 the race modification procedure was carried out using individual census records. Persons whose race could not be specified were assigned to a racial category using a pool of "race donors," which was derived from persons of specified race and the identical response to the Hispanic origin question within the auspices of the same Census District Office. As in 1980, the underlying assumption was that the Hispanic origin response was the major criterion for allocating race. Unlike 1980, persons of Hispanic origin, including Mexican, could be assigned to any racial group, rather than white or black only, and the non-Hispanic component of "other" race was allocated primarily on the basis of geography (District Office), rather than detailed characteristic.

The means by which respondent's age was determined were fundamentally different in the two censuses; therefore, the problems that necessitated the modification were different. In 1980 respondents reported year of birth and quarter of birth (within year) on the census form. When census results were tabulated, persons born in the first quarter of the year (before April 1) had age equal to 1980 minus year of birth, while persons born in the last 3 quarters had age equal to 1979 minus year of birth.

In 1990 the quarter year of birth was not reported on the census form, so that direct determination of age from year of birth was impossible. In 1990 census publications age is based on respondents' direct reports of age at last birthday. This definition proved inadequate for postcensal estimates, because it was apparent that many respondents had reported their age at time of either completion of the census form or interview by an enumerator, which could occur several months after the April 1 reference data. As a result, age was biased upward. Modification was based

on a respecification of age, for most individual respondents, by year of birth, with allocation to first quarter (persons aged 1990 minus year of birth) and last three quarters (aged 1989 minus year of birth) based on a historical series of registered births by month. This process partially restored the 1980 logic for assignment of age. It was not considered necessary to correct for age overstatement and heaping in 1990, because the availability of age and year of birth on the census form provided elimination of spurious year-of-birth reports in the census data before modification occurred.

Populations for 1999--The population of the United States by age, sex, race, and Hispanic origin is shown in the Census Bureau report United States population estimates, by age, sex, race, and Hispanic origin: 1990 to 1999. Washington, DC: U.S. Census Bureau. Internet release, April 11, 2000. http://www.census.gov/population/estimates/nat_90s_1.html.

Populations for 1998--The population of the United States by age, sex, race, and Hispanic origin is shown in the Census Bureau report United States population estimates, by age, sex, race, and Hispanic origin: 1990 to 1998. Washington, DC: U.S. Bureau of the Census. Internet release, June 4, 1999. Http://www.census.gov/population/www/estimates/uspop.html.

Populations for 1997--The population of the United States by age, sex, race, and Hispanic origin is shown in the Census Bureau report United States population estimates, by age, sex, race, and Hispanic origin: 1990 to 1997. PPL-91R.U.S. Bureau of the Census. Rounded populations are consistent with U.S. Bureau of the Census file NESTV97. Washington: U.S. Department of Commerce. 1998.

Populations for 1996--The population of the United States by age, sex, race, and Hispanic origin is shown in the Census Bureau report, United States population estimates by age, sex, race and Hispanic origin: 1990 to 1996. U.S. Bureau of the Census. PPL-57. Washington: U.S. Department of Commerce. 1997.

Populations for 1995--The population of the United States by age, sex, race, and Hispanic origin is shown in the Census Bureau report, United States population estimates by age, sex, race and Hispanic origin: 1990 to 1995. U.S. Bureau of the Census. Census file RESDO795, PPL-41. Washington: U.S. Department of Commerce. 1996.

Populations for 1994--The population of the United States by age, sex, race, and Hispanic origin is shown in the Census Bureau report, United States population estimates by age, sex, race and Hispanic origin: 1990 to 1994. U.S. Bureau of the Census. PPL-21. Washington: U.S. Department of Commerce. 1995.

Populations for 1993--The population of the United States by age, sex, race and Hispanic origin is tabulated from Census file RESO793.

Populations for 1992--The population of the United States by age, sex, race and Hispanic origin is tabulated from census file RESPO792.

Populations for 1991--The population of the United States by age, race, and sex is shown in *Current Population Reports*, Series P-25, Number 1095. Monthly population figures were published in *Current Population Reports*, Series P-25, Number 1097.

Populations for 1990--The population of the United States by age, race, and sex, and the population for each State is shown *in Current Population Reports*, Series P-25, Number 1095. The figures have been modified as described above. Monthly population figures were published in *Current Population Reports*, Series P-25, Number 1094.

Population estimates for 1981-89--Birth rates for 1981-89 (except those for cohorts of women) have been revised, based on revised population estimates that are consistent with the 1990 census levels, and thus may differ from rates published in volumes of *Vital Statistics of the United States* for these years. The 1990 census counted approximately 1.5 million fewer persons than had earlier been estimated for April 1, 1990. The revised estimates for the United States by age, race, and sex were published by the U.S. Bureau of the Census in *Current Population Reports*, Series P-25, Number 1095. Population estimates by month are based on data published in *Current Population Reports*, Series P-25, Number 1094 and unpublished data. Unpublished revised estimates for States were obtained from the U.S. Bureau of the Census.

Populations for 1980--The population of the United States by age, race, and sex, and the population for each State are shown in tables 4-2 and 4-3 of volume I, *Vital Statistics of the United States*, 1980. The figures by race have

been modified as described above. Monthly population figures were published in *Current Population Reports*, Series P-25, Number 899.

Population estimates for 1971-79--Birth rates for 1971-79 (except those for cohorts of women) have been revised, based on revised population estimates that are consistent with the 1980 census levels, and thus may differ from rates published in volumes of *Vital Statistics of the United States* for these years. The 1980 census counted approximately 5.5 million more persons than had earlier been estimated for April 1, 1980 (27). The revised estimates for the United States by age, race, and sex were published by the U.S. Bureau of the Census in *Current Population Reports*, Series P-25, Number 917. Population estimates by month are based on data published in *Current Population Reports*, Series P-25, Number 899. Unpublished revised estimates for States were obtained from the U.S. Bureau of the Census.

Population estimates for 1961-69--Birth rates for 1961-69 are based on revised estimates of the population and thus may differ slightly from rates published before 1976. The revised estimates used in computing these rates were published in *Current Population Reports*, Series P-25, Number 519. The rates for 1961-64 are based on revised estimates of the population published in *Current Population Reports*, Series P-25, Numbers 321 and 324 and may differ slightly from rates published in those years.

Population estimates for 1951-59--Final intercensal estimates of the population by age, race, and sex and total population by State for 1951-59 are shown in tables 4-4 and 4-5 of volume I, *Vital Statistics of the United States*, 1966. Beginning with 1963 these final estimates have been used to compute birth rates for 1951-59 in all issues of *Vital Statistics of the United States.*

Net census undercounts and overcounts

The U.S. Bureau of the Census has conducted extensive research to evaluate the coverage of the U.S. population (including undercount, overcount, and misstatement of age, race, and sex) in the last five decennial censuses 1950, 1960, 1970, 1980, and 1990. These studies provide estimates of the national population, that were not enumerated or over enumerated in the respective censuses, by age, race, and sex (27-29). The report for 1990 (30) includes estimates of net under enumeration and over enumeration for age, sex, and racial subgroups of the national population, modified for race consistency with previous population counts as described in the section "Population bases."

These studies indicate that there are differential coverages in the censuses among the population subgroups; that is, some age, race, and sex groups are more completely enumerated than others. To the extent that these estimates of overcounts or undercounts are valid, that they are substantial, and that they vary among subgroups and geographic areas, census miscounts can have consequences for vital statistics measures (28). However, the effects of undercounts in the census are reduced to the extent that there is underregistration of births. If these two factors are of equal magnitude, rates based on unadjusted populations are more accurate than those based on adjusted populations because the births have not been adjusted for underregistration.

The impact of net census miscounts on vital statistics measures includes the effects on levels of the rates and effects on differentials among groups.

If adjustments were made for persons who were not counted in the census of population, the size of the denominators would generally increase and the rates would be smaller than without an adjustment. Adjusted rates for 1990 can be computed by multiplying the reported rates by ratios of the 1990 census-level population adjusted for the estimated net census miscounts, which are shown in table E. A ratio of less than 1.0 indicates a net census undercount and would result in a corresponding decrease in the rate. A ratio in excess of 1.0 indicates a net census overcount and would result in a corresponding increase in the rate.

Enumeration of white females in the childbearing ages was at least 97 percent complete for all ages. Among black women, the undercount ranged up to 5 percent. Generally, females in the childbearing ages were more completely enumerated than males for similar race-age groups.

If vital statistics measures were calculated with adjustments for net census miscounts for each of these subgroups, the resulting rates would have been differentially changed from their original levels; that is, rates for

those groups with the greatest estimated overcounts or undercounts would show the greatest relative changes due to these adjustments. Thus the racial differential in fertility between the white and the ``All other'' population can be affected by such adjustments.

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. Bureau of the Census and have been expanded to include data for the two major racial groups. Heuser has prepared a detailed description of the methods used in deriving these measures as well as more detailed data for earlier years (31). These tables for current years are available at http://www.cdc.gov/nchs/datawh/statab/unpubd/natality/natab97.htm.

Parity distribution--The percent distribution of women by parity (number of children ever born alive to mother) is derived from cumulative birth rates by order of birth. The percent of zero-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 percent 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 rate

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 are the same number of women in each age group. The rate of 2,075.0 in 1999, 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 1999, they would have a total of 2,075.0 children by the time they reached the end of the reproductive period (taken here to be age 55 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 (32). This method of seasonal adjustment 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 percents, percent 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 percents, percent distributions, and medians were computed. The percent 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. The procedures for distributing not stated age of father in order to compute mean ages are described in the section "age of father." An asterisk is shown in place of any derived statistic based on fewer than 20 births in the numerator or denominator.

References

1. National Center for Health Statistics. natality public use tape and CD-ROM. Hyattsville, Maryland: National Center for Health Statistics. Annual products.
2. Ventura SJ, Martin JA, Curtin SA, Menacker F, Hamilton BE. Births: Final data for 1999. National vital statistics reports; vol 49 no 1. Hyattsville, Maryland: National Center for Health Statistics. 2001.
3. Department of Health and Human Services. Model State Vital Statistics Act and Regulations, 1992 Revision. Publication no. (PHS). 94-1115.
4. World Health Organization. Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, based on the recommendations of the Tenth Revision Conference, 1987. Geneva: World Health Organization. 1992.
5. American College of Obstetricians and Gynecologists. Guidelines for Perinatal Care, ed. 2, Washington, DC. 308-324. 1988.
6. Kowaleski J. State definitions and reporting requirements for live births, fetal deaths, and induced terminations of pregnancy (1997 revision). Hyattsville, Maryland: National Center for Health Statistics. 1997.
7. Statistical Office of the United Nations. Handbook of vital statistics systems and methods/Department of International Economic and Social Affairs. Studies in methods. Series F, no. 35, ST/ESA/STAT/SER.F35. New York: United Nations. 1985.
8. National Office of Vital Statistics. Births and birth rates in the entire United States, 1909 to 1948. Vital Statistics--Special reports; vol 33 no 8. Washington: Public Health Service. 1950.
9. Division of Vital Statistics. Instruction manual part 3a: Classification and coding instructions for birth records, 1999. Hyattsville, Maryland: National Center for Health Statistics. http://www.cdc.gov/nchs/data/3amanual/pdf.
10. U.S. Bureau of the Census. Population of metropolitan areas and component geography: 1990 and 1980 (6-30-90 definitions). 1990 CPH-L-10. Washington: U.S. Department of Commerce. 1991.
11. U.S. Department of Commerce. Metropolitan statistical area classification. Federal Register; vol 45 no 2. Washington: U.S. Government Printing Office, 956-62. 1980.
12. U.S. Office of Management and Budget. Standard metropolitan statistical areas. Rev. ed. Washington: U.S. Government Printing Office, 89-90. 1975.
13. U.S. Bureau of the Census. 1990 Census of Population. General population characteristics; (1990 CP-1-1). Washington: U.S. Department of Commerce. 1992.
14. Martin JA. Birth characteristics for Asian or Pacific Islander subgroups, 1992. Monthly vital statistics report; vol 43 no 10, suppl. Hyattsville, Maryland: National Center for Health Statistics. 1995.
15. Schachter J. Matched record comparison of birth certificate and census information in the United States, 1950. Vital statistics--Special Reports; vol 47 no12. Washington: Public Health Service. 1962.
16. Schoendorf KC, Parker JD, Batkhan LZ, Kiely JL. Comparability of the birth certificate and 1988 maternal and infant health survey. Vital and health statistics reports; series 2 no 116. Hyattsville, Maryland: National Center for Health Statistics. 1993.
17. Ventura SJ, Bachrach CA. Nonmarital Childbearing in the United States, 1940-99. National vital statistics reports; vol 48 no 16. Hyattsville, Maryland: National Center for Health Statistics. 2000.
18. Berkov B. An evaluation of California's inferred birth statistics for unmarried women. National Center for Health Statistics. Vital Health Stat 2(97). 1985.
19. Ventura SJ. Births to unmarried mothers, United States, 1980-92. National Center for Health Statistics. Vital Health Stat 21(53). 1995.
20. Taffel S, Johnson D, Heuser R. A method for imputing length of gestation on birth certificates. National Center for Health Statistics. Vital Health Stat 2(93). 1982.
21. Brockert JE, Stockbauer JW, Senner JW, et al. Recommended standard medical definitions for the U.S. Standard Certificate of Live Birth, 1989 revision. Paper presented at annual meeting of the Association for the Vital Record and Health Statistics. June 1990.

22. Watkins ML, Edmonds L, McClearn A, et al. The surveillance of birth defects: The usefulness of the revised U.S. standard birth certificate. Am J Public Health 86(5):731-34. 1996.
23. U.S. Bureau of the Census. Test of birth-registration completeness, 1964 to 1968. 1970 census of population and housing; PHC (E)-2. Evaluation and Research Program. Washington: U.S. Department of Commerce. 1973.
24. U.S. Bureau of the Census. Money income in the United States: 1998 (with separate data on valuation of noncash benefits). Current population reports, consumer income. Series P60-206. Washington: U.S. Government Printing Office. 1999.
25. U.S. Bureau of the Census. Money income in the United States: 1999 (with separate data on valuation of noncash benefits). Current population reports, consumer income. Series P60-209. Washington: U.S. Government Printing Office. 2000.
26. U.S. Bureau of the Census. U.S. population estimates, by age, sex, race, and Hispanic origin, 1980-91. Current population reports; series P-25, no 1095. Washington: U.S. Department of Commerce. 1993.
27. U.S. Bureau of the Census. Coverage of the national population in the 1980 census by age, sex, and race. Preliminary estimates by demographic analysis. Current population reports; series P-23, no 115. Washington: U.S. Department of Commerce. 1982.
28. U.S. Bureau of the Census. Estimates of coverage of the population by sex, race, and age--Demographic analysis. 1970 census of population and housing; PHC (E)-4. Evaluation and Research Program. Washington: U.S. Department of Commerce. 1974.
29. U.S. Bureau of the Census. Developmental estimates of the coverage of the population of States in the 1970 census-demographic analysis. Current population reports; series P-23, no 65. Washington: U.S. Department of Commerce. 1977.
30. Robinson JG, Ahmed B, Das Gupta P, et al. Estimation of population coverage in the 1990 United States census based on demographic analysis. JASA 88(423):1061-71. 1993.
31. Heuser R. Fertility tables for birth cohorts by color: United States, 1917-73. Washington: National Center for Health Statistics. 1976.
32. U.S. Bureau of the Census. The X-11 variant of the Census Method II Seasonal Adjustment Program. Technical paper; no 15, 1967 rev. Washington: U.S. Department of Commerce. 1967.

TYPE/PRINT IN PERMANENT BLACK INK FOR INSTRUCTIONS SEE HANDBOOK

U.S. STANDARD

CERTIFICATE OF LIVE BIRTH

LOCAL FILE NUMBER

BIRTH NUMBER

CHILD

1. CHILD'S NAME *(First, Middle, Last)*
2. DATE OF BIRTH *(Month, Day, Year)*
3. TIME OF BIRTH
4. SEX
5. CITY, TOWN, OR LOCATION OF BIRTH
6. COUNTY OF BIRTH
7. PLACE OF BIRTH: ☐ Hospital ☐ Freestanding Birthing Center ☐ Clinic/Doctor's Office ☐ Residence ☐ Other *(Specify)*
8. FACILITY NAME *(If not institution, give street and number)*

CERTIFIER/ ATTENDANT

9. I certify that this child was born alive at the place and time and on the date stated. *Signature* ▶
10. DATE SIGNED *(Month, Day, Year)*
11. ATTENDANT'S NAME AND TITLE *(If other than certifier) (Type/Print)* Name ☐ M.D. ☐ D.O. ☐ C.N.M. ☐ Other Midwife ☐ Other *(Specify)*
12. CERTIFIER'S NAME AND TITLE *(Type/Print)* Name ☐ M.D. ☐ D.O. ☐ Hospital Admin. ☐ C.N.M. ☐ Other Midwife ☐ Other *(Specify)*
13. ATTENDANT'S MAILING ADDRESS *(Street and Number or Rural Route Number, City or Town, State, Zip Code)*

DEATH UNDER ONE YEAR OF AGE Enter State File Number of death certificate for this child

14. REGISTRAR'S SIGNATURE ▶
15. DATE FILED BY REGISTRAR *(Month, Day, Year)*

MOTHER

16a. MOTHER'S NAME *(First, Middle, Last)*
16b. MAIDEN SURNAME
17. DATE OF BIRTH *(Month, Day, Year)*
18. BIRTHPLACE *(State or Foreign Country)*
19a. RESIDENCE—STATE
19b. COUNTY
19c. CITY, TOWN, OR LOCATION
19d. STREET AND NUMBER
19e. INSIDE CITY LIMITS? *(Yes or no)*
20. MOTHER'S MAILING ADDRESS *(If same as residence, enter Zip Code on*

FATHER

21. FATHER'S NAME *(First, Middle, Last)*
22. DATE OF BIRTH *(Month, Day, Year)*
23. BIRTHPLACE *(State or Foreign Country)*

INFORMANT

24. I certify that the personal information provided on this certificate is correct to the best of my knowledge and belief. *Signature of Parent or Other Informant* ▶

INFORMATION FOR MEDICAL AND HEALTH USE ONLY

	25. OF HISPANIC ORIGIN? (Specify No or Yes—If yes, specify Cuban, Mexican, Puerto Rican, etc.)	26. RACE—American Indian, Black, White, etc. *(Specify below)*	27. EDUCATION *(Specify only highest grade completed)* Elementary/Secondary (0-12) | College (1-4 or 5+
MOTHER	25a. ☐ No ☐ Yes Specify:	26a.	27a.
FATHER	25b. ☐ No ☐ Yes Specify:	26b.	27b.

28. PREGNANCY HISTORY *(Complete each section)*

LIVE BIRTHS *(Do not include this child)*		OTHER TERMINATIONS *(Spontaneous and induced at any time after conception)*
28a. Now Living Number ☐ None	28b. Now Dead Number ☐ None	28d. Number ☐ None
28c. DATE OF LAST LIVE BIRTH *(Month, Year)*		28e. DATE OF LAST OTHER TERMINATION *(Month, Year)*

29. MOTHER MARRIED? (At birth, conception, or any time between) *(Yes or no)*
30. DATE LAST NORMAL MENSES BEGAN *(Month, Day, Year)*
31. MONTH OF PREGNANCY PRENATAL CARE BEGAN—First, Second, Third, etc. *(Specify)*
32. PRENATAL VISITS—Total Number *(If none, so state)*
33. BIRTH WEIGHT *(Specify unit)*
34. CLINICAL ESTIMATE OF GESTATION *(Week*
35a. PLURALITY—Single, Twin, Triplet, etc. *(Specify)*
35b. IF NOT SINGLE BIRTH—Born First, Second, Third, etc. *(Specify)*

MULTIPLE BIRTHS Enter State File Number for Mate(s) LIVE BIRTH(S)

FETAL DEATH(S)

36. APGAR SCORE		37a. MOTHER TRANSFERRED PRIOR TO DELIVERY? ☐ No ☐ Yes If Yes, enter name of facility transferred **from:**
36a. 1 Minute	36b. 5 Minutes	37b. INFANT TRANSFERRED? ☐ No ☐ Yes If Yes, enter name of facility transferred **to:**

38a. MEDICAL RISK FACTORS FOR THIS PREGNANCY
(Check all that apply)

Anemia (Hct. < 30/Hgb. < 10) . . . . . 01 ☐
Cardiac disease . . . . . 02 ☐
Acute or chronic lung disease . . . . . 03 ☐
Diabetes . . . . . 04 ☐
Genital herpes . . . . . 05 ☐
Hydramnios/Oligohydramnios . . . . . 06 ☐
Hemoglobinopathy . . . . . 07 ☐
Hypertension, chronic . . . . . 08 ☐
Hypertension, pregnancy-associated . . . . . 09 ☐
Eclampsia . . . . . 10 ☐
Incompetent cervix . . . . . 11 ☐
Previous infant 4000 + grams . . . . . 12 ☐
Previous preterm or small-for-gestational-age infant . . . . . 13 ☐
Renal disease . . . . . 14 ☐
Rh sensitization . . . . . 15 ☐
Uterine bleeding . . . . . 16 ☐
None . . . . . 00 ☐
Other _____ 17 ☐
(Specify)

38b. OTHER RISK FACTORS FOR THIS PREGNANCY
(Complete all items)

Tobacco use during pregnancy . . . . . Yes ☐ No ☐
Average number cigarettes per day _____
Alcohol use during pregnancy . . . . . Yes ☐ No ☐
Average number drinks per week _____
Weight gained during pregnancy _____ lbs.

39. OBSTETRIC PROCEDURES
(Check all that apply)

Amniocentesis . . . . . 01 ☐
Electronic fetal monitoring . . . . . 02 ☐
Induction of labor . . . . . 03 ☐
Stimulation of labor . . . . . 04 ☐
Tocolysis . . . . . 05 ☐
Ultrasound . . . . . 06 ☐
None . . . . . 00 ☐
Other _____ 07 ☐
(Specify)

40. COMPLICATIONS OF LABOR AND/OR DELIVERY
(Check all that apply)

Febrile (> 100 °F. or 38 °C.) . . . . . 01 ☐
Meconium, moderate/heavy . . . . . 02 ☐
Premature rupture of membrane (> 12 hours) . . . . . 03 ☐
Abruptio placenta . . . . . 04 ☐
Placenta previa . . . . . 05 ☐
Other excessive bleeding . . . . . 06 ☐
Seizures during labor . . . . . 07 ☐
Precipitous labor (< 3 hours) . . . . . 08 ☐
Prolonged labor (> 20 hours) . . . . . 09 ☐
Dysfunctional labor . . . . . 10 ☐
Breech/Malpresentation . . . . . 11 ☐
Cephalopelvic disproportion . . . . . 12 ☐
Cord prolapse . . . . . 13 ☐
Anesthetic complications . . . . . 14 ☐
Fetal distress . . . . . 15 ☐
None . . . . . 00 ☐
Other _____ 16 ☐
(Specify)

41. METHOD OF DELIVERY *(Check all that apply)*

Vaginal . . . . . 01 ☐
Vaginal birth after previous C-section . . . . . 02 ☐
Primary C-section . . . . . 03 ☐
Repeat C-section . . . . . 04 ☐
Forceps . . . . . 05 ☐
Vacuum . . . . . 06 ☐

42. ABNORMAL CONDITIONS OF THE NEWBORN
(Check all that apply)

Anemia (Hct. < 39/Hgb. < 13) . . . . . 01 ☐
Birth injury . . . . . 02 ☐
Fetal alcohol syndrome . . . . . 03 ☐
Hyaline membrane disease/RDS . . . . . 04 ☐
Meconium aspiration syndrome . . . . . 05 ☐
Assisted ventilation < 30 min . . . . . 06 ☐
Assisted ventilation ≥ 30 min . . . . . 07 ☐
Seizures . . . . . 08 ☐
None . . . . . 00 ☐
Other _____ 09 ☐
(Specify)

43. CONGENITAL ANOMALIES OF CHILD
(Check all that apply)

Anencephalus 01
Spina bifida/Meningocele 02
Hydrocephalus 03
Microcephalus 04
Other central nervous system anomalies
(Specify) _____ 05

Heart malformations 06
Other circulatory/respiratory anomalies
(Specify) _____ 07

Rectal atresia/stenosis 08
Tracheo-esophageal fistula/ Esophageal atresia . . . 09
Omphalocele/ Gastroschisis 10
Other gastrointestinal anomalies
(Specify) _____ 11

Malformed genitalia 12
Renal agenesis 13
Other urogenital anomalies
(Specify) _____ 14

Cleft lip/palate 15
Polydactyly/Syndactyly/Adactyly 16
Club foot 17
Diaphragmatic hernia 18
Other musculoskeletal/integumental anomalies
(Specify) _____ 19

Down's syndrome 20
Other chromosomal anomalies
(Specify) _____ 21

None 00
Other _____ 22
(Specify)

Table A. Percent of Birth Records on Which Specified Items Were Not Stated: United States and Each State and territory, 1999

[Page 1 of 2]

[By place of residence]

Area	All births	Place of Birth	Attendant at Birth	Mother's Birthplace	Father's Age	Father's Race	Hispanic Origin		Educational Attainment of Mother	Live-birth Order	Length of Gestation	Month Prenatal Care Began	Number of Prenatal Visits
							Mother	Father					
Total of reporting areas 1/	3,959,417	0.0	0.0	0.3	14.0	14.6	1.2	14.9	1.6	0.5	1.1	2.9	3.9
Alabama	62,122	-	0.0	0.1	22.7	22.8	0.1	22.7	0.3	0.0	0.1	0.3	0.7
Alaska	9,950	0.0	0.1	0.4	12.7	15.1	0.5	13.4	2.2	0.3	0.2	1.9	1.7
Arizona	81,145	0.0	0.0	0.2	19.7	21.7	1.3	21.7	2.4	0.3	0.2	2.5	4.7
Arkansas	36,729	0.0	0.0	0.1	19.6	21.8	0.1	20.9	1.0	0.1	0.2	2.4	2.6
California	518,508	0.0	0.0	0.3	7.2	6.8	0.6	6.2	1.5	0.1	2/5.7	1.6	3.1
Colorado	62,167	-	-	0.3	9.0	9.4	0.1	9.5	1.0	0.1	0.0	0.7	0.9
Connecticut	43,310	0.0	0.0	0.2	10.9	12.3	5.1	15.6	3.4	7.1	0.2	3.3	6.3
Delaware	10,676	-	0.5	0.2	31.6	32.3	0.1	31.5	0.5	0.1	0.1	0.8	1.0
District of Columbia	7,522	-	-	0.1	43.5	51.0	0.7	43.4	9.2	0.1	0.6	16.8	19.7
Florida	197,023	0.0	0.0	0.1	17.3	17.6	0.1	18.9	0.6	0.0	0.1	0.9	2.0
Georgia	126,717	0.0	0.0	0.2	17.6	18.1	1.2	18.4	2.3	0.5	0.2	3.7	3.4
Hawaii	17,038	-	0.0	0.1	8.9	9.1	0.1	9.2	0.7	0.0	3.4	3.8	4.4
Idaho	19,872	-	0.0	0.2	8.3	11.5	0.4	11.1	2.3	0.1	0.2	1.5	2.0
Illinois	182,068	0.0	0.0	0.1	14.4	15.8	0.1	15.9	1.0	0.1	0.2	2.1	2.5
Indiana	86,031	0.0	0.1	0.2	13.3	13.4	0.4	13.6	0.9	0.2	0.1	1.3	2.6
Iowa	37,558	0.0	0.0	0.4	11.9	13.7	1.0	14.6	1.5	0.1	0.1	1.1	3.2
Kansas	38,782	-	0.0	0.1	10.5	10.7	0.9	11.9	0.3	0.0	0.1	0.6	0.8
Kentucky	54,403	-	0.1	0.0	19.5	22.2	0.1	23.1	0.2	0.1	0.1	1.0	1.2
Louisiana	67,136	0.0	0.0	0.0	21.3	21.5	0.6	21.8	0.0	0.0	0.0	0.3	0.6
Maine	13,616	-	0.0	-	9.6	14.1	5.1	18.1	0.8	0.3	0.1	0.5	0.5
Maryland	71,967	0.0	0.0	0.6	7.7	9.2	0.4	6.6	1.9	0.3	0.5	3.8	6.6
Massachusetts	80,939	-	0.0	0.0	7.7	7.6	0.6	6.8	0.4	0.4	0.4	1.2	0.5
Michigan	133,607	0.0	0.1	0.1	15.4	17.6	5.9	22.2	1.7	0.4	0.3	4.1	5.6
Minnesota	65,970	-	-	0.1	8.5	10.9	5.2	15.3	2.2	0.4	0.9	6.4	5.7
Mississippi	42,684	0.0	0.0	0.1	23.1	22.9	0.1	23.3	0.3	0.1	0.2	0.6	1.7
Missouri	75,432	-	-	0.2	17.9	18.5	0.1	18.3	0.7	0.4	0.1	1.8	2.8
Montana	10,785	0.0	0.1	0.0	9.4	10.5	1.4	11.5	0.4	0.0	0.1	0.4	0.3
Nebraska	23,907	-	0.0	0.0	11.8	12.8	2.4	13.9	0.1	-	0.0	0.3	0.6
Nevada	29,362	0.0	0.0	1.0	20.8	21.7	1.4	20.3	3.5	1.1	1.0	8.4	10.9
New Hampshire	14,041	-	-	0.0	6.3	8.8	3.9	13.2	1.1	2.4	0.3	1.5	1.6
New Jersey	114,105	0.0	0.0	0.2	9.0	11.3	0.4	9.4	2.6	0.1	0.1	5.4	6.8
New Mexico	27,191	-	-	2.7	28.6	28.0	0.0	28.0	4.5	0.5	0.5	7.3	5.8
New York	255,612	0.1	0.0	0.4	14.9	15.2	4.9	18.8	1.9	0.1	0.4	9.6	6.7
North Carolina	113,795	-	0.0	0.0	16.8	16.8	0.0	16.8	0.2	0.1	0.1	0.7	0.7
North Dakota	7,639	0.0	0.0	-	8.4	9.0	3.4	12.1	0.2	0.1	0.1	0.4	0.4
Ohio	152,584	0.0	0.0	2.0	15.1	17.0	0.4	12.3	0.7	0.3	0.1	1.2	2.4
Oklahoma	49,010	-	0.1	0.1	17.8	19.2	2.0	19.3	1.8	1.5	4.8	11.2	13.9
Oregon	45,204	-	-	0.2	11.3	5.1	0.8	6.0	1.8	0.1	0.0	0.4	0.7
Pennsylvania	145,347	0.0	0.0	0.9	5.5	4.2	0.5	3.6	2.7	0.5	0.3	3.8	6.0
Rhode Island	12,366	-	-	0.5	13.6	14.4	13.8	24.2	2.9	1.6	1.3	4.9	5.6
South Carolina	54,948	0.0	0.0	0.3	28.0	28.0	0.1	28.0	4.5	0.1	0.2	1.5	1.7
South Dakota	10,524	0.0	-	0.0	12.7	12.8	0.1	13.1	0.2	0.0	0.0	0.2	0.3
Tennessee	77,803	-	0.0	0.1	15.8	16.0	0.0	16.1	0.2	0.2	0.3	1.4	1.1
Texas	349,245	0.0	0.0	0.4	15.2	15.3	0.4	15.3	1.7	1.3	0.7	2.1	5.8
Utah	46,290	0.0	0.0	0.2	8.7	9.6	0.2	9.0	1.0	0.4	0.1	4.9	5.6
Vermont	6,567	-	-	0.1	9.1	14.8	2.2	16.1	2.6	0.5	0.1	4.1	2.0
Virginia	95,469	-	0.1	0.1	17.8	19.1	0.2	17.8	0.7	0.0	0.1	0.3	0.5
Washington	79,586	0.0	0.2	0.4	10.0	13.8	4.4	15.1	10.1	3.7	2.2	9.5	13.8
West Virginia	20,728	0.2	0.0	0.1	12.6	13.4	0.2	13.4	0.8	0.1	0.4	4.5	3.3
Wisconsin	68,208	-	0.0	0.1	28.8	28.8	0.0	28.8	0.2	0.0	0.0	0.2	0.3
Wyoming	6,129	-	-	0.0	14.2	14.8	0.0	14.3	0.5	0.0	0.0	0.7	1.1
Puerto Rico	59,563	-	0.1	-	3.0	3.8	---	---	0.4	0.0	0.1	0.4	0.1
Virgin Islands	1,671	-	0.1	-	24.8	26.5	4.4	27.5	2.6	0.6	1.1	0.7	2.9
Guam	4,021	0.0	1.0	0.4	22.9	23.9	1.2	25.4	0.6	1.0	0.3	0.5	0.9
American Samoa	1,736	0.1	-	36.6	35.5	35.8	---	---	---	-	---	---	---
Commonwealth of the Northern Marianas Islands	1,381	0.1	0.2	0.1	6.4	8.5	---	---	15.1	14.4	12.5	15.5	13.3

Table A. Percent of Birth Records on Which Specified Items Were Not Stated: United States and Each State and territory, 1999

[Page 2 of 2]

[By place of residence]

Area	All births	Birth Weight	5-minute Apgar Score	Medical Risk Factors	Tobacco Use	Alcohol Use	Weight Gain	Obstetric Procedures	Complications of Labor and/or Delivery	Method of Delivery	Abnormal Conditions of Newborn	Congenital Anomalies
Total of reporting areas 1/	3,959,417	0.1	0.5	1.6	1.4	1.7	8.4	1.1	1.3	0.8	2.5	1.9
Alabama	62,122	0.1	0.3	0.0	0.0	0.1	3.4	0.0	0.0	0.3	0.0	0.0
Alaska	9,950	0.4	0.6	0.7	0.6	0.8	2.5	0.4	0.6	0.5	0.7	0.9
Arizona	81,145	0.1	0.4	0.0	1.3	1.5	11.9	0.0	0.0	0.3	0.0	0.4
Arkansas	36,729	0.1	3.4	0.2	0.4	0.5	7.5	0.2	0.2	0.5	0.2	0.2
California	518,508	0.0	---	0.0	---	---	---	0.0	0.0	0.0	0.0	0.0
Colorado	62,167	0.0	0.3	0.0	0.1	0.1	2.9	-	-	-	-	0.1
Connecticut	43,310	0.0	1.5	9.8	5.7	6.0	18.4	9.3	10.2	0.9	15.9	16.8
Delaware	10,676	0.0	0.3	0.0	0.3	0.3	1.6	0.0	0.0	-	0.1	0.0
District of Columbia	7,522	0.2	1.1	0.0	0.0	0.0	17.5	-	0.0	0.0	0.0	0.0
Florida	197,023	0.0	0.2	0.0	0.1	0.1	4.8	0.0	0.0	0.6	0.0	0.0
Georgia	126,717	0.0	0.5	0.3	0.5	0.5	8.2	0.0	0.0	0.4	0.0	0.0
Hawaii	17,038	0.9	1.2	19.6	0.1	0.1	12.5	11.8	10.1	0.5	21.5	23.3
Idaho	19,872	0.1	0.5	0.2	0.5	0.6	7.1	0.2	0.2	0.4	0.5	0.5
Illinois	182,068	0.1	0.3	0.0	0.2	0.1	4.2	0.0	0.0	0.4	0.0	0.1
Indiana	86,031	0.4	0.4	0.2	3/ 0.3	0.3	2.8	0.1	0.2	0.5	0.7	0.7
Iowa	37,558	0.0	0.3	0.1	2.2	2.6	6.7	0.1	0.1	0.5	0.1	0.1
Kansas	38,782	0.0	0.4	4/ 0.5	0.5	0.5	0.6	0.4	0.4	1.2	0.4	0.4
Kentucky	54,403	0.1	0.4	5.3	3.8	4.4	8.5	4.0	6.1	4.2	13.0	11.9
Louisiana	67,136	0.0	0.3	0.1	0.1	0.1	5.9	0.1	0.1	0.1	0.1	0.1
Maine	13,616	0.1	0.2	0.1	1.7	2.1	1.7	0.0	0.0	0.2	0.1	0.1
Maryland	71,967	0.0	0.4	0.0	0.4	0.6	6.6	0.0	0.0	0.2	0.0	0.0
Massachusetts	80,939	0.5	0.5	1.0	0.4	0.4	1.1	1.0	1.0	0.7	1.3	1.3
Michigan	133,607	0.3	0.5	0.1	2.1	2.1	9.6	0.1	0.1	0.5	0.1	0.3
Minnesota	65,970	0.1	0.6	7.2	6.6	6.7	18.2	5.8	6.7	3.3	7.5	7.9
Mississippi	42,684	0.1	0.3	0.1	0.2	0.3	5.1	0.0	0.1	0.3	0.1	0.1
Missouri	75,432	0.0	0.5	0.1	0.3	0.4	2.9	0.1	0.1	0.6	0.1	0.1
Montana	10,785	0.0	0.4	0.1	0.9	1.4	1.7	0.1	0.1	0.3	0.1	0.2
Nebraska	23,907	0.0	0.2	0.0	0.8	0.8	1.7	0.0	0.0	0.3	0.1	0.0
Nevada	29,362	0.1	1.4	9.4	2.0	2.2	11.8	1.2	6.4	0.8	11.2	11.7
New Hampshire	14,041	0.3	0.4	0.1	0.3	0.3	4.1	0.1	0.1	0.3	0.1	0.1
New Jersey	114,105	0.1	0.3	1.2	0.6	0.8	7.2	0.1	0.8	0.4	24.8	1.7
New Mexico	27,191	0.3	3.3	0.1	2.4	2.4	11.1	0.0	0.0	0.6	0.2	---
New York	255,612	0.1	0.2	1.3	3/ 0.2	0.2	9.7	0.2	0.4	0.3	7/ 0.9	0.9
North Carolina	113,795	0.1	0.4	0.0	0.2	0.2	2.5	0.0	0.0	0.4	0.0	0.0
North Dakota	7,639	0.1	0.3	0.4	0.7	1.2	1.6	0.3	0.3	1.3	0.6	0.5
Ohio	152,584	0.1	0.2	0.1	0.4	0.4	2.8	0.1	0.1	0.6	0.1	0.1
Oklahoma	49,010	0.6	6.1	37.9	28.7	29.0	37.9	33.9	37.0	28.9	40.9	41.2
Oregon	45,204	0.0	0.5	1.0	0.9	1.0	3.3	0.0	0.0	0.3	0.1	0.1
Pennsylvania	145,347	0.1	0.4	0.1	0.6	0.7	9.3	0.0	0.0	0.0	0.6	0.5
Rhode Island	12,366	0.5	0.4	6.8	2.8	2.9	12.3	6.5	6.6	0.4	14.7	14.7
South Carolina	54,948	0.0	0.3	0.0	0.2	0.2	2.6	0.0	0.0	0.4	0.0	0.0
South Dakota	10,524	0.0	0.4	0.1	---	---	1.1	0.1	0.0	0.1	0.0	0.0
Tennessee	77,803	0.0	0.3	0.1	0.2	0.2	5.5	0.1	0.1	0.6	0.1	0.1
Texas	349,245	0.1	---	5/ 1.4	1.4	1.4	18.5	0.0	8/ 0.0	0.9	6/ 0.3	0.4
Utah	46,290	0.1	0.4	0.1	0.3	0.4	3.8	0.0	0.0	0.0	0.2	0.2
Vermont	6,567	0.3	0.4	0.2	0.4	0.4	1.4	0.2	0.2	0.1	0.3	0.2
Virginia	95,469	0.1	0.3	0.2	0.0	0.0	2.2	0.0	0.2	0.3	0.5	0.3
Washington	79,586	1.2	0.9	16.3	6.5	16.1	26.1	12.8	15.5	0.5	20.3	17.8
West Virginia	20,728	0.1	0.3	1.0	1.5	3.2	8.9	0.2	1.3	0.4	2.6	2.5
Wisconsin	68,208	0.0	0.4	0.1	0.1	0.1	1.8	0.1	0.1	0.0	9/ 0.1	0.1
Wyoming	6,129	0.0	0.5	0.0	1.1	1.2	2.6	0.0	0.0	0.2	0.0	0.0
Puerto Rico	59,563	0.0	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.1
Virgin Islands	1,671	0.2	3.3	7.2	1.7	1.8	7.8	2.0	8.2	2.7	8.0	7.4
Guam	4,021	0.2	1.6	2.8	0.8	0.9	5.1	1.1	3.5	0.6	2.9	2.8
American Samoa	1,736	-	---	---	---	---	---	---	---	---	---	---
Commonwealth of the Northern Marianas Islands	1,381	5.8	10.4	---	10/ 16.0	10/ 16.1	---	---	---	9.8	---	---

0.0 Quantity more than zero but less than 0.05.

---Data not available.

- Quantity zero.

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

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

3/ Indiana and New York State report tobacco use but do not report the average number of cigarettes smoked smoked per day in standard categories; data for New York City are reported in standard categories.
4/ Kansas does not report Rh sensitization.
5/ Texas does not report genital herpes and uterine bleeding.
6/ Nebraska and Texas do not report birth injury.
7/ New York city does not report assisted ventilation less than 30 minutes and assisted ventilation of 30 minutes or more.
8/ Texas does not report anesthetic complications and fetal distress.
9/ Wisconsin does not report fetal alcohol syndrome.
10/ The Commonwealth of the Northern Marianas reports tobacco and alcohol use, but does not report the average number of cigarettes smoked per day or the average number of drinks per day.

Table B. Births by State of Occurrence and Residence for Births Occurring in the 50 States and the District of Columbia, 1999

Area	Occurrence	Residence
United States	3,963,465	3,959,417
Alabama	61,337	62,122
Alaska	9,843	9,950
Arizona	81,208	81,145
Arkansas	35,629	36,729
California	519,102	518,508
Colorado	62,387	62,167
Connecticut	43,253	43,310
Delaware	11,306	10,676
District of Columbia	14,655	7,522
Florida	197,153	197,023
Georgia	127,581	126,717
Hawaii	17,096	17,038
Idaho	19,413	19,872
Illinois	179,094	182,068
Indiana	86,211	86,031
Iowa	37,701	37,558
Kansas	38,231	38,782
Kentucky	52,829	54,403
Louisiana	67,419	67,136
Maine	13,393	13,616
Maryland	67,605	71,967
Massachusetts	81,767	80,939
Michigan	132,307	133,607
Minnesota	65,787	65,970
Mississippi	41,747	42,684
Missouri	77,371	75,432
Montana	10,747	10,785
Nebraska	24,210	23,907
Nevada	28,892	29,362
New Hampshire	13,684	14,041
New Jersey	110,992	114,105
New Mexico	26,870	27,191
New York State only	133,425	136,273
New York City only	123,713	119,339
North Carolina	114,885	113,795
North Dakota	8,879	7,639
Ohio	153,257	152,584
Oklahoma	47,908	49,010
Oregon	46,106	45,204
Pennsylvania	145,882	145,347
Rhode Island	13,223	12,366
South Carolina	52,594	54,948
South Dakota	10,673	10,524
Tennessee	82,963	77,803
Texas	352,970	349,245
Utah	47,261	46,290
Vermont	6,220	6,567
Virginia	93,293	95,469
Washington	79,062	79,586
West Virginia	21,376	20,728
Wisconsin	67,192	68,208
Wyoming	5,763	6,129
Occurrence in U.S. Territories or Foreign Countries	-	4,048
Puerto Rico	-	19
Virgin Islands	-	19
Guam	-	4
American Samoa	-	-
Northern Marianas	-	-
Canada	-	175
Cuba	-	-
Mexico	-	3,069
Remainder of world	-	762

- Quantity zero.

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

B	L(1- a=.95,*B*)	U(1- a =.95,*B*)	L(1- a =.96,*B*)	U(1- a =.96,*B*)
1	0.02532	5.57164	0.02020	5.83392
2	0.12110	3.61234	0.10735	3.75830
3	0.20622	2.92242	0.18907	3.02804
4	0.27247	2.56040	0.25406	2.64510
5	0.32470	2.33367	0.30591	2.40540
6	0.36698	2.17658	0.34819	2.23940
7	0.40205	2.06038	0.38344	2.11666
8	0.43173	1.97040	0.41339	2.02164
9	0.45726	1.89831	0.43923	1.94553
10	0.47954	1.83904	0.46183	1.88297
11	0.49920	1.78928	0.48182	1.83047
12	0.51671	1.74680	0.49966	1.78566
13	0.53246	1.71003	0.51571	1.74688
14	0.54671	1.67783	0.53027	1.71292
15	0.55969	1.64935	0.54354	1.68289
16	0.57159	1.62394	0.55571	1.65610
17	0.58254	1.60110	0.56692	1.63203
18	0.59266	1.58043	0.57730	1.61024
19	0.60207	1.56162	0.58695	1.59042
20	0.61083	1.54442	0.59594	1.57230
21	0.61902	1.52861	0.60435	1.55563
22	0.62669	1.51401	0.61224	1.54026
23	0.63391	1.50049	0.61966	1.52602
24	0.64072	1.48792	0.62666	1.51278
25	0.64715	1.47620	0.63328	1.50043
26	0.65323	1.46523	0.63954	1.48888

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

B	L(1- a=.95,*B*)	U(1- a =.95,*B*)	L(1- a =.96,*B*)	U(1- a =.96,*B*)
27	0.65901	1.45495	0.64549	1.47805
28	0.66449	1.44528	0.65114	1.46787
29	0.66972	1.43617	0.65652	1.45827
30	0.67470	1.42756	0.66166	1.44922
31	0.67945	1.41942	0.66656	1.44064
32	0.68400	1.41170	0.67125	1.43252
33	0.68835	1.40437	0.67575	1.42480
34	0.69253	1.39740	0.68005	1.41746
35	0.69654	1.39076	0.68419	1.41047
36	0.70039	1.38442	0.68817	1.40380
37	0.70409	1.37837	0.69199	1.39743
38	0.70766	1.37258	0.69568	1.39134
39	0.71110	1.36703	0.69923	1.38550
40	0.71441	1.36172	0.70266	1.37991
41	0.71762	1.35661	0.70597	1.37454
42	0.72071	1.35171	0.70917	1.36938
43	0.72370	1.34699	0.71227	1.36442
44	0.72660	1.34245	0.71526	1.35964
45	0.72941	1.33808	0.71816	1.35504
46	0.73213	1.33386	0.72098	1.35060
47	0.73476	1.32979	0.72370	1.34632
48	0.73732	1.32585	0.72635	1.34218
49	0.73981	1.32205	0.72892	1.33818
50	0.74222	1.31838	0.73142	1.33431
51	0.74457	1.31482	0.73385	1.33057
52	0.74685	1.31137	0.73621	1.32694

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

B	L(1- a=.95,*B*)	U(1- a =.95,*B*)	L(1- a =.96,*B*)	U(1- a =.96,*B*)
53	0.74907	1.30802	0.73851	1.32342
54	0.75123	1.30478	0.74075	1.32002
55	0.75334	1.30164	0.74293	1.31671
56	0.75539	1.29858	0.74506	1.31349
57	0.75739	1.29562	0.74713	1.31037
58	0.75934	1.29273	0.74916	1.30734
59	0.76125	1.28993	0.75113	1.30439
60	0.76311	1.28720	0.75306	1.30152
61	0.76492	1.28454	0.75494	1.29873
62	0.76669	1.28195	0.75678	1.29601
63	0.76843	1.27943	0.75857	1.29336
64	0.77012	1.27698	0.76033	1.29077
65	0.77178	1.27458	0.76205	1.28826
66	0.77340	1.27225	0.76373	1.28580
67	0.77499	1.26996	0.76537	1.28340
68	0.77654	1.26774	0.76698	1.28106
69	0.77806	1.26556	0.76856	1.27877
70	0.77955	1.26344	0.77011	1.27654
71	0.78101	1.26136	0.77162	1.27436
72	0.78244	1.25933	0.77310	1.27223
73	0.78384	1.25735	0.77456	1.27014
74	0.78522	1.25541	0.77598	1.26810
75	0.78656	1.25351	0.77738	1.26610
76	0.78789	1.25165	0.77876	1.26415
77	0.78918	1.24983	0.78010	1.26223
78	0.79046	1.24805	0.78143	1.26036

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

B	L(1- a=.95,*B*)	U(1- a =.95,*B*)	L(1- a =.96,*B*)	U(1- a =.96,*B*)
79	0.79171	1.24630	0.78272	1.25852
80	0.79294	1.24459	0.78400	1.25672
81	0.79414	1.24291	0.78525	1.25496
82	0.79533	1.24126	0.78648	1.25323
83	0.79649	1.23965	0.78769	1.25153
84	0.79764	1.23807	0.78888	1.24987
85	0.79876	1.23652	0.79005	1.24824
86	0.79987	1.23499	0.79120	1.24664
87	0.80096	1.23350	0.79233	1.24507
88	0.80203	1.23203	0.79344	1.24352
89	0.80308	1.23059	0.79453	1.24201
90	0.80412	1.22917	0.79561	1.24052
91	0.80514	1.22778	0.79667	1.23906
92	0.80614	1.22641	0.79771	1.23762
93	0.80713	1.22507	0.79874	1.23621
94	0.80810	1.22375	0.79975	1.23482
95	0.80906	1.22245	0.80074	1.23345
96	0.81000	1.22117	0.80172	1.23211
97	0.81093	1.21992	0.80269	1.23079
98	0.81185	1.21868	0.80364	1.22949
99	0.81275	1.21746	0.80458	1.22822

Table D. Sources for resident population and population including Armed Forces abroad: Birth- and death-registration States, 1900-1932, and United States, 1900-1999.

Year	Source
1999----------	U.S. Bureau of the Census, United States population estimates, by age, sex, race, and Hispanic origin: 1990 to 1999. Washington: U.S. Bureau of the Census. Internet release, Jan. 2, 2001. Http://www.census.gov/population/estimates/nation/intfile3-1.txt.
1998----------	U.S. Bureau of the Census, United States population estimates, by age, sex, race, and Hispanic origin: 1990 to 1998. Washington: U.S. Bureau of the Census. Internet release, June 4, 1999. Http://www.census.gov/population/www/estimates/uspop.html.
1997----------	U.S. Bureau of the Census, United States population estimates, by age, sex, race, and Hispanic origin: 1990 to 1997. PPL-91R. Rounded populations consistent with U.S. Bureau of the Census file NESTV97. Washington:U.S. Department of Commerce. 1998.
1996----------	U.S. Bureau of the Census, United States population estimates, by age, sex, race, and Hispanic origin: 1990 to 1996. PPL-57. Washington:U.S. Department of Commerce. 1997.
1995----------	U.S. Bureau of the Census, United States population estimates, by age, sex, race, and Hispanic origin: 1990 to 1995. Census file RESD0795, PPL-41. Washington:U.S. Department of Commerce. 1996.
1994----------	U.S. Bureau of the Census, United States population estimates, by age, sex, race, and Hispanic origin: 1990 to 1994. PPL-21. Washington:U.S. Department of Commerce. 1995.
1993----------	U.S. Bureau of the Census, United States population estimates, by age, sex, race, and Hispanic origin: 1993. Census file RESO793. Washington:U.S. Department of Commerce. 1995.
1992----------	U.S. Bureau of the Census, United States population estimates, by age, sex, race, and Hispanic origin: 1992. Census file RESPO792. Washington:U.S. Department of Commerce. 1994.
1991----------	U.S. Bureau of the Census, Unpublished data consistant with Current Population Reports, Series P-25, No. 1095, Feb. 1993.
1990----------	U.S. Bureau of the Census, Unpublished data from the 1990 census. 1990 CPH-L-74 and unpublished data consistent with Current Population Reports, Series P-25, No. 1095, Feb. 1993.
1989----------	U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 1057, Mar. 1990.
1988----------	U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 1045, Jan. 1990.
1986-87-------	U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 1022, Mar. 1988.
1985----------	U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 1000, Feb. 1987.
1984----------	U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 985, Apr. 1986.
1983----------	U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 965, Mar. 1985.
1982----------	U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 949, May 1984.
1981----------	U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 929, May 1983.
1980----------	U.S. Bureau of the Census, U.S. Census of Population: 1980, Number of Inhabitants, PC80-1-A1, United States Summary, 1983.
1971-79-------	U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 917, July 1982.
1970----------	U.S. Bureau of the Census, U.S. Census of Population: 1970, Number of Inhabitants, Final Report PC(1)-A1, United States Summary, 1971.
1961-69-------	U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 519, April 1974.
1960----------	U.S. Bureau of the Census, U.S. Census of Population: 1960, Number of Inhabitants, PC(1)-A1, United States Summary, 1964.
1951-59-------	U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 310, June 30, 1965.
1940-50-------	U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 499, May 1973.
1930-39-------	U.S. Bureau of the Census, Current Population Reports, Series P-25, No. 499, May 1973, and National Office of Vital Statistics, Vital Statistics Rates in the United States, 1900-1940, 1947.
1920-29-------	National Office of Vital Statistics, Vital Statistics Rates in the United States, 1900-1940, 1947.
1917-19-------	Same as for 1930-39.
1900-1916-----	Same as for 1920-29.

Table E. Ratio of census-level resident population to resident population adjusted for estimated net census undercount by age, sex, and race: April 1, 1990

Age	Total			White			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	0.9815	0.9721	0.9906	0.9802	0.9728	0.9873	0.9432	0.9151	0.9699
10-14	0.9882	0.9891	0.9873	0.9830	0.9841	0.9818	0.9591	0.9586	0.9595
15-19	1.0166	1.0198	1.0133	1.0094	1.0128	1.0059	0.9988	1.0016	0.9959
20-24	1.0002	0.9987	1.0017	0.9975	0.9985	0.9966	0.9593	0.9432	0.9753
25-29	0.9591	0.9439	0.9748	0.9558	0.9441	0.9681	0.9123	0.8732	0.9510
30-34	0.9687	0.9487	0.9892	0.9669	0.9518	0.9828	0.9129	0.8599	0.9651
35-39	0.9790	0.9628	0.9954	0.9764	0.9643	0.9888	0.9303	0.8808	0.9778
40-44	0.9901	0.9758	1.0044	0.9875	0.9764	0.9988	0.9410	0.8943	0.9850
45-49	0.9775	0.9633	0.9916	0.9762	0.9648	0.9877	0.9302	0.8807	0.9762
50-54	...	0.9623	...	...	0.9651	...	...	0.8802	...
55 years and over	...	0.9758	...	...	0.9783	...	...	0.9294	...
15-44	...	...	0.9954	...	...	0.9890	...	...	0.9739
15-54	...	0.9710	...	...	0.9710	...	...	0.9046	...

... Category not applicable.

Table 4-1. Population of Birth- and Death-Registration States, 1900-1932, and United States, 1900-1999

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

Year	United States/1		Year	United States/1		Birth-registration States		Death-registration States	
	Population including Armed Forces abroad	Population residing in area		Population including Armed Forces abroad	Population residing in area	Number of States/2	Population residing in area	Number of States/2	Population residing in area
1999	272,945,300	272,690,813	1949	149,188,000	148,665,000	. . .	. . .	. . .	. . .
1998	270,509,187	270,298,524	1948	146,631,000	146,093,000	. . .	. . .	. . .	. . .
1997	267,901,000	267,636,061	1947	144,126,000	143,446,000	. . .	. . .	. . .	. . .
1996	265,556,890	265,283,783	1946	141,389,000	140,054,000	. . .	. . .	. . .	. . .
1995	263,033,968	262,755,270	1945	139,928,000	132,481,000	. . .	. . .	. . .	. . .
1994	260,650,690	260,340,990	1944	138,397,000	132,885,000	. . .	. . .	. . .	. . .
1993	258,119,768	257,783,004	1943	136,739,000	134,245,000	. . .	. . .	. . .	. . .
1992	255,457,501	255,077,536	1942	134,860,000	133,920,000	. . .	. . .	. . .	. . .
1991	252,688,000	252,177,000	1941	133,402,000	133,121,000	. . .	. . .	. . .	. . .
1990	249,225,000	248,709,873	1940	131,820,000	131,669,275	. . .	. . .	. . .	. . .
1989	247,342,000	246,819,000	1939	131,028,000	130,879,718	. . .	. . .	. . .	. . .
1988	245,021,000	244,499,000	1938	129,969,000	129,824,939	. . .	. . .	. . .	. . .
1987	242,804,000	242,289,000	1937	128,961,000	128,824,829	. . .	. . .	. . .	. . .
1986	240,651,000	240,133,000	1936	128,181,000	128,053,180	. . .	. . .	. . .	. . .
1985	238,466,000	237,924,000	1935	127,362,000	127,250,232	. . .	. . .	. . .	. . .
1984	236,348,000	235,825,000	1934	126,485,000	126,373,773	. . .	. . .	. . .	. . .
1983	234,307,000	233,792,000	1933	125,690,000	125,578,763	. . .	. . .	. . .	. . .
1982	232,188,000	231,664,000	1932	124,949,000	124,840,471	47	118,903,899	47	118,903,899
1981	229,966,000	229,466,000	1931	124,149,000	124,039,648	46	117,455,229	47	118,148,987
1980	227,061,000	226,545,805	1930	123,188,000	123,076,741	46	116,544,946	47	117,238,278
1979	225,055,000	224,567,000	1929	- - -	121,769,939	46	115,317,450	46	115,317,450
1978	222,585,000	222,095,000	1928	- - -	120,501,115	44	113,636,160	44	113,636,160
1977	220,239,000	219,760,000	1927	- - -	119,038,062	40	104,320,830	42	107,084,532
1976	218,035,000	217,563,000	1926	- - -	117,399,225	35	90,400,590	41	103,822,683
1975	215,973,000	215,465,000	1925	- - -	115,831,963	33	88,294,564	40	102,031,555
1974	213,854,000	213,342,000	1924	- - -	114,113,463	33	87,000,295	39	99,318,098
1973	211,909,000	211,357,000	1923	- - -	111,949,945	30	81,072,123	38	96,788,197
1972	209,896,000	209,284,000	1922	- - -	110,054,778	30	79,560,746	37	92,702,901
1971	207,661,000	206,827,000	1921	- - -	108,541,489	27	70,807,090	34	87,814,447
1970	204,270,000	203,211,926	1920	- - -	106,466,420	23	63,597,307	34	86,079,263
1969	202,677,000	201,385,000	1919	105,063,000	104,512,110	22	61,212,076	33	83,157,982
1968	200,706,000	199,399,000	1918	104,550,000	103,202,801	20	55,153,782	30	79,008,412
1967	198,712,000	197,457,000	1917	103,414,000	103,265,913	20	55,197,952	27	70,234,775
1966	196,560,000	195,576,000	1916	- - -	101,965,984	11	32,944,013	26	66,971,177
1965	194,303,000	193,526,000	1915	- - -	100,549,013	10	31,096,697	24	61,894,847
1964	191,889,000	191,141,000	1914	- - -	99,117,567	. . .	. . .	24	60,963,309
1963	189,242,000	188,483,000	1913	- - -	97,226,814	. . .	. . .	23	58,156,740
1962	186,538,000	185,771,000	1912	- - -	95,331,300	. . .	. . .	22	54,847,700
1961	183,691,000	182,992,000	1911	- - -	93,867,814	. . .	. . .	22	53,929,644
1960	179,933,000	179,323,175	1910	- - -	92,406,536	. . .	. . .	20	47,470,437
1959	177,264,000	176,513,000	1909	- - -	90,491,525	. . .	. . .	18	44,223,513
1958	174,141,000	173,320,000	1908	- - -	88,708,976	. . .	. . .	17	38,634,759
1957	171,274,000	170,371,000	1907	- - -	87,000,271	. . .	. . .	15	34,552,837
1956	168,221,000	167,306,000	1906	- - -	85,436,556	. . .	. . .	15	33,782,288
1955	165,275,000	164,308,000	1905	- - -	83,819,666	. . .	. . .	10	21,767,980
1954	162,391,000	161,164,000	1904	- - -	82,164,974	. . .	. . .	10	21,332,076
1953	159,565,000	158,242,000	1903	- - -	80,632,152	. . .	. . .	10	20,943,222
1952	156,954,000	155,687,000	1902	- - -	79,160,196	. . .	. . .	10	20,582,907
1951	154,287,000	153,310,000	1901	- - -	77,585,128	. . .	. . .	10	20,237,453
1950	151,132,000	150,697,361	1900	- - -	76,094,134	. . .	. . .	10	19,965,446

. . . Category not applicable.

- - - Data not available.

1/Alaska included beginning 1959 and Hawaii, 1960.

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

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

Table 4-2. Estimated Population of the United States, by Age, Race, and Sex: July 1, 1999

[Figures include Armed Forces stationed in the United States but exclude those stationed outside the United States.]

Age	All races			White			Black			American Indian			Asian and Pacific Islander		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	272,690,813	133,276,559	139,414,254	224,610,797	110,336,291	114,274,506	34,862,169	16,557,186	18,304,983	2,397,426	1,186,745	1,210,681	10,820,421	5,196,337	5,624,084
Under 1	3,819,903	1,952,133	1,867,770	3,027,180	1,549,389	1,477,791	568,772	289,078	279,694	42,542	21,442	21,100	181,409	92,224	89,185
1-4 years	15,122,239	7,730,542	7,391,697	12,015,456	6,155,680	5,859,776	2,226,888	1,129,687	1,097,201	159,576	80,755	78,821	720,319	364,420	355,899
5-9 years	19,946,746	10,207,957	9,738,789	15,706,268	8,047,451	7,658,817	3,145,614	1,597,522	1,548,092	219,430	111,364	108,066	875,434	451,620	423,814
10-14 years	19,548,484	10,011,707	9,536,777	15,388,526	7,892,905	7,495,621	3,087,258	1,569,095	1,518,163	248,536	126,289	122,247	824,164	423,418	400,746
15-19 years	19,747,923	10,150,997	9,596,926	15,647,637	8,069,271	7,578,366	3,043,767	1,548,256	1,495,511	234,657	117,925	116,732	821,862	415,545	406,317
15-17 years	11,762,063	6,058,282	5,703,781	9,304,359	4,803,475	4,500,884	1,807,421	924,663	882,758	145,820	73,686	72,134	504,463	256,458	248,005
18-19 years	7,985,860	4,092,715	3,893,145	6,343,278	3,265,796	3,077,482	1,236,346	623,593	612,753	88,837	44,239	44,598	317,399	159,087	158,312
20-24 years	18,025,589	9,183,052	8,842,537	14,367,068	7,371,872	6,995,196	2,696,655	1,333,366	1,363,289	194,322	97,858	96,464	767,544	379,956	387,588
25-29 years	18,209,100	9,055,292	9,153,808	14,504,772	7,289,220	7,215,552	2,611,248	1,248,879	1,362,369	193,241	99,069	94,172	899,839	418,124	481,715
30-34 years	19,726,712	9,770,996	9,955,716	15,926,621	7,984,101	7,942,520	2,675,415	1,256,405	1,419,010	180,806	92,200	88,606	943,870	438,290	505,580
35-39 years	22,544,607	11,215,732	11,328,875	18,503,500	9,302,148	9,201,352	2,901,808	1,364,864	1,536,944	185,829	93,253	92,576	953,470	455,467	498,003
40-44 years	22,268,042	11,038,584	11,229,458	18,443,045	9,238,092	9,204,953	2,750,550	1,288,831	1,461,719	172,940	84,866	88,074	901,507	426,795	474,712
45-49 years	19,356,220	9,500,663	9,855,557	16,205,941	8,047,476	8,158,465	2,239,697	1,025,799	1,213,898	143,280	69,542	73,738	767,302	357,846	409,456
50-54 years	16,446,138	7,998,425	8,447,713	14,043,588	6,906,744	7,136,844	1,688,828	757,911	930,917	112,728	54,150	58,578	600,994	279,620	321,374
55-59 years	12,875,299	6,182,625	6,692,674	11,077,469	5,379,073	5,698,396	1,289,244	564,183	725,061	83,514	39,471	44,043	425,072	199,898	225,174
60-64 years	10,513,786	4,967,782	5,546,004	9,056,192	4,331,042	4,725,150	1,055,855	450,465	605,390	64,599	30,129	34,470	337,140	156,146	180,994
65-69 years	9,447,220	4,336,705	5,110,515	8,188,753	3,797,077	4,391,676	935,175	400,069	535,106	50,054	22,580	27,474	273,238	116,979	156,259
70-74 years	8,771,028	3,861,991	4,909,037	7,769,876	3,446,700	4,323,176	743,318	307,454	435,864	40,457	18,176	22,281	217,377	89,661	127,716
75-79 years	7,329,496	3,057,003	4,272,493	6,584,585	2,759,812	3,824,773	557,747	217,526	340,221	31,397	13,468	17,929	155,767	66,197	89,570
80-84 years	4,817,199	1,814,131	3,003,068	4,381,055	1,654,360	2,726,695	331,333	115,771	215,562	19,137	7,744	11,393	85,674	36,256	49,418
85 years +	4,175,082	1,240,242	2,934,840	3,773,265	1,113,878	2,659,387	312,997	92,025	220,972	20,381	6,464	13,917	68,439	27,875	40,564

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

Table 4-3. Estimated Total Population and Female Population Aged 15-44 Years: United States, Each Division and State, Puerto Rico, Virgin Islands, Guam, American Samoa, and Northern Marianas: July 1, 1999

Division and State	Total	Female 15-44 years
United States	272,690,813	60,107,320
New England	13,495,933	2,985,434
Maine	1,253,040	275,886
New Hampshire	1,201,134	276,157
Vermont	593,740	133,527
Massachusetts	6,175,169	1,383,500
Rhode Island	990,819	216,350
Connecticut	3,282,031	700,014
Middle Atlantic	38,334,029	8,324,400
New York	18,196,601	4,021,959
New Jersey	8,143,412	1,768,142
Pennsylvania	11,994,016	2,534,299
East North Central	44,442,146	9,830,575
Ohio	11,256,654	2,485,661
Indiana	5,942,901	1,318,926
Illinois	12,128,370	2,675,538
Michigan	9,863,775	2,201,144
Wisconsin	5,250,446	1,149,306
West North Central	18,800,138	4,077,775
Minnesota	4,775,508	1,054,543
Iowa	2,869,413	603,102
Missouri	5,468,338	1,197,857
North Dakota	633,666	133,290
South Dakota	733,133	155,395
Nebraska	1,666,028	358,971
Kansas	2,654,052	574,617
South Atlantic	49,560,021	10,906,909
Delaware	753,538	173,146
Maryland	5,171,634	1,191,034
District of Columbia	519,000	125,336
Virginia	6,872,912	1,601,592
West Virginia	1,806,928	379,123
North Carolina	7,650,789	1,684,358
South Carolina	3,885,736	884,147
Georgia	7,788,240	1,841,921
Florida	15,111,244	3,026,252
East South Central	16,582,841	3,720,245
Kentucky	3,960,825	884,631
Tennessee	5,483,535	1,225,260
Alabama	4,369,862	981,570
Mississippi	2,768,619	628,784
West South Central	30,325,593	6,744,879
Arkansas	2,551,373	542,905
Louisiana	4,372,035	991,196
Oklahoma	3,358,044	711,212
Texas	20,044,141	4,499,566
Mountain	17,127,479	3,693,701
Montana	882,779	180,369
Idaho	1,251,700	271,323
Wyoming	479,602	100,851
Colorado	4,056,133	891,205
New Mexico	1,739,844	376,584
Arizona	4,778,332	1,001,135
Utah	2,129,836	497,103
Nevada	1,809,253	375,131
Pacific	44,022,633	9,823,402
Washington	5,756,361	1,281,159
Oregon	3,316,154	697,905
California	33,145,121	7,462,555
Alaska	619,500	133,877
Hawaii	1,185,497	247,906
Puerto Rico	3,889,507	911,825
Virgin Islands	119,615	25,990
Guam	151,968	31,111
American Samoa	63,781	13,873
Northern Marianas	69,216	23,435

Table 4-4. Estimated Total Population and Female Population Aged 15-44 Years: United States, Each Division, State, and Territory: July 1, 1999

[Figures include Armed Forces stationed in each area and exclude those stationed outside the United States.]

Area	Total	Female 15-44 years	Area	Total	Female 15-44 years
United States	272,690,813	60,107,320			
			South Atlantic	49,560,021	10,906,909
Geographic divisions:			Delaware	753,538	173,146
			Maryland	5,171,634	1,191,034
New England	13,495,933	2,985,434	District of Columbia	519,000	125,336
Middle Atlantic	38,334,029	8,324,400	Virginia	6,872,912	1,601,592
East North Central	44,442,146	9,830,575	West Virginia	1,806,928	379,123
West North Central	18,800,138	4,077,775	North Carolina	7,650,789	1,684,358
South Atlantic	49,560,021	10,906,909	South Carolina	3,885,736	884,147
East South Central	16,582,841	3,720,245	Georgia	7,788,240	1,841,921
West South Central	30,325,593	6,744,879	Florida	15,111,244	3,026,252
Mountain	17,127,479	3,693,701			
Pacific	44,022,633	9,823,402	East South Central	16,582,841	3,720,245
			Kentucky	3,960,825	884,631
New England	13,495,933	2,985,434	Tennessee	5,483,535	1,225,260
Maine	1,253,040	275,886	Alabama	4,369,862	981,570
New Hampshire	1,201,134	276,157	Mississippi	2,768,619	628,784
Vermont	593,740	133,527			
Massachusetts	6,175,169	1,383,500	West South Central	30,325,593	6,744,879
Rhode Island	990,819	216,350	Arkansas	2,551,373	542,905
Connecticut	3,282,031	700,014	Louisiana	4,372,035	991,196
			Oklahoma	3,358,044	711,212
Middle Atlantic	38,334,029	8,324,400	Texas	20,044,141	4,499,566
New York	18,196,601	4,021,959			
New Jersey	8,143,412	1,768,142	Mountain	17,127,479	3,693,701
Pennsylvania	11,994,016	2,534,299	Montana	882,779	180,369
			Idaho	1,251,700	271,323
East North Central	44,442,146	9,830,575	Wyoming	479,602	100,851
Ohio	11,256,654	2,485,661	Colorado	4,056,133	891,205
Indiana	5,942,901	1,318,926	New Mexico	1,739,844	376,584
Illinois	12,128,370	2,675,538	Arizona	4,778,332	1,001,135
Michigan	9,863,775	2,201,144	Utah	2,129,836	497,103
Wisconsin	5,250,446	1,149,306	Nevada	1,809,253	375,131
West North Central	18,800,138	4,077,775	Pacific	44,022,633	9,823,402
Minnesota	4,775,508	1,054,543	Washington	5,756,361	1,281,159
Iowa	2,869,413	603,102	Oregon	3,316,154	697,905
Missouri	5,468,338	1,197,857	California	33,145,121	7,462,555
North Dakota	633,666	133,290	Alaska	619,500	133,877
South Dakota	733,133	155,395	Hawaii	1,185,497	247,906
Nebraska	1,666,028	358,971			
Kansas	2,654,052	574,617	Territories		
			Puerto Rico	3,889,507	911,825
			Virgin Islands	119,615	25,990
			Guam	151,968	31,111
			American Samoa	63,781	13,873
			Northern Marianas	69,216	23,435

Source: Published and unpublished data from the Bureau of the Census; see text.

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Deaths: Final Data for 1999 (Technical Notes and References)

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DEPARTMENT OF HEALTH AND HUMAN SERVICES • CENTERS FOR DISEASE CONTROL AND PREVENTION
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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. The U.S. Standard Certificate of Death—which is used as a model by the States—was last revised in 1989; for additional details see the 1989 revision of the U.S. standard certificates and reports (21) and Technical Appendix of *Vital Statistics of the United States, 1989*, Volume II, Mortality, part A (22). 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 1999 all the States and the District of Columbia participated in this program and submitted part or all of the mortality data for 1999 in electronic data files to NCHS. All States provided precoded medical (cause-of-death) data to NCHS except Arizona, Illinois, Kentucky, Missouri, New Jersey, Ohio, and West Virginia, New York City, and the District of Columbia. For 1999 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 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. Effective with deaths occurring in 1999, the United States began using the Tenth Revision of this classification, (ICD–10) (6); during the period 1979–98, causes were coded and classified according to the Ninth Revision (ICD–9) (8). For earlier years causes of death were classified according to the revisions then in use—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. Discontinuities between the Ninth and Tenth Revisions of the ICD for selected causes of death are measured using comparability ratios from a comparability study described in the section *Comparability between ICD–9 and ICD–10 for mortality*. Comparability ratios 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 (23–25).

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* (26–28). It includes rules for selecting the underlying cause of death for tabulation purposes, definitions, tabulation lists, and regulations on the use of the Classification.

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) (29), 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) (30,31), 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 International Classification of Diseases (ICD) code structure. 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 1999 approximately 39 percent of the Nation's death records were multiple-cause coded using SuperMICAR, and 61 percent using MICAR only. This represents data from 27 States that were coded by SuperMICAR and data from 23 States, the District of Columbia, and New York City that were coded by MICAR.

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 morbid events leading directly to death, or the circumstances of the accident or violence which produced the fatal injury" (6). 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 (32–34).

Tabulation lists and cause-of-death ranking

Tabulation lists for ICD–10 were developed to maximize continuity with ICD–9. This continuity is especially useful in trend analysis and in identifying causes of death that are of public health and

medical importance. The lists are published in the NCHS Instruction Manual, Part 9, ICD–10 Cause-of-Death Lists for Tabulating Mortality Statistics, Effective 1999 (35). 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.

Cause-of-death titles in ICD–10 differ in some cases from those in ICD–9. A comparison of cause-of-death titles for the 15 leading causes of death between ICD–9 and ICD–10 is shown in table I. For 7 of the 15 leading causes of death the titles between ICD–9 and ICD–10 are the same.

The 10 leading causes of infant death were affected by the introduction of ICD–10 as well. A comparison of cause-of-death titles for the 10 leading causes of infant death between ICD–9 and ICD–10 are shown in table II. For 4 of the 10 leading causes of infant death, the titles between ICD–9 and ICD–10 are the same.

The change in the tabulation lists and coding rules for selecting the underlying cause of death between ICD–9 and ICD–10 has implications for ranking leading causes of death (9). The top five causes of death and causes of infant death did not change in rank; however, changes in rank for causes ranked sixth and lower resulted from using ICD–10 instead of ICD–9.

Race and Hispanic origin

Race and Hispanic origin are reported separately on the death certificate. Therefore, data shown by race include persons of Hispanic or 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, American Indian, and Asian or Pacific Islander (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, American Indian, 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 on censuses, surveys, and birth certificates. Studies have shown underreporting on death certificates of American Indians, API, and Hispanic decedents; and undercounts of these groups in the censuses (14,36).

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 assure unbiased death rates by race.

Studies (36,37) 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 (5,14,38). 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; Asian or Pacific Islander, +10.7 (14).

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 Current Population Surveys conducted by the U.S. Bureau of the Census for the years 1979–85 (14). 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; the estimated net correction, taking into account both sources of bias, is 1.6 percent (14,38).

Other races and race not stated—Beginning in 1992 all records coded as "Other races" (0.02 percent of the total deaths in 1999) were assigned to the specified race of the previous record. Records for which race was unknown, not stated, or not classifiable (0.10 percent) were assigned the racial designation of the previous record.

Infant and maternal mortality rates—For 1989–99, 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 (39,40). 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

Table I. List of ICD–10 leading causes of death for 1999 and comparable ICD–9 causes of death

ICD–10	ICD–9
Diseases of heart (I00–I09,I11,I13,I20–I51)	Diseases of heart (390–398,402,404,410–429)
Malignant neoplasms (C00–C97)	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues (140–208)
Cerebrovascular diseases (I60–I69)	Cerebrovascular diseases (430–434,436–438)[1]
Chronic lower respiratory diseases (J40–J47)	Chronic obstructive pulmonary diseases and allied conditions (490–494,496)[1]
Accidents (unintentional injuries) (V01–X59,Y85–Y86)	Accidents (E800–E869,E880–E929)[1]
Diabetes mellitus (E10–E14)	Diabetes mellitus (250)
Influenza and pneumonia (J10–J18)	Pneumonia and influenza (480–487)
Alzheimer's disease (G30)	Alzheimer's disease (331.0)
Nephritis, nephrotic syndrome and nephrosis (N00–N07,N17–N19,N25–N27)	Nephritis, nephrotic syndrome and nephrosis (580–589)
Septicemia (A40–A41)	Septicemia (038)
Intentional self-harm (suicide) (X60–X84,Y87.0)	Suicide (E950–E959)
Chronic liver disease and cirrhosis (K70,K73–K74)	Chronic liver disease and cirrhosis (571)
Essential (primary) hypertension and hypertensive renal disease (I10,I12)	Hypertension with or without renal disease (401,403)
Assault (homicide) (X85–Y09,Y87.1)	Homicide (E960–E969)[1]
Aortic aneurysm and dissection (I71)	Aortic aneurysm (441)[2]

[1]ICD–9 codes do not match those of the ICD–9 List of 72 Selected Causes of Death; see Technical notes.
[2]Not a rankable cause in ICD–9; see Technical notes.

Table II. List of ICD–10 leading causes of infant death for 1999 and comparable ICD–9 causes of infant death

ICD–10	ICD–9
Congenital malformations, deformations, and chromosomal abnormalities (Q00–Q99)	Congenital anomalies (740–759)
Disorders related to short gestation and low birthweight, not elsewhere classified (P07)	Disorders relating to short gestation and unspecified low birthweight (765)
Sudden infant death syndrome (R95)	Sudden infant death syndrome (798.0)
Newborn affected by maternal complications of pregnancy (P01)	Newborn affected by maternal complications of pregnancy (761)
Respiratory distress of newborn (P22)	Respiratory distress syndrome (769)
Newborn affected by complications of placenta, cord and membranes (P02)	Newborn affected by complications of placenta, cord and membranes (762)
Accidents (unintentional injuries) (V01–X59)	Accidents (E800–E869,E880–E929)[1]
Bacterial sepsis of newborn (P36)	Other infection specific to the perinatal period (771.8)[2]
Diseases of the circulatory system (I00–I99)	Diseases of the circulatory system (390–434,436–459)[2]
Atelectasis (P28.0–P28.1)	Primary, other, and unspecified atelectasis (770.4–770.5)[2]

[1]ICD–9 codes do not match those of the ICD–9 List of 61 Selected Causes of Infant Death; see Technical notes.
[2]Not a rankable cause in ICD–9; see Technical notes.

parents. Rates for most other minority races also are higher when computed by race of mother (22,40).

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. The percent of infant deaths of unknown origin was 1.4 and the percent of live births to mothers of unknown origin was 1.2 for the United States for 1999.

Small numbers of infant deaths for specific Hispanic-origin groups result in infant mortality rates subject to relatively large random variation (see "Random variation"). Infant mortality rates by Hispanic origin are less subject to reporting error when based on linked files of infant deaths and live births (20).

Infant mortality rates calculated from the general mortality file for specified race and/or Hispanic origin are in error 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 (20). The linked file computes infant mortality rates using the race and/or Hispanic origin of the mother from the birth certificate in both the numerator and denominator of the rate. In addition, mother's race and/or Hispanic origin from the birth certificate is considered to be more accurately reported than infant's race and/or 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/or 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 (14,22).

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 (41). 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 (42) using a methodology similar to that of the decennial life tables (43). The advantages of the new over the previous methodology 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 (42). 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 (44).

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 (15,45).

Comparability between ICD–9 and ICD–10 for mortality

One of the efforts to maintain the tradition of progress in the classification of diseases has been the practice, begun in 1900, to revise about every 10–20 years what is now the International Classification of Diseases (ICD). Each of these revisions has produced some break in the comparability of cause-of-death statistics. ICD–10 has many changes from ICD–9, including considerably greater detail, shifts of inclusion terms and titles from one category, section, or chapter to another; regroupings of diseases; new titles and sections; and modifications in coding rules (6). As a result, serious breaks occur in comparability for a number of causes of death. Measures of this discontinuity are essential to the interpretation of mortality trends. Ratios of comparability between ICD–9 and ICD–10 have been computed for this purpose.

The method followed by the United States for constructing comparability ratios for mortality data is that recommended by the International Conference for the Sixth Revision of the International List of Diseases and Causes of Death, which convened in France in 1948. The Conference recommended that deaths for a country as a whole in 1949 or in 1950 be coded according to the Detailed List of Causes of Death of the Fifth Revision, and that dual tabulations of these data be published in such a way as to indicate the changes resulting from the application of the new revision. The dual coding method to measure discontinuities in mortality data resulting from the introduction of a new revision was used in this study between ICD–9 and ICD–10. This makes the fifth time since the recommendation of the International Conference for the Sixth Revision that the United States used this method (7).

Studies of the comparability between revisions of the ICD have been carried out and published at least since the Fifth Revision. Comparability studies—also called bridge-coding studies—involve dual classification of a single year of mortality data, that is, classifying the underlying cause of death on mortality records by the new revision and the previous revision. The key element of a comparability study is the comparability ratio, which is derived from the dual classification. It is calculated by dividing the number of deaths for a selected cause of death classified by the new revision by the number of deaths classified to the most nearly comparable cause of death by the previous revision. The resulting ratio represents the net effect of the new revision on statistics for this cause and can be used as a factor to adjust mortality statistics for causes of death classified by a previous revision to be comparable to those for the same cause classified by the new revision.

A comparability ratio of 1.00 indicates that the same number of deaths was assigned to a particular cause or combination of causes whether the Ninth or Tenth Revision was used. A ratio showing perfect correspondence (1.00) between the two revisions does not necessarily indicate that the cause was unaffected by changes in classification and coding procedures but merely that there was no net change.

A ratio of less than 1.00 results from a decrease in assignments of death to a cause in ICD–10 compared with ICD–9. A ratio of more than 1.00 results from an increase in assignments of deaths to a cause in ICD–10 compared with the comparable ICD–9 cause.

One of the major objectives of the comparability study was to furnish ratios that measure the degree of discontinuity between data tabulated by the cause lists published under ICD–10 and data tabulated by the most nearly comparable cause lists published under ICD–9.

Ratios are presented for the cause lists presented in this report. The list of selected causes for which final data are published has been expanded from the 72 causes plus HIV infection and Alzheimer's disease published under ICD–9, to 113 causes under ICD–10. The list of selected causes of infant death was expanded from 61 plus HIV disease to 130 causes. The lists are as follows:

ICD–10	ICD–9
1. List of 113 Selected Causes of Death	1. List of 72 Selected Causes of Death, HIV infection and Alzheimer's disease
2. List of 130 Selected Causes of Infant Death	2. List of 61 Selected Causes of Infant Death and HIV infection

The data used in the ICD–10 Comparability Study are cause-of-death information from a large sample of death certificates for deaths occurring in 1996 filed in the 50 States and the District of Columbia. Table III shows comparability ratios and their standard errors for the List of 113 Selected Causes of Death. Table IV shows the same information for the List of 130 Selected Causes of Infant Death. The cause-of-death information in the sample is based on death records in which the underlying cause of death is classified by ICD–9 and ICD–10. The sample comprises 1,852,651 (80 percent) out of the total 2,314,690 resident deaths that occurred in the United States during 1996. The sample is treated as if it were random. As a result, standard errors associated with comparability ratios are based on sampling and stochastic (random) variation (9). Most of the records in the study were processed using the NCHS automated systems for

Table III. Comparable category codes and estimated comparability ratios for 113 selected causes of death, injury by firearms, drug-induced deaths, and alcohol-induced deaths according to the Ninth and Tenth Revisions, *International Classification of Diseases*

Cause of death (Based on the *Tenth Revision, International Classification of Diseases*, 1992)	Category codes according to the Tenth Revision (ICD–10)	Category codes according to the Ninth Revision (ICD–9)	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95-percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Salmonella infections	A01–A02	002–003	30	37	0.8108	0.0644	7.9	0.6846	0.9370
Shigellosis and amebiasis	A03,A06	004,006	*	*	*	*	*	*	*
Certain other intestinal infections	A04,A07–A09	007–009	*	*	*	*	*	*	*
Tuberculosis	A16–A19	010–018	653	764	0.8547	0.0172	2.0	0.8209	0.8885
Respiratory tuberculosis	A16	010–012	518	572	0.9056	0.0201	2.2	0.8662	0.9450
Other tuberculosis	A17–A19	013–018	135	192	0.7031	0.0407	5.8	0.6233	0.7830
Whooping cough	A37	033	*	*	*	*	*	*	*
Scarlet fever and erysipelas	A38,A46	034.1–035	*	*	*	*	*	*	*
Meningococcal infection	A39	036	221	222	0.9955	0.0149	1.5	0.9663	1.0247
Septicemia	A40–A41	038	21,258	17,791	1.1949	0.0042	0.3	1.1867	1.2030
Syphilis	A50–A53	090–097	21	33	0.6364	0.1184	18.6	0.4043	0.8685
Acute poliomyelitis	A80	045	*	*	*	*	*	*	*
Arthropod-borne viral encephalitis	A83–A84,A85.2	062–064	*	*	*	*	*	*	*
Measles	B05	055	*	*	*	*	*	*	*
Viral hepatitis	B15–B19	070	1,123	1,346	0.8343	0.0120	1.4	0.8109	0.8578
Human immunodeficiency virus (HIV) disease	B20–B24	*042–*044	12,765	11,150	1.1448	0.0045	0.4	1.1360	1.1536
Malaria	B50–B54	084	*	*	*	*	*	*	*
Other and unspecified infectious and parasitic diseases and their sequelae	A00,A05,A20–A36,A42–A44,A48–A49, A54–A79,A81–A82,A85.0–A85.1,A85.8 A86–B04,B06–B09,B25–B49,B55–B99	001,005,020–032,037,039–041,046–054, 056–061,065–066,071–083,085–088, 098–134,136–139,771.3	2,865	2,607	1.0990	0.0154	1.4	1.0688	1.1291
Malignant neoplasms	C00–C97	140–208	464,688	461,544	1.0068	0.0002	0.0	1.0064	1.0072
Malignant neoplasms of lip, oral cavity and pharynx	C00–C14	140–149	5,927	6,172	0.9603	0.0040	0.4	0.9525	0.9681
Malignant neoplasm of esophagus	C15	150	9,596	9,630	0.9965	0.0020	0.2	0.9926	1.0003
Malignant neoplasm of stomach	C16	151	11,480	11,408	1.0063	0.0019	0.2	1.0025	1.0101
Malignant neoplasms of colon, rectum and anus	C18–C21	153–154	48,583	48,619	0.9993	0.0009	0.1	0.9975	1.0010
Malignant neoplasms of liver and intrahepatic bile ducts	C22	155	9,732	10,102	0.9634	0.0023	0.2	0.9588	0.9679
Malignant neoplasm of pancreas	C25	157	24,313	24,361	0.9980	0.0009	0.1	0.9963	0.9997
Malignant neoplasm of larynx	C32	161	3,209	3,194	1.0047	0.0053	0.5	0.9943	1.0150
Malignant neoplasms of trachea, bronchus and lung	C33–C34	162	131,750	133,936	0.9837	0.0005	0.1	0.9827	0.9846
Malignant melanoma of skin	C43	172	5,941	6,139	0.9677	0.0032	0.3	0.9614	0.9741
Malignant neoplasm of breast	C50	174–175	38,102	37,891	1.0056	0.0010	0.1	1.0036	1.0075
Malignant neoplasm of cervix uteri	C53	180	3,753	3,802	0.9871	0.0034	0.3	0.9805	0.9938
Malignant neoplasms of corpus uteri and uterus, part unspecified	C54–C55	179,182	5,318	5,183	1.0260	0.0040	0.4	1.0182	1.0339
Malignant neoplasm of ovary	C56	183.0	11,292	11,344	0.9954	0.0016	0.2	0.9923	0.9985
Malignant neoplasm of prostate	C61	185	30,672	30,267	1.0134	0.0015	0.1	1.0105	1.0162
Malignant neoplasms of kidney and renal pelvis	C64–C65	189.0,189.1	9,521	9,521	1.0000	0.0022	0.2	0.9957	1.0043
Malignant neoplasm of bladder	C67	188	9,563	9,594	0.9968	0.0026	0.3	0.9916	1.0019
Malignant neoplasms of meninges, brain and other parts of central nervous system	C70–C72	191–192	10,039	10,359	0.9691	0.0025	0.3	0.9642	0.9740
Malignant neoplasms of lymphoid, hematopoietic and related tissue	C81–C96	200–208	44,715	44,530	1.0042	0.0012	0.1	1.0019	1.0064
Hodgkin's disease	C81	201	1,021	1,036	0.9855	0.0089	0.9	0.9680	1.0030
Non-Hodgkin's lymphoma	C82–C85	200,202	17,924	18,326	0.9781	0.0018	0.2	0.9745	0.9817
Leukemia	C91–C95	204–208	16,600	16,405	1.0119	0.0019	0.2	1.0083	1.0155

See footnotes at end of table.

Table III. Comparable category codes and estimated comparability ratios for 113 selected causes of death, injury by firearms, drug-induced deaths, and alcohol-induced deaths according to the Ninth and Tenth Revisions, *International Classification of Diseases*—Con.

Cause of death (Based on the *Tenth Revision, International Classification of Diseases*, 1992)	Category codes according to the Tenth Revision (ICD–10)	Category codes according to the Ninth Revision (ICD–9)	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95-percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Multiple myeloma and immunoproliferative neoplasms	C88,C90	203	9,099	8,763	1.0383	0.0030	0.3	1.0324	1.0443
Other and unspecified malignant neoplasms of lymphoid, hematopoietic and related tissue	C96	- - -	*	*	*	*	*	*	*
All other and unspecified malignant neoplasms	C17,C23–C24,C26–C31,C37–C41, C44–C49,C51–C52,C57–C60, C66,C68–C69,C73–C80,C97	152, 156,158–160,163–171,173,181, 183.2–184,186–187,189.2–190,193–199	51,182	45,492	1.1251	0.0021	0.2	1.1210	1.1292
In situ neoplasms, benign neoplasms and neoplasms of uncertain or unknown behavior	D00–D48	210–239	9,263	5,532	1.6744	0.0164	1.0	1.6422	1.7067
Anemias	D50–D64	280–285	3,059	3,200	0.9559	0.0077	0.8	0.9409	0.9710
Diabetes mellitus	E10–E14	250	48,636	48,242	1.0082	0.0011	0.1	1.0060	1.0103
Nutritional deficiencies	E40–E64	260–269	3,215	2,763	1.1636	0.0165	1.4	1.1312	1.1960
Malnutrition	E40–E46	260–263	2,607	2,665	0.9782	0.0151	1.5	0.9487	1.0078
Other nutritional deficiencies	E50–E64	264–269	608	98	6.2041	0.5961	9.6	5.0358	7.3724
Meningitis	G00,G03	320–322	592	584	1.0137	0.0136	1.3	0.9871	1.0403
Parkinson's disease	G20–G21	332	10,404	10,392	1.0012	0.0028	0.3	0.9956	1.0067
Alzheimer's disease	G30	331.0	29,707	19,121	1.5536	0.0071	0.5	1.5398	1.5675
Major cardiovascular diseases	I00–I78	390–434,436–448	796,919	798,435	0.9981	0.0002	0.0	0.9977	0.9985
Diseases of heart	I00–I09,I11,I13,I20–I51	390–398,402,404,410–429	615,564	624,405	0.9858	0.0002	0.0	0.9854	0.9863
Acute rheumatic fever and chronic rheumatic heart diseases	I00–I09	390–398	2,446	2,980	0.8208	0.0089	1.1	0.8034	0.8382
Hypertensive heart disease	I11	402	17,322	21,577	0.8028	0.0028	0.3	0.7973	0.8083
Hypertensive heart and renal disease	I13	404	2,170	2,027	1.0705	0.0160	1.5	1.0392	1.1019
Ischemic heart diseases	I20–I25	410–414,429.2	466,459	466,935	0.9990	0.0002	0.0	0.9985	0.9994
Acute myocardial infarction	I21–I22	410	178,125	180,169	0.9887	0.0003	0.0	0.9880	0.9893
Other acute ischemic heart diseases	I24	411	2,667	2,638	1.0110	0.0117	1.2	0.9880	1.0340
Other forms of chronic ischemic heart disease	I20,I25	412–414,429.2	285,667	284,128	1.0054	0.0004	0.0	1.0046	1.0062
Atherosclerotic cardiovascular disease, so described	I25.0	429.2	64,354	61,362	1.0488	0.0016	0.2	1.0456	1.0519
All other forms of chronic ischemic heart disease	I20,I25.1–I25.9	412–414	221,313	222,766	0.9935	0.0004	0.0	0.9927	0.9942
Other heart diseases	I26–I51	415–429.1,429.3–429.9	127,167	130,886	0.9716	0.0010	0.1	0.9696	0.9736
Acute and subacute endocarditis	I33	421	552	554	0.9964	0.0137	1.4	0.9695	1.0233
Diseases of pericardium and acute myocarditis	I30–I31,I40	420,422–423	489	475	1.0295	0.0160	1.6	0.9981	1.0608
Heart failure	I50	428	44,297	42,554	1.0410	0.0013	0.1	1.0384	1.0435
All other forms of heart disease	I26–I28,I34–I38,I42–I49,151	415–417,424–427,429.0–429.1,429.3–429.9	81,829	87,303	0.9373	0.0014	0.2	0.9345	0.9401
Essential (primary) hypertension and hypertensive renal disease	I10,I12	401,403	11,958	10,684	1.1192	0.0050	0.4	1.1094	1.1291
Cerebrovascular diseases	I60–I69	430–434,436–438	137,264	129,640	1.0588	0.0008	0.1	1.0572	1.0604
Atherosclerosis	I70	440	13,894	14,417	0.9637	0.0025	0.3	0.9588	0.9686
Other diseases of circulatory system	I71–I78	441–448	18,239	19,289	0.9456	0.0021	0.2	0.9414	0.9498
Aortic aneurysm and dissection	I71	441	12,216	12,201	1.0012	0.0010	0.1	0.9992	1.0032
Other diseases of arteries, arterioles and capillaries	I72–I78	442–448	6,023	7,088	0.8497	0.0053	0.6	0.8394	0.8601
Other disorders of circulatory system	I80–I99	451–459	2,984	2,899	1.0293	0.0172	1.7	0.9956	1.0631
Influenza and pneumonia	J10–J18	480–487	50,526	72,371	0.6982	0.0018	0.3	0.6947	0.7016
Influenza	J10–J11	487	572	567	1.0088	0.0073	0.7	0.9945	1.0231
Pneumonia	J12–J18	480–486	49,954	71,804	0.6957	0.0018	0.3	0.6922	0.6992
Other acute lower respiratory infections	J20–J22	466	346	355	0.9746	0.0392	4.0	0.8978	1.0515
Acute bronchitis and bronchiolitis	J20–J21	466	265	355	0.7465	0.0264	3.5	0.6947	0.7983

See footnotes at end of table.

Table III. Comparable category codes and estimated comparability ratios for 113 selected causes of death, injury by firearms, drug-induced deaths, and alcohol-induced deaths according to the Ninth and Tenth Revisions, *International Classification of Diseases*—Con.

Cause of death (Based on the *Tenth Revision, International Classification of Diseases*, 1992)	Category codes according to the Tenth Revision (ICD–10)	Category codes according to the Ninth Revision (ICD–9)	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95-percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Unspecified acute lower respiratory infection	J22	- - -	*	*	*	*	*	*	*
Chronic lower respiratory diseases	J40–J47	490–494,496	94,326	90,022	1.0478	0.0009	0.1	1.0460	1.0496
Bronchitis, chronic and unspecified	J40–J42	490–491	913	2,320	0.3935	0.0107	2.7	0.3726	0.4145
Emphysema	J43	492	14,369	14,774	0.9726	0.0031	0.3	0.9666	0.9786
Asthma	J45–J46	493	4,217	4,718	0.8938	0.0061	0.7	0.8819	0.9057
Other chronic lower respiratory diseases	J44,J47	494,496	74,827	68,210	1.0970	0.0014	0.1	1.0943	1.0998
Pneumoconioses and chemical effects	J60–J66,J68	500–506	860	845	1.0178	0.0099	1.0	0.9983	1.0372
Pneumonitis due to solids and liquids	J69	507	10,183	9,104	1.1185	0.0048	0.4	1.1092	1.1279
Other diseases of respiratory system	J00–J06,J30–J39,J67,J70–J98	034.0,460–465,470–478,495,508–519	16,656	14,269	1.1673	0.0052	0.4	1.1572	1.1774
Peptic ulcer	K25–K28	531–534	3,574	3,686	0.9696	0.0045	0.5	0.9608	0.9784
Diseases of appendix	K35–K38	540–543	209	202	1.0347	0.0242	2.3	0.9873	1.0820
Hernia	K40–K46	550–553	658	633	1.0395	0.0154	1.5	1.0094	1.0696
Chronic liver disease and cirrhosis	K70,K73–K74	571	21,688	20,920	1.0367	0.0027	0.3	1.0314	1.0420
Alcoholic liver disease	K70	571.0–571.3	10,147	9,965	1.0183	0.0050	0.5	1.0085	1.0281
Other chronic liver disease and cirrhosis	K73–K74	571.4–571.9	11,541	10,955	1.0535	0.0041	0.4	1.0454	1.0615
Cholelithiasis and other disorders of gallbladder	K80–K82	574–575	1,725	1,803	0.9567	0.0060	0.6	0.9450	0.9685
Nephritis, nephrotic syndrome and nephrosis	N00–N07,N17–N19,N25–N27	580–589	24,939	20,242	1.2320	0.0044	0.4	1.2234	1.2407
Acute and rapidly progressive nephritic and nephrotic syndrome	N00–N01,N04	580–581	161	249	0.6466	0.0342	5.3	0.5796	0.7136
Chronic glomerulonephritis, nephritis and nephropathy not specified as acute or chronic, and renal sclerosis unspecified	N02–N03,N05–N07,N26	582–583,587	468	1,213	0.3858	0.0144	3.7	0.3575	0.4141
Renal failure	N17–N19	584–586	24,290	18,758	1.2949	0.0050	0.4	1.2852	1.3047
Other disorders of kidney	N25,N27	588–589	20	22	0.9091	0.0867	9.5	0.7392	1.0790
Infections of kidney	N10–N12,N13.6,N15.1	590	731	726	1.0069	0.0144	1.4	0.9786	1.0352
Hyperplasia of prostate	N40	600	326	327	0.9969	0.0159	1.6	0.9658	1.0280
Inflammatory diseases of female pelvic organs	N70–N76	614–616	63	64	0.9844	0.0410	4.2	0.9040	1.0648
Pregnancy, childbirth and the puerperium	O00–099	630–676	*	*	*	*	*	*	*
Pregnancy with abortive outcome	O00–O07	630–639	*	*	*	*	*	*	*
Other complications of pregnancy, childbirth and the puerperium	O10–O99	640–676	*	*	*	*	*	*	*
Certain conditions originating in the perinatal period	P00–P96	760–771.2,771.4–779	10,184	9,555	1.0658	0.0033	0.3	1.0593	1.0724
Congenital malformations, deformations and chromosomal abnormalities	Q00–Q99	740–759	5,950	7,025	0.8470	0.0055	0.6	0.8362	0.8577
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	R00–R99	780–799	16,940	17,732	0.9553	0.0034	0.4	0.9487	0.9620
All other diseases (Residual)	Residual	Residual	109,853	122,107	0.8996	0.0015	0.2	0.8968	0.9025
Accidents (unintentional injuries)	V01–X59,Y85–Y86	E800–E869,E880–E929	31,084	30,163	1.0305	0.0014	0.1	1.0278	1.0333
Transport accidents	V01–V99,Y85	E800–E848,E929.0,E929.1	17,547	17,586	0.9978	0.0006	0.1	0.9966	0.9990
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	E810–E825	16,632	17,051	0.9754	0.0006	0.1	0.9742	0.9766

See footnotes at end of table.

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Cause of death (Based on the *Tenth Revision, International Classification of Diseases*, 1992)	Category codes according to the Tenth Revision (ICD–10)	Category codes according to the Ninth Revision (ICD–9)	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95-percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Other land 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,V87.8,V88.9,V89.1,V89.3, V89.9	E800–E807,E826–E829	*	*	*	*	*	*	*
Water, air and space, and other and unspecified transport accidents and their sequelae	V90–V99,Y85	E830–E848,E929.0,E929.1	351	347	1.0115	0.0209	2.1	0.9706	1.0525
Nontransport accidents	W00–X59,Y86	E850–E869,E880–E928,E929.2–E929.9	13,537	12,577	1.0763	0.0035	0.3	1.0696	1.0831
Falls	W00–W19	E880–E888	5,173	6,152	0.8409	0.0049	0.6	0.8313	0.8505
Accidental discharge of firearms	W32–W34	E922	493	466	1.0579	0.0127	1.2	1.0331	1.0828
Accidental drowning and submersion	W65–W74	E910	283	284	0.9965	0.0127	1.3	0.9716	1.0213
Accidental exposure to smoke, fire and flames	X00–X09	E890–E899	493	506	0.9743	0.0089	0.9	0.9568	0.9918
Accidental poisoning and exposure to noxious substance	X40–X49	E850–E869,E924.1	*	*	*	*	*	*	*
Other and unspecified nontransport accidents and their sequelae	W20–W31,W35–W64,W75–W99, X10–X39,X50–X59,Y86	E900–E909,E911–E921,E923–E924.0, E924.8–E928,E929.2–E929.9	6,698	4,721	1.4188	0.0123	0.9	1.3947	1.4428
Intentional self-harm (suicide)	X60–X84,Y87.0	E950–E959	18,352	18,422	0.9962	0.0005	0.0	0.9952	0.9972
Intentional self-harm (suicide) by discharge of firearms	X72–X74	E955.0–E955.4	14,157	14,183	0.9982	0.0007	0.1	0.9968	0.9996
Intentional self-harm (suicide) by other and unspecified means and their sequelae	X60–X71,X75–X84,Y87.0	E950–E954,E955.5–E959	4,195	4,239	0.9896	0.0023	0.2	0.9850	0.9942
Assault (homicide)	X85–Y09,Y87.1	E960–E969	12,287	12,308	0.9983	0.0006	0.1	0.9972	0.9994
Assault (homicide) by discharge of firearms	X93–X95	E965.0–E965.4	8,718	8,745	0.9969	0.0008	0.1	0.9953	0.9985
Assault (homicide) by other and unspecified means and their sequelae	X85–X92,X96–Y09,Y87.1	E960–E964,E965.5–E969	3,569	3,563	1.0017	0.0024	0.2	0.9969	1.0064
Legal intervention	Y35,Y89.0	E970–E978	*	*	*	*	*	*	*
Events of undetermined intent	Y10–Y34,Y87.2,Y89.9	E980–E989	*	*	*	*	*	*	*
Discharge of firearms, undetermined intent	Y22–Y24	E985.0–E985.4	*	*	*	*	*	*	*
Other and unspecified events of undetermined intent and their sequelae	Y10–Y21,Y25–Y34,Y87.2,Y89.9	E980–E984,E985.5–E989	*	*	*	*	*	*	*
Operations of war and their sequelae	Y36,Y89.1	E990–E999	*	*	*	*	*	*	*
Complications of medical and surgical care	Y40–Y84,Y88	E870–E879,E930–E949	*	*	*	*	*	*	*
Injury by firearms[1]	W32–W34,X72–X74,X93–X95, Y22–Y24,Y35.0	E922,E955.0–E955.4,E965.0–E965.4, E970,E985.0–E985.4	23,355	23,418	0.9973	0.0006	0.1	0.9961	0.9985
Drug-induced deaths[1]	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,X40–X44,X60–X64,X85, Y10–Y14	292,304,305.2–305.9,E850–E858, E950.0–E950.5,E962.0,E980.0–E980.5	1,158	969	1.1950	0.0225	1.9	1.1509	1.2391
Alcohol-induced deaths[1]	F10,G31.2,G62.1,I42.6,K29.2,K70, R78.0,X45,X65,Y15	291,303,305.0,357.5,425.5,535.3, 571.0–571.3,790.3,E860	14,783	15,269	0.9682	0.0025	0.3	0.9633	0.9731

* Figure does not meet standards of reliability or precision; see Technical notes.

- - - Category not applicable.

0.0 Quantity more than zero but less than 0.05.

[1]Included in selected categories.

Table IV. Comparable category codes and estimated comparability ratios for 130 selected causes of infant death according to the Ninth and Tenth Revisions, *International Classification of Diseases*

Cause of death (Based on the *Tenth Revision, International Classification of Diseases,* 1992)	Category codes according to the Tenth Revision (ICD–10)	Category codes according to the Ninth Revision (ICD–9)	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95-percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Certain infectious and parasitic diseases	A00–B99	001–033,034.1–134,136–139,771.3	284	387	0.7339	0.0339	4.6	0.6673	0.8004
Certain intestinal infectious diseases	A00–A08	001–008	*	*	*	*	*	*	*
Diarrhea and gastroenteritis of infectious origin	A09	009	0	144	0.0000	0.0000	0.0	0.0000	0.0000
Tuberculosis	A16–A19	010–018	*	*	*	*	*	*	*
Tetanus	A33,A35	037,771.3	*	*	*	*	*	*	*
Diptheria	A36	032	*	*	*	*	*	*	*
Whooping cough	A37	033	*	*	*	*	*	*	*
Meningococcal infection	A39	036	25	26	0.9615	0.0377	3.9	0.8876	1.0355
Septicemia	A40–A41	038	167	121	1.3802	0.0713	5.2	1.2403	1.5200
Congenital syphillis	A50	090	*	*	*	*	*	*	*
Gonococcal infection	A54	098	*	*	*	*	*	*	*
Viral diseases	A80–B34	042–079	62	62	1.0000	0.0757	7.6	0.8517	1.1483
Acute poliomyelitis	A80	045	*	*	*	*	*	*	*
Varicella (chickenpox)	B01	052	*	*	*	*	*	*	*
Measles	B05	055	*	*	*	*	*	*	*
Human immunodeficiency virus (HIV) disease	B20–B24	042–044	*	*	*	*	*	*	*
Mumps	B26	072	*	*	*	*	*	*	*
Other and unspecified viral diseases	A81–B00,B02–B04,B06–B19,B25, B27–B34	046–051,053–054,056–071,073–079	35	36	0.9722	0.1255	12.9	0.7262	1.2182
Candidiasis	B37	112	*	*	*	*	*	*	*
Malaria	B50–B54	084	*	*	*	*	*	*	*
Pneumocystosis	B59	136.3	*	*	*	*	*	*	*
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	020–031,034.1–035,039–041,080–083, 085–088,091–097,099–111,114–134, 136.0–136.2,136.4–139	*	*	*	*	*	*	*
Neoplasms	C00–D48	140–239	73	72	1.0139	0.0420	4.1	0.9317	1.0961
Malignant neoplasms	C00–C97	140–208	48	46	1.0435	0.0544	5.2	0.9369	1.1501
Hodgkin's disease and non-Hodgkin's lymphomas	C81–C85	200–202	*	*	*	*	*	*	*
Leukemia	C91–C95	204–208	*	*	*	*	*	*	*
Other and unspecified malignant neoplasms	C00–C80,C88–C90,C96–C97	140–199,203	30	28	1.0714	0.0906	8.5	0.8939	1.2489
In situ neoplasms, benign neoplasms and neoplasms of uncertain or unknown behavior	D00–D48	210–239	25	26	0.9615	0.1131	11.8	0.7398	1.1833
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism	D50–D89	135, 279–289	35	50	0.7000	0.0803	11.5	0.5427	0.8573
Anemias	D50–D64	280–285	*	*	*	*	*	*	*
Other diseases of blood and blood-forming organs	D65–D76	286–289	*	*	*	*	*	*	*
Certain disorders involving the immune mechanism	D80–D89	135,279	*	*	*	*	*	*	*
Endocrine, nutritional and metabolic diseases	E00–E88	240–278	112	129	0.8682	0.0555	6.4	0.7595	0.9770
Short stature, not elsewhere classified	E34.3	259.4	*	*	*	*	*	*	*
Malnutrition and other nutritional deficiencies	E40–E64	260–269	*	*	*	*	*	*	*
Cystic fibrosis	E84	277.0	*	*	*	*	*	*	*
Volume depletion, disorders of fluid, electrolyte and acid-base balance	E86–E87	276	40	53	0.7547	0.0852	11.3	0.5878	0.9217

See footnotes at end of table.

Table IV. Comparable category codes and estimated comparability ratios for 130 selected causes of infant death according to the Ninth and Tenth Revisions, *International Classification of Diseases*—Con.

Cause of death (Based on the *Tenth Revision, International Classification of Diseases,* 1992)	Category codes according to the Tenth Revision (ICD–10)	Category codes according to the Ninth Revision (ICD–9)	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95-percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
All other endocrine, nutritional and metabolic diseases	E00–E32,E34.0–E34.2,E34.4–E34.9, E65–E83,E85,E88	240–259.3,259.8–259.9,270–275, 277.1–278	64	55	1.1636	0.0809	6.9	1.0051	1.3221
Diseases of the nervous system	G00–G98	320–359,435	305	286	1.0664	0.0263	2.5	1.0149	1.1180
Meningitis	G00,G03	320–322	70	70	1.0000	0.0404	4.0	0.9208	1.0792
Infantile spinal muscular atrophy, type I (Werdnig-Hoffman)	G12.0	335.0	47	47	1.0000	0.0521	5.2	0.8978	1.1022
Infantile cerebral palsy	G80	343	*	*	*	*	*	*	*
Anoxic brain damage, not elsewhere classified	G93.1	348.1	29	30	0.9667	0.1269	13.1	0.7179	1.2155
Other diseases of nervous system	G04,G06–G11,G12.1–G12.9, G20–G72,G81–G92,G93.0, G93.2–G93.9,G95–G98	323–334,335.1–342,344–348.0, 348.2–359,435	145	126	1.1508	0.0532	4.6	1.0466	1.2550
Diseases of the ear and mastoid process	H60–H93	380–389	*	*	*	*	*	*	*
Diseases of the circulatory system	I00–I99	390–434,436–459	419	587	0.7138	0.0244	3.4	0.6659	0.7617
Pulmonary heart disease and diseases of pulmonary circulation	I26–I28	415–417	138	123	1.1220	0.0447	4.0	1.0342	1.2097
Pericarditis, endocarditis and myocarditis	I30,I33,I40	420–422	*	*	*	*	*	*	*
Cardiomyopathy	I42	425	82	84	0.9762	0.0166	1.7	0.9436	1.0088
Cardiac arrest	I46	427.5	25	87	0.2874	0.0508	17.7	0.1878	0.3869
Cerebrovascular diseases	I60–I69	430–434,436–438	77	163	0.4724	0.0510	10.8	0.3725	0.5723
All other diseases of circulatory system	I00–I25,I31,I34–I38,I44–I45, I47–I51,I70–I99	390–414,423–424,426–427.4, 427.6–429,440–459	88	123	0.7154	0.0519	7.3	0.6137	0.8172
Disease of the respiratory system	J00–J98	034.0,460–519	420	516	0.8140	0.0220	2.7	0.7709	0.8570
Acute upper respiratory infections	J00–J06	034.0,460–465	*	*	*	*	*	*	*
Influenza and pneumonia	J10–J18	480–487	231	303	0.7624	0.0261	3.4	0.7112	0.8135
Influenza	J10–J11	487	*	*	*	*	*	*	*
Pneumonia	J12–J18	480–486	224	295	0.7593	0.0266	3.5	0.7072	0.8114
Acute bronchitis and acute bronchiolitis	J20–J21	466	33	41	0.8049	0.0758	9.4	0.6563	0.9534
Bronchitis, chronic and unspecified	J40–J42	490–491	*	*	*	*	*	*	*
Asthma	J45–J46	493	*	*	*	*	*	*	*
Pneumonitis due to solids and liquids	J69	507	*	*	*	*	*	*	*
Other and unspecified diseases of respiratory system	J22,J30–J39,J43–J44,J47–J68,J70–J98	470–479,492,494–506,508–519	117	127	0.9213	0.0632	6.9	0.7973	1.0452
Diseases of the digestive system	K00–K92	520–579	278	167	1.6647	0.1084	6.5	1.4521	1.8772
Gastritis, duodenitis, and noninfective enteritis and colitis	K29,K50–K55	535, 555–558	137	47	2.9149	0.3879	13.3	2.1547	3.6751
Hernia of abdominal cavity and intestinal obstruction without hernia	K40–K46,K56	550–553,560	*	*	*	*	*	*	*
All other and unspecified diseases of digestive system	K00–K28,K30–K38,K57–K92	520–534,536–543,562–579	84	86	0.9767	0.0708	7.3	0.8379	1.1156
Diseases of the genitourinary system	N00–N98	580–629	117	117	1.0000	0.0567	5.7	0.8889	1.1111
Renal failure and other disorders of kidney	N17–N19,N25,N27	584–589	102	98	1.0408	0.0658	6.3	0.9118	1.1699
Other and unspecified diseases of genitourinary system	N00–N15,N20–N23,N26,N28–N98	580–583,590–629	*	*	*	*	*	*	*
Certain conditions originating in the perinatal period	P00–P96	760–771.2,771.4–779	10,047	9,495	1.0581	0.0032	0.3	1.0519	1.0643

See footnotes at end of table.

Table IV. Comparable category codes and estimated comparability ratios for 130 selected causes of infant death according to the Ninth and Tenth Revisions, *International Classification of Diseases*—Con.

Cause of death (Based on the *Tenth Revision, International Classification of Diseases,* 1992)	Category codes according to the Tenth Revision (ICD–10)	Category codes according to the Ninth Revision (ICD–9)	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95-percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Newborn affected by maternal factors and by complications of pregnancy, labor and delivery	P00–P04	760–763	1,305	1,256	1.0390	0.0099	1.0	1.0196	1.0585
Newborn affected by maternal hypertensive disorders	P00.0	760.0	23	22	1.0455	0.0465	4.4	0.9544	1.1365
Newborn affected by other maternal conditions which may be unrelated to present pregnancy	P00.1–P00.9	760.1–760.6,760.8–760.9	*	*	*	*	*	*	*
Newborn affected by maternal complications of pregnancy	P01	761	662	643	1.0295	0.0138	1.3	1.0024	1.0567
Newborn affected by incompetent cervix	P01.0	761.0	205	201	1.0199	0.0188	1.8	0.9831	1.0567
Newborn affected by premature rupture of membranes	P01.1	761.1	314	307	1.0228	0.0136	1.3	0.9962	1.0494
Newborn affected by multiple pregnancy	P01.5	761.5	104	103	1.0097	0.0507	5.0	0.9103	1.1091
Newborn affected by other maternal complications of pregnancy	P01.2–P01.4,P01.6–P01.9	761.2–761.4,761.6–761.9	39	32	1.2188	0.1655	13.6	0.8945	1.5430
Newborn affected by complications of placenta, cord and membranes	P02	762	579	553	1.0470	0.0128	1.2	1.0219	1.0721
Newborn affected by complications involving placenta	P02.0–P02.3	762.0–762.3	306	285	1.0737	0.0174	1.6	1.0395	1.1079
Newborn affected by complications involving cord	P02.4–P02.6	762.4–762.6	*	*	*	*	*	*	*
Newborn affected by chorioamnionitis	P02.7	762.7	258	255	1.0118	0.0163	1.6	0.9799	1.0436
Newborn affected by other and unspecified abnormalities of membranes	P02.8–P02.9	762.8–762.9	*	*	*	*	*	*	*
Newborn affected by other complications of labor and delivery	P03	763.0–763.4,763.6–763.9	37	20	1.8500	0.3262	17.6	1.2107	2.4893
Newborn affected by noxious influences transmitted via placenta or breast milk	P04	760.7, 763.5	*	*	*	*	*	*	*
Disorders related to length of gestation and fetal malnutrition	P05–P08	764–766	3,843	3,474	1.1062	0.0064	0.6	1.0936	1.1188
Slow fetal growth and fetal malnutrition	P05	764	34	30	1.1333	0.1004	8.9	0.9366	1.3301
Disorders related to short gestation and low birth weight, not elsewhere classified	P07	765	3,809	3,444	1.1060	0.0064	0.6	1.0934	1.1186
Extremely low birthweight or extreme immaturity	P07.0,P07.2	765.0	2,835	2,558	1.1083	0.0079	0.7	1.0927	1.1239
Other low birthweight or preterm	P07.1,P07.3	765.1	974	886	1.0993	0.0135	1.2	1.0729	1.1258
Disorders related to long gestation and high birthweight	P08	766	*	*	*	*	*	*	*
Birth trauma	P10–P15	767	5	113	0.0442	0.0197	44.5	0.0056	0.0829
Intrauterine hypoxia and birth asphyxia	P20–P21	768	401	277	1.4477	0.0599	4.1	1.3303	1.5650
Intrauterine hypoxia	P20	768.2–768.4	57	63	0.9048	0.1227	13.6	0.6643	1.1452
Birth asphyxia	P21	768.5–768.9	344	214	1.6075	0.0763	4.7	1.4579	1.7571
Respiratory distress of newborn	P22	769	917	894	1.0257	0.0131	1.3	1.0001	1.0513
Other respiratory conditions originating in the perinatal period	P23–P28	770	1,160	1,372	0.8455	0.0216	2.6	0.8032	0.8878
Congenital pneumonia	P23	770.0	57	15	3.8000	0.9004	23.7	2.0352	5.5648
Neonatal aspiration syndromes	P24	770.1	78	56	1.3929	0.1115	8.0	1.1743	1.6114
Interstitial emphysema and related conditions originating in the perinatal period	P25	770.2	146	121	1.2066	0.0595	4.9	1.0899	1.3233

See footnotes at end of table.

Table IV. Comparable category codes and estimated comparability ratios for 130 selected causes of infant death according to the Ninth and Tenth Revisions, *International Classification of Diseases*—Con.

Cause of death (Based on the *Tenth Revision, International Classification of Diseases,* 1992)	Category codes according to the Tenth Revision (ICD–10)	Category codes according to the Ninth Revision (ICD–9)	Number of deaths allocated according to		Estimated comparability ratio	Standard error	Relative standard error	95-percent confidence limits	
			Tenth Revision	Ninth Revision				Lower	Upper
Pulmonary hemorrhage originating in the perinatal period	P26	770.3	212	145	1.4621	0.0751	5.1	1.3150	1.6092
Chronic respiratory disease originating in the perinatal period	P27	770.7	243	214	1.1355	0.0327	2.9	1.0715	1.1995
Atelectasis	P28.0–P28.1	770.4–770.5	382	185	2.0649	0.1144	5.5	1.8406	2.2891
All other respiratory conditions originating in the perinatal period	P28.2–P28.9	770.6–770.8	42	636	0.0660	0.0101	15.2	0.0463	0.0858
Infections specific to the perinatal period	P35–P39	771.0–771.2,771.4–771.8	563	552	1.0199	0.0261	2.6	0.9688	1.0710
Bacterial sepsis of newborn	P36	771.8	470	514	0.9144	0.0272	3.0	0.8611	0.9677
Omphalitis of newborn with or without mild hemorrhage	P38	771.4	*	*	*	*	*	*	*
All other infections specific to the perinatal period	P35,P37,P39	771.0–771.2,771.5–771.7	93	38	2.4474	0.3705	15.1	1.7211	3.1736
Hemorrhagic and hematological disorders of newborn	P50–P61	772–774, 776	390	274	1.4234	0.0640	4.5	1.2979	1.5488
Neonatal hemorrhage	P50–P52,P54	772	319	222	1.4369	0.0698	4.9	1.3002	1.5737
Hemorrhagic disease of newborn	P53	776.0	*	*	*	*	*	*	*
Hemolytic disease of newborn due to isoimmunization and other perinatal jaundice	P55–P59	773–774	*	*	*	*	*	*	*
Hematological disorders	P60–P61	776.1–776.9	*	*	*	*	*	*	*
Syndrome of infant of a diabetic mother and neonatal diabetes mellitus	P70.0–P70.2	775.0–775.1	*	*	*	*	*	*	*
Necrotizing enterocolitis of newborn	P77	777.5	249	203	1.2266	0.0456	3.7	1.1371	1.3161
Hydrops fetalis not due to hemolytic disease	P83.2	778.0	120	120	1.0000	0.0264	2.6	0.9483	1.0517
Other perinatal conditions	P29,P70.3–P76,P78–P81,P83.0–P83.1 P83.3–P96	775.2–775.9,777.0–777.4,777.6–777.9, 778.1–779	1,092	954	1.1447	0.0192	1.7	1.1070	1.1823
Congenital malformations, deformations and chromosomal abnormalities	Q00–Q99	740–759	3,400	3,751	0.9064	0.0057	0.6	0.8953	0.9176
Anencephaly and similar malformations	Q00	740	299	299	1.0000	0.0000	0.0	1.0000	1.0000
Congenital hydrocephalus	Q03	742.3	62	91	0.6813	0.0552	8.1	0.5732	0.7895
Spina bifida	Q05	741	24	32	0.7500	0.0765	10.2	0.6000	0.9000
Other congenital malformations of nervous system	Q01–Q02,Q04,Q06–Q07	742.0–742.2,742.4–742.9	191	177	1.0791	0.0477	4.4	0.9856	1.1725
Congenital malformations of heart	Q20–Q24	745–746	1,022	1,027	0.9951	0.0081	0.8	0.9793	1.0109
Other congenital malformations of circulatory system	Q25–Q28	747	75	121	0.6198	0.0504	8.1	0.5210	0.7186
Congenital malformations of respiratory system	Q30–Q34	748	361	571	0.6322	0.0225	3.6	0.5882	0.6762
Congenital malformations of digestive system	Q35–Q45	749–751	*	*	*	*	*	*	*
Congenital malformations of genitourinary system	Q50–Q64	752–753	216	229	0.9432	0.0244	2.6	0.8955	0.9910
Congenital malformations and deformations of musculoskeletal system, limbs and integument	Q65–Q85	754–757	269	311	0.8650	0.0319	3.7	0.8024	0.9275
Down's syndrome	Q90	758.0	57	58	0.9828	0.0705	7.2	0.8446	1.1209
Edward's syndrome	Q91.0–Q91.3	758.2	277	278	0.9964	0.0080	0.8	0.9807	1.0121
Patau's syndrome	Q91.4–Q91.7	758.1	170	173	0.9827	0.0099	1.0	0.9632	1.0021
Other congenital malformations and deformations	Q10–Q18,Q86–Q89	743–744,759	304	312	0.9744	0.0210	2.2	0.9332	1.0155
Other chromosomal abnormalities, not elsewhere classified	Q92–Q99	758.3–758.9	57	53	1.0755	0.0783	7.3	0.9221	1.2289

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			Tenth Revision	Ninth Revision				Lower	Upper
Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	R00–R99	780–799	2,799	2,732	1.0245	0.0042	0.4	1.0163	1.0327
Sudden infant death syndrome	R95	798.0	2,575	2,485	1.0362	0.0040	0.4	1.0284	1.0440
Other symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified	R00–R53,R55–R594,R96–R99	780–796,798.1–799	224	247	0.9069	0.0270	3.0	0.8540	0.9598
All other diseases	F01–F99,H00–H57,L00–M99	290–319,360–379,680–739	*	*	*	*	*	*	*
External causes of mortality	V01–Y84	E800–E999	441	444	0.9932	0.0098	1.0	0.9741	1.0124
Accidents (unintentional injuries)	V01–X59	E800–E869,E880-E929	292	285	1.0246	0.0107	1.0	1.0037	1.0454
Transport accidents	V01–V99	E800–E848,E920–E929.1	99	108	0.9167	0.0294	3.2	0.8590	0.9743
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	E810–E825	95	98	0.9694	0.0176	1.8	0.9349	1.0039
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	E800–E807,E826–E848,E929.1	*	*	*	*	*	*	*
Falls	W00–W19	E880–E888	*	*	*	*	*	*	*
Accidental discharge of firearms	W32–W34	E922	*	*	*	*	*	*	*
Accidental drowning and submersion	W65–W74	E910	*	*	*	*	*	*	*
Accidental suffocation and strangulation in bed	W75	E913.0	*	*	*	*	*	*	*
Other accidental suffocation and strangulation	W76–W77,W81–W84	E913.1–E913.9	79	69	1.1449	0.0537	4.7	1.0396	1.2502
Accidental inhalation and ingestion of food or other objects causing obstruction of respiratory tract	W78–W80	E911–E912	32	29	1.1034	0.0810	7.3	0.9447	1.2622
Accidents caused by exposure to smoke, fire and flames	X00–X09	E890–E899	*	*	*	*	*	*	*
Accidental poisoning and exposure to noxious substances	X40–X49	E850–E869,E924.1	*	*	*	*	*	*	*
Other and unspecified accidents	W20–W31,W35–W64,W85–W99, X10–X39,X50–X59	E900–E909,E914–E921,E923–E924.0, E924.8–E929	*	*	*	*	*	*	*
Assault (homicide)	X85–Y09	E960–E968	146	154	0.9481	0.0179	1.9	0.9130	0.9831
Assault (homicide) by hanging, strangulation and suffocation	X91	E963	*	*	*	*	*	*	*
Assault (homicide) by discharge of firearms	X93–X95	E965.0–E965.4	*	*	*	*	*	*	*
Neglect, abandonment and other maltreatment syndromes	Y06–Y07	E967,E968.4	*	*	*	*	*	*	*
Assault (homicide) by other and unspecified means	X85–X90,X92,X96–X99,Y00–Y05, Y08–Y09	E960–E962,E964,E965.5–E966, E968.0–E968.3, E968.8–E968.9	91	88	1.0341	0.0417	4.0	0.9524	1.1158
Complications of medical and surgical care	Y40–Y84	E870–E879,E930–E949	*	*	*	*	*	*	*
Other external causes	X60–X84,Y10–Y36	E970–E979	*	*	*	*	*	*	*

* Figure does not meet standards of reliability or precision; see Technical notes.

0.0 Quantity more than zero but less than 0.05.

selecting the underlying cause of death. Records that could not be processed were rejected for manual coding. Since the rejects are not fully representative of the complete file, the comparability ratios in this report are biased to an unknown extent. For most categories the bias is believed to be small. Tables III and IV show comparability ratios only for causes of death for which the data were deemed reliable; data not deemed reliable were replaced with an asterisk (*).

For the 15 leading causes of death in 1999 according to ICD–10, table 8 presents death rates for 1999, death rates for 1998 for the most nearly comparable ICD–9 titles (tables I and II) multiplied by the comparability ratio (comparability-modified rates), and death rates for 1998 that are not comparability modified. Comparability-modified data for 1998 uses ICD–9 codes that approximate ICD–10 categories (table III).

Selected causes of death with problems of interpretation

Changes between the comparability-modified 1998 rates and the 1999 rates for selected causes should be interpreted with caution due to concerns with the accuracy of the comparability ratio if the ratio does not accurately account for difference in the coding and classification system, changes in death rates between 1998 and 1999 will be under or overstated. Although comparability-modified 1998 rates are presented in this report for only the 15 leading causes of death (table 8), the following paragraphs attempt to explain some of the issues in interpreting these data for selected causes in the List of 113 Selected Causes of Death and the List of 130 Selected Causes of Infant Death. For further explanation of these issues, refer to the report, *Comparability of Cause of Death Between ICD–9 and ICD–10: Preliminary Estimates (9)*.

Alzheimer's disease—The comparability ratio for Alzheimer's disease (ICD–10 code G30) is 1.5536 (table III), indicating a 55 percent increase in Alzheimer's disease deaths when classified by ICD–10. In absolute terms, more than 10,000 additional deaths were classified to Alzheimer's disease in ICD–10 than in ICD–9. Nearly all of this increase (about 95 percent) comes from deaths that were classified in ICD–9 as Presenile dementia (ICD–9 code 290.1).

The application of the comparability ratio presented for Alzheimer's disease to years later than 1996 may substantially underestimate the increase in Alzheimer's disease due to ICD–10. Increases in the reporting of Alzheimer's-type dementia have occurred since 1996, resulting in substantial increases in Presenile dementia from 1996 to 1998. The number of Alzheimer's disease deaths increased by about 1,000 deaths between 1996 and 1997; slowing to an increase of about 300 between 1997 and 1998. In contrast, the increase in Presenile dementia was more substantial, about 2,000 deaths each year. If the comparability ratio were based on 1998 data it would probably be at least 1.69 (approximating the ICD–10-classified Alzheimer's disease deaths by adding the Alzheimer's disease and Presenile dementia deaths). Assuming proportionately similar increases in the ICD–9 classification of Alzheimer's disease and Presenile dementia from 1998 to 1999, the comparability ratio based on 1999 data could be as high as 1.8 or 1.9 resulting in higher rates for Alzheimer's disease in 1998. As a consequence, the reported increase in mortality for Alzheimer's disease in table C is overstated considerably.

Nephritis, nephrotic syndrome and nephrosis and Renal failure—Nephritis, nephrotic syndrome and nephrosis (ICD–10 codes N00–N07,N17–N19,N25–N27) has a comparability ratio of 1.2320 (table III). The 23 percent increase in this category is due primarily to changes in the classification of Renal failure (ICD–10 codes N17–N19) that has a comparability ratio of 1.2949. End-stage renal disease, which was classified as an unspecified disorder of the kidney in ICD–9 (ICD–9 code 593.9) (grouped with All other diseases), has been reclassified in ICD–10 as End-stage renal disease (ICD–10 code N18.0), a subcategory of Renal failure (N17–N19). This results in adding a substantial number of deaths to the Renal failure and Nephritis, nephrotic syndrome and nephrosis categories.

When applied to years later than 1996, the comparability ratios for Nephritis, nephrotic syndrome and nephrosis and Renal failure presented in this report may underestimate the increase in these causes due to ICD–10. From 1996 to 1999 reporting of End-stage renal disease increased by about 1,900 deaths. This increase disproportionately affects the numerator of the comparability ratio since End-stage renal disease is included with Renal failure in ICD–10, but not in ICD–9. Thus, the numerator of the comparability ratio should probably be larger by roughly 1,900 deaths giving a comparability ratio about 1.4 for Renal failure and about 1.3 for Nephritis, nephrotic syndrome and nephrosis.

Pregnancy, childbirth and the puerperium—The large increase in the number of deaths attributable to Pregnancy, childbirth and the puerperium (ICD–10 codes O00-O99) is due to a selection rule change in ICD–10 (26). See section entitled *Maternal mortality*.

Motor vehicle accidents and Other land transport accidents—The preliminary comparability ratio for Motor vehicle accidents shown in table III (0.9754) is different from that shown in the report, *Comparability of Cause of Death Between ICD–9 and ICD–10: Preliminary Estimates* (9). For a death to be classified as a Motor vehicle accident in ICD–10, it must be explicit that the injury involved a "motor" vehicle. In ICD–9, in the absence of the term "motor" or when a vehicle accident was reported as occurring on a highway or road, the assumption was to classify the accident as involving a motor vehicle. ICD–10 does not allow this assumption and classifies such accidents as involving unspecified vehicles (categorized in ICD–10 as Other land transport accidents). However, for U.S. data, it has been decided that, if an accident occurred on a highway or road, classification to Motor vehicle accident is appropriate. This change is made in this report. Taking into account, this change in classification results in a revised comparability ratio for Motor vehicle accidents. This ratio is only applicable to data in which the aforementioned classification change was implemented. It is possible that some States may have released data that does not include this change.

Diarrhea and gastroenteritis of infectious origin—The apparent elimination of infant deaths due to Diarrhea and gastroenteritis of infectious origin (ICD–10 code A09) occurred because in ICD–10, for developed countries, diarrhea or gastroenteritis is presumed to be noninfectious unless specified otherwise. In ICD–9 the presumption was that the disease was infectious when unspecified. Records coded in ICD–9 to ICD–9 code 009.0 (Infectious colitis, enteritis, and gastroenteritis) are reclassified in ICD–10 to noninfectious causes.

Birth trauma—For newborns, cerebral hemorrhage either unspecified or due to birth injury, anoxia, or hypoxia was classified in ICD–9 to a birth injury or trauma (ICD–9 code 767.0, Subdural and cerebral hemorrhage). In ICD–10, for the cerebral hemorrhage to be classified as birth injury (ICD–10 code P10.0, Subdural hemorrhage due to birth injury), the certifier must specify that there was a birth injury. Cerebral hemorrhages either unspecified or due to anoxia or hypoxia are classified as nontraumatic. Nearly all of the Birth trauma (ICD–10 codes

P10–P15) cases are reclassified to nontraumatic causes; thus the numerator of the comparability ratio is based on a very small number (table IV).

Atelectasis—In ICD–10, when hypoplasia or dysplasia of lung is mentioned on the death certificate with prematurity or short gestation, the appropriate classification is Primary atelectasis of newborn (ICD–10 codes P28.0–P28.1) rather than Hypoplasia and dysplasia of lung (ICD–10 code Q33.6). Due to this coding change, the number of deaths classified to Atelectasis increased substantially in 1999.

Sudden infant death syndrome (SIDS)—The large decrease in the number of deaths attributable to SIDS (ICD–10 code R95) is partially due to the change in the way SIDS is diagnosed in the medical community and reported on the death certificate. Many of these deaths have been classified to the category Other symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified.

Codes for firearm deaths

Causes of death attributable to firearm mortality include ICD–10 codes 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

Causes of death attributable to drug-induced mortality include selected codes from the ICD–10 title Mental and behavioral disorders due to psychoactive substance use, specifically, ICD–10 codes 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, and F19.7–F19.9; Accidental poisoning by and exposure to drugs, medicaments and biological substances, X40–X44; Intentional self-poisoning (suicide) by and exposure to drugs, medicaments and biological substances, X60–X64; Assault (homicide) by drugs, medicaments and biological substances, X85; and Poisoning by and exposure to drugs, medicaments and biological substances, undetermined intent, Y10–Y14. 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.

Codes for alcohol-induced deaths

Causes of death attributable to alcohol-induced mortality include ICD–10 codes F10, Mental and behavioral disorders due to alcohol use; G31.2, Degeneration of nervous system due to alcohol; G62.1, Alcoholic polyneuropathy; I42.6, Alcoholic cardiomyopathy; K29.2, Alcoholic gastritis; K70, Alcoholic liver disease; 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.

Marital status

Age-specific and age-adjusted death rates by marital status are shown in table 22. 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 (37). 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. While 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 among 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.

Educational attainment

Beginning with the 1989 data year, an item indicating decedent's educational attainment was added to the certificates of numerous States. Mortality data on educational attainment for 1999 are based on deaths to residents of the 46 States and the District of Columbia whose data were approximately 80 percent or more complete on a place-of-occurrence basis. Data for Kentucky were excluded using this criterion. Data for Georgia, Rhode Island, and South Dakota were excluded because the item was not on their certificates.

Age-specific and age-adjusted death rates by educational attainment are shown in table 23. 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 (46).

Rates by educational attainment are affected by differences in the measuring 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 (47).

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 24 and 25. 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 *Computation of Rates*.

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 1999* (48). 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 estimated population of persons under 1 year of age on July 1, 1999, and 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.

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" (6). Included in these deaths are ICD–10 codes O00–O95, O98–O99, and A34.

Changes have been made in the classification and coding of maternal deaths between ICD–9 and ICD–10, effective with mortality data for 1999. Some State death certificates include a separate question regarding pregnancy status. A positive response to the question is interpreted as "pregnant" being 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 (that is, a previously existing disease or a disease that developed during pregnancy that 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, ICD–10 classifies this as a maternal death. ICD–9 only classified the death as maternal if pregnancy was reported in Part I.

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. In 1999, 1.12 percent of all reported deaths in the United States were assigned to Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified. The percent of deaths from this cause for all ages combined generally has remained stable since 1990.

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 (26,49,50).

As a consequence of the major effort involved in implementing a new revision of the ICD, a number of States did not provide complete confirmation of deaths from Infrequent and rare causes for 1999. These States include the following: California, Florida, Illinois, Indiana, Kentucky, Maine, Michigan, Missouri, New Jersey, New York City, North Carolina, Ohio, Pennsylvania, Rhode Island, Washington, and West Virginia.

Population bases for computing rates

The population used for computing death rates in this report (furnished by the U.S. Bureau of the Census) represents the population residing in the specified area, enumerated as of April 1 for census years and estimated as of July 1 for all other years. Death rates for the United States for 1999 are based on population estimates as of July 1, 1999, shown in table V by 10-year age groups and available by 5-year age groups on the mortality Web site at http://www.cdc.gov/nchs/datawh/statab/unpubd/mortabs.htm (51). The estimates are based on the 1990 census level counts. The 1990 census level counts by race were modified to be consistent with U.S. Office of Management and Budget categories and historical categories for death data (52). The population estimates for Mexicans, Puerto Ricans, Cubans, and Other Hispanics, shown in table VI, and the population estimates by marital status, shown in table VII, are based on the Current Population Survey adjusted to resident population control totals (53) for the United States and, as such, are subject to sampling variation (see "Random variation").

Population estimates by educational attainment, shown in table VIII, are also based on the Current Population Survey (53) adjusted to resident population control totals for 46 States and the District of Columbia and are also subject to sampling variation (see "Random variation").

Population estimates for each State, Puerto Rico, Virgin Islands, Guam, American Samoa, and Northern Marianas, shown in table IX, are based on demographic analysis and, therefore, are not subject to sampling variation (54–59).

Computing rates

Except for infant and maternal mortality rates, rates are on an annual basis per 1,000 or 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 are used to compare relative mortality risks among groups and over time. However, they should be viewed as

Table V. Estimated population by 10-year age groups, specified race and sex: United States, 1999

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	272,690,813	133,276,559	139,414,254	224,610,797	110,336,291	114,274,506	34,862,169	16,557,186	18,304,983	2,397,426	1,186,745	1,210,681	10,820,421	5,196,337	5,624,084
Under 1 year	3,819,903	1,952,133	1,867,770	3,027,180	1,549,389	1,477,791	568,772	289,078	279,694	42,542	21,442	21,100	181,409	92,224	89,185
1–4 years	15,122,239	7,730,542	7,391,697	12,015,456	6,155,680	5,859,776	2,226,888	1,129,687	1,097,201	159,576	80,755	78,821	720,319	364,420	355,899
5–14 years	39,495,230	20,219,664	19,275,566	31,094,794	15,940,356	15,154,438	6,232,872	3,166,617	3,066,255	467,966	237,653	230,313	1,699,598	875,038	824,560
15–24 years	37,773,512	19,334,049	18,439,463	30,014,705	15,441,143	14,573,562	5,740,422	2,881,622	2,858,800	428,979	215,783	213,196	1,589,406	795,501	793,905
25–34 years	37,935,812	18,826,288	19,109,524	30,431,393	15,273,321	15,158,072	5,286,663	2,505,284	2,781,379	374,047	191,269	182,778	1,843,709	856,414	987,295
35–44 years	44,812,649	22,254,316	22,558,333	36,946,545	18,540,240	18,406,305	5,652,358	2,653,695	2,998,663	358,769	178,119	180,650	1,854,977	882,262	972,715
45–54 years	35,802,358	17,499,088	18,303,270	30,249,529	14,954,220	15,295,309	3,928,525	1,783,710	2,144,815	256,008	123,692	132,316	1,368,296	637,466	730,830
55–64 years	23,389,085	11,150,407	12,238,678	20,133,661	9,710,115	10,423,546	2,345,099	1,014,648	1,330,451	148,113	69,600	78,513	762,212	356,044	406,168
65–74 years	18,218,248	8,198,696	10,019,552	15,958,629	7,243,777	8,714,852	1,678,493	707,523	970,970	90,511	40,756	49,755	490,615	206,640	283,975
75–84 years	12,146,695	4,871,134	7,275,561	10,965,640	4,414,172	6,551,468	889,080	333,297	555,783	50,534	21,212	29,322	241,441	102,453	138,988
85 years and over	4,175,082	1,240,242	2,934,840	3,773,265	1,113,878	2,659,387	312,997	92,025	220,972	20,381	6,464	13,917	68,439	27,875	40,564

SOURCE: Unpublished Bureau of the Census file NESTV99.

Table VI. Estimated population by 10-year age groups, according to specified Hispanic origin, race for non-Hispanic population, and sex: United States, 1999

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	272,690,817	3,819,898	15,122,243	39,495,210	37,773,512	37,935,822	44,812,633	35,802,344	23,389,103	18,218,255	12,146,702	4,175,095
Male	133,276,546	1,952,129	7,730,544	20,219,645	19,334,054	18,826,296	22,254,296	17,499,079	11,150,419	8,198,701	4,871,139	1,240,244
Female	139,414,271	1,867,769	7,391,699	19,275,565	18,439,458	19,109,526	22,558,337	18,303,265	12,238,684	10,019,554	7,275,563	2,934,851
Hispanic	31,337,161	721,505	2,745,603	5,982,424	5,470,190	5,230,172	4,748,231	2,914,649	1,679,035	1,101,735	554,434	189,183
Male	15,761,486	367,917	1,401,922	3,054,760	2,839,902	2,694,460	2,423,093	1,423,924	778,134	485,849	227,993	63,532
Female	15,575,675	353,588	1,343,681	2,927,664	2,630,288	2,535,712	2,325,138	1,490,725	900,901	615,886	326,441	125,651
Mexican	20,488,782	512,263	1,982,862	4,165,118	3,787,811	3,503,948	2,925,177	1,708,153	924,033	597,836	292,282	89,299
Male	10,548,482	261,059	997,510	2,151,110	2,004,072	1,838,773	1,530,723	876,699	450,397	271,914	132,653	33,572
Female	9,940,300	251,204	985,352	2,014,008	1,783,739	1,665,175	1,394,454	831,454	473,636	325,922	159,629	55,727
Puerto Rican	2,945,172	60,495	231,465	544,553	505,575	451,306	439,630	317,737	193,064	127,288	62,256	11,803
Male	1,419,464	30,919	128,458	280,642	246,828	210,967	203,359	149,028	90,634	49,110	25,783	3,736
Female	1,525,708	29,576	103,007	263,911	258,747	240,339	236,271	168,709	102,430	78,178	36,473	8,067
Cuban	1,344,410	16,287	54,265	135,355	136,076	175,451	208,400	169,844	173,622	144,959	97,666	32,485
Male	646,862	7,260	17,640	72,174	66,202	86,250	112,076	82,361	86,336	75,189	31,530	9,844
Female	697,548	9,027	36,625	63,181	69,874	89,201	96,324	87,483	87,286	69,770	66,136	22,641
Other Hispanic[1]	6,558,797	132,460	477,011	1,137,398	1,040,728	1,099,467	1,175,024	718,915	388,316	231,652	102,230	55,596
Male	3,146,678	68,679	258,314	550,834	522,800	558,470	576,935	315,836	150,767	89,636	38,027	16,380
Female	3,412,119	63,781	218,697	586,564	517,928	540,997	598,089	403,079	237,549	142,016	64,203	39,216
Non-Hispanic[2]	241,353,656	3,098,393	12,376,640	33,512,786	32,303,322	32,705,650	40,064,402	32,887,695	21,710,068	17,116,520	11,592,268	3,985,912
Male	117,515,060	1,584,212	6,328,622	17,164,885	16,494,152	16,131,836	19,831,203	16,075,155	10,372,285	7,712,852	4,643,146	1,176,712
Female	123,838,596	1,514,181	6,048,018	16,347,901	15,809,170	16,573,814	20,233,199	16,812,540	11,337,783	9,403,668	6,949,122	2,809,200
White	196,049,405	2,366,680	9,504,139	25,662,188	25,019,655	25,667,506	32,639,082	27,600,764	18,598,444	14,945,247	10,450,220	3,595,480
Male	95,962,070	1,212,565	4,873,529	13,167,936	12,843,492	12,814,074	16,340,919	13,659,876	8,997,644	6,795,986	4,201,617	1,054,432
Female	100,087,335	1,154,115	4,630,610	12,494,252	12,176,163	12,853,432	16,298,163	13,940,888	9,600,800	8,149,261	6,248,603	2,541,048
Black	33,092,411	529,001	2,074,442	5,886,951	5,446,361	4,996,800	5,366,444	3,757,034	2,249,229	1,617,792	862,710	305,647
Male	15,674,062	268,703	1,051,490	2,988,505	2,731,741	2,360,779	2,507,837	1,699,897	971,148	681,338	322,995	89,629
Female	17,418,349	260,298	1,022,952	2,898,446	2,714,620	2,636,021	2,858,607	2,057,137	1,278,081	936,454	539,715	216,018

[1]Includes Central and South American and Other and unknown Hispanic.

[2]Includes races other than white and black.

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

Table VII. Estimated population for ages 15 years and over by marital status, 10-year age groups, race, and sex: United States, 1999

Race, sex, and marital status	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[1]	214,253,450	37,773,516	37,935,789	44,812,661	35,802,370	23,389,072	18,218,238	16,321,804
Never married	59,325,869	33,280,736	13,443,119	7,028,745	3,023,419	1,216,086	694,728	639,036
Ever married	154,927,581	4,492,780	24,492,670	37,783,916	32,778,951	22,172,986	17,523,510	15,682,768
Married	120,319,059	4,170,254	21,821,638	31,386,346	26,347,606	17,153,203	12,121,780	7,318,232
Widowed	14,703,589	14,013	92,354	404,593	874,824	1,818,109	3,848,043	7,651,653
Divorced	19,904,933	308,513	2,578,678	5,992,977	5,556,521	3,201,674	1,553,687	712,883
All races,[1] male	103,374,198	19,334,060	18,826,271	22,254,312	17,499,075	11,150,399	8,198,689	6,111,392
Never married	32,158,349	17,663,740	7,700,596	4,084,523	1,555,183	611,445	307,972	234,890
Ever married	71,215,849	1,670,320	11,125,675	18,169,789	15,943,892	10,538,954	7,890,717	5,876,502
Married	59,887,583	1,558,121	10,014,050	15,284,800	13,366,454	8,881,852	6,520,127	4,262,179
Widowed	2,697,871	1,205	17,991	104,440	174,507	319,701	710,507	1,369,520
Divorced	8,630,395	110,994	1,093,634	2,780,549	2,402,931	1,337,401	660,083	244,803
All races,[1] female	110,879,252	18,439,456	19,109,518	22,558,349	18,303,295	12,238,673	10,019,549	10,210,412
Never married	27,167,520	15,616,996	5,742,523	2,944,222	1,468,236	604,641	386,756	404,146
Ever married	83,711,732	2,822,460	13,366,995	19,614,127	16,835,059	11,634,032	9,632,793	9,806,266
Married	60,431,476	2,612,133	11,807,588	16,101,546	12,981,152	8,271,351	5,601,653	3,056,053
Widowed	12,005,718	12,808	74,363	300,153	700,317	1,498,408	3,137,536	6,282,133
Divorced	11,274,538	197,519	1,485,044	3,212,428	3,153,590	1,864,273	893,604	468,080
White	178,473,363	30,014,708	30,431,387	36,946,548	30,249,543	20,133,641	15,958,634	14,738,902
Never married	44,853,837	26,047,748	9,676,554	4,926,191	2,188,638	915,291	536,697	562,718
Ever married	133,619,526	3,966,960	20,754,833	32,020,357	28,060,905	19,218,350	15,421,937	14,176,184
Married	104,652,644	3,693,245	18,538,676	26,783,108	22,788,468	15,158,095	10,910,637	6,780,415
Widowed	12,439,757	8,727	66,107	315,778	662,094	1,414,227	3,190,185	6,782,639
Divorced	16,527,125	264,988	2,150,050	4,921,471	4,610,343	2,646,028	1,321,115	613,130
White male	86,690,843	15,441,144	15,273,309	18,540,233	14,954,211	9,710,105	7,243,785	5,528,056
Never married	24,941,567	13,975,201	5,786,730	3,069,701	1,190,999	481,755	236,661	200,520
Ever married	61,749,276	1,465,943	9,486,579	15,470,532	13,763,212	9,228,350	7,007,124	5,327,536
Married	52,237,112	1,366,346	8,563,878	13,068,602	11,581,204	7,856,009	5,873,623	3,927,450
Widowed	2,247,711	846	17,414	80,029	132,439	244,324	577,045	1,195,614
Divorced	7,264,453	98,751	905,287	2,321,901	2,049,569	1,128,017	556,456	204,472
White female	91,782,520	14,573,564	15,158,078	18,406,315	15,295,332	10,423,536	8,714,849	9,210,846
Never married	19,912,270	12,072,547	3,889,824	1,856,490	997,639	433,536	300,036	362,198
Ever married	71,870,250	2,501,017	11,268,254	16,549,825	14,297,693	9,990,000	8,414,813	8,848,648
Married	52,415,532	2,326,899	9,974,798	13,714,506	11,207,264	7,302,086	5,037,014	2,852,965
Widowed	10,192,046	7,881	48,693	235,749	529,655	1,169,903	2,613,140	5,587,025
Divorced	9,262,672	166,237	1,244,763	2,599,570	2,560,774	1,518,011	764,659	408,658
Black	25,833,663	5,740,427	5,286,661	5,652,362	3,928,525	2,345,107	1,678,490	1,202,091
Never married	11,191,899	5,401,212	2,830,960	1,776,005	713,843	271,582	136,849	61,448
Ever married	14,641,764	339,215	2,455,701	3,876,357	3,214,682	2,073,525	1,541,641	1,140,643
Married	9,986,018	307,153	2,093,204	2,914,336	2,237,024	1,268,666	810,750	354,885
Widowed	1,835,077	2,256	24,685	72,818	173,022	330,517	527,831	703,948
Divorced	2,820,669	29,806	337,812	889,203	804,636	474,342	203,060	81,810
Black male	11,971,816	2,881,630	2,505,282	2,653,699	1,783,711	1,014,651	707,518	425,325
Never married	5,475,863	2,750,533	1,374,466	830,959	315,717	116,805	62,027	25,356
Ever married	6,495,953	131,097	1,130,816	1,822,740	1,467,994	897,846	645,491	399,969
Married	4,962,125	122,449	975,428	1,418,674	1,128,887	659,012	441,587	216,088
Widowed	381,222	0	0	20,097	39,804	60,441	111,753	149,127
Divorced	1,152,606	8,648	155,388	383,969	299,303	178,393	92,151	34,754
Black female	13,861,847	2,858,797	2,781,379	2,998,663	2,144,814	1,330,456	970,972	776,766
Never married	5,716,036	2,650,679	1,456,494	945,046	398,126	154,777	74,822	36,092
Ever married	8,145,811	208,118	1,324,885	2,053,617	1,746,688	1,175,679	896,150	740,674
Married	5,023,893	184,704	1,117,776	1,495,662	1,108,137	609,654	369,163	138,797
Widowed	1,453,855	2,256	24,685	52,721	133,218	270,076	416,078	554,821
Divorced	1,668,063	21,158	182,424	505,234	505,333	295,949	110,909	47,056

[1]Includes races other than white and black.

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

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 to the U.S. standard population.

Beginning with the 1999 data year, a new population standard was adopted by NCHS for use in age-adjusting death rates. Based on the year 2000 projected 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* (7).

Table VIII. Estimated population for ages 25–64 years, by educational attainment and sex: Total of 46 reporting States and the District of Columbia, 1999

Years of school completed and sex	25-64 years	25-34 years	35-44 years	45-54 years	55-64 years
Both sexes	134,833,509	36,084,064	42,608,999	33,842,243	22,298,203
Under 12 years	17,266,667	4,433,942	4,933,222	3,819,020	4,080,483
12 years	44,118,610	11,032,314	14,373,871	10,601,169	8,111,256
13 or more years	73,448,232	20,617,808	23,301,906	19,422,054	10,106,464
Male	66,309,181	17,920,066	21,187,418	16,562,700	10,638,997
Under 12 years	8,790,283	2,371,126	2,629,132	1,855,186	1,934,839
12 years	21,261,941	5,762,296	7,282,051	4,733,429	3,484,165
13 or more years	36,256,957	9,786,644	11,276,235	9,974,085	5,219,993
Female	68,524,328	18,163,998	21,421,581	17,279,543	11,659,206
Under 12 years	8,476,384	2,062,816	2,304,090	1,963,834	2,145,644
12 years	22,856,669	5,270,018	7,091,820	5,867,740	4,627,091
13 or more years	37,191,275	10,831,164	12,025,671	9,447,969	4,886,471

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

Table IX. Estimated population for the United States, each division, each State, Puerto Rico, Virgin Islands, Guam, American Samoa, and Northern Marianas, 1999

Area	Total	Area	Total
United States	272,690,813	East South Central	16,582,841
		Kentucky	3,960,825
New England	13,495,933	Tennessee	5,483,535
Maine	1,253,040	Alabama	4,369,862
New Hampshire	1,201,134	Mississippi	2,768,619
Vermont	593,740	West South Central	30,325,593
Massachusetts	6,175,169	Arkansas	2,551,373
Rhode Island	990,819	Louisiana	4,372,035
Connecticut	3,282,031	Oklahoma	3,358,044
Middle Atlantic	38,334,029	Texas	20,044,141
New York	18,196,601	Mountain	17,127,479
New Jersey	8,143,412	Montana	882,779
Pennsylvania	11,994,016	Idaho	1,251,700
East North Central	44,442,146	Wyoming	479,602
Ohio	11,256,654	Colorado	4,056,133
Indiana	5,942,901	New Mexico	1,739,844
Illinois	12,128,370	Arizona	4,778,332
Michigan	9,863,775	Utah	2,129,836
Wisconsin	5,250,446	Nevada	1,809,253
West North Central	18,800,138	Pacific	44,022,633
Minnesota	4,775,508	Washington	5,756,361
Iowa	2,869,413	Oregon	3,316,154
Missouri	5,468,338	California	33,145,121
North Dakota	633,666	Alaska	619,500
South Dakota	733,133	Hawaii	1,185,497
Nebraska	1,666,028		
Kansas	2,654,052	Puerto Rico	3,889,507
South Atlantic	49,560,021	Virgin Islands	119,615
Delaware	753,538	Guam	151,968
Maryland	5,171,634	American Samoa	63,781
District of Columbia	519,000	Northern Marianas	69,216
Virginia	6,872,912		
West Virginia	1,806,928		
North Carolina	7,650,789		
South Carolina	3,885,736		
Georgia	7,788,240		
Florida	15,111,244		

SOURCE: Unpublished Bureau of the Census file STRES991.txt.

All age-adjusted rates shown in this report are based on the year 2000 standard population. The year 2000 standard population and corresponding weights used for computing age-adjusted rates and relative standard errors (RSEs), excluding those by marital status, education, injury at work, and the U.S. territories, are shown in table X.

Age-adjusted rates by marital status were computed by applying the age-specific death rates to the U.S. 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 calculation of age-adjusted rate because of their high

Table X. United States standard population: Numbers and proportions (weights)

Age	Number	Weights (w_i)
All ages	1,000,000	1.000000
Under 1 year	13,818	0.013818
1–4 years	55,317	0.055317
5–14 years	145,565	0.145565
15–24 years	138,646	0.138646
25–34 years	135,573	0.135573
35–44 years	162,613	0.162613
45–54 years	134,834	0.134834
55–64 years	87,247	0.087247
65–74 years	66,037	0.066037
75–84 years	44,842	0.044842
85 years and over	15,508	0.015508

variability, particularly among 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 and corresponding weights used for computing age-adjusted rates and relative standard errors by marital status are shown in table XI.

Table XI. United States standard population for ages 25 years and over: Numbers and proportions (weights)

Age	Number	Weights (w_i)
25 years and over	646,654	1.000000
25–34 years	135,573	0.209653
35–44 years	162,613	0.251468
45–54 years	134,834	0.208510
55–64 years	87,247	0.134921
65–74 years	66,037	0.102121
75 years and over	60,350	0.093327

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 (46). The year 2000 standard population and corresponding weights used for computing age-adjusted rates and relative standard errors by education are shown in table XII.

Table XII. United States standard population for ages 25–64 years: Numbers and proportions (weights)

Age	Number	Weights (w_i)
25–64 years	520,267	1.000000
25–34 years	135,573	0.260584
35–44 years	162,613	0.312557
45–54 years	134,834	0.259163
55–64 years	87,247	0.167697

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 and corresponding weights used for computing age-adjusted rates and relative standard errors for injury at work are shown in table XIII.

Table XIII. United States standard population for ages 15 years and over: Numbers and proportions (weights)

Age	Number	Weights (w_i)
15 years and over	785,300	1.000000
15–24 years	138,646	0.176552
25–34 years	135,573	0.172638
35–44 years	162,613	0.207071
45–54 years	134,834	0.171697
55–64 years	87,247	0.111100
65 years and over	126,387	0.160941

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 year 2000 standard population and corresponding weights used for computing age-adjusted rates and relative standard errors for the territories are shown in table XIV.

Table XIV. United States standard population: Numbers and proportions (weights)

Age	Number	Weights (w_i)
All ages	1,000,000	1.000000
Under 1 year	13,818	0.013818
1–4 years	55,317	0.055317
5–14 years	145,565	0.145565
15–24 years	138,646	0.138646
25–34 years	135,573	0.135573
35–44 years	162,613	0.162613
45–54 years	134,834	0.134834
55–64 years	87,247	0.087247
65–74 years	66,037	0.066037
75 years and over	60,350	0.060350

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 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. Random variation is discussed for demographic data and cause-of-death data separately because of problems in comparing cause-of-death between ICD revisions.

Demographic data—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. For this distribution, the relative standard error (RSE) is a measure of the variability. For computing RSEs in percent, this formula may be used for all tables except for the death rates shown in tables 4, 22, and 23 (see subsection below):

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

where

D = number of deaths
R = rate

Beginning with 1989 data, an asterisk is shown in place of a rate based on fewer than 20 deaths, which is the equivalent of an RSE(R) of 23 percent or more. A RSE(R) of 23 percent is considered statistically unreliable. For age-adjusted death rates, this criterion was based on the sum of the age-specific deaths. This same procedure is used in this report except for the death rates shown in tables 4, 22, and 23 (see subsection below).

For tables showing the number of deaths (D) (where D is 100 or more) the chances are 95 in 100 that

$$2.\quad D - \left(1.96 \bullet D \bullet \frac{\mathrm{RSE}(D)}{100}\right) \text{ and } D + \left(1.96 \bullet D \bullet \frac{\mathrm{RSE}(D)}{100}\right)$$

cover the "true" number of deaths. This is referred to as a 95-percent confidence interval. For computing 95-percent confidence intervals when D is less than 100 deaths, see the NCHS Web site at http://www.cdc.gov/nchs and refer to "Technical Appendix from *Vital Statistics of United States: Mortality, 1999*."

For tables showing a crude death rate (R) or an age-specific death rate (based on 100 or more deaths) for the ith age group (R_i), except the rates in tables 4, 22, and 23, the chances are 95 in 100 that the actual rate falls within the confidence interval as computed using the following formula:

$$3.\quad R - \left(1.96 \bullet R \bullet \frac{\mathrm{RSE}(R)}{100}\right) \text{ and } R + \left(1.96 \bullet R \bullet \frac{\mathrm{RSE}(R)}{100}\right)$$

For computing 95-percent confidence intervals for R when D is less than 100 deaths, see the Web site mentioned above.

For testing the difference between two rates (R_1 and R_2, each based on 100 or more deaths), the following z-test may be used to define a significance test statistic:

$$4.\quad z = \frac{R_1 - R_2}{\sqrt{R_1^2\left(\frac{\mathrm{RSE}(R_1)}{100}\right)^2 + R_2^2\left(\frac{\mathrm{RSE}(R_2)}{100}\right)^2}}$$

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. For computing statistical tests when R_1 and/or R_2 are based on less than 100 deaths, see the Web site mentioned above.

For tables showing an age-adjusted death rate (R'), except the rates in tables 4, 22, and 23, the RSEs in formulas 3 and 4 above would be substituted by this formula:

$$5.\quad \mathrm{RSE}(R') = 100\,\frac{\sqrt{\sum\left\{w_i^2\, R_i^2\, \left(\frac{1}{D_i}\right)\right\}}}{R'}$$

where

R_i = age-specific rate for the ith age group
w_i = ith age-specific U.S. standard population such that $\sum(w_i)$ = 1.000000 (see table X and age-adjusted death rate under "Definition of terms")
D_i = number of deaths for the ith age group

For tables showing an infant mortality rate (based on live births in the denominator), IMR, the RSEs in formulas 3 and 4 would be substituted by the following formula:

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

where

B = number of live births

For tables showing a maternal mortality rate (based on live births in the denominator), the RSEs in formulas 3 and 4 would be substituted with formula 6.

Tables 4, 22, and 23—Rates for Mexicans, Puerto Ricans, Cubans, and Other Hispanics in table 4, rates by marital status in table 22, and rates by educational attainment in table 23 are based on population estimates derived from the U.S. Bureau of the Census' Current Population Survey and adjusted to resident population control totals. As a result, the rates are subject to the variability of the denominator as well as the numerator. For tables 4, 22, and 23 the following RSE formulas were used to determine an RSE of 23 percent or more for the purpose of showing the rate or an asterisk.

For crude, R, and age-specific death rates, R_i,

$$7.\quad \mathrm{RSE}(R) = 100\sqrt{\left(\frac{1}{D}\right) + 0.67\left(a + \frac{b}{P}\right)}$$

and for age-adjusted death rates, R',

$$8.\quad \mathrm{RSE}(R') = 100\,\frac{\sqrt{\sum\left\{w_i^2\, R_i^2\left[\left(\frac{1}{D_i}\right) + 0.67\left(a + \frac{b}{P_i}\right)\right]\right\}}}{R'}$$

where

D = number of deaths
P = population estimate used for computing the rate (see table VI for population estimates used for computing rates in table 4; see table VII for population estimates used for computing rates in table 22; and see table VIII for population estimates used for computing rates in table 23)
D_i = number of deaths for the ith age group
P_i = population estimate used for computing the ith age-specific death rate (see table VI for population estimates used for computing rates in table 4; see table VII for population estimates used for computing rates in table 22; and see table VIII for population estimates used for computing rates in table 23)

w_i = age-specific U.S. standard population such that $\sum(w_i) = 1.000000$ (see table X for weights (w_i) used for computing age-adjusted rates in table 4; see table XI for weights used for computing age-adjusted rates in table 22; and see table XII for weights used for computing age-adjusted rates in table 23)

w_i^2 = the square of the age-specific U.S. standard population

In table 4, for all origins, total Hispanic, total non-Hispanic, non-Hispanic white, and non-Hispanic black populations,

$$a = 0.000000 \text{ and } b = 0$$

and for Mexican, Puerto Rican, Cuban, and Other Hispanic populations,

$$a = -0.000238 \text{ and } b = 7{,}486$$

In table 22, for all marital status groups combined for all races, white, and black populations,

$$a = 0.000000 \text{ and } b = 0,$$

for each marital status group for all races and the white population,

$$a = -0.000019 \text{ and } b = 5{,}211,$$

and for each marital status group for the black population,

$$a = -0.000213 \text{ and } b = 7{,}486$$

In table 23, for all education groups combined,

$$a = 0.000000 \text{ and } b = 0$$

and for each education group,

$$a = -0.000011 \text{ and } b = 2{,}369$$

The a and b parameters are averages of the 1998 and 1999 CPS standard error parameters (60,61).

To compute 95-percent confidence intervals and z-tests for the death rates (based on 100 or more deaths) shown in tables 4, 22, and 23, the RSE formulas 7 and 8 may be substituted, as appropriate, for the RSEs used in formulas 3 and 4.

Cause-of-death data—The calculation of measures of variability by cause of death take into account the variability of the comparability ratio modified 1998 data for comparison with the 1999 data. For additional information on the statistical tests below, please refer to *A Guide to State Implementation of ICD–10 for Mortality, Part II: Applying Comparability Ratios* (62) at the following Web site: http://www.cdc.gov/nchs/datawh/statab/unpubd/comp.htm.

Two issues arise in the analysis of mortality data across the boundary of two ICD revisions (ICD–9 and ICD–10):

1. data presentation and analysis
2. statistical tests to ascertain whether the change in mortality between the last year of the old revision (1998) and the first year of the new revision (1999) is a statistically significant change

Table 8 presents death rates for the 15 leading causes of death in 1999 according to ICD–10, compared with death rates for 1998 for the most nearly comparable ICD–9 titles (tables I and II) multiplied by the ICD–10:ICD–9 comparability ratios (comparability-modified death rates). Also shown are the 1998 rates that are not comparability-modified for the same 15 leading causes.

The second issue is determining whether the change in death rates between 1998 and 1999 was statistically significant, taking into account comparability. This is accomplished in a manner similar to statistical analysis of mortality trends within the same revision (8), but incorporating into the comparisons and the statistical tests explicit regard for comparability. This section focuses on presenting methods for analyzing differences in mortality *between* revisions. The key difference is that the latter analysis must take explicitly into account comparability ratios that measure the quantitative impact of the new revisions on causes of death.

Formulas shown below address the general problem of evaluating differences between two population-based death rates estimated for successive years, between revisions of the ICD. Rates used throughout the section are specific for cause of death. Rates computed using data from an initial year (R_1) are assumed to be based on ICD–9, while those for the following year (R_2) are assumed to be based on ICD–10. A comparability ratio (C) measures the level of agreement between classification systems. The cause-specific comparability ratio will be applied to R_1 to adjust for the change in the way these deaths were classified for the later revision compared with the earlier revision. In addition to 1998 mortality data, this factor (C) should also be applicable to at least 1994, 1995, 1996, and 1997. The comparability ratio needs to be considered in statistical tests that compare the changes in rates from one year to a subsequent one between revisions.

In applying the formulas, distinctions should be made for cases involving large (100 or more) and small (1–99) numbers of deaths. All formulas in this section are for cases involving large numbers of deaths (100 or more). Formulas for constructing 95 percent confidence intervals for small numbers of deaths are shown in the publication mentioned above (62).

The general formula for obtaining (estimated) RSE's for a point-estimate, θ (like a comparability ratio), is the following:

$$9.\quad \mathrm{RSE}(\hat{\theta}) = 100\,\frac{S(\hat{\theta})}{\hat{\theta}}$$

where

$S(\theta)$ = standard error of Theta

The estimated RSE for an age-specific death rate or a crude death rate is given by the formula below:

$$10.\quad \mathrm{RSE}(R) = \mathrm{RSE}(D) = 100\sqrt{\frac{1}{D}}$$

where

R = the cause-specific death rate produced by dividing the number of deaths attributed to a given cause at a given time by the population-at-risk for that same time period

D = the estimated number of deaths due to a given cause on a given time

The following procedures for constructing approximate 95 percent confidence intervals are ordered depending on whether the death rate was computed based on the recently introduced ICD–10 revision or on the previous (ICD–9) revision, respectively. The rate based on the ICD–9 revision is adjusted by the application of a cause-specific comparability ratio.

For an age-specific or crude death rate based on the ICD–10 revision, the 95 percent confidence interval may be captured as follows:

$$11.\quad \text{Lower limit: } R_2 - \left(1.96 \bullet R_2 \bullet \frac{\mathrm{RSE}(R_2)}{100}\right)$$

$$12.\quad \text{Upper limit: } R_2 + \left(1.96 \bullet R_2 \bullet \frac{\mathrm{RSE}(R_2)}{100}\right)$$

For an age-specific or crude death rate based on the ICD–9 revision, the 95 percent confidence interval may be captured as follows:

13. Lower limit: $C \bullet R_1 - \left(1.96 \bullet C \bullet R_1 \bullet \frac{\text{RSE}(C \bullet R_1)}{100}\right)$

14. Upper limit: $C \bullet R_1 + \left(1.96 \bullet C \bullet R_1 \bullet \frac{\text{RSE}(C \bullet R_1)}{100}\right)$

where

R_2 = death rate (per 100,000) computed for data year under ICD–10

C = ICD–10:ICD–9 comparability ratio specific for the cause-of-death of interest

R_1 = death rate (per 100,000) computed for data year under ICD–9

Let us suppose that the respective ICD–9 and ICD–10 death rates for a cause of death were 11.7 (R_1) and 6.2 (R_2) per 100,000 population. The ICD–10:ICD–9 comparability ratio (C) obtained for this cause was 1.0600. Its standard error, $S(C)$, is 0.0096.

Assume that the numbers of deaths for this cause were 31,130 for ICD–9 and 16,516 for ICD–10. By inserting the number of deaths (D) into formula 10, we obtain the RSEs for both yearly rates: 0.5668 for the ICD–9 rate and 0.7781 for the ICD–10 rate [RSE(R_1) and RSE(R_2), respectively].

By inserting the comparability ratio and its standard error into Formula 9, we obtain RSE(C) = (0.0096 / 1.0600) • 100 = 0.9057.

Since we wish to modify the ICD–9 rate (R_1) to compensate for the difference in classification systems, we must multiply this rate times the comparability ratio $C \bullet R_1 = 12.40$. To obtain the standard error of this modified ICD–9 rate, $S(C \bullet R_1)$, we must refer to Formula 17. This formula requires knowing the RSEs for the ICD–9 rate and for the comparability ratio. By substituting these values into the formula, we have that RSE($C \bullet R_1$) = 1.0684.

Lower 95-percent confidence interval limit for $C \bullet R_1 = 12.40 - (1.96 \bullet 0.1325) = 12.14$.

Upper 95-percent confidence interval limit for $C \bullet R_1 = 12.40 + (1.96 \bullet 0.1325) = 12.66$.

Lower 95-percent confidence interval limit for $R_2 = 6.2 - (1.96 \bullet 0.0482) = 6.10$.

Upper 95-percent confidence interval limit for $R_2 = 6.2 + (1.96 \bullet 0.0482) = 6.29$.

For testing the difference between two rates (R_1 and R_2, each based on 100 or more deaths), the following z-test that considers the use of a comparability ratio applied to ICD–9 death rates, may be used to define a significance test statistic:

15. $$z = \frac{C \bullet R_1 - R_2}{\sqrt{C^2 \bullet R_1^2 \left\{\left(\frac{\text{RSE}(R_1)}{100}\right)^2 + \left(\frac{\text{RSE}(C)}{100}\right)^2 \bullet \left[1 + \left(\frac{\text{RSE}(R_1)}{100}\right)^2\right]\right\} + R_2^2 \left(\frac{\text{RSE}(R_2)}{100}\right)^2}}$$

where

C = ICD–10:ICD–9 comparability ratio for the specific cause category

R_1, R_2 = cause-specific death rates based on ICD–9 and ICD–10 years, respectively

RSE(R_1) = relative standard error of the ICD–9 cause-specific death rate

RSE(R_2) = relative standard error of the ICD–10 cause-specific death rate

RSE(C) = relative standard error of the ICD–10:ICD–9 comparability ratio specific for the cause of death

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. For computing statistical tests when R_1 and/or R_2 are based on less than 100 deaths, see *A Guide to State Implementation of ICD–10 for Mortality, Part II: Applying Comparability Ratios* (62).

For tables showing an age-adjusted death rate, (R'), the RSE in formula 5 above would be substituted by this formula:

16. $$\text{RSE}(R'_2) = 100 \frac{\sqrt{\sum \left[w_i^2 \bullet R_{i2}^2 \left(\frac{1}{D_{i2}}\right)\right]}}{R'_2}$$

where

R'_2 = age-adjusted death rate for a specific cause of interest, based on ICD–10

i = each age group

R_{i2} = age-specific death rate for the ith age group (ICD–10 file)

w_i = ith age-specific U.S. Standard Population weight such that $\sum w_i = 1.000000$

D_{i2} = number of deaths for the ith age group (ICD–10 file) attributed to the cause of interest

C_i's are treated as constants in this report ($C_i = C$). Assuming that we have both an age-specific rate and comparability ratio, we may proceed to compute the RSE for $C_i R_{i1}$ for each age group. This is the first of two steps necessary for obtaining the RSE of an age-adjusted rate based on ICD–9 data that has been modified through a comparability ratio, R''_1. For an age-specific comparability ratio and death rate based on the ICD–9 revision, the RSE can be calculated as follows:

17. $$\text{RSE}(C_i \bullet R_{i1}) = 100 \sqrt{\left(\frac{\text{RSE}(R_{i1})}{100}\right)^2 + \left(\frac{\text{RSE}(C_i)}{100}\right)^2 \left[1 + \left(\frac{\text{RSE}(R_{i1})}{100}\right)^2\right]}$$

where

C_i = age-specific comparability ratio for the cause of interest

R_{i1} = age-specific death rate for the ith age group (ICD–9 file)

Let $R''_1 = \sum w_i C_i R_{i1}$. The RSE for R''_1 would incorporate all 11 values (corresponding to each age group) computed through the

previous formula. For age-adjusted and comparability-modified death rates based on the ICD–9 revision, the RSE can be calculated as follows:

$$18.\quad \mathrm{RSE}(R''_1) = 100\frac{\sqrt{\sum\left[w_i^2(C_iR_{i1})^2 \bullet \left(\frac{\mathrm{RSE}(C_iR_{i1})}{100}\right)^2\right]}}{R''_1}$$

where

R''_1= age-adjusted death rate for a specific cause of interest based on ICD–9 data and modified by a comparability ratio

The following procedures for constructing approximate 95 percent confidence intervals are ordered depending on whether the age-adjusted death rate was computed based on the recently introduced ICD–10 revision or on the previous (ICD–9) revision, respectively. The rate based on the ICD–9 revision is adjusted by the application of a cause-specific comparability ratio.

For an age-adjusted death rate based on the ICD–10 revision, the 95 percent confidence interval may be captured as follows:

$$19.\quad \text{Lower limit: } R'_2 - \left(1.96 \bullet R'_2 \bullet \frac{\mathrm{RSE}(R'_2)}{100}\right)$$

$$20.\quad \text{Upper limit: } R'_2 + \left(1.96 \bullet R'_2 \bullet \frac{\mathrm{RSE}(R'_2)}{100}\right)$$

For an age-adjusted and comparability-modified death rate based on the ICD–9 revision, the 95 percent confidence interval may be captured as follows:

$$21.\quad \text{Lower limit: } R''_1 - \left(1.96 \bullet R''_1 \bullet \frac{\mathrm{RSE}(R''_1)}{100}\right)$$

$$22.\quad \text{Upper limit: } R''_1 + \left(1.96 \bullet R''_1 \bullet \frac{\mathrm{RSE}(R''_1)}{100}\right)$$

where

R'_2 = age-adjusted death rate (per 100,000) computed for data year under ICD–10

R''_1 = age-adjusted death rate (per 100,000) computed for data year under ICD–9

Availability of mortality data

Mortality data are available in publications, unpublished tables, and electronic products as described on the NCHS Web site at the following address: http://www.cdc.gov/nchs. The data are available on data tapes from the National Technical Information Service (NTIS) and on CD-ROM from NTIS and the Government Printing Office (GPO). 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 (63).

References

1. Hoyert DL, Singh GK, Rosenberg HM. Sources of data on socioeconomic differential mortality in the United States. Journal of Official Statistics. 11(3): 233–60. 1995.
2. Kochanek KD, Smith BL, Anderson RN. Deaths: Preliminary data for 1999. National vital statistics reports; vol 49 no 3. Hyattsville, Maryland: National Center for Health Statistics. 2001.
3. Anderson RN. Deaths: Leading causes for 1999. National vital statistics reports; vol 49 no. 11. Hyattsville, Maryland: National Center for Health Statistics. 2001 (forthcoming).
4. de Turk PB. Deaths: Geographic variations in cause specific mortality, United States, 1997–99. National vital statistics reports; vol 49. Hyattsville, Maryland: National Center for Health Statistics. 2001 (forthcoming).
5. National Center for Health Statistics. Technical appendix. Vital statistics of the United States: Mortality, 1995. Available on the NCHS Web site at: www.cdc.gov/nchs and to be included on the CD-ROM entitled, "Vital Statistics of the United States, Mortality, 1995."
6. World Health Organization. International Statistical Classification of Diseases and Related Health Problems, Tenth Revision. Geneva: World Health Organization. 1992.
7. Anderson RN, Rosenberg HM. Age standardization of death rates: Implementation of the year 2000 standard. National vital statistics reports; vol 47 no 3. Hyattsville, Maryland: National Center for Health Statistics. 1998.
8. World Health Organization. Manual of the International Statistical Classification of Diseases, Injuries, and Causes of Death, based on the recommendations of the Ninth Revision Conference, 1975. Geneva: World Health Organization. 1977.
9. Anderson RN, Miniño AM, Hoyert DL, Rosenberg HM. Comparability of cause of death between ICD–9 and ICD–10: Preliminary estimates. National vital statistics reports; vol 49 no 2. Hyattsville, Maryland: National Center for Health Statistics. 2001.
10. Murphy SL. Deaths: Final data for 1998. National vital statistics reports; vol 48 no 11. Hyattsville, Maryland: National Center for Health Statistics. 2000.
11. Centers for Disease Control and Prevention. Update: Influenza activity—United States, 1998–99 season. Morbidity and mortality weekly report; vol 48 no 9. Washington DC: Public Health Service. 1999.
12. Centers for Disease Control and Prevention. Influenza activity—United States, 1999–2000 season. Morbidity and mortality weekly report; vol 48 no 45. Washington, DC: Public Health Service. 2000.
13. Centers for Disease Control and Prevention. Update: Influenza activity—United States, 1999–2000 season. Morbidity and mortality weekly report; vol 49 no 3. Washington, DC: Public Health Service. 2000.
14. Rosenberg HM, Maurer JD, Sorlie PD, Johnson NJ, et al. Quality of death rates by race and Hispanic origin: A summary of current research, 1999. National Center for Health Statistics. Vital Health Stat 2(128). 1999.
15. Kochanek KD, Maurer JD, Rosenberg HM. Causes of death contributing to changes in life expectancy: United States, 1984–1989. National Center for Health Statistics. Vital Health Stat 20(23). 1994.
16. Maurer JD, Rosenberg HM, Keemer JB. Deaths of Hispanic origin, 15 reporting States, 1979–81. National Center for Health Statistics. Vital Health Stat 20(18). 1990.
17. Hoyert DL, Rosenberg HM, MacDorman MF. Effect of changes in death certificate format on cause-specific mortality trends, United States, 1979–1992. Office for National Statistics. Studies on Medical and Population Subjects 64. 2000.
18. Hoyert DL, Kochanek KD, Murphy SL. Deaths: Final Data for 1997. National vital statistics reports; vol 47 no 19. Hyattsville, Maryland: National Center for Health Statistics. 1999.
19. Pamuk E, Makuc D, Heck K, Reuben C, Lochner K. Socioeconomic status and health chartbook. Health, United States, 1998. Hyattsville, Maryland: National Center for Health Statistics. 1998.
20. Mathews TJ, Curtin SC, MacDorman MF. Infant mortality statistics from the 1998 period linked birth/infant death data set. National vital statistics reports; vol 48 no 12. Hyattsville, Maryland: National Center for Health Statistics. 2000.
21. Tolson GC, Barnes JM, Gay GA, Kowaleski JL. The 1989 revision of the U.S. standard certificates and reports. National Center for Health Statistics. Vital Health Stat 4(28). 1991.
22. National Center for Health Statistics. Technical appendix. Vital statistics of the United States, 1989, vol II, mortality, part A. Washington: Public Health Service. 1993.
23. Klebba AJ, Scott JH. Estimates of selected comparability ratios based on dual coding of 1976 death certificates by the Eighth and Ninth Revisions of the International Classification of Diseases. Monthly vital statistics report; vol 28 no 11, supp. Hyattsville, Maryland: Public Health Service. 1980.

24. Klebba AJ, Dolman AB. Comparability of mortality statistics for the Seventh and Eighth Revisions of the International Classification of Diseases, United States. National Center for Health Statistics. Vital Health Stat 2(66). 1975.
25. National Center for Health Statistics. Comparability of mortality statistics for the Sixth and Seventh Revisions, United States, 1958. Vital Statistics-Special reports; vol 51 no 4. Washington, DC: Public Health Service. 1965.
26. National Center for Health Statistics. Vital statistics, instructions for classifying the underlying cause of death. NCHS instruction manual; part 2a. Hyattsville, Maryland: Public Health Service. Published annually.
27. National Center for Health Statistics. Vital statistics, instructions for classifying multiple causes of death. NCHS instruction manual; part 2b. Hyattsville, Maryland: Public Health Service. Published annually.
28. National Center for Health Statistics. Vital statistics, nonindexed terms, standard abbreviations, and State geographic codes used in mortality data classification. NCHS instruction manual; part 2e. Hyattsville, Maryland: Public Health Service. Published annually until 1999.
29. National Center for Health Statistics. Vital statistics, ICD–9 ACME decision tables for classifying underlying causes of death. NCHS instruction manual; part 2c. Hyattsville, Maryland: Public Health Service. Published annually.
30. National Center for Health Statistics. Vital statistics, data entry instructions for the mortality medical indexing, classification, and retrieval system (MICAR). NCHS instruction manual; part 2g. Hyattsville, Maryland: Public Health Service. Published annually.
31. National Center for Health Statistics. Vital statistics, dictionary of valid terms for the mortality medical indexing, classification, and retrieval system (MICAR). NCHS instruction manual; part 2h. Hyattsville, Maryland: Public Health Service. Published annually.
32. Chamblee RF, Evans MC. TRANSAX, the NCHS system for producing multiple cause-of-death statistics, 1968–78. National Center for Health Statistics. Vital Health Stat 1(20). 1986.
33. Israel RA, Rosenberg HM, Curtin LR. Analytical potential for multiple cause-of-death data. Am J Epidemiol 124(2): 161–79. 1986.
34. National Center for Health Statistics. Public use data file documentation: Multiple cause of death for ICD–9, 1998 data. Hyattsville, Maryland: Public Health Service. 2000.
35. National Center for Health Statistics. ICD–10 cause-of-death lists for tabulating mortality statistics, effective 1999. NCHS instruction manual: part 9. Hyattsville, Maryland: Public Health Service. 1999.
36. Sorlie PD, Rogot E, Johnson NJ. Validity of demographic characteristics on the death certificate. Epidemiology 3(2):181–4. 1992.
37. Poe GS, Powell-Griner E, McLaughlin JK, et al. Comparability of the death certificate and the 1986 national mortality followback survey. National Center for Health Statistics. Vital Health Stat 2(118). 1993.
38. Hogan H. The 1990 post-enumeration survey: Operations and results. J Am Stat Assoc 48(423):1047–60. 1993.
39. National Center for Health Statistics. Technical appendix. Vital statistics of the United States, 1989, vol I, natality. Washington: Public Health Service. 1992.
40. Hoyert DL. Effect on mortality rates of the 1989 changes in tabulating race. National Center for Health Statistics. Vital Health Stat 20(25). 1994.
41. Sirken MG. Comparison of two methods of constructing abridged life tables by reference to a "standard" table. National Center for Health Statistics. Vital Health Stat 2(4). 1966.
42. Anderson RN. Method for constructing complete annual U.S. life tables. National Center for Health Statistics. Vital Health Stat 2(129). 1999.
43. National Center for Health Statistics. U.S. decennial life tables for 1989–91, vol 1 no 2, methodology of the national and State life tables. Hyattsville, Maryland. 1998.
44. Kestenbaum B. A description of the extreme aged population based on improved Medicare enrollment data. Demography 29:565–80. 1992.
45. Arriaga EE. Changing trends in mortality decline during the last decades. In: Ruzicka L, Wunsch G, Kane P, eds. Differential mortality: Methodological issues and biosocial factors. Oxford: Clarendon Press. 1989.
46. Sorlie PD, Johnson NJ. Validity of education information on the death certificate. Epidemiology 7(4): 437–9. 1996.
47. Kominski R, Adams A. Educational attainment in the United States, March 1993 and 1992. U.S. Bureau of the Census. Current Population reports: series p20–476. Washington: U.S. Government Printing Office. 1994.
48. Ventura SJ, Martin JA, Curtin SC, et al. Births: Final data for 1999. National vital statistics reports; vol 49 no 1. Hyattsville, Maryland: National Center for Health Statistics. 2001.
49. National Center for Health Statistics. Vital statistics, computer edits for mortality data, effective 1999. NCHS instruction manual; part 11. Hyattsville, Maryland: Public Health Service. 1998.
50. National Center for Health Statistics. Vital statistics, ICD–10 cause-of-death querying, 1999. NCHS instruction manual; part 20. Hyattsville, Maryland: Public Health Service. 1999.
51. U.S. Bureau of the Census. Unpublished census file NESTV99. Consistent with populations published in: U.S. population estimates, by age, sex, race, and Hispanic origin: 1990–1999. Washington, DC. 2000.
52. National Center for Health Statistics. Technical appendix. Vital statistics of the United States, 1990, vol II, mortality, part A. Washington: Public Health Service. 1994.
53. U.S. Bureau of the Census. Population estimates for 1999 based on unpublished tabulations prepared by the Housing and Household Economic Statistics Division.
54. U.S. Bureau of the Census. Population estimates for the U.S. and States by single year of age and sex: July 1, 1999. Internet release date: March 9, 2000. http://www.census.gov/population/estimates/state/stats/st-99–10.txt.
55. U.S. Bureau of the Census. Unpublished Census file PUERTO99.
56. U.S. Bureau of the Census. Unpublished Census file USVI99.WK1.
57. U.S. Bureau of the Census. Unpublished Census file GUAM99.WK1.
58. U.S. Bureau of the Census. Unpublished Census file ASAMOA99.WK1.
59. U.S. Bureau of the Census. Unpublished Census file CNMI99.WK1.
60. U.S. Bureau of the Census. Money income in the United States: 1998. Current population reports, consumer income. Series P60–206. Washington: U.S. Government Printing Office. 1999.
61. U.S. Bureau of the Census. Money income in the United States: 1999. Current population reports, consumer income. Series P60–209. Washington: U.S. Government Printing Office. 2000.
62. Minino AM. A guide to State implementation of ICD–10 for mortality, part II: Applying comparability ratios. Hyattsville, Maryland: National Center for Health Statistics. 2000.
63. Feinleib M, Zarate AO, eds. Reconsidering age adjustment procedures: Workshop proceedings. National Center for Health Statistics. Vital Health Stat 4(29). 1992.