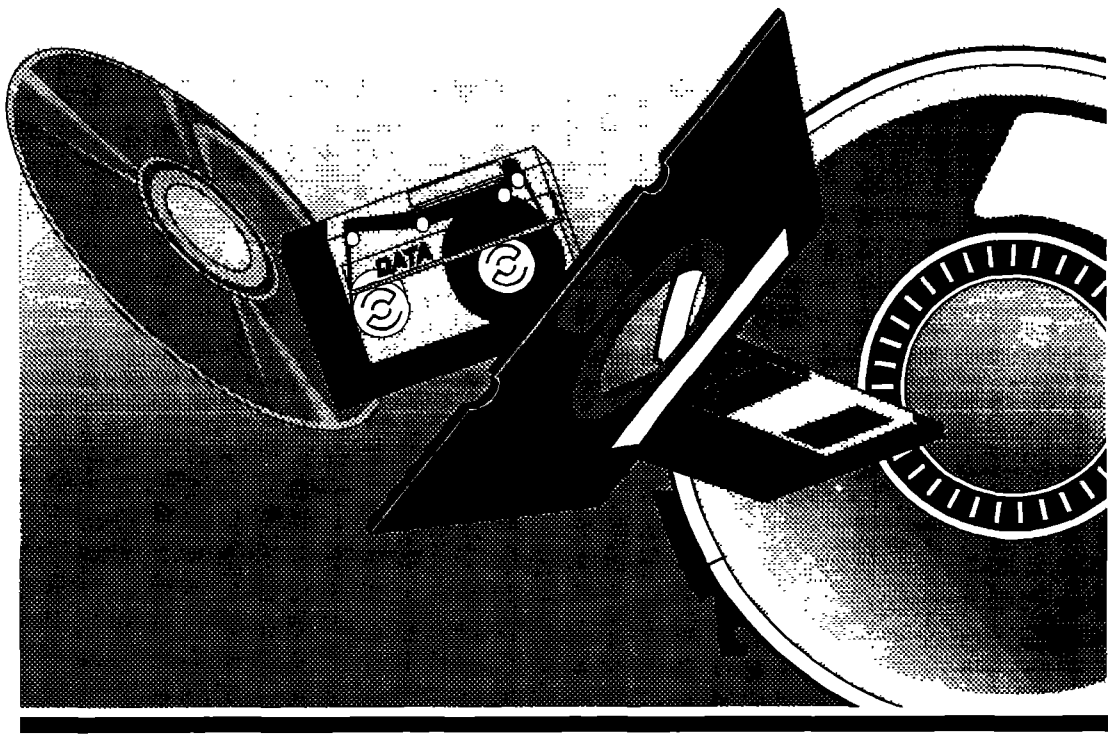
Public Use Data File Documentation

Linked Birth/Infant Death Data Set: 1989 Birth Cohort



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This tape documentation was prepared in the Division of Vital Statistics. David Johnson of the Systems and Programming Branch and Kate Prager, previously of the Mortality Statistics Branch were responsible for developing the linked birth/infant death data set documentation. Linda Biggar of the Systems and Programming Branch and Marian MacDorman of the Mortality Statistics Branch were responsible for providing all needed modifications to keep it up-to-date. Bettie L. Hudson of the Mortality Statistics Branch coordinated preparation of the Mortality Technical Appendices. Joyce A. Martin of the Natality, Marriage and Divorce Statistics Branch coordinated preparation of the Natality Technical Appendix. The Registration Methods Branch and the Technical Services Branch provided consultation to State vital statistics offices regarding collection of birth and death certificate data.

Questions concerning the documentation or general questions concerning the linked file should be directed to the Systems and Programming Branch, Division of Vital Statistics, NCHS, 6525 Belcrest Road, Room 840, Hyattsville, MD 20782 Ph: (301) 436-8900.

Questions concerning the Mortality Technical Appendices or substantive questions concerning the data should be directed to the Mortality Statistics Branch, Division of Vital Statistics, NCHS, 6525 Belcrest Road, Room 840, Hyattsville, MD 20782 Ph: (301) 436-8884.

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SYMBOLS USED IN TABLES

Symbol	Explanation
---	Data not available
...	Category not applicable
-	Quantity zero
0.0	Quantity more than 0 but less than 0.05
*	Figure does not meet standards of reliability or precision

Linked Birth/Infant Death Data Set: 1989 Birth Cohort

Introduction

The Linked Birth/Infant Death Data Set, 1989 Birth Cohort consists of three separate data files. The first file includes linked records of live births and infant deaths for the 1989 birth cohort -- also referred to as the numerator file. The second file is the live birth file for 1989, with a few minor modifications -- referred to as the denominator-plus file. The files are offered as a numerator/denominator data set to give users the means to compute infant mortality rates. The third file contains information from the death certificate for all infant death records which could not be linked to their corresponding birth certificates -- referred to as the unlinked death file.

The 1989 linked file is comprised of deaths to infants born in 1989 who died in 1989 or 1990 before their first birthday. Infant death records were extracted from the 1989 and 1990 National Center for Health Statistics (NCHS) mortality statistical files. Linked birth records were extracted from a denominator file that contained the 1989 NCHS natality statistical file and a small number of late-filed birth certificates. Refer to the Methodology section for a more detailed explanation of records added to the statistical file. The denominator file is not identical with the NCHS natality statistical file.

The linked file of live births and infant deaths <u>includes</u> linked records for births and deaths that occurred in the United States to U.S. residents and to U.S. nonresidents. <u>Excluded</u> are deaths that occurred outside the United States to infants born in the U.S.; deaths that occurred in the United States to foreign-born infants; and births and deaths that occurred outside the United States to U.S. residents.

Sources for denominator data and for birth records included in the numerator file are described in detail in the 1989 Technical Appendix from the Natality Annual Volume; sources for death records included in the numerator file are described in detail in the 1989 and 1990 Technical Appendices, from the Mortality Annual Volumes. Copies of these Technical Appendices are included in this tape documentation.

Because of confidentiality concerns, only those counties of 250,000 or more population and only those cities of 250,000 or more population are identified in this data set. The population counts are based on the results of the 1980 census. Users should refer to the geographic code outline in this document for the list of available areas and codes.

In tabulations of linked data and denominator data, events occurring in the United States to U.S. nonresidents are included in tabulations that are by place of occurrence, and excluded from tabulations by place of residence. For linked data, these exclusions are based on the usual place of residence item of the mother. This item is contained in both the denominator file and the birth section of the numerator (linked) file. U.S. nonresidents are identified by a code 4 in location 11 of these files.

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, linking the two records that are filed in different jurisdictions requires State cooperation for the exchange of records. In accordance with the terms of the "Association for Vital Records and Health Statistics Agreement for Administering the Vital Records Exchange System," 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 computerized linked files from States that had them and extracted only the birth and death certificate numbers for linked records and State and year of occurrence. The States of Arizona and Nevada provided linkage information by posting birth certificate numbers on a

computer-generated list of infant death certificate numbers that was provided by NCHS. A file that contained only State-provided identifiers for linked certificates was then matched to the NCHS mortality and natality 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 of death copies or computer lists of unlinked infant death certificates for followup 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.

If the linking birth certificate from another State had been renumbered, the State of death requested the original certificate number from the State of birth. If the linked birth certificate had been filed after NCHS closed its statistical files, States provided NCHS with a copy of the late-filed birth certificate. These certificates were coded, keyed, processed, added to the denominator file and then linked to the infant death record. Approximately 300 late-filed records were added to the denominator.

The birth record in the denominator file includes an item in tape location 1 that identifies whether or not the record is linked to an infant death. This item is included in the denominator record for users who would want to identify individual records for which the infant died in the first year of life, or survived.

Changes Beginning with the 1989 Birth Cohort

Beginning with data for 1989, the U.S. Standard Certificate of Birth was redesigned to add a number of new items and to expand some previously reported items. Items that were added or changed from an open-ended to a checkbox format include: medical risk factors for the pregnancy, smoking, alcohol use, weight gain of the mother during pregnancy, obstetric procedures, complications of labor and/or delivery, method of delivery, abnormal conditions of the newborn, and congenital anomalies of child. An item on clinical estimate of gestation was also added, and the Hispanic-origin reporting area was expanded substantially.

The addition of these new items nearly doubled the record length of the 1989 Natality data tape. Because of this, the linked file record layout was redesigned beginning with 1989 data to create a more compact record layout while including all of the new information from the expanded birth certificate. In addition, a

number of innovations were added to the linked file, primarily to respond to requests from data users.

Selected variables from the numerator file have been added to the denominator file to facilitate processing. These variables are age at death (and recodes), underlying cause of death (and the 61-cause recode), autopsy, and place of accident. These variables are the most widely used variables from the numerator file. With the previous file format it was sometimes necessary to combine the numerator and denominator files when performing certain multivariate statistical techniques. In fact, NCHS received several calls each year asking how best to combine the numerator and denominator files while eliminating duplicate records. Now, when the number of variables required from the numerator file is limited, the denominator file may be used by itself for ease of programming. It is hoped that this small alteration in file structure will make the linked birth/infant death data set more convenient to use.

Infant death identification numbers have been added to both the numerator and denominator files, so that the same infant can be uniquely identified and matched between the two files. These numbers bear no relationship to birth or death certificate numbers, but are sequential numbers created solely for the purpose of identifying records for the same infant between the numerator and denominator files. This innovation will enhance processing of the file, as additional data from the numerator file can now be directly matched and imported into the denominator file.

Other new variables added to the file in 1989 include: exact age at death of the infant in days, day of the week of birth and death, and month of the year of birth and death.

Finally, a separate file of infant death records which could not be linked to their corresponding birth records has been added to provide additional information on unlinked records. 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 1-88, reserved for information from the matching birth certificate, are blank since no matching birth certificate could be found for these records. Both race and sex of child (tape locations 209-210 and 77-78, respectively) contain information as reported on the death certificate, rather than the information as reported on the birth certificate as is the case with the linked record file. 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. This unlinked file has been added to provide additional information on unmatched records so

that data users who wish to make adjustments to the data (such as weighting) can do so.

Percent of Records Linked

The 1989 birth cohort linked file includes 38,605 linked records representing 97.4 percent of the infant deaths to the 1989 birth cohort. After followup, records for some 1,029 infant deaths, or 2.6 percent of the deaths to the birth cohort, remained unlinked. These records are contained in the unlinked file. Documentation table 6 presents summary information about the unlinked death records. The table 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 at the time of death; whereas, tables 2-5 present data from the linked file in which the race and residence items are based on information reported at the time of birth. For more information, see discussions about race and residence on pages 4-5 of the Natality Technical Appendix and about infant deaths on pages 11-14 of the Mortality Technical Appendix in this documentation.

While the overall percent linked for infant deaths in the 1989 birth cohort is 97.4%, 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 residence. 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 Louisiana (91.4), Ohio (90.9) and Oklahoma (83.4). When a high percentage of deaths remain unlinked, infant mortality rates computed for these States are underestimated. Thus, caution must be used in comparing infant mortality rates by State from the linked file.

The percent of infant deaths linked by race and age at death is shown in Table 2. The percent linked for black infants is 96.9, lower than the percent linked for white infants (97.7). In general, a higher percentage of postneonatal (97.9), than neonatal deaths (97.1) are linked, and the percentage for early neonatal deaths (96.9) is lower still. Again, the lower the percent linked the more likely that infant mortality rates computed for these groups will be slightly underestimated. Also, since most early neonatal deaths are to very low birthweight infants, and since black infants are more likely to be born at very low birthweight, the patterns in percentage linked provide

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Table 1. Percent of infant deaths linked by State of residence: United States, 1989 birth cohort

(For linked infant deaths, State of residence is at the time of birth. For unlinked infant deaths, State of residence is at the time of death.)

United States	97.4%	Montana	98.5%
Alabama	100.0%	Nebraska	99.5%
Alaska	96.3%	Nevada	98.8%
Arizona	99.2%	New Hampshire	100.0%
Arkansas	98.9%	New Jersey	96.8%
California	96.0%	New Mexico	98.3%
Colorado	99.8%	New York	97.9%
Connecticut	98.6%	Upstate	97.9%
Delaware	100.0%	City	97.9%
District of Columbia	96.6%	North Carolina	98.6%
Florida	99.8%	North Dakota	100.0%
Georgia	99.9%	Ohio	90.9%
Hawaii	97.4%	Oklahoma	83.4%
Idaho	99.4%	Oregon	100.0%
Illinois	98.5%	Pennsylvania	95.4%
Indiana	97.3%	Rhode Island	100.0%
Iowa	99.4%	South Carolina	100.0%
Kansas	98.8%	South Dakota	99.1%
Kentucky	98.4%	Tennessee	99.6%
Louisiana	91.4%	Texas	95.6%
Maine	100.0%	Utah	99.3%
Maryland	96.2%	Vermont	100.0%
Massachusetts	99.3%	Virginia	98.0%
Michigan	99.3%	Washington	99.7%
Minnesota	100.0%	West Virginia	98.1%
Mississippi	98.4%	Wisconsin	97.8%
Missouri	99.5%	Wyoming	98.3%

Table 2. Percent of infant deaths linked by race and age at death: United States, 1989 birth cohort

(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)

	All races	White	Black
Infant	97.4%	97.7%	96.9%
Total Neonatal	97.1%	97.5%	96.4%
Early Neonatal	96.9%	97.4%	96.0%
Late Neonatal	98.2%	98.2%	98.6%
Postneonatal	97.9%	97.9%	97.7%

indirect evidence of lower linkage rates for very low birthweight infants. This hypothesis is supported by relatively low infant mortality rates for infants with birthweights under 500 grams for a few States (data not shown). Variations in percent matched by underlying cause of death have also been noted, particularly a slightly lower percent matched for ICD-9 No. 765 - Disorders relating to short gestation and unspecified low birthweight (data not shown). So, although the data is generally of good quality, variations in the percent of records linked should be taken into account when comparing infant mortality rates for particular States, race groups, age, or birthweight categories.

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. While not absolutely essential to the proper interpretation of the data for a number of general applications, these documents should nevertheless be studied carefully prior to any detailed analysis of demographic or medical (especially multiple cause) 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.

A. Manual of the International Statistical Classification of Diseases, Injuries, and the Cause-of-Death, Ninth Revision (ICD-9) Volumes 1 and 2.

B. NCHS Instruction Manual Data Preparation Part 2a, Vital Statistics Instructions for Classifying the Underlying Cause-of-Death. Published annually.

C. NCHS Instruction Manual Data Preparation, Part 2b, Vital Statistics Instructions for Classifying Multiple Cause-of-Death. Published annually.

D. NCHS Instruction Manual Data Preparation, Part 2c, Vital Statistics ICD-9 ACME Decision Tables for Classifying Underlying Causes-of-Death. Published annually.

E. NCHS Instruction Manual Data Preparation, Part 2d, Vital Statistics NCHS Procedures for Mortality Medical Data System File Preparation and Maintenance, Effective 1985.

F. NCHS Instruction Manual Data Tabulation, Part 2f, Vital Statistics ICD-9 TRANSAX Disease Reference Tables for Classifying Multiple Causes-of-Death, 1982-85.

G. NCHS Instruction Manual Part 2g, Vital Statistics, Data Entry Instructions for the Mortality Medical Indexing, Classification, and Retrieval system (MICAR). Published annually.

H. NCHS Instruction Manual Part 2h, Vital Statistics, Dictionary of Valid Terms for the Mortality Medical Indexing, Classification, and Retrieval System (MICAR). Published annually.

I. NCHS Instruction Manual Data Preparation, Part 3a, Vital Statistics Classification and Coding Instructions for Live Birth Records. Published annually.

J. NCHS Instruction Manual Data Preparation, Part 4, Vital Statistics Demographic Classification and Coding Instructions for Death Records. Published annually.

K. NCHS Instruction Manual Tabulation, Part 11, Vital Statistics Computer Edits for Mortality Data, Effective 1989.

Volumes 1 and 2 of the ICD-9 may be purchased from WHO Publication Center USA, 49 Sheridan Avenue, Albany, New York, 12210. The remaining documents may be requested from the Chief, Data Preparation Branch, Division of Data Processing, National Center for Health Statistics, P.O.Box 12214, Research Triangle Park, North Carolina 27709.

In addition, the user should refer to the Technical Appendices of the Vital Statistics of the United States for information on the source of data, coding procedures, quality of the data, etc. The Technical Appendices for natality and mortality are part of this documentation package.

Cause-of-Death Data

Mortality data are traditionally analyzed and published in terms of underlying cause-of-death. The underlying cause-of-death data are coded and classified as described in the 1989 and 1990 Mortality Technical Appendices. NCHS has augmented underlying cause-of-death data with data on multiple causes reported on the death certificate. The linked file includes both underlying and multiple cause-of-death data.

The multiple cause of death codes were developed with two objectives in mind. First, to facilitate etiological studies of the relationships among conditions, it was necessary to reflect accurately in coded form each condition and its location on the death certificate in the exact manner given by the certifier.

Secondly, coding needed to be carried out in a manner by which the underlying cause of death could be assigned through computer applications. The approach was to suspend the linkage provisions of the ICD for the purpose of condition coding and code each entity with minimum regard to other conditions present on the certification. This general approach is hereafter called entity coding.

Unfortunately, the set of multiple cause codes produced by entity coding is not conducive to a third objective -- 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 certificate and modified or linked to such conditions as provided by ICD-9. By definition, the entity data cannot meet this requirement since the linkage provisions distort the character and placement of the information originally recorded by the certifying physician.

Since the two objectives are incompatible, NCHS has chosen to create from the original set of entity codes a new code set called record axis multiple cause data. Essentially, the axis of classification has been converted from an entity basis to a record (or person) basis. The record axis codes are assigned in terms of the set of codes that best describe the overall medical certification portion of the death certificate.

This translation is accomplished by a computer system called TRANSAX (TRANSLATION OF AXIS) through selective use of 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 which are free of contradictions and are the most precise within the constraints of ICD-9 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-9 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 5715 (cirrhosis of liver without mention of alcohol) and 303 (alcohol dependence syndrome). Tabulation of records with 5715 would on the surface falsely imply that such records had no mention of alcohol. A preferable codification would be 5712 (alcoholic cirrhosis of liver) in lieu of both 5715 and 303.

Case 2: If "gastric ulcer" and "bleeding gastric ulcer" are reported on a record they are coded to 5319 (gastric ulcer, unspecified as acute or chronic, without mention of hemorrhage or perforation) and 5314 (gastric ulcer, chronic or unspecified, with hemorrhage). A more concise codification would be to code 5314 only since the 5314 shows both the gastric ulcer and the bleeding.

A. 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 tape. The following paragraphs describe the format and application of entity axis data.

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 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 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-9 cause code.

4. Nature of injury flag: ICD-9 uses the same series of numbers (800-999) to indicate nature of injury (N codes) and external cause codes (E codes). This flag distinguishes between the two with a one (1) representing nature of injury codes and a zero (0) representing all other cause codes.

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.

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 Part 11 of the NCHS Vital Statistics Instruction Manual Series.

ENTITY AXIS APPLICATIONS: The entity axis multiple cause data is appropriate to analyses which 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 certificate. Within this framework, the entity data are appropriate to the examination of etiological relationships among conditions, accuracy of certification reporting, and the validity of traditional assumptions in underlying cause selection.

Additionally, the entity data provide in certain categories a more detailed code assignment which is linked out in the creation of record axis data. Where such detail is needed for a study, the user should selectively employ entity data. Finally, the researcher may not wish to be bound by the assumptions used in the axis translation process preferring rather to investigate hypotheses of his own predilection.

By definition, the main limitation of entity axis data is that an entity code 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 5750 is titled "Acute cholecystitis without mention of calculus". Within the framework of entity codes this is interpreted to mean

that the codable entity itself contained no mention of calculus rather than that calculus was not mentioned anywhere on the record. Tabulation of records with a "5750" as a count of persons having acute cholecystitis without mention of calculus would therefore be erroneous. This illustrates the fact that under entity coding the ICD-9 titles cannot be taken literally. The user must study the rules for entity coding as they relate to his/her research prior to utilization of entity data. The user is further cautioned that the inclusion notes in ICD-9 which relate to modifying and combining categories are seldom applicable to entity coding (except where provided in Part 2b of the Vital Statistics Instruction Manual Series).

In tabulating the entity axis data, one may count codes with the resultant tabulation of an individual code representing the number of times the disease(s) represented by the code appears in the file. In this kind of tabulation of morbid condition prevalence, 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.

B. Record Axis Codes

The following paragraphs describe the format and application of record-axis data. Part 2f of the Vital Statistics Instruction Manual Series describes the TRANSAX process for creating record axis data from entity axis data.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-9 cause code.
2.	Nature of injury flag:	The last byte contains a 0 or 1 with the 1 indicating that the cause is a nature of injury category.

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.

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.

RECORD AXIS APPLICATIONS: The record axis multiple cause data set is the basis for NCHS core multiple cause tabulations. Location of codes is not relevant to this data set 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-9 category. This is in contrast to the entity code which is assigned each time such a disease is reported on two different lines of the certification. Secondly, the linkage implies that within the constraints of ICD-9 the most meaningful code has been assigned. The translation process creates for the user a data set which 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. Likewise, they are comparable to general morbidity coding where the linkage provisions of ICD-9 are usually utilized. 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-9 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-9 are utilized. (See Part 2f of the Vital Statistics Instruction Manual Series.)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 which combine individual cause categories must take into account the possible interaction of up to 20 codes on a single certificate.

In using the NCHS multiple cause data, the user is urged to review the information in this document and its references. The instructional material does change from year to year and revision to revision. The user is cautioned that coding of specific ICD-9 categories should be checked in the appropriate instruction manual. What may appear on the surface to be the correct code by ICD-9 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 Part 2f of the Vital Statistics Instruction Manual Series 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 assumptions of axis translation. In certain situations, a combination of entity and record axis data may be the more appropriate alternative.

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Machine/File/Data Characteristics:

I. Denominator File:

A.	Machine used:	IBM/3081
B.	Language used:	PL/I
C.	File Organization:	One file, multiple tapes
D.	Record Format:	Blocked, fixed format
E.	Record count:	4,045,881
F.	Record length:	225
G.	Blocksize:	32625
H.	Recording mode:	IBM/EBCDIC 8-bit code
J.	Last block	May be a short block
I.	Code Scheme	Numeric/Alphabetic/Blank
K.	Data counts:	a. By occurrence: 4,045,881
		b. By residence: 4,041,146
		c. To foreign residents: 4,735

II. Numerator File:

A.	Machine used:	IBM/3081
B.	Language used:	PL/I
C.	File Organization:	One file, one tape
D.	Record Format:	Blocked, fixed format
E.	Record count:	38,605
F.	Record length:	535
G.	Blocksize:	32635
H.	Recording mode:	IBM/EBCDIC 8-bit code
J.	Last block	May be a short block
I.	Code Scheme	Numeric/Alphabetic/Blank
K.	Data counts:	a. By occurrence: 38,605
		b. By residence: 38,578
		c. To foreign residents: 27

III. Unlinked File:

A.	Machine used:	IBM/3081
B.	Language used:	PL/I
C.	File Organization:	One file, one tape
D.	Record Format:	Blocked, fixed format
E.	Record count:	1,029
F.	Record length:	535
G.	Blocksize:	32635
H.	Recording mode:	IBM/EBCDIC 8-bit code
J.	Last block	May be a short block
I.	Code Scheme	Numeric/Alphabetic/Blank
K.	Data counts:	a. By occurrence: 1,029
		b. By residence: 1,027
		c. To foreign residents: 2

Linked Birth/Infant Death Data Set

List of Data Elements and Locations

	Data Items	Denominator-Plus File	Numerator File Birth	Numerator File Death	Unlinked File
1.	General				
a.	Match status	1	1	--	1
b.	Infant death number	2-6	2-6	--	--
c.	Year of birth	7-10	7-10	--	7-10*
d.	Year of death	--	--	522-525	522-525
e.	Resident status	11	11	505	505
2.	Occurrence				
a.	FIPS state	14-15	14-15	506-507	506-507
b.	FIPS county	16-18	16-18	508-510	508-510
3.	Residence				
a.	FIPS state	19-20	19-20	511-512	511-512
b.	FIPS county	21-23	21-23	513-515	513-515
c.	NCHS state	24-25	24-25	516-517	516-517
d.	NCHS city	26-28	26-28	518-520	518-520
4.	Infant				
a.	Age	213-216	--	213-216	213-216+
b.	Race	209-210	209-210	--	209-210*
c.	Sex	77-78	77-78	--	77-78*
d.	Gestation	72-76	72-76	--	--
e.	Birthweight	79-85	79-85	--	--
f.	Plurality	86-87	86-87	--	--
g.	Apgar score	88-91	88-91	--	--
h.	Day of week of birth/death	207	207	528	528
i.	Month of birth/death	69-71	69-71	526-527	526-527
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.	Education	67-68	67-68	--	--
d.	Hispanic origin	63-64	63-64	--	--

Linked Birth/Infant Death Data Set

List of Data Elements and Locations

	Data Items	Denominator-Plus File	Numerator File Birth	Numerator File Death	Unlinked File
7.	Pregnancy items				
a.	Interval since last live birth	57-59	57-59	--	--
b.	Month prenatal care began	51-53	51-53	--	--
c.	Number of prenatal visits	54-55	54-55	--	--
d.	Adequacy of care recode	56	56	--	--
e.	Total birth order	47-48	47-48	--	--
f.	Live birth order	49-50	49-50	--	--
8.	Medical and Health Data				
a.	Method of delivery	92-99	92-99	--	--
b.	Medical risk factors	101-117	101-117	--	--
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	130-136	130-136	--	--
e.	Complications of labor and/or delivery	138-153	138-153	--	--
f.	Abnormal conditions of the newborn	155-163	155-163	--	--
g.	Congenital anomalies	165-186	165-186	--	--
h.	Underlying cause of death	219-222	--	219-222	219-222
i.	61 Infant cause recode	223-225	--	223-225	223-225
j.	Multiple conditions	--	--	261-504	261-504
9.	Other items				
a.	Place of delivery	12	12	--	--
b.	Attendant at birth	13	13	--	--
c.	Hospital and patient status	--	--	521	521
d.	Autopsy performed	217	--	--	217
e.	Place of accident	218	--	--	218
f.	Residence reporting flags	187-204	187-204	--	--

* For the unlinked file, these items are from the death certificate. See section on Changes Beginning with 1989 Data for explanation.

\+ 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 1989 Data for explanation.

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Denominator-Plus Record and Natality Section of Numerator (Linked) Record

Item Location	Item Length	Variable Name, Item and Code Outline
1	1	**MATCHS** **Match Status** 1 ... Matched Birth/Infant Death Record 2 ... Late Filed Matched Birth/Infant Death Record 3 ... Surviving infant record 4 ... Unmatched infant death record Note: This code is used in the unlinked record file only.
2-6	5	**IDNUMBER** **Infant Death Number** This number uniquely identifies the same infant in the numerator and denominator-plus files.

Locations 7-212 of the linked file contain data from the Birth Certificate.
Locations 213-535 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.

7-10	4	**BIRYR** **Year of Birth** 1989 ... Born in 1989
11	1	**RESSTATB** **Resident Status - Birth** 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.
12	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

Item Location	Item Length	Variable Name, Item and Code Outline
13	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
14-18	5	**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.
14-15	2	**STOCCFIPB** **State of Occurrence (FIPS) - Birth** 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

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

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Denominator-Plus Record and Natality Section of Numerator (Linked) Record

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

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

Item Location	Item Length	Variable Name, Item and Code Outline
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
24-25	2	**BRSTATE** **State Residence - NCHS Codes - Birth** 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

Item Location	Item Length	Variable Name, Item and Code Outline
24-25	2	**BRSTATE** **State of Residence - NCHS Codes - Birth (Cont'd)** 40 ... Rhode Island 41 ... South Carolina 42 ... South Dakota 43 ... Tennessee 44 ... Texas 45 ... Utah 46 ... Vermont 47 ... Virginia 48 ... Washington 49 ... West Virginia 50 ... Wisconsin 51 ... Wyoming 52-57,59 ... Foreign Residents 52 ... Puerto Rico 53 ... Virgin Islands 54 ... Guam 55 ... Canada 56 ... Cuba 57 ... Mexico 59 ... Remainder of the World
26-28	3	**CITYRESB** **City of Residence - NCHS Codes - Birth** A complete list of cities is shown in the Geographic Code Outline further back in this document. 001-nnn ... Cities are numbered alphabetically within each State and identify each city with a population of 250,000 or more in 1980. (Note: To uniquely identify a city, both the State and city codes must be used. State, county and city codes may als0 be used.) 999 ... Entire county, balance of county, or city less than 250,000 population ZZZ ... Foreign residents
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 10-49 code range. Blank ... Not imputed and reported age is not used 1 ... Reported age is used 2 ... Age is imputed

Item Location	Item Length	Variable Name, Item and Code Outline
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. 10-49 ... Age in single years
32	1	**MAGER8** **Age of Mother Recode 8** 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
33	1	**ORMOTH** **Hispanic Origin of Mother** Origin is not reported by all areas. See reporting flags. 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
34	1	**ORRACEM** **Hispanic Origin and Race of Mother Recode** Origin is not reported by all areas. See reporting flags. 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

Item Location	Item Length	Variable Name, Item and Code Outline
36-37	2	**MRACE** **Race of Mother** Race codes effective with 1989 data differ from previous years. 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 09 ... All other Races
38	1	**MRACE3** **Race of Mother Recode** 1 ... White 2 ... Races other than White or Black 3 ... Black
39-40	2	**DMEDUC** **Education of Mother Detail** Education is not reported by all areas. See reporting flags. 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** Education is not reported by all areas. See reporting flags. 1 ... 0 - 8 years 2 ... 9 - 11 years 3 ... 12 years 4 ... 13 - 15 years 5 ... 16 years and over 6 ... Not stated

Item Location	Item Length	Variable Name, Item and Code Outline
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** 1 ... Married 2 ... Unmarried
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

Item Location	Item Length	Variable Name, Item and Code Outline
44-45	2	**MPLBIR** **Place of Birth of Mother Cont'd** 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 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** 1 ... Born in the 50 States and D.C. 2 ... Born outside the 50 States and D.C. 3 ... Unknown or not stated
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** 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

Item Location	Item Length	Variable Name, Item and Code Outline
57-59	3	**DISLLB** **Interval Since Last Live Birth** This item was computed using date of birth of the child and date of last live birth. 777 ... No previous live birth 000 ... Zero months (plural birth) 001-468 ... One - four hundred sixty-eight months 999 ... Unknown
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** Origin is not reported by all areas. See reporting flags. 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
64	1	**ORRACEF** **Hispanic Origin and Race of Father Recode** Origin is not reported by all areas. See reporting flags. 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
65-66	2	**FRACE** **Race of Father** Race codes effective with 1989 data differ from previous years. 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 09 ... All other races 99 ... Unknown or not stated
67-68	2	**DFEDUC** **Education of Father Detail** Education is not reported by all areas. See reporting flags 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

Item Location	Item Length	Variable Name, Item and Code Outline
69	1	**CDOBMIMP** **Month of Birth of Child Imputation Flag** Blank ... Month is not imputed 1 ... Month is imputed
70-71	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
72	1	**GESTFLG** **Clinical Estimate of Gestation Used or Gestation Imputed Flag** This position is flagged whenever gestation is imputed or the clinical estimate of gestation is used. It is used whenever gestation could not be computed or when the computed gestation is outside the 17-47 code range. Blank ... Not imputed and the clinical estimate of gestation is not used 1 ... Clinical estimate is used 2 ... Gestation is imputed
73-74	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
75-76	2	**GESTAT 10** **GESTATION RECODE 10** 01 ... Under 20 weeks 02 ... 20 - 27 weeks 03 ... 28 - 31 weeks 04 ... 32 - 35 weeks

Item Location	Item Length	Variable Name, Item and Code Outline
75-76	2	**GESTAT_10** **GESTATION RECODE 10 (Cont'd)** 05 ... 36 weeks 06 ... 37 - 39 weeks 07 ... 40 weeks 08 ... 41 weeks 09 ... 42 weeks and over 10 ... Not stated
77	1	**CSEXIMP** **Sex Imputation Flag** Blank ... Sex is not imputed 1 ... Sex is imputed
78	1	**CSEX** **Sex** 1 ... Male 2 ... Female
79-82	4	**DBIRWT** **Birth Weight Detail in Grams** 0227-8165 ... Number of grams 9999 ... Not stated birth weight
83-84	2	**BIRWT12** **Birth Weight Recode 12** 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
85	1	**BIRWT4** **Birth Weight Recode 4** 1 ... 1499 grams or less 2 ... 1500-2499 grams 3 ... 2500 grams or more 4 ... Unknown or not stated
86	1	**PLURIMP** **Plurality Imputation Flag** Blank ... Plurality is not imputed 1 ... Plurality is imputed

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Denominator-Plus Record and Natality Section of Numerator (Linked) Record

Item Location	Item Length	Variable Name, Item and Code Outline
87	1	**DPLURAL** **Plurality** 1 ... Single 2 ... Twin 3 ... Triplet 4 ... Quadruplet 5 ... Quintuplet or higher
88-89	2	**OMAPS** **One Minute Apgar Score** Apgar score is not reported by all areas. See reporting flags. 00-10 ... A score of 1-10 99 ... Unknown or not stated
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**

Item Location	Item Length	Variable Name, Item and Code Outline
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**
97	1	**VACUUM** **Vacuum**
98	1	**R1** **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	1	**R2** **Reserved Position**
101-117	17	**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
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**

Item Location	Item Length	Variable Name, Item and Code Outline
106	1	**HYDRA** Hydramnios/Oligohydramnios
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	1	**R3** **Reserved Position**
130-136	7	**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
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**
137	1	**R4** **Reserved Position**

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Denominator-Plus Record and Natality Section of Numerator (Linked) Record

Item Location	Item Length	Variable Name, Item and Code Outline
138-153	16	**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
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**
149	1	**CEPHALO** **Cephalopelvic disproportion**
150	1	**CORD** **Cord prolapse**
151	1	**ANESTHE** **Anesthetic complications**

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Denominator-Plus Record and Natality Section of Numerator (Linked) Record

Item Location	Item Length	Variable Name, Item and Code Outline
152	1	**DISTRESS** **Fetal distress**
153	1	**OTHERLB** **Other Complication of Labor and/or Delivery**
154	1	**R5** **Reserved Position**
155-163	9	**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
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**
161	1	**VEN30M** **Assisted ventilation, 30 minutes or more**

Item Location	Item Length	Variable Name, Item and Code Outline
162	1	**NSEIZ** **Seizures**
163	1	**OTHERAB** **Other Abnormal Conditions of the Newborn**
164	1	**R6** **Reserved Position**
165-186	22	**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
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**
173	1	**TRACHEO** **Tracheo-esophageal fistula/Esophageal atresia**
174	1	**OMPHALO** **Omphalocele/Gastroschisis**
175	1	**GASTRO** **Other gastrointestinal anomalies**
176	1	**GENITAL** **Malformed genitalia**

1989
Denominator-Plus Record and Natality Section of Numerator (Linked) Record

Item Location	Item Length	Variable Name, Item and Code Outline
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
187-206	20	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.
187	1	ORIGM Origin of mother
188	1	ORIGF Origin of father
189	1	EDUCM Education of mother
190	1	EDUCF Education of father

Item Location	Item Length	Variable Name, Item and Code Outline
191	1	**GESTE** Clinical estimate of gestation
192	1	**OMAPSRF** 1-minute Apgar score
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	**R7** Reserved position
204	1	**EDUCSMSA** Education of Mother (Based on SMSA)
205-206	2	**R8** Reserved positions
207	1	**WEEKDAYB** Day of Week Child Born 1 ... Sunday 2 ... Monday 3 ... Tuesday 4 ... Wednesday 5 ... Thursday 6 ... Friday 7 ... Saturday

1989

Denominator-Plus Record and Natality Section of Numerator (Linked) Record

Item Location	Item Length	Variable Name, Item and Code Outline
208	1	**R9** **Reserved position**
209-210	2	**CRACE** **Race of Child** Race codes effective with 1989 data differ from previous years. 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 09 ... All other races
211-212	2	**R10** **Reserved positions**

Denominator-Plus Record and Mortality Section of Numerator (Linked) Record

Item Location	Item Length	Variable Name, Item and Code Outline
		Locations 213-535 contain data from the Death Certificate. Data in locations 213-225 are included on both the numerator and denominator-plus files. Data in locations 226-535 are included in the numerator file only. 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.
213-215	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
216	1	**AGER5** **Infant Age Recode 5** 1 ... Under 1 hour 2 ... 1-23 hours 3 ... 1-6 hours 4 ... 7-27 days (late neonatal) 5 ... 28 days and over (postneonatal)
217	1	**AUTOPSY** **Autopsy Performed** 1 ... Yes 2 ... No 8 ... Autopsy performed not on certificate 9 ... Autopsy performed not stated
218	1	**ACCIDPL** **Place of Accident for Causes E850-E869 and E880-E928** Blank ... Causes other than E850-E869 and E880-E928 0 ... Home 1 ... Farm 2 ... Mine and quarry 3 ... Industrial place and premises 4 ... Place for recreation and sport 5 ... Street and highway 6 ... Public building 7 ... Resident institution 8 ... Other specified places 9 ... Place of accident not specified

1989

Denominator-Plus Record and Mortality Section of Numerator (Linked) Record

Item Location	Item Length	Variable Name, Item and Code Outline
219-222	4	**UCOD** **ICD Code (9th Revision)** See the "International Classification of Diseases". 1975 Revision, Volume 1. For injuries and poisoning, the external cause is coded (E800-E999). rather than the Nature of Injury (800-899) These positions do not include the letter E for the external cause of injury. For those causes that do not have a 4th digit, location 222 is blank.
223-225	3	**UCODR61** **61 Infant Cause Recode** A recode of the ICD cause code into 61 groups for NCHS publications. Further back in this document is a complete list of recodes and the causes included. 010-680 ... Code range (not inclusive)

Here ends the Denominator-plus file. The layout for the Numerator (Linked) file continues on the next page.

Item Location	Item Length	Variable Name, Item and Code Outline
226-260	35	**R11** **Reserved Positions**
261-504	244	**MULTCOND** **Multiple Conditions** See the "International Classification of Diseases", 1975 Revision, Volume 1. Both the entity-axis and record-axis conditions are coded according to this revision (9th).
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 maximum of 20 conditions. Each condition takes 7 positions in the record. 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 9th 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**
298-304	7	**6th Condition**

1989
Mortality Section of Linked Record

Item Location	Item Length	Variable Name, Item and Code Outline
		ENTITY
263-402	140	ENTITY - AXIS CONDITIONS (Cont'd)
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
		RANUM
403-404	2	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. Records that do not have 20 conditions are blank in the unused area.
		Positions 1-4: Condition code (ICD 9th 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
405-409	5	1st Condition
410-414	5	2nd Condition

1989
Mortality Section of Linked Record

Item Location	Item Length	Variable Name, Item and Code Outline
405-504	100	RECORD RECORD - AXIS CONDITIONS Cont'd)
405-419	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

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.

Item Location	Item Length	Variable Name, Item and Code Outline
506-510	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.
506-507	2	**STOCCFIPD** **State of Occurrence (FIPS) - Death** 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

Item Location	Item Length	Variable Name, Item and Code Outline
506-507	5	**STOCCFIPD** **State of Occurrence (FIPS) - Death (Cont'd)** 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
508-510	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
511-515	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.
511-512	2	**STRESFIPD** **State of Residence (FIPS) - Death** 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

Item Location	Item Length	Variable Name, Item and Code Outline
511-512	2	**STRESFIPD** **State of Residence (FIPS) - Death (Cont'd)**

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

513-515	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
516-517	2	**DRSTATE** **State of Residence - NCHS Codes - Death**

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
50	...	Wisconsin
51	...	Wyoming

Item Location	Item Length	Variable Name, Item and Code Outline
516-517	2	**DRSTATE** **State of Residence - NCHS Codes - Death (Cond't)** 52-57,59 ... Foreign Residents 52 ... Puerto Rico 53 ... Virgin Islands 54 ... Guam 55 ... Canada 56 ... Cuba 57 ... Mexico 59 ... Remainder of the World
518-520	3	**CITYRESD** **City of Residence - NCHS Codes - Death** A complete list of cities is shown in the Geographic Code Outline further back in this document. 001-nnn ... Cities are numbered alphabetically within each State and identify each city with a population of 250,000 or more in 1980. (Note: To uniquely identify a city, both the State and city codes must be used. State, county and city codes may also be used.) 999 ... Balance of county ZZZ ... Foreign residents
521	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
522-525	4	**DTHYR** **Year of Death** 1989 ... Death occurred in 1989 1990 ... Death occurred in 1990

Item Location	Item Length	Variable Name, Item and Code Outline
526-527	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
528	1	**WEEKDAYD** **Day of Week of Death** 1 ... Sunday 2 ... Monday 3 ... Tuesday 4 ... Wednesday 5 ... Thursday 6 ... Friday 7 ... Saturday 9 ... Unknown
529-535	7	**R12** **Reserved positions**

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 and County Codes: For the 1989 linked file, the county codes and the State code immediately preceding them are FIPS codes. These codes were effective with the 1989 data year and are based on the results of the 1980 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.

NCHS State and City Codes: The city codes and the State codes immediately preceding them are NCHS codes. These codes were effective with the 1982 data year and are based on the results of the 1980 Census. 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; several western hemisphere countries or the remainder of the world are uniquely identified.

Listing of Counties Identified in the Linked Data Set

Vital Statistics Geographic Code Outline Effective With 1989 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
	097	Sonoma
	099	Stanislaus
	111	Ventura
08		Colorado
	005	Arapahoe
	031	Denver, coext. with Denver city
	041	El Paso
	059	Jefferson
09		Connecticut
	001	Fairfield
	003	Hartford
	009	New Haven
10		Delaware
	003	New Castle
11		District of Columbia
	001	District of Columbia
12		Florida
	009	Brevard
	011	Broward
	025	Dade
	031	Duval
	057	Hillsborough
	095	Orange
	099	Palm Beach
	103	Pinellas
	105	Polk
	127	Volusia

State	County	State and County Name
13		Georgia
	067	Cobb
	089	De Kalb
	121	Fulton
15		Hawaii
	003	Honolulu
16		Idaho
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
	017	Caddo
	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
26		Michigan
	049	Genesee
	065	Ingham
	081	Kent
	099	Macomb
	125	Oakland
	161	Washtenaw
	163	Wayne

State	County	State and County Name
27		Minnesota
	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
33		New Hampshire
	011	Hillsborough
34		New Jersey
	003	Bergen
	005	Burlington
	007	Camden
	013	Essex
	017	Hudson
	021	Mercer
	023	Middlesex
	025	Monmouth
	027	Morris
	029	Ocean
	031	Passaic
	039	Union
35		New Mexico
	001	Bernalillo
36		New York
	001	Albany
	029	Erie
	055	Monroe
	059	Nassau
	005	New York city
	065	Oneida
	067	Onondaga
	071	Orange
	087	Rockland
	103	Suffolk
	119	Westchester
37		North Carolina
	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

Listing of Counties Identified in the Linked Data Set

State	County	State and County Name
40		Oklahoma
	109	Oklahoma
	143	Tulsa
41		Oregon
	039	Lane
	051	Multnomah
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
	113	Dallas
	141	El Paso
	201	Harris
	215	Hidalgo
	245	Jefferson
	355	Nueces
	439	Tarrant
	453	Travis
49		Utah
	035	Salt Lake
50		Vermont
51		Virginia
	059	Fairfax
	710	Norfolk city
	810	Virginia Beach city
53		Washington
	033	King
	053	Pierce
	061	Snohomish
	063	Spokane

State	County	State and County Name
54		West Virginia
55		Wisconsin
	025	Dane
	079	Milwaukee
	133	Waukesha
56		Wyoming

State	County	State and County Name
00	000	Puerto Rico
00	000	Virgin Islands
00	000	Guam
00	000	Canada
00	000	Cuba
00	000	Mexico
00	000	Remainder of World

Listing of Cities Identified in the Linked Data Set

State	City	State and City Name
01		Alabama
	008	Birmingham
02		Alaska
03		Arizona
	011	Phoenix
	016	Tucson
04		Arkansas
05		California
	112	Long Beach
	115	Los Angeles
	146	Oakland
	186	Sacramento
	194	San Diego
	197	San Francisco
	200	San Jose
06		Colorado
	009	Denver
07		Connecticut
08		Delaware
09		District of Columbia
	001	Washington
10		Florida
	033	Jacksonville
	047	Miami
	086	Tampa
11		Georgia
	004	Atlanta
12		Hawaii
	004	Honolulu
13		Idaho
14		Illinois
	032	Chicago
15		Indiana
	027	Indianapolis
16		Iowa
17		Kansas
	033	Wichita
18		Kentucky
	016	Louisville
19		Louisiana
	024	New Orleans
20		Maine
21		Maryland
	003	Baltimore
22		Massachusetts
	012	Boston
23		Michigan
	023	Detroit

State	City	State and City Name
24		Minnesota
	035	Minneapolis
	055	St. Paul
25		Mississippi
26		Missouri
	026	Kansas City
	044	St. Louis
27		Montana
28		Nebraska
	011	Omaha
29		Nevada
30		New Hampshire
31		New Jersey
	094	Newark
32		New Mexico
	002	Albuquerque
33		New York
	009	Bronx borough, Bronx county
	010	Buffalo
	043	Brooklyn borough, Kings county
	060	Manhattan borough, New York county
	077	Queens borough, Queens county
	078	Staten Island borough, Richmond county
34		North Carolina
	008	Charlotte
35		North Dakota
36		Ohio
	028	Cincinnati
	030	Cleveland
	032	Columbus
	126	Toledo
37		Oklahoma
	023	Oklahoma City
	031	Tulsa
38		Oregon
	023	Portland
39		Pennsylvania
	096	Philadelphia
	098	Pittsburgh
40		Rhode Island
41		South Carolina
42		South Dakota
43		Tennessee
	026	Memphis
	030	Nashville-Davidson
44		Texas
	009	Austin
	036	Dallas
	047	El Paso
	052	Fort Worth
	066	Houston
	121	San Antonio

State	City	State and City Name
45		Utah
46		Vermont
47		Virginia
	021	Norfolk
	032	Virginia Beach
48		Washington
	030	Seattle
49		West Virginia
50		Wisconsin
	032	Milwaukee
51		Wyoming

Listing of Cities Identified in the Linked Data Set

State	City	State and City Name
52	ZZZ	Puerto Rico
53	ZZZ	Virgin Islands
54	ZZZ	Guam
55	ZZZ	Canada
56	ZZZ	Cuba
57	ZZZ	Mexico
59	ZZZ	Remainder of World

ST: 1 = Subtotal Limited: Sex: 1 = Males; 2 = Females
Length = of Cause Title Age: 1 = 5 & Over; 2 = 10-54; 3 = 28 Days & Over

***** Cause Subtotals are not Identified in this File *****

61 Recode	S T	Limited Sex	Age	Len- gth	Cause Title And ICD-9 Codes Included
010				039	Certain intestinal infections (008-009)
020				020	Whooping cough (033)
030				029	Meningococcal infection (036)
040			3	016	Septicemia (038)
050				024	Viral diseases (045-079)
060				025	Congenital syphilis (090)
070				110	Remainder of infectious and parasitic diseases (001-007,010-032,034-035,037,039-041,*042-*044,080-088,
080				089	Malignant neoplasms, including neoplasms of lymphatic and hematopoietic tissues (140-208)
090				108	Benign neoplasms, carcinoma in situ, and neoplasms of uncertain behavior and of unspecified nature (210-239)
100				030	Diseases of thymus gland (254)
110				023	Cystic fibrosis (277.0)
120				052	Diseases of blood and blood-forming organs (280-289)
130				020	Meningitis (320-322)
140				059	Other diseases of nervous system and sense organs (323-389)
150				044	Acute upper respiratory infections (460-465)
160				042	Bronchitis and bronchiolitis (466,490-491)
170	1			033	Pneumonia and influenza (480-487)
180				021	Pneumonia (480-486)
190				017	Influenza (487)
200				061	Remainder of diseases of respiratory system (470-478,492-519)
210				093	Hernia of abdominal cavity and intestinal obstruction without mention of hernia (550-553,560)
220				075	Gastritis, duodenitis, and noninfective enteritis and colitis (535,555-558)
230				067	Remainder of diseases of digestive system (520-534,536-543,562-579)
240	1			030	Congenital anomalies (740-759)
250				042	Anencephalus and similar anomalies (740)
260				020	Spina bifida (741)
270				034	Congenital hydrocephalus (742.3)
280				092	Other congenital anomalies of central nervous system and eye (742.0-742.2,742.4-742.9,743)
290				041	Congenital anomalies of heart (745-746)
300				056	Other congenital anomalies of circulatory system (747)
310				050	Congenital anomalies of respiratory system (748)
320				052	Congenital anomalies of digestive system (749-751)
330				056	Congenital anomalies of genitourinary system (752-753)
340				058	Congenital anomalies of musculoskeletal system (754-756)
350				025	Down's syndrome (758.0)
360				043	Other chromosomal anomalies (758.1-758.9)
370				062	All other and unspecified congenital anomalies (744,757,759)

ST: 1 = Subtotal Limited: Sex: 1 = Males; 2 = Females
Length = of Cause Title Age: 1 = 5 & Over; 2 = 10-54; 3 = 28 Days & Over

***** Cause Subtotals are not Identified in this File *****

61 Recode	ST	Limited Sex	Age	Len-gth	Cause Title And ICD-9 Codes Included
380	1			064	Certain conditions originating in the perinatal period (760-779)
390				091	Newborn affected by maternal conditions which may be unrelated to present pregnancy (760)
400				063	Newborn affected by maternal complications of pregnancy (761)
410				074	Newborn affected by complications of placenta, cord, and membranes (762)
420				069	Newborn affected by other complications of labor and delivery (763)
430				048	Slow fetal growth and fetal malnutrition (764)
440				077	Disorders relating to short gestation and unspecified low birthweight (765)
450				065	Disorders relating to long gestation and high birthweight (766)
460				020	Birth trauma (767)
470	1			047	Intrauterine hypoxia and birth asphyxia (768)
480				051	Fetal distress in liveborn infant (768.2-768.4)
490				032	Birth asphyxia (768.5-768.9)
500				037	Respiratory distress syndrome (769)
510				047	Other respiratory conditions of newborn (770)
520				051	Infections specific to the perinatal period (771)
530				027	Neonatal hemorrhage (772)
540				094	Hemolytic disease of newborn, due to isoimmunization, and other perinatal jaundice (773-774)
550				088	Syndrome of "infant of a diabetic mother" and neonatal diabetes mellitus (775.0-775.1)
560				040	Hemorrhagic disease of newborn (776.0)
570				098	All other and ill-defined conditions originating in the perinatal period (775.2-775.9,776.1-779)
580	1			053	Symptoms, signs, and ill-defined conditions (780-799)
590				038	Sudden infant death syndrome (798.0)
600				075	Symptoms, signs, and all other ill-defined conditions (780-797,798.1-799)
610	1			041	Accidents and adverse effects (E800-E949)
620				118	Inhalation and ingestion of food or other object causing obstruction of respiratory tract or suffocation (E911-E912)
630				042	Accidental mechanical suffocation (E913)
640				067	Other accidental causes and adverse effects (E800-E910,E914-E949)
650	1			020	Homicide (E960-E969)
660				047	Child battering and other maltreatment (E967)
670				038	Other homicide (E960-E966,E968-E969)
680				027	All other causes (Residual)

DOCUMENTATION TABLE 1

LIVE BIRTHS BY STATE OF OCCURRENCE AND BY STATE RESIDENCE AND INFANT DEATHS BY STATE OF OCCURRENCE AND BY STATE OF RESIDENCE.
1989 BIRTH COHORT

(RESIDENCE AT BIRTH IS OF THE MOTHER. RESIDENCE AT DEATH IS OF THE DECEDENT)

AREA	LIVE BIRTHS		INFANT DEATHS			
			AT BIRTH		AT DEATH	
	OCCURRENCE	RESIDENCE	OCCURRENCE	RESIDENCE	OCCURRENCE	RESIDENCE
UNITED STATES	4,045,881	4,041,146	38,605	38,578	38,605	38,576
ALABAMA	61,914	62,568	761	768	778	765
ALASKA	11,524	11,666	101	103	98	104
ARIZONA	67,290	67,196	610	621	626	623
ARKANSAS	34,618	35,911	338	360	346	362
CALIFORNIA	570,396	570,024	4,691	4,690	4,676	4,670
COLORADO	52,964	52,711	493	466	506	465
CONNECTICUT	49,348	49,471	429	425	418	426
DELAWARE	11,369	10,738	138	132	135	134
DISTRICT OF COLUMBIA	22,220	11,789	408	253	475	259
FLORIDA	192,931	193,137	1,898	1,894	1,901	1,903
GEORGIA	111,359	110,272	1,360	1,361	1,342	1,353
HAWAII	19,428	19,367	153	147	151	147
IDAHO	15,830	15,883	147	162	127	158
ILLINOIS	186,851	190,310	2,089	2,155	2,059	2,162
INDIANA	83,594	83,475	822	851	824	846
IOWA	39,395	39,018	335	333	319	334
KANSAS	37,572	38,738	320	333	303	333
KENTUCKY	52,754	53,430	481	500	467	502
LOUISIANA	73,249	72,752	753	753	758	753
MAINE	16,874	17,466	117	124	113	126
MARYLAND	70,874	78,275	651	767	612	774
MASSACHUSETTS	93,381	91,548	720	704	752	700
MICHIGAN	146,715	148,557	1,604	1,616	1,611	1,624
MINNESOTA	67,255	67,519	473	470	498	472
MISSISSIPPI	42,309	43,047	477	496	456	499
MISSOURI	79,877	77,880	819	766	886	769

DOCUMENTATION TABLE 1

LIVE BIRTHS BY STATE OF OCCURRENCE AND BY STATE RESIDENCE AND INFANT DEATHS BY STATE OF OCCURRENCE AND BY STATE OF RESIDENCE: 1989 BIRTH COHORT

(RESIDENCE AT BIRTH IS OF THE MOTHER. RESIDENCE AT DEATH IS OF THE DECEDENT)

AREA	LIVE BIRTHS		INFANT DEATHS			
			AT BIRTH		AT DEATH	
	OCCURRENCE	RESIDENCE	OCCURRENCE	RESIDENCE	OCCURRENCE	RESIDENCE
MONTANA	11,432	11,678	116	130	96	128
NEBRASKA	24,517	24,216	206	196	224	199
NEVADA	19,378	19,606	162	161	163	166
NEW HAMPSHIRE	17,475	17,809	144	152	133	149
NEW JERSEY	118,748	121,842	1,057	1,118	970	1,109
NEW MEXICO	26,937	27,356	227	226	216	235
NEW YORK	292,493	291,450	3,003	2,998	3,005	3,000
UPSTATE	155,240	158,613	1,307	1,339	1,276	1,336
CITY	137,253	132,837	1,696	1,659	1,729	1,664
NORTH CAROLINA	102,752	102,105	1,120	1,102	1,112	1,101
NORTH DAKOTA	10,871	9,570	84	77	86	77
OHIO	164,894	163,952	1,503	1,471	1,498	1,466
OKLAHOMA	46,379	47,385	358	368	345	367
OREGON	42,710	41,281	396	367	407	366
PENNSYLVANIA	169,872	168,828	1,667	1,619	1,760	1,622
RHODE ISLAND	15,377	14,768	154	147	152	146
SOUTH CAROLINA	55,115	57,330	692	716	692	716
SOUTH DAKOTA	11,108	11,086	113	114	102	112
TENNESSEE	77,678	73,178	878	779	880	782
TEXAS	312,280	307,665	2,679	2,666	2,688	2,654
UTAH	36,544	35,567	319	285	329	288
VERMONT	8,123	8,494	58	58	57	58
VIRGINIA	94,089	96,798	921	962	906	964
WASHINGTON	74,038	75,368	673	697	673	697
WEST VIRGINIA	23,118	22,163	204	207	208	204
WISCONSIN	71,578	72,002	644	653	631	646
WYOMING	6,484	6,901	39	59	35	61
FOREIGN RESIDENTS	...	4,735	...	27	...	29

DOCUMENTATION TABLE 2

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY RACE OF MOTHER, SEX AND BIRTH WEIGHT OF CHILD: UNITED STATES, 1989 BIRTH COHORT

(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.....	4,041,146	5,512	9,312	10,619	12,197	14,258	54,308	178,315	3,751,351	5,274
INFANT DEATHS...	38,578	4,977	6,280	3,143	1,821	1,231	2,425	3,104	14,399	1,198
INF.MORT.RATE...	9.5	902.9	674.4	296.0	149.3	86.3	44.7	17.4	3.8	227.2
MALE										
LIVE BIRTHS.....	2,069,590	2,686	4,588	5,531	6,221	7,267	26,838	81,162	1,932,499	2,798
INFANT DEATHS...	21,834	2,430	3,416	1,924	1,160	729	1,336	1,658	8,464	717
INF.MORT.RATE...	10.5	904.7	744.6	347.9	186.5	100.3	49.8	20.4	4.4	256.3
FEMALE										
LIVE BIRTHS.....	1,971,556	2,826	4,724	5,088	5,976	6,991	27,470	97,153	1,818,852	2,476
INFANT DEATHS...	16,744	2,547	2,864	1,219	661	502	1,089	1,446	5,935	481
INF.MORT.RATE...	8.5	901.3	606.3	239.6	110.6	71.8	39.6	14.9	3.3	194.3
WHITE										
BOTH SEXES										
LIVE BIRTHS.....	3,192,457	2,970	5,214	6,159	7,279	8,770	34,603	117,409	3,006,374	3,679
INFANT DEATHS...	25,060	2,714	3,639	1,969	1,211	827	1,662	2,053	10,302	683
INF.MORT.RATE...	7.8	913.8	697.9	319.7	166.4	94.3	48.0	17.5	3.4	185.6
MALE										
LIVE BIRTHS.....	1,637,655	1,440	2,597	3,299	3,730	4,552	17,264	53,830	1,549,014	1,929
INFANT DEATHS...	14,406	1,315	1,996	1,227	774	489	922	1,140	6,126	417
INF.MORT.RATE...	8.8	913.2	768.6	371.9	207.5	107.4	53.4	21.2	4.0	216.2
FEMALE										
LIVE BIRTHS.....	1,554,802	1,530	2,617	2,860	3,549	4,218	17,339	63,579	1,457,360	1,750
INFANT DEATHS...	10,654	1,399	1,643	742	437	338	740	913	4,176	266
INF.MORT.RATE...	6.9	914.4	627.8	259.4	123.1	80.1	42.7	14.4	2.9	152.0
BLACK										
BOTH SEXES										
LIVE BIRTHS.....	673,208	2,403	3,852	4,146	4,499	4,967	17,745	53,167	581,035	1,394
INFANT DEATHS...	11,979	2,138	2,475	1,065	545	363	660	907	3,360	466
INF.MORT.RATE...	17.8	889.7	642.5	256.9	121.1	73.1	37.2	17.1	5.8	334.3
MALE										
LIVE BIRTHS.....	341,753	1,181	1,863	2,055	2,279	2,419	8,581	23,704	298,920	751
INFANT DEATHS...	6,563	1,057	1,335	630	348	215	358	444	1,908	268
INF.MORT.RATE...	19.2	895.0	716.6	306.6	152.7	88.9	41.7	18.7	6.4	356.9
FEMALE										
LIVE BIRTHS.....	331,455	1,222	1,989	2,091	2,220	2,548	9,164	29,463	282,115	643
INFANT DEATHS...	5,416	1,081	1,140	435	197	148	302	463	1,452	198
INF.MORT.RATE...	16.3	884.6	573.2	208.0	88.7	58.1	33.0	15.7	5.1	307.9

1/ INCLUDES RACES OTHER THAN WHITE AND BLACK

DOCUMENTATION TABLE 3

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF MOTHER, AND GESTATIONAL AGE: UNITED STATES, 1989 BIRTH COHORT

(RATES ARE PER 1000 LIVE BIRTHS.)

BIRTH WEIGHT	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	4,041,146	28,425	49,191	201,550	142,648	1,617,847	893,514	571,848	478,267	57,956
INFANT DEATHS	38,578	13,685	3,689	3,578	1,397	7,442	3,084	1,909	2,187	1,607
INF. MORT. RATE	9.5	481.4	75.0	17.8	9.8	4.6	3.5	3.3	4.6	27.7
LESS THAN 2,500 GRAMS										
LIVE BIRTHS	284,521	26,109	33,635	82,963	28,136	74,716	14,884	7,772	10,240	6,066
INFANT DEATHS	22,981	13,119	3,473	2,558	595	1,569	336	205	295	831
INF. MORT. RATE	80.8	502.5	103.3	30.8	21.1	21.0	22.6	26.4	28.8	137.0
LESS THAN 500 GRAMS										
LIVE BIRTHS	5,512	4,998	202	15	1	1	5	1	4	285
INFANT DEATHS	4,977	4,548	179	15	0	0	4	1	4	226
INF. MORT. RATE	902.9	910.0	886.1	1000.0	-	-	800.0	1000.0	1000.0	793.0
500-749 GRAMS										
LIVE BIRTHS	9,312	7,703	1,028	131	8	21	5	4	5	407
INFANT DEATHS	6,280	5,404	527	60	6	10	5	1	5	262
INF. MORT. RATE	674.4	701.5	512.6	458.0	750.0	476.2	1000.0	250.0	1000.0	643.7
750-999 GRAMS										
LIVE BIRTHS	10,619	6,494	3,005	469	60	139	69	35	38	310
INFANT DEATHS	3,143	2,184	697	107	8	30	11	6	5	95
INF. MORT. RATE	296.0	336.3	231.9	228.1	133.3	215.8	159.4	171.4	131.6	306.5
1,000-1,249 GRAMS										
LIVE BIRTHS	12,197	3,140	5,870	1,865	184	468	122	87	114	347
INFANT DEATHS	1,821	647	749	238	27	54	15	8	18	65
INF. MORT. RATE	149.3	206.1	127.6	127.6	146.7	115.4	123.0	92.0	157.9	187.3
1,250-1,499 GRAMS										
LIVE BIRTHS	14,258	1,184	7,076	3,866	444	862	170	108	185	363
INFANT DEATHS	1,231	166	569	298	38	84	17	6	13	40
INF. MORT. RATE	86.3	140.2	80.4	77.1	85.6	97.4	100.0	55.6	70.3	110.2
1,500-1,999 GRAMS										
LIVE BIRTHS	54,308	1,487	11,060	24,868	4,277	8,193	1,316	739	1,189	1,179
INFANT DEATHS	2,425	140	659	884	171	433	63	50	57	68
INF. MORT. RATE	44.7	94.1	50.5	35.5	40.0	52.8	47.9	67.7	47.9	57.7
2,000-2,499 GRAMS										
LIVE BIRTHS	178,315	1,103	5,394	51,749	23,162	65,032	13,197	6,798	8,705	3,175
INFANT DEATHS	3,104	30	193	956	345	958	221	133	193	75
INF. MORT RATE	17.4	27.2	35.8	18.5	14.9	14.7	16.7	19.6	22.2	23.6
2,500-2,999 GRAMS										
LIVE BIRTHS	649,012	1,598	6,006	51,649	50,570	325,557	99,198	51,116	53,489	9,829
INFANT DEATHS	4,685	29	91	554	441	2,052	609	358	445	106
INF. MORT RATE	7.2	18.1	15.2	10.7	8.7	6.3	6.1	7.0	8.3	10.8
3,000-3,499 GRAMS										
LIVE BIRTHS	1,477,635	-	6,407	42,213	42,198	672,561	335,927	191,604	166,792	19,933
INFANT DEATHS	5,426	-	58	287	226	2,341	1,109	625	662	118
INF MORT RATE	3.7	-	9.1	6.8	5.4	3.5	3.3	3.3	4.0	5.9
3,500-3,999 GRAMS										
LIVE BIRTHS	1,183,054	-	2,952	19,246	16,884	424,306	319,783	217,280	167,882	14,721
INFANT DEATHS	3,180	-	21	97	89	1,122	741	502	545	63
INF MORT RATE	2.7	-	7.1	5.0	5.3	2.6	2.3	2.3	3.2	4.3

SEE FOOTNOTES AT END OF TABLE

DOCUMENTATION TABLE 3

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF MOTHER, AND GESTATIONAL AGE: UNITED STATES, 1989 BIRTH COHORT

(RATES ARE PER 1000 LIVE BIRTHS.)

BIRTH WEIGHT	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/										
4,000-4,499 GRAMS										
LIVE BIRTHS.....	368,154	-	-	4,437	3,875	102,149	103,900	84,749	64,465	4,579
INFANT DEATHS.....	834	-	-	20	25	227	211	162	172	17
INF. MORT. RATE....	2.3	-	-	4.5	6.5	2.2	2.0	1.9	2.7	3.7
4,500-4,999 GRAMS										
LIVE BIRTHS.....	65,196	-	-	654	648	15,559	17,300	16,814	13,376	845
INFANT DEATHS.....	197	-	-	7	5	47	54	30	42	12
INF. MORT. RATE....	3.0	-	-	10.7	7.7	3.0	3.1	1.8	3.1	14.2
5,000 GRAMS OR MORE										
LIVE BIRTHS.....	8,300	-	-	129	122	2,047	1,994	2,130	1,726	152
INFANT DEATHS.....	77	-	-	7	0	15	12	11	7	25
INF. MORT. RATE....	9.3	-	-	54.3	-	7.3	6.0	5.2	4.1	164.6
NOT STATED										
LIVE BIRTHS.....	5,274	718	191	259	115	952	528	383	297	1,831
INFANT DEATHS.....	1,198	537	46	48	16	69	12	16	19	435
INF. MORT. RATE....	227.2	747.9	240.8	185.3	139.1	72.5	22.7	41.8	64.0	237.6

SEE FOOTNOTES AT END OF TABLE.

DOCUMENTATION TABLE 3

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF MOTHER, AND GESTATIONAL AGE: UNITED STATES, 1989 BIRTH COHORT

(RATES ARE PER 1000 LIVE BIRTHS.)

BIRTH WEIGHT	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	3,192,457	15,285	29,010	132,335	101,574	1,263,374	735,952	482,819	389,021	43,087
INFANT DEATHS	25,060	7,888	2,366	2,408	948	5,223	2,257	1,428	1,584	958
INF. MORT. RATE	7.8	516.1	81.6	18.2	9.3	4.1	3.1	3.0	4.1	22.2
LESS THAN 2,500 GRAMS										
LIVE BIRTHS	182,404	14,139	20,370	54,754	18,924	49,234	9,754	5,110	6,523	3,596
INFANT DEATHS	14,075	7,576	2,241	1,745	417	1,049	222	130	198	497
INF. MORT. RATE	77.2	535.8	110.0	31.9	22.0	21.3	22.8	25.4	30.4	138.2
LESS THAN 500 GRAMS										
LIVE BIRTHS	2,970	2,690	107	5	1	-	3	1	4	159
INFANT DEATHS	2,714	2,483	96	5	0	-	2	1	4	123
INF. MORT. RATE	913.8	923.0	897.2	1000.0	-	-	666.7	1000.0	1000.0	773.6
500-749 GRAMS										
LIVE BIRTHS	5,214	4,300	579	77	8	14	2	3	4	227
INFANT DEATHS	3,639	3,136	303	34	6	7	2	1	4	146
INF. MORT. RATE	697.9	729.3	523.3	441.6	750.0	500.0	1000.0	333.3	1000.0	643.2
750-999 GRAMS										
LIVE BIRTHS	6,159	3,664	1,800	292	30	95	49	28	27	174
INFANT DEATHS	1,969	1,340	443	79	6	20	7	5	3	66
INF. MORT. RATE	319.7	365.7	246.1	270.5	200.0	210.5	142.9	178.6	111.1	379.3
1,000-1,249 GRAMS										
LIVE BIRTHS	7,279	1,783	3,574	1,144	101	287	64	54	73	199
INFANT DEATHS	1,211	428	500	166	16	36	9	3	14	39
INF. MORT. RATE	166.4	240.0	139.9	145.1	158.4	125.4	140.6	55.6	191.8	196.0
1,250-1,499 GRAMS										
LIVE BIRTHS	8,770	583	4,520	2,381	313	515	98	64	104	192
INFANT DEATHS	827	98	401	199	23	56	7	6	9	28
INF. MORT. RATE	94.3	168.1	88.7	83.6	73.5	108.7	71.4	93.8	86.5	145.8
1,500-1,999 GRAMS										
LIVE BIRTHS	34,603	641	6,952	16,192	2,798	5,286	848	462	726	698
INFANT DEATHS	1,662	79	376	620	122	303	45	35	36	46
INF. MORT. RATE	48.0	123.2	54.1	38.3	43.6	57.3	53.1	75.8	49.6	65.9
2,000-2,499 GRAMS										
LIVE BIRTHS	117,409	478	2,838	34,663	15,673	43,037	8,690	4,498	5,585	1,947
INFANT DEATHS	2,053	12	122	642	244	627	150	79	128	49
INF. MORT. RATE	17.5	25.1	43.0	18.5	15.6	14.6	17.3	17.6	22.9	25.2
2,500-2,999 GRAMS										
LIVE BIRTHS	455,051	774	2,951	33,401	35,802	229,685	71,237	37,419	37,332	6,450
INFANT DEATHS	3,126	17	52	368	290	1,393	413	246	283	64
INF. MORT. RATE	6.9	22.0	17.6	11.0	8.1	6.1	5.8	6.6	7.6	9.9
3,000-3,499 GRAMS										
LIVE BIRTHS	1,152,667	-	3,622	26,799	10,477	522,781	268,148	155,390	130,643	14,867
INFANT DEATHS	3,841	-	32	183	145	1,651	809	467	473	81
INF. MORT. RATE	3.3	-	8.8	6.8	4.8	3.2	3.0	3.0	3.6	5.4
3,500-3,999 GRAMS										
LIVE BIRTHS	1,005,115	-	1,964	13,346	12,614	356,472	275,548	190,006	143,073	12,092
INFANT DEATHS	2,459	-	14	50	62	863	579	410	437	44
INF. MORT. RATE	2.4	-	7.1	3.7	4.9	2.4	2.1	2.2	3.1	3.6

SEE FOOTNOTES AT END OF TABLE

DOCUMENTATION TABLE 3

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF MOTHER, AND GESTATIONAL AGE: UNITED STATES, 1989 BIRTH COHORT

(RATES ARE PER 1000 LIVE BIRTHS.)

BIRTH WEIGHT	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										
4,000-4,499 GRAMS										
LIVE BIRTHS.....	327,570	-	-	3,344	3,088	89,185	93,401	77,105	57,499	3,948
INFANT DEATHS.....	670	-	-	16	19	182	172	132	138	11
INF. MORT. RATE....	2.0	-	-	4.8	6.2	2.0	1.8	1.7	2.4	2.8
4,500-4,999 GRAMS										
LIVE BIRTHS.....	58,747	-	-	493	514	13,626	15,714	15,507	12,160	733
INFANT DEATHS.....	154	-	-	5	5	33	45	24	37	5
INF. MORT. RATE....	2.6	-	-	10.1	9.7	2.4	2.9	1.5	3.0	6.8
5,000 GRAMS OR MORE										
LIVE BIRTHS.....	7,224	-	-	95	77	1,701	1,723	1,960	1,555	113
INFANT DEATHS.....	52	-	-	3	0	10	9	9	6	15
INF. MORT. RATE....	7.2	-	-	31.6	-	5.9	5.2	4.6	3.9	132.7
NOT STATED										
LIVE BIRTHS.....	3,679	372	103	163	78	690	427	322	236	1,288
INFANT DEATHS.....	683	295	27	38	10	42	8	10	12	241
INF. MORT. RATE....	185.6	793.0	262.1	233.1	128.2	60.9	18.7	31.1	50.8	187.1

SEE FOOTNOTES AT END OF TABLE.

DOCUMENTATION TABLE 3

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF MOTHER, AND GESTATIONAL AGE: UNITED STATES, 1989 BIRTH COHORT

(RATES ARE PER 1000 LIVE BIRTHS.)

BIRTH WEIGHT	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.....	673,208	12,358	18,415	60,210	34,604	276,461	120,749	68,524	71,296	10,591
INFANT DEATHS.....	11,979	5,428	1,209	1,026	372	1,835	651	380	511	567
INF. MORT. RATE....	17.8	439.2	65.7	17.0	10.8	6.6	5.4	5.5	7.2	53.5
LESS THAN 2,500 GRAMS										
LIVE BIRTHS.....	90,779	11,269	12,196	25,169	8,096	21,930	4,406	2,320	3,325	2,068
INFANT DEATHS.....	8,153	5,190	1,130	716	155	437	88	65	85	287
INF. MORT. RATE....	89.8	460.6	92.7	28.4	19.1	19.9	20.0	28.0	25.6	138.8
LESS THAN 500 GRAMS										
LIVE BIRTHS.....	2,403	2,185	89	10	-	1	2	-	-	116
INFANT DEATHS.....	2,138	1,954	78	10	-	0	2	-	-	94
INF. MORT. RATE....	889.7	894.3	876.4	1000.0	-	-	1000.0	-	-	810.3
500-749 GRAMS										
LIVE BIRTHS.....	3,852	3,211	420	49	-	7	2	1	1	161
INFANT DEATHS.....	2,475	2,136	208	23	-	3	2	0	1	102
INF. MORT. RATE....	642.5	665.2	495.2	469.4	-	428.6	1000.0	-	1000.0	633.5
750-999 GRAMS										
LIVE BIRTHS.....	4,146	2,643	1,125	158	24	40	15	7	9	125
INFANT DEATHS.....	1,065	767	236	22	1	10	1	1	2	25
INF. MORT. RATE....	256.9	290.2	209.8	139.2	41.7	250.0	66.7	142.9	222.2	200.0
1,000-1,249 GRAMS										
LIVE BIRTHS.....	4,499	1,267	2,088	668	77	159	54	32	36	128
INFANT DEATHS.....	545	199	223	62	10	16	5	5	4	21
INF. MORT. RATE....	121.1	157.1	106.8	94.2	129.9	100.6	92.6	156.3	111.1	164.1
1,250-1,499 GRAMS										
LIVE BIRTHS.....	4,967	564	2,329	1,325	116	307	63	38	76	149
INFANT DEATHS.....	363	60	155	87	13	27	8	0	4	9
INF. MORT. RATE....	73.1	106.4	66.6	65.7	112.1	87.9	127.0	-	52.6	60.4
1,500-1,999 GRAMS										
LIVE BIRTHS.....	17,745	807	3,753	7,836	1,333	2,546	410	241	421	398
INFANT DEATHS.....	660	58	163	234	44	101	15	12	16	17
INF. MORT. RATE....	37.2	71.9	43.4	29.9	33.0	39.7	36.6	49.8	38.0	42.7
2,000-2,499 GRAMS										
LIVE BIRTHS.....	53,167	592	2,392	15,139	6,546	18,870	3,860	2,001	2,782	991
INFANT DEATHS.....	907	16	67	278	87	280	55	47	58	19
INF. MORT. RATE....	17.1	27.0	28.0	18.4	13.3	14.8	14.2	23.5	20.8	19.2
2,500-2,999 GRAMS										
LIVE BIRTHS.....	159,428	764	2,785	15,920	12,519	77,301	22,663	11,255	13,711	2,510
INFANT DEATHS.....	1,349	12	36	168	126	572	163	91	144	37
INF. MORT. RATE....	8.5	15.7	12.9	10.6	10.1	7.4	7.2	8.1	10.5	14.7
3,000-3,499 GRAMS										
LIVE BIRTHS.....	253,469	-	2,484	13,146	9,719	115,353	51,972	28,149	29,227	3,399
INFANT DEATHS.....	1,301	-	20	90	60	572	238	129	160	32
INF. MORT. RATE....	5.1	-	8.1	6.8	6.2	5.0	4.6	4.6	5.5	9.4
3,500-3,999 GRAMS										
LIVE BIRTHS.....	133,425	-	866	4,899	3,445	50,632	32,653	20,266	19,002	1,662
INFANT DEATHS.....	542	-	6	33	19	191	123	62	90	13
INF. MORT. RATE....	4.1	-	6.9	6.7	5.5	3.8	3.8	3.1	4.7	7.8

SEE FOOTNOTES AT END OF TABLE.

DOCUMENTATION TABLE 3

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF MOTHER, AND GESTATIONAL AGE: UNITED STATES, 1989 BIRTH COHORT

(RATES ARE PER 1000 LIVE BIRTHS.)

BIRTH WEIGHT	GESTATION									
	TOTAL	<28 WEEKS	28-31 WEEKS	32-35 WEEKS	36 WEEKS	37-39 WEEKS	40 WEEKS	41 WEEKS	42 WEEKS OR MORE	NOT STATED
BLACK										
4,000-4,499 GRAMS										
LIVE BIRTHS.....	29,383	-	-	846	630	9,402	7,603	5,453	5,062	387
INFANT DEATHS.....	119	-	-	2	6	32	28	24	23	4
INF. MORT. RATE....	4.0	-	-	2.4	9.5	3.4	3.7	4.4	4.5	10.3
4,500-4,999 GRAMS										
LIVE BIRTHS.....	4,578	-	-	117	110	1,383	1,172	909	820	67
INFANT DEATHS.....	29	-	-	1	0	9	6	4	3	6
INF. MORT. RATE....	6.3	-	-	8.5	-	6.5	5.1	4.4	3.7	89.6
5,000 GRAMS OR MORE										
LIVE BIRTHS.....	752	-	-	27	31	245	196	121	102	30
INFANT DEATHS.....	20	-	-	3	0	3	3	2	0	9
INF. MORT. RATE....	26.6	-	-	111.1	-	12.2	15.3	16.5	-	300.0
NOT STATED										
LIVE BIRTHS.....	1,394	325	84	86	34	215	84	51	47	468
INFANT DEATHS.....	466	226	17	8	6	19	2	3	6	179
INF. MORT. RATE....	334.3	695.4	202.4	93.0	176.5	88.4	23.8	58.8	127.7	382.5

1/ INCLUDES RACES OTHER THAN WHITE AND BLACK

DOCUMENTATION TABLE 4

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF MOTHER, AND AGE AT DEATH: UNITED STATES, 1989 BIRTH COHORT

(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 RACES[1]/							
TOTAL (ALL BIRTH WEIGHTS)	NUMBER	4,041,146	38,578	24,426	20,128	4,298	14,152
	RATE		9.5	6.0	5.0	1.1	3.5
LESS THAN 2,500 GRAMS	NUMBER	284,521	22,981	18,397	15,999	2,398	4,584
	RATE		80.8	64.7	56.2	8.4	16.1
LESS THAN 500 GRAMS	NUMBER	5,512	4,977	4,944	4,871	73	33
	RATE		902.9	897.0	883.7	13.2	6.0
500-749 GRAMS	NUMBER	9,312	6,280	5,726	5,191	535	554
	RATE		674.4	614.9	557.5	57.5	59.5
750-999 GRAMS	NUMBER	10,619	3,143	2,521	1,989	532	622
	RATE		296.0	237.4	187.3	50.1	58.6
1,000-1,249 GRAMS	NUMBER	12,197	1,821	1,335	1,016	319	486
	RATE		149.3	109.5	83.3	26.2	39.8
1,250-1,499 GRAMS	NUMBER	14,258	1,231	865	668	197	366
	RATE		86.3	60.7	46.9	13.8	25.7
1,500-1,999 GRAMS	NUMBER	54,308	2,425	1,497	1,167	330	928
	RATE		44.7	27.6	21.5	6.1	17.1
2,000-2,499 GRAMS	NUMBER	178,315	3,104	1,509	1,097	412	1,595
	RATE		17.4	8.5	6.2	2.3	8.9
2,500-2,999 GRAMS	NUMBER	649,012	4,685	1,786	1,162	624	2,899
	RATE		7.2	2.8	1.8	1.0	4.5
3,000-3,499 GRAMS	NUMBER	1,477,635	5,426	1,689	1,014	675	3,737
	RATE		3.7	1.1	.7	.5	2.5
3,500-3,999 GRAMS	NUMBER	1,183,054	3,180	1,003	613	390	2,177
	RATE		2.7	.8	.5	.3	1.8
4,000-4,499 GRAMS	NUMBER	368,154	834	279	173	106	555
	RATE		2.3	.8	.5	.3	1.5
4,500-4,999 GRAMS	NUMBER	65,196	197	82	52	30	115
	RATE		3.0	1.3	.8	.5	1.8
5,000 GRAMS OR MORE	NUMBER	8,300	77	54	48	6	23
	RATE		9.3	6.5	5.8	.7	2.8
NOT STATED	NUMBER	5,274	1,198	1,136	1,067	69	62
	RATE		227.2	215.4	202.3	13.1	11.8

DOCUMENTATION TABLE 4

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF MOTHER, AND AGE AT DEATH: UNITED STATES, 1989 BIRTH COHORT

(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)-C

BIRTH WEIGHT AND RACE OF MOTHER	LIVE BIRTHS	INFANT	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
WHITE						
TOTAL (ALL BIRTH WEIGHTS)...NUMBER..	3,192,457	25,060	15,874	12,985	2,889	9,186
RATE..		7.8	5.0	4.1	.9	2.9
LESS THAN 2,500 GRAMS.....NUMBER..	182,404	14,075	11,516	10,023	1,493	2,559
RATE..		77.2	63.1	54.9	8.2	14.0
LESS THAN 500 GRAMS.....NUMBER..	2,970	2,714	2,699	2,660	39	15
RATE..		913.8	908.8	895.6	13.1	5.1
500-749 GRAMS.....NUMBER..	5,214	3,639	3,385	3,072	313	254
RATE..		697.9	649.2	589.2	60.0	48.7
750-999 GRAMS.....NUMBER..	6,159	1,969	1,646	1,326	320	323
RATE..		319.7	267.3	215.3	52.0	52.4
1,000-1,249 GRAMS.....NUMBER..	7,279	1,211	960	752	208	251
RATE..		166.4	131.9	103.3	28.6	34.5
1,250-1,499 GRAMS.....NUMBER..	8,770	827	611	487	124	216
RATE..		94.3	69.7	55.5	14.1	24.6
1,500-1,999 GRAMS.....NUMBER..	34,603	1,662	1,115	888	227	547
RATE..		48.0	32.2	25.7	6.6	15.8
2,000-2,499 GRAMS.....NUMBER..	117,409	2,053	1,100	838	262	953
RATE..		17.5	9.4	7.1	2.2	8.1
2,500-2,999 GRAMS.....NUMBER..	455,051	3,126	1,328	886	442	1,798
RATE..		6.9	2.9	1.9	1.0	4.0
3,000-3,499 GRAMS.....NUMBER..	1,152,667	3,841	1,263	770	493	2,578
RATE..		3.3	1.1	.7	.4	2.2
3,500-3,999 GRAMS.....NUMBER..	1,005,115	2,459	794	491	303	1,665
RATE..		2.4	.8	.5	.3	1.7
4,000-4,499 GRAMS.....NUMBER..	327,570	670	221	141	80	449
RATE..		2.0	.7	.4	.2	1.4
4,500-4,999 GRAMS.....NUMBER..	58,747	154	61	34	27	93
RATE..		2.6	1.0	.6	.5	1.6
5,000 GRAMS OR MORE.....NUMBER..	7,224	52	37	32	5	15
RATE..		7.2	5.1	4.4	.7	2.1
NOT STATED.....NUMBER..	3,679	683	654	608	46	29
RATE..		185.6	177.8	165.3	12.5	7.9

DOCUMENTATION TABLE 4

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF MOTHER, AND AGE AT DEATH: UNITED STATES, 1989 BIRTH COHORT

(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)-C

BIRTH WEIGHT AND RACE OF MOTHER	LIVE BIRTHS	INFANT	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
BLACK						
TOTAL (ALL BIRTH WEIGHTS)...NUMBER..	673,208	11,979	7,711	6,483	1,228	4,268
RATE..		17.8	11.5	9.6	1.8	6.3
LESS THAN 2,500 GRAMS.....NUMBER..	90,779	8,153	6,298	5,486	812	1,855
RATE..		89.8	69.4	60.4	8.9	20.4
LESS THAN 500 GRAMS.....NUMBER..	2,403	2,138	2,122	2,090	32	16
RATE..		889.7	883.1	869.7	13.3	6.7
500-749 GRAMS.....NUMBER..	3,852	2,475	2,189	1,976	213	286
RATE..		642.5	568.3	513.0	55.3	74.2
750-999 GRAMS.....NUMBER..	4,146	1,065	782	590	192	283
RATE..		256.9	188.6	142.3	46.3	68.3
1,000-1,249 GRAMS.....NUMBER..	4,499	545	333	238	95	212
RATE..		121.1	74.0	52.9	21.1	47.1
1,250-1,499 GRAMS.....NUMBER..	4,967	363	228	161	67	135
RATE..		73.1	45.9	32.4	13.5	27.2
1,500-1,999 GRAMS.....NUMBER..	17,745	660	314	225	89	346
RATE..		37.2	17.7	12.7	5.0	19.5
2,000-2,499 GRAMS.....NUMBER..	53,167	907	330	206	124	577
RATE..		17.1	6.2	3.9	2.3	10.9
2,500-2,999 GRAMS.....NUMBER..	159,428	1,349	385	226	159	964
RATE..		8.5	2.4	1.4	1.0	6.0
3,000-3,499 GRAMS.....NUMBER..	253,469	1,301	357	205	152	944
RATE..		5.1	1.4	.8	.6	3.7
3,500-3,999 GRAMS.....NUMBER..	133,425	542	159	93	66	383
RATE..		4.1	1.2	.7	.5	2.9
4,000-4,499 GRAMS.....NUMBER..	29,383	119	46	27	19	73
RATE..		4.0	1.6	.9	.6	2.5
4,500-4,999 GRAMS.....NUMBER..	4,578	29	16	15	1	13
RATE..		6.3	3.5	3.3	.2	2.8
5,000 GRAMS OR MORE.....NUMBER..	752	20	13	12	1	7
RATE..		26.6	17.3	16.0	1.3	9.3
NOT STATED.....NUMBER..	1,394	466	437	419	18	29
RATE..		334.3	313.5	300.6	12.9	20.8

1/ INCLUDES RACES OTHER THAN WHITE AND BLACK

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1989 BIRTH COHORT

(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, BIRTH WEIGHT, AND RACE OF MOTHER		LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
ALL RACES 1/, ALL BIRTH WEIGHTS							
ALL CAUSES	NUMBER...	4,041,146	38,578	24,426	20,128	4,298	14,152
	RATE..		954.6	604.4	498.1	106.4	350.2
CONGENITAL ANOMALIES (740-759)	NUMBER...		7,991	5,793	4,497	1,296	2,198
	RATE..		197.7	143.4	111.3	32.1	54.4
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER...		5,569	391	46	345	5,178
	RATE..		137.8	9.7	1.1	8.5	128.1
PREMATURITY (765)	NUMBER...		3,785	3,738	3,696	42	47
	RATE..		93.7	92.5	91.5	1.0	1.2
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER...		3,509	3,286	2,763	523	223
	RATE..		86.8	81.3	68.4	12.9	5.5
MATERNAL COMPLICATIONS (761)	NUMBER...		1,489	1,481	1,472	9	8
	RATE..		36.8	36.6	36.4	.2	.2
ACCIDENTS (E800-E949)	NUMBER...		932	86	35	51	846
	RATE..		23.1	2.1	.9	1.3	20.9
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER...		935	927	892	35	8
	RATE..		23.1	22.9	22.1	.9	.2
INFECTIONS (771)	NUMBER...		876	822	479	343	54
	RATE..		21.7	20.3	11.9	8.5	1.3
HYPOXIA AND ASPHYXIA (768)	NUMBER...		698	632	511	121	66
	RATE..		17.3	15.6	12.6	3.0	1.6
PNEUMONIA AND INFLUENZA (480-487)	NUMBER...		622	101	37	64	521
	RATE..		15.4	2.5	.9	1.6	12.9
ALL OTHER CAUSES (RESIDUAL)	NUMBER...		1,586	608	384	224	978
	RATE..		39.2	15.0	9.5	5.5	24.2

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1989 BIRTH COHORT

(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, BIRTH WEIGHT, 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...	284,521	22,981	18,397	15,999	2,398	4,584
RATE..		8,077.1	6,466.0	5,623.1	842.8	1,611.1
CONGENITAL ANOMALIES (740-759).....NUMBER...		3,938	3,150	2,675	475	788
RATE..		1,384.1	1,107.1	940.2	166.9	277.0
SUDDEN INFANT DEATH SYNDROME (798.0)..NUMBER...		1,035	49	6	43	986
RATE..		363.8	17.2	2.1	15.1	346.5
PREMATURITY (765).....NUMBER...		3,393	3,349	3,308	41	44
RATE..		1,192.5	1,177.1	1,162.7	14.4	15.5
RESPIRATORY DISTRESS SYNDROME (769)...NUMBER...		3,319	3,114	2,614	500	205
RATE..		1,166.5	1,094.5	918.7	175.7	72.1
MATERNAL COMPLICATIONS (761).....NUMBER...		1,323	1,318	1,310	8	5
RATE..		465.0	463.2	460.4	2.8	1.8
ACCIDENTS (E800-E949).....NUMBER...		152	31	20	11	121
RATE..		53.4	10.9	7.0	3.9	42.5
COMPLICATIONS OF PLACENTA,ETC. (762)..NUMBER...		767	762	746	16	5
RATE..		269.6	267.8	262.2	5.6	1.8
INFECTIONS (771).....NUMBER...		642	606	336	270	36
RATE..		225.6	213.0	118.1	94.9	12.7
HYPOXIA AND ASPHYXIA (768).....NUMBER...		342	325	289	36	17
RATE..		120.2	114.2	101.6	12.7	6.0
PNEUMONIA AND INFLUENZA (480-487).....NUMBER...		252	48	17	31	204
RATE..		88.6	16.9	6.0	10.9	71.7
ALL OTHER CAUSES (RESIDUAL).....NUMBER...		692	327	222	105	365
RATE..		243.2	114.9	78.0	36.9	128.3

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1989 BIRTH COHORT

(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, BIRTH WEIGHT, 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...	3,751,351	14,399	4,893	3,062	1,831	9,506
	RATE..		383.8	130.4	81.6	48.8	253.4
CONGENITAL ANOMALIES (740-759)	NUMBER...		3,897	2,498	1,694	804	1,399
	RATE..		103.9	66.6	45.2	21.4	37.3
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER...		4,517	341	40	301	4,176
	RATE..		120.4	9.1	1.1	8.0	111.3
PREMATURITY (765)	NUMBER...		59	56	55	1	3
	RATE..		1.6	1.5	1.5	.0	.1
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER...		113	99	81	18	14
	RATE..		3.0	2.6	2.2	.5	.4
MATERNAL COMPLICATIONS (761)	NUMBER...		23	20	19	1	3
	RATE..		.6	.5	.5	.0	.1
ACCIDENTS (E800-E949)	NUMBER...		774	52	12	40	722
	RATE..		20.6	1.4	.3	1.1	19.2
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER...		108	105	86	19	3
	-RATE..		2.9	2.8	2.3	.5	.1
INFECTIONS (771)	NUMBER...		218	200	135	65	18
	RATE..		5.8	5.3	3.6	1.7	.5
HYPOXIA AND ASPHYXIA (768)	NUMBER...		313	266	190	76	47
	RATE..		8.3	7.1	5.1	2.0	1.3
PNEUMONIA AND INFLUENZA (480-487)	NUMBER...		369	53	20	33	316
	RATE..		9.8	1.4	.5	.9	8.4
ALL OTHER CAUSES (RESIDUAL)	NUMBER. .		868	257	144	113	611
	RATE..		23.1	6.9	3 8	3.0	16.3

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1989 BIRTH COHORT

(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, BIRTH WEIGHT, AND RACE OF MOTHER	LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
ALL RACES 1/, NOT STATED BIRTH WEIGHT						
ALL CAUSES.....NUMBER...	5,274	1,198	1,136	1,067	69	62
RATE..		22,715.2	21,539.6	20,231.3	1,308.3	1,175.6
CONGENITAL ANOMALIES (740-759).....NUMBER...		156	145	128	17	11
RATE..		2,957.9	2,749.3	2,427.0	322.3	208.6
SUDDEN INFANT DEATH SYNDROME (798.0)..NUMBER...		17	1	-	1	16
RATE..		322.3	19.0	-	19.0	303.4
PREMATURITY (765).....NUMBER...		333	333	333	-	-
RATE..		6,314.0	6,314.0	6,314.0	-	-
RESPIRATORY DISTRESS SYNDROME (769)...NUMBER...		77	73	68	5	4
RATE..		1,460.0	1,384.1	1,289.3	94.8	75.8
MATERNAL COMPLICATIONS (761).....NUMBER...		143	143	143	-	-
RATE..		2,711.4	2,711.4	2,711.4	-	-
ACCIDENTS (E800-E949).....NUMBER...		6	3	3	-	3
RATE..		113.8	56.9	56.9	-	56.9
COMPLICATIONS OF PLACENTA,ETC. (762)..NUMBER...		60	60	60	-	-
RATE..		1,137.7	1,137.7	1,137.7	-	-
INFECTIONS (771).....NUMBER...		16	16	8	8	-
RATE..		303.4	303.4	151.7	151.7	-
HYPOXIA AND ASPHYXIA (768).....NUMBER...		43	41	32	9	2
RATE..		815.3	777.4	606.8	170.6	37.9
PNEUMONIA AND INFLUENZA (480-487).....NUMBER...		1	-	-	-	1
RATE..		19.0	-	-	-	19.0
ALL OTHER CAUSES (RESIDUAL).....NUMBER...		26	24	18	6	2
RATE..		493.0	455.1	341.3	113.8	37.9

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1989 BIRTH COHORT

(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, BIRTH WEIGHT, AND RACE OF MOTHER		LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
WHITE, ALL BIRTH WEIGHTS							
ALL CAUSES	NUMBER...	3,192,457	25,060	15,874	12,985	2,889	9,186
	RATE..		785.0	497.2	406.7	90.5	287.7
CONGENITAL ANOMALIES (740-759)	NUMBER...		6,209	4,581	3,604	977	1,628
	RATE..		194.5	143.5	112.9	30.6	51.0
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER...		3,780	259	27	232	3,521
	RATE..		118.4	8.1	.8	7.3	110.3
PREMATURITY (765)	NUMBER...		1,871	1,847	1,826	21	24
	RATE..		58.6	57.9	57.2	.7	.8
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER...		2,295	2,165	1,812	353	130
	RATE..		71.9	67.8	56.8	11.1	4.1
MATERNAL COMPLICATIONS (761)	NUMBER...		958	955	947	8	3
	RATE..		30.0	29.9	29.7	.3	.1
ACCIDENTS (E800-E949)	NUMBER...		589	57	23	34	532
	RATE..		18.4	1.8	.7	1.1	16.7
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER...		637	631	605	26	6
	RATE..		20.0	19.8	19.0	.8	.2
INFECTIONS (771)	NUMBER...		557	532	331	201	25
	RATE..		17.4	16.7	10.4	6.3	.8
HYPOXIA AND ASPHYXIA (768)	NUMBER...		449	408	331	77	41
	RATE..		14.1	12.8	10.4	2.4	1.3
PNEUMONIA AND INFLUENZA (480-487)	NUMBER...		378	62	25	37	316
	RATE..		11.8	1.9	.8	1.2	9.9
ALL OTHER CAUSES (RESIDUAL)	NUMBER...		1,042	424	279	145	618
	RATE..		32.6	13.3	8.7	4.5	19.4

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1989 BIRTH COHORT

(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, BIRTH WEIGHT, 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...	182,404	14,075	11,516	10,023	1,493	2,559
	RATE..		7,716.4	6,313.5	5,494.9	818.5	1,402.9
CONGENITAL ANOMALIES (740-759)	NUMBER...		2,996	2,455	2,123	332	541
	RATE..		1,642.5	1,345.9	1,163.9	182.0	296.6
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER...		593	26	5	21	567
	RATE..		325.1	14.3	2.7	11.5	310.8
PREMATURITY (765)	NUMBER...		1,681	1,659	1,639	20	22
	RATE..		921.6	909.5	898.6	11.0	12.1
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER...		2,166	2,045	1,711	334	121
	RATE..		1,187.5	1,121.1	938.0	183.1	66.3
MATERNAL COMPLICATIONS (761)	NUMBER...		866	863	856	7	3
	RATE..		474.8	473.1	469.3	3.8	1.6
ACCIDENTS (E800-E949)	NUMBER...		68	18	11	7	50
	RATE..		37.3	9.9	6.0	3.8	27.4
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER...		504	501	491	10	3
	RATE..		276.3	274.7	269.2	5.5	1.6
INFECTIONS (771)	NUMBER...		386	370	216	154	16
	RATE..		211.6	202.8	118.4	84.4	8.8
HYPOXIA AND ASPHYXIA (768)	NUMBER...		197	189	169	20	8
	RATE..		108.0	103.6	92.7	11.0	4.4
PNEUMONIA AND INFLUENZA (480-487)	NUMBER...		132	26	9	17	106
	RATE..		72.4	14.3	4.9	9.3	58.1
ALL OTHER CAUSES (RESIDUAL)	NUMBER...		416	208	157	51	208
	RATE..		228.1	114.0	86.1	28.0	114.0

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1989 BIRTH COHORT

(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, BIRTH WEIGHT, 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...	3,006,374	10,302	3,704	2,354	1,350	6,598
	RATE..		342.7	123.2	78.3	44.9	219.5
CONGENITAL ANOMALIES (740-759)	NUMBER...		3,089	2,010	1,378	632	1,079
	RATE..		102.7	66.9	45.8	21.0	35.9
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER...		3,178	232	22	210	2,946
	RATE..		105.7	7.7	.7	7.0	98.0
PREMATURITY (765)	NUMBER...		30	28	27	1	2
	RATE..		1.0	.9	.9	.0	.1
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER...		78	71	55	16	7
	RATE..		2.6	2.4	1.8	.5	.2
MATERNAL COMPLICATIONS (761)	NUMBER...		13	13	12	1	-
	RATE..		.4	.4	.4	.0	-
ACCIDENTS (E800-E949)	NUMBER...		518	37	10	27	481
	RATE..		17.2	1.2	.3	.9	16.0
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER...		91	88	72	16	3
	-RATE..		3.0	2.9	2.4	.5	.1
INFECTIONS (771)	NUMBER...		162	153	109	44	9
	RATE..		5.4	5.1	3.6	1.5	.3
HYPOXIA AND ASPHYXIA (768)	NUMBER...		232	199	146	53	33
	RATE..		7.7	6.6	4.9	1.8	1.1
PNEUMONIA AND INFLUENZA (480-487)	NUMBER...		246	36	16	20	210
	RATE..		8.2	1.2	.5	.7	7.0
ALL OTHER CAUSES (RESIDUAL)	NUMBER...		607	198	110	88	409
	RATE..		20.2	6.6	3.7	2.9	13.6

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1989 BIRTH COHORT

(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, BIRTH WEIGHT, AND RACE OF MOTHER		LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
WHITE, NOT STATED BIRTH WEIGHT							
ALL CAUSES	NUMBER	3,679	683	654	608	46	29
	RATE		18,564.8	17,776.6	16,526.2	1,250.3	788.3
CONGENITAL ANOMALIES (740-759)	NUMBER		124	116	103	13	8
	RATE		3,370.5	3,153.0	2,799.7	353.4	217.5
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER		9	1	-	1	8
	RATE		244.6	27.2	-	27.2	217.5
PREMATURITY (765)	NUMBER		160	160	160	-	-
	RATE		4,349.0	4,349.0	4,349.0	-	-
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER		51	49	46	3	2
	RATE		1,386.2	1,331.9	1,250.3	81.5	54.4
MATERNAL COMPLICATIONS (761)	NUMBER		79	79	79	-	-
	RATE		2,147.3	2,147.3	2,147.3	-	-
ACCIDENTS (E800-E949)	NUMBER		3	2	2	-	1
	RATE		81.5	54.4	54.4	-	27.2
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER		42	42	42	-	-
	RATE		1,141.6	1,141.6	1,141.6	-	-
INFECTIONS (771)	NUMBER		9	9	6	3	-
	RATE		244.6	244.6	163.1	81.5	-
HYPOXIA AND ASPHYXIA (768)	NUMBER		20	20	16	4	-
	RATE		543.6	543.6	434.9	108.7	-
PNEUMONIA AND INFLUENZA (480-487)	NUMBER		-	-	-	-	-
	RATE		-	-	-	-	-
ALL OTHER CAUSES (RESIDUAL)	NUMBER		19	18	12	6	1
	RATE		516.4	489.3	326.2	163.1	27.2

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1989 BIRTH COHORT

(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, BIRTH WEIGHT, AND RACE OF MOTHER		LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
BLACK, ALL BIRTH WEIGHTS							
ALL CAUSES	NUMBER	673,208	11,979	7,711	6,483	1,228	4,268
	RATE		1,779.4	1,145.4	963.0	182.4	634.0
CONGENITAL ANOMALIES (740-759)	NUMBER		1,407	959	708	251	448
	RATE		209.0	142.5	105.2	37.3	66.5
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER		1,525	118	19	99	1,407
	RATE		226.5	17.5	2.8	14.7	209.0
PREMATURITY (765)	NUMBER		1,815	1,793	1,772	21	22
	RATE		269.6	266.3	263.2	3.1	3.3
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER		1,108	1,027	878	149	81
	RATE		164.6	152.6	130.4	22.1	12.0
MATERNAL COMPLICATIONS (761)	NUMBER		493	488	487	1	5
	RATE		73.2	72.5	72.3	.1	.7
ACCIDENTS (E800-E949)	NUMBER		294	21	11	10	273
	RATE		43.7	3.1	1.6	1.5	40.6
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER		267	265	256	9	2
	RATE		39.7	39.4	38.0	1.3	.3
INFECTIONS (771)	NUMBER		291	263	132	131	28
	RATE		43.2	39.1	19.6	19.5	4.2
HYPOXIA AND ASPHYXIA (768)	NUMBER		211	190	153	37	21
	RATE		31.3	28.2	22.7	5.5	3.1
PNEUMONIA AND INFLUENZA (480-487)	NUMBER		210	30	10	20	180
	RATE		31.2	4.5	1.5	3.0	26.7
ALL OTHER CAUSES (RESIDUAL)	NUMBER		479	167	94	73	312
	RATE		71.2	24.8	14.0	10.8	46.3

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1989 BIRTH COHORT

(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, BIRTH WEIGHT, 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...	90,779	8,153	6,298	5,486	812	1,855
RATE..		8,981.2	6,937.7	6,043.2	894.5	2,043.4
CONGENITAL ANOMALIES (740-759).....NUMBER...		751	550	438	112	201
RATE..		827.3	605.9	482.5	123.4	221.4
SUDDEN INFANT DEATH SYNDROME (798.0)..NUMBER...		412	20	1	19	392
RATE..		453.8	22.0	1.1	20.9	431.8
PREMATURITY (765).....NUMBER...		1,625	1,604	1,583	21	21
RATE..		1,790.1	1,766.9	1,743.8	23.1	23.1
RESPIRATORY DISTRESS SYNDROME (769)...NUMBER...		1,053	980	835	145	73
RATE..		1,160.0	1,079.5	919.8	159.7	80.4
MATERNAL COMPLICATIONS (761).....NUMBER...		424	422	421	1	2
RATE..		467.1	464.9	463.8	1.1	2.2
ACCIDENTS (E800-E949).....NUMBER...		75	11	8	3	64
RATE..		82.6	12.1	8.8	3.3	70.5
COMPLICATIONS OF PLACENTA,ETC. (762)..NUMBER...		234	232	226	6	2
RATE..		257.8	255.6	249.0	6.6	2.2
INFECTIONS (771).....NUMBER...		240	221	111	110	19
RATE..		264.4	243.4	122.3	121.2	20.9
HYPOXIA AND ASPHYXIA (768).....NUMBER...		134	125	112	13	9
RATE..		147.6	137.7	123.4	14.3	9.9
PNEUMONIA AND INFLUENZA (480-487).....NUMBER...		109	19	7	12	90
RATE..		120.1	20.9	7.7	13.2	99.1
ALL OTHER CAUSES (RESIDUAL).....NUMBER...		260	112	61	51	148
RATE..		286.4	123.4	67.2	56.2	163.0

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1989 BIRTH COHORT

(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, BIRTH WEIGHT, 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...	581,035	3,360	976	578	398	2,384
	RATE..		578.3	168.0	99.5	68.5	410.3
CONGENITAL ANOMALIES (740-759)	NUMBER...		632	388	251	137	244
	RATE..		108.8	66.8	43.2	23.6	42.0
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER...		1,106	98	18	80	1,008
	RATE..		190.3	16.9	3.1	13.8	173.5
PREMATURITY (765)	NUMBER...		29	28	28	-	1
	RATE..		5.0	4.8	4.8	-	.2
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER...		30	24	22	2	6
	RATE..		5.2	4.1	3.8	.3	1.0
MATERNAL COMPLICATIONS (761)	NUMBER...		7	4	4	-	3
	RATE..		1.2	.7	.7	-	.5
ACCIDENTS (E800-E949)	NUMBER...		217	9	2	7	208
	RATE..		37.3	1.5	.3	1.2	35.8
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER...		16	16	13	3	-
	RATE..		2.8	2.8	2.2	.5	-
INFECTIONS (771)	NUMBER...		45	36	20	16	9
	RATE..		7.7	6.2	3.4	2.8	1.5
HYPOXIA AND ASPHYXIA (768)	NUMBER...		62	52	31	21	10
	RATE..		10.7	8.9	5.3	3.6	1.7
PNEUMONIA AND INFLUENZA (480-487)	NUMBER...		100	11	3	8	89
	RATE..		17.2	1.9	.5	1.4	15.3
ALL OTHER CAUSES (RESIDUAL)	NUMBER...		212	49	27	22	163
	RATE..		36.5	8.4	4.6	3.8	28.1

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF MOTHER AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF MOTHER FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1989 BIRTH COHORT

(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, BIRTH WEIGHT, AND RACE OF MOTHER		LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
BLACK, NOT STATED BIRTH WEIGHT							
ALL CAUSES	NUMBER	1,394	466	437	419	18	29
	RATE		33,429.0	31,348.6	30,057.4	1,291.2	2,080.3
CONGENITAL ANOMALIES (740-759)	NUMBER		24	21	19	2	3
	RATE		1,721.7	1,506.5	1,363.0	143.5	215.2
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER		7	-	-	-	7
	RATE		502.2	-	-	-	502.2
PREMATURITY (765)	NUMBER		161	161	161	-	-
	RATE		11,549.5	11,549.5	11,549.5	-	-
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER		25	23	21	2	2
	RATE		1,793.4	1,649.9	1,506.5	143.5	143.5
MATERNAL COMPLICATIONS (761)	NUMBER		62	62	62	-	-
	RATE		4,447.6	4,447.6	4,447.6	-	-
ACCIDENTS (E800-E949)	NUMBER		2	1	1	-	1
	RATE		143.5	71.7	71.7	-	71.7
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER		17	17	17	-	-
	RATE		1,219.5	1,219.5	1,219.5	-	-
INFECTIONS (771)	NUMBER		6	6	1	5	-
	RATE		430.4	430.4	71.7	358.7	-
HYPOXIA AND ASPHYXIA (768)	NUMBER		15	13	10	3	2
	RATE		1,076.0	932.6	717.4	215.2	143.5
PNEUMONIA AND INFLUENZA (480-487)	NUMBER		1	-	-	-	1
	RATE		71.7	-	-	-	71.7
ALL OTHER CAUSES (RESIDUAL)	NUMBER		7	6	6	-	1
	RATE		502.2	430.4	430.4	-	71.7

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, 1989 BIRTH COHORT

(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 TO THE 1989 BIRTH COHORT 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	1,027	718	641	77	309
WHITE	602	405	353	52	197
BLACK	386	286	268	18	100
ALABAMA	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
ALASKA	4	3	2	1	1
WHITE	2	1	1	-	1
BLACK	-	-	-	-	-
ARIZONA	5	2	2	-	3
WHITE	5	2	2	-	3
BLACK	-	-	-	-	-
ARKANSAS	4	3	2	1	1
WHITE	2	1	-	1	1
BLACK	2	2	2	-	-
CALIFORNIA	194	153	145	8	41
WHITE	127	98	92	6	29
BLACK	53	43	41	2	10
COLORADO	1	-	-	-	1
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
CONNECTICUT	6	3	2	1	3
WHITE	6	3	2	1	3
BLACK	-	-	-	-	-
DELAWARE	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
DISTRICT OF COLUMBIA	9	4	4	-	5
WHITE	3	2	2	-	1
BLACK	6	2	2	-	4

DOCUMENTATION TABLE 6

UNLINKED INFANT DEATHS BY RACE, AGE AT DEATH, AND STATE OF RESIDENCE:
UNITED STATES, 1989 BIRTH COHORT

(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 TO THE 1989 BIRTH COHORT 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
FLORIDA	4	2	1	1	2
WHITE	4	2	1	1	2
BLACK	-	-	-	-	-
GEORGIA	1	-	-	-	1
WHITE	1	-	-	-	1
BLACK	-	-	-	-	-
HAWAII	4	2	-	2	2
WHITE	1	-	-	-	1
BLACK	-	-	-	-	-
IDAHO	1	-	-	-	1
WHITE	1	-	-	-	1
BLACK	-	-	-	-	-
ILLINOIS	33	26	26	-	7
WHITE	13	11	11	-	2
BLACK	20	15	15	-	5
INDIANA	24	14	7	7	10
WHITE	17	10	4	6	7
BLACK	7	4	3	1	3
IOWA	2	2	2	-	-
WHITE	1	1	1	-	-
BLACK	1	1	1	-	-
KANSAS	4	1	1	-	3
WHITE	3	1	1	-	2
BLACK	-	-	-	-	-
KENTUCKY	8	5	5	-	3
WHITE	7	4	4	-	3
BLACK	1	1	1	-	-
LOUISIANA	71	58	56	2	13
WHITE	20	17	16	1	3
BLACK	51	41	40	1	10

DOCUMENTATION TABLE 6

UNLINKED INFANT DEATHS BY RACE, AGE AT DEATH, AND STATE OF RESIDENCE:
UNITED STATES, 1989 BIRTH COHORT

(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 TO THE 1989 BIRTH COHORT 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
MAINE	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
MARYLAND	30	21	16	5	9
WHITE	15	11	7	4	4
BLACK	14	9	8	1	5
MASSACHUSETTS	5	3	2	1	2
WHITE	5	3	2	1	2
BLACK	-	-	-	-	-
MICHIGAN	11	4	1	3	7
WHITE	9	2	-	2	7
BLACK	2	2	1	1	-
MINNESOTA	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
MISSISSIPPI	8	1	-	1	7
WHITE	4	-	-	-	4
BLACK	4	1	-	1	3
MISSOURI	4	1	1	-	3
WHITE	1	-	-	-	1
BLACK	3	1	1	-	2
MONTANA	2	-	-	-	2
WHITE	2	-	-	-	2
BLACK	-	-	-	-	-
NEBRASKA	1	-	-	-	1
WHITE	1	-	-	-	1
BLACK	-	-	-	-	-
NEVADA	2	1	-	1	1
WHITE	1	-	-	-	1
BLACK	-	-	-	-	-

DOCUMENTATION TABLE 6

UNLINKED INFANT DEATHS BY RACE, AGE AT DEATH, AND STATE OF RESIDENCE:
UNITED STATES, 1989 BIRTH COHORT

(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 TO THE 1989 BIRTH COHORT 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 HAMPSHIRE	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
NEW JERSEY	37	20	18	2	17
WHITE	18	8	6	2	10
BLACK	18	11	11	-	7
NEW MEXICO	4	3	2	1	1
WHITE	4	3	2	1	1
BLACK	-	-	-	-	-
NEW YORK	29	13	11	2	16
WHITE	21	10	8	2	11
BLACK	7	3	3	-	4
NEW YORK CITY	35	21	16	5	14
WHITE	18	12	9	3	6
BLACK	16	8	7	1	8
NORTH CAROLINA	16	6	6	-	10
WHITE	10	2	2	-	8
BLACK	6	4	4	-	2
NORTH DAKOTA	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
OHIO	147	116	110	6	31
WHITE	81	64	61	3	17
BLACK	64	50	47	3	14
OKLAHOMA	73	39	30	9	34
WHITE	52	29	23	6	23
BLACK	13	7	6	1	6
OREGON	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-

DOCUMENTATION TABLE 6

UNLINKED INFANT DEATHS BY RACE, AGE AT DEATH, AND STATE OF RESIDENCE:
UNITED STATES, 1989 BIRTH COHORT

(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 TO THE 1989 BIRTH COHORT 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
PENNSYLVANIA	78	65	62	3	13
WHITE	39	32	30	2	7
BLACK	39	33	32	1	6
RHODE ISLAND	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
SOUTH CAROLINA	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
SOUTH DAKOTA	1	-	-	-	1
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
TENNESSEE	3	3	2	1	-
WHITE	2	2	1	1	-
BLACK	1	1	1	-	-
TEXAS	122	103	92	11	19
WHITE	76	63	57	6	13
BLACK	45	39	34	5	6
UTAH	2	1	-	1	1
WHITE	2	1	-	1	1
BLACK	-	-	-	-	-
VERMONT	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
VIRGINIA	20	14	13	1	6
WHITE	8	5	4	1	3
BLACK	11	8	8	-	3
WASHINGTON	2	1	1	-	1
WHITE	2	1	1	-	1
BLACK	-	-	-	-	-

DOCUMENTATION TABLE 6

UNLINKED INFANT DEATHS BY RACE, AGE AT DEATH, AND STATE OF RESIDENCE:
UNITED STATES, 1989 BIRTH COHORT

(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 TO THE 1989 BIRTH COHORT 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
WEST VIRGINIA	4	3	2	1	1
WHITE	4	3	2	1	1
BLACK	-	-	-	-	-
WISCONSIN	15	1	1	-	14
WHITE	13	1	1	-	12
BLACK	2	-	-	-	2
WYOMING	1	-	-	-	1
WHITE	1	-	-	-	1
BLACK	-	-	-	-	-
FOREIGN RESIDENTS	2	2	2	-	-
WHITE	2	2	2	-	-
BLACK	-	-	-	-	-

1/ TOTALS FOR GEOGRAPHIC AREAS INCLUDES RACES OTHER THAN WHITE AND BLACK

TECHNICAL APPENDIX FROM

VITAL STATISTICS OF THE UNITED STATES

1989

VOLUME I - NATALITY

U.S. DEPARTMENT OF
HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
CENTERS FOR DISEASE CONTROL AND PREVENTION
NATIONAL CENTER FOR HEALTH STATISTICS

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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 (1):

> 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 section on fetal deaths in the Technical Appendix of volume II of this report). In the interest of comparable natality statistics, both the Statistical Commission of the United Nations and the National Center for Health Statistics (NCHS) have adopted this definition (2,3).

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. At present 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 Trust Territory of the Pacific 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. Tabulations for Puerto Rico, the Virgin Islands, and Guam are shown separately in section 3 of this volume.

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 have been prepared by P.K. Whelpton for the period 1909–34 (4) (table 4-1). These estimates include adjustments both 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 computer data tapes coded by the States and provided to NCHS through the Vital Statistics Cooperative Program. NCHS receives these tapes from the registration offices of all States, the District of Columbia, and New York City. Information for Puerto Rico is also received on computer tapes through the Vital Statistics Cooperative Program. Information for the Virgin Islands and Guam is obtained from microfilm copies of original birth certificates, and is based on the total file of records for all years.

Birth statistics presented in this report for years before 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 with the exception of 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 *Vital Statistics of the United States, 1967,* volume I, pages 3–9 to 3–11. 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. (See "Classification by occurrence and residence" for further discussion.) 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, and Guam are limited to births registered in these areas.

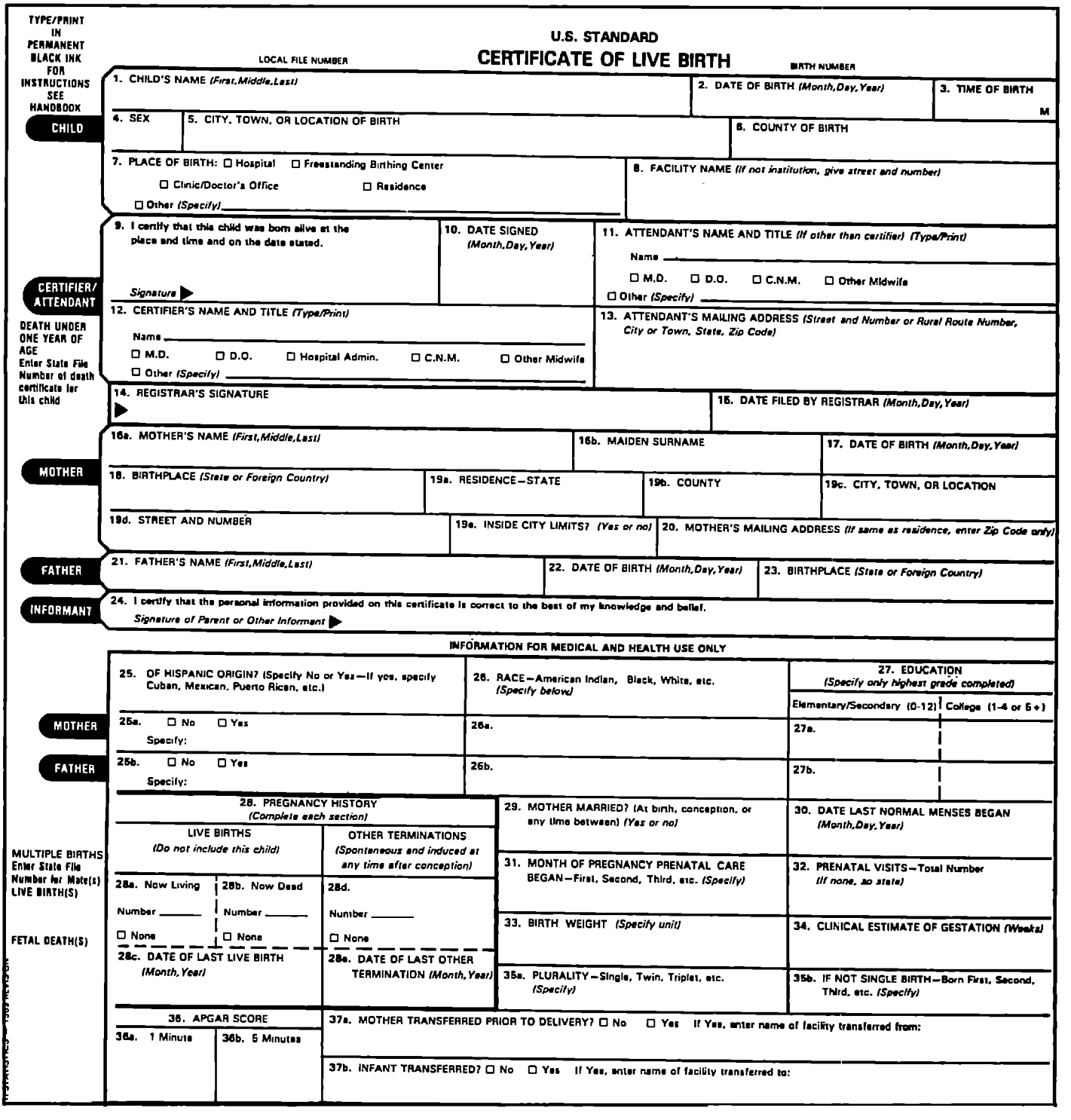
Standard Certificate of Live Birth

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 the fields of 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 provides a wide

FIGURE 4–A. U.S. Standard Certificate of Live Birth: 1989 Revision



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 only)

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 (Weeks)
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)

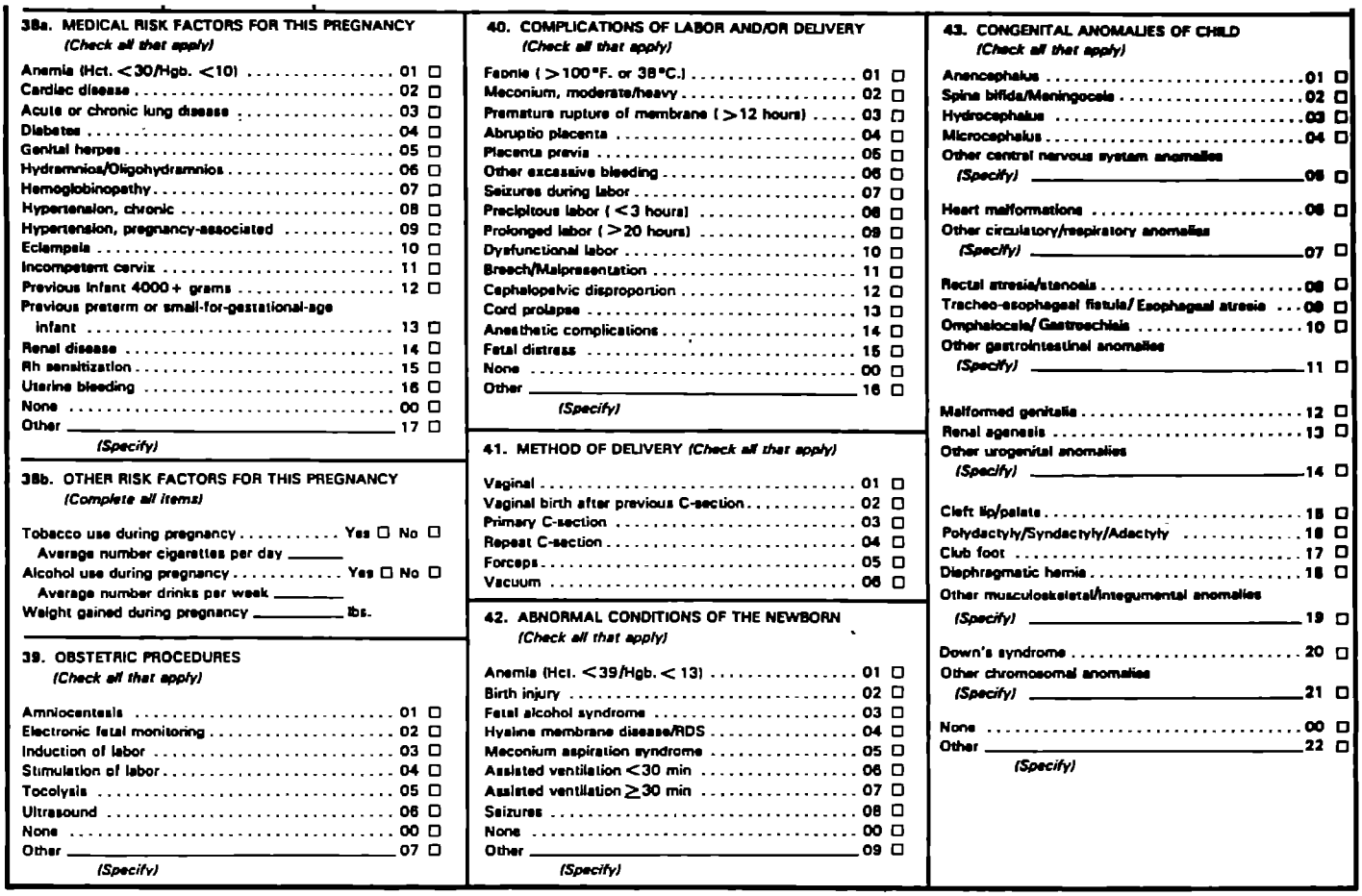
FETAL DEATH(S)

36. APGAR SCORE
36a. 1 Minute
36b. 5 Minutes

37a. MOTHER TRANSFERRED PRIOR TO DELIVERY? ☐ No ☐ Yes If Yes, enter name of facility transferred from:

37b. INFANT TRANSFERRED? ☐ No ☐ Yes If Yes, enter name of facility transferred to:

FIGURE 4–A. U.S. Standard Certificate of Live Birth: 1989 Revision—Con.



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)

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 is the use of checkboxes 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 open-ended items.

The reformatted items include "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 have been 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 increased use of technology in childbirth, and to identify babies with specific abnormal conditions. When combined with other socioeconomic and health data, these new items will provide a wealth of information relevant to the etiology of low birth weight and other adverse pregnancy outcomes.

Another modification is the addition of an Hispanic identifier for the mother and father. Although NCHS 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 item is new to the U.S. Standard Certificate for 1989. As a consequence, more States included this item for 1989, and the fertility and health experience of the Hispanic population may be assessed with greater accuracy.

The revised certificate will also provide more detail than previously requested on the birth attendant and place of birth. This will permit 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 popula-

tion 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, 1989," *NCHS Instruction Manual*, Part 3a. The classification of certain important items is discussed in the following pages.

Classification by occurrence and residence

All but three tabulations for States and other areas within the United States are by place of mother's residence. These three tabulations (1–26, 1–27, and 2–1) show births by place of occurrence. 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 had 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.

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 procedure of using "city" addresses for persons living outside the city limits.

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 1989 is given in another manual, "Vital Records Geographic Classification, 1982," *NCHS Instruction Manual*, Part 8.

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.

Standard metropolitan statistical areas—The standard metropolitan statistical areas (SMSA's) used in this report are those established by the U.S. Office of Management and Budget (5) from final 1980 census population counts and used by the U.S. Bureau of the Census except in the New England States.

Except in the New England States, an SMSA is a county or a group of contiguous counties containing either a city of 50,000 inhabitants or more, or an urbanized area of 50,000 with a total metropolitan population of at least 100,000. In addition to the county or counties containing such a city or urbanized area, contiguous counties are included in an SMSA if, according to specified criteria, they are essentially metropolitan in character and are socially and economically integrated with the central city or urbanized area (6).

In the New England States the U.S. Office of Management and Budget uses towns and cities rather than counties as geographic components of SMSA's. NCHS cannot, however, use the SMSA 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 (7) and are made up of county units.

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

Population-size groups—Beginning in 1982 vital statistics data for cities and certain other urban places have been classified according to the population enumerated in the 1980 Census of Population. Data are available for individual cities and other urban places of 10,000 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 the years 1970–81 was determined by the

population enumerated in the 1970 Census of Population. As a result of changes in the enumerated population between 1970 and 1980, 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 this report 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.)

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 other parent's race. When the parents were of different races and neither parent was white, the child was assigned to the father's race, 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 race 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 in the *Vital Statistics of the United States, 1988*, volume I, sec. 4, page 4. In 1989 the criteria for reporting the race of the parents has not changed and continues to reflect the response of the informant (usually the mother).

The most important factor influencing the decision to tabulate births by race of the mother is the decennial revision of the U.S. Standard Certificate of Live Birth in 1989. This revision includes 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, her marital status, her education level, and her 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. In 1989, 3.4 percent of births were to parents of different races, compared with just 1.0 percent 20 years ago. The majority of these births were to white mothers and fathers of another race. 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 both of whose parents were white (or one parent if only one parent's race 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, 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 its 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 birth weight. In this instance, the racial differential is larger when the data are tabulated by race of mother 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, 15 percent in 1989 compared with 7 percent in 1968. This reflects the increase in the proportion of births to unmarried women; in many cases no information is reported on the father. These births are already assigned the race of the mother on a de facto basis. Tabulating births by the race of the mother will provide for a more uniform approach, rather than a necessarily arbitrary combination of parental races.

The difference in the number of births classified by race of mother rather than race of child varies among the specific groups, reflecting differences in the extent of mixed parentage. With the new classification by race of mother, the number of births classified as white will go up and the number for all other racial groups will go down. The percent difference in the number of live births by race of mother compared with race of child for 1989 are as follows:

White	1.9
Black	–5.1
American Indian	–19.9
Chinese	–6.8

Japanese	–17.8
Hawaiian	–31.0
Filipino	–5.7
Other Asian or Pacific Islander	–7.9

This 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. In order to facilitate continuity and analysis of the data, key published tables for births in this volume, including all trend tables, show 1989 data for both race of mother and race of child. This makes it possible to distinguish the effects of this change from real changes in the data.

The categories for race or national origin are "White," "Black," "American Indian," "Chinese," "Japanese," "Hawaiian," "Filipino," "Other Asian or Pacific Islander," and "Other." Before 1978 the category "Other Asian or Pacific Islander" was not identified separately but included with "Other" races. The separation of this category 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.

White—The category "White" comprises births reported as white and births where race 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.")

All other—The category "All other" comprises black, American Indian, Chinese, Japanese, Hawaiian, and part-Hawaiian, Filipino, other Asian or Pacific Islander including Asian Indian, and "Other." Aleuts and Eskimos are included in "American Indian."

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 parent's race 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, and the father's race is known, the race of the father is assigned as the mother's race. 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 0.3 percent of birth certificates for 1989.

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 parents' race 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 *Vital Statistics of the United States, 1963,* volume I, page 4–8.) Estimates of births to unmarried mothers by race for the United States, which include special estimates for New Jersey for 1962 and 1963, have been prepared and are shown in table 1-76.

Age of mother

Beginning in 1989 the birth certificate asks for "Date of Birth." In previous years, "Age (at time of this birth)" was requested. Not all States have revised this item for 1989 and, therefore, the mother's age either is derived from the reported month and year of birth or coded as stated on the certificate. The age of mother is edited for upper and lower limits. When the mother's age is computed to be under 10 years or 50 years or over, the age of the mother is considered not stated and is assigned as described below.

Age-specific birth rates shown in this report are based on populations of women by age, which are 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 1980 Census of Population derived age in completed years as of April 1, 1980, from the responses to questions on age at last birthday and month and year of birth, with the latter given preference. In the 1960 and the 1970 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 the reporting of age in these two sources (8).

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.

Not stated date of birth of mother—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 "Vital Statistics Computer Edits for Natality Data," *NCHS Instruction Manual*, Part 12, page 9.) 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 father's age 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 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.

Live-birth order and parity

Live-birth order and parity classifications shown in this volume refer to the total number of live births the mother has had including the 1989 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. For an interval to be computed, both the month and year of the last live birth must be valid. This interval is computed only for events to mothers who have had at least one previous live birth.

Births for which the interval since last live birth is not stated are excluded from the computation of percents and means.

Zero interval—An interval of zero months since the last live birth indicates the second born of a set of twins, the second or third born of a set of triplets, and so forth. Births with an interval of zero months are excluded from the computation of mean intervals.

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. In 1989 data on education were obtained from 48 States, New York City, and the District of Columbia as indicated in table A.

The educational attainment of either parent is defined as "the number of years of school completed." Only those years completed in "regular" schools, that is, a formal educational system of public schools or the equivalent in accredited private or parochial schools, are counted. 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."

Persons 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, persons 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.

Table A. Percent of Birth Records on Which Specified Items Were Not Stated: United States and Each State, Puerto Rico, Virgin Islands, and Guam: 1989

(Page 1 of 2)

[By place of residence]

Area	Number of births	Place of birth	Attendant at birth	Mother's birthplace	Father's age	Hispanic origin		Educational attainment		Live-birth order	Interval since last live birth	Length of gestation	Month prenatal care began	Number of prenatal visits
						Mother	Father	Mother	Father					
Total of reporting areas [1]	4,040,958	0.1	0.2	0.2	16.3	1.9	15.6	3.6	19.0	0.6	4.9	1.4	2.1	2.8
Alabama	62,568	–	0.1	0.1	29.8	0.2	29.9	1.1	31.2	0.3	1.3	0.2	1.3	1.3
Alaska	11,666	0.0	.4	.9	14.5	.1	11.8	1.5	14.8	.1	2.5	.6	1.1	1.0
Arizona	67,196	.0	1.8	.2	19.4	.4	22.7	4.0	26.1	.1	3.7	.3	1.5	2.7
Arkansas	35,911	.0	.3	.5	18.1	.8	18.4	1.7	19.2	.4	2.7	.8	3.7	5.5
California	569,992	.0	.0	.1	6.8	.5	3.0	1.4	5.7	.1	.8	[3] 4.3	.7	2.1
Colorado	52,711	.0	–	.0	19.7	.1	20.6	.9	20.4	.1	1.0	.1	.6	.9
Connecticut	49,464	.0	.1	.8	11.9	9.4	19.1	14.2	23.8	9.2	15.4	9.2	11.3	13.0
Delaware	10,730	.0	.4	.0	27.9	.1	28.4	.3	29.3	.1	1.5	.3	.3	.5
District of Columbia	11,789	.0	14.1	.5	63.1	.4	63.3	.6	63.7	.3	1.5	.9	.7	1.4
Florida	193,131	.6	.0	.2	17.9	.3	19.4	.9	20.5	.2	1.2	.4	.9	1.4
Georgia	110,272	.0	.0	.1	18.1	.6	19.5	.7	20.5	.1	1.7	.4	1.4	2.0
Hawaii	19,367	–	.0	.1	10.6	.0	10.4	.2	10.8	.0	.5	.5	7.4	6.9
Idaho	15,883	.0	.0	.2	9.1	.3	9.1	2.3	11.6	.2	5.5	1.3	3.3	4.5
Illinois	190,308	.0	.1	.1	14.8	1.6	7.4	.5	13.5	.1	.9	.1	.8	1.2
Indiana	83,469	.0	.5	.4	19.6	.4	16.8	.8	18.8	.2	1.8	.4	2.7	2.4
Iowa	39,018	.0	.0	.1	15.3	.1	16.7	.3	18.3	.1	.9	.2	.9	1.5
Kansas	38,737	–	.0	.0	10.2	1.3	11.8	.3	10.9	.0	.7	.2	.2	.6
Kentucky	53,424	.0	.0	.2	21.7	.8	22.7	.6	22.2	.2	1.6	.3	.8	1.4
Louisiana	72,752	–	.0	.0	29.5	. . .	. . .	.3	29.9	.1	.5	[3] 4.2	1.3	1.7
Maine	17,466	.0	.0	.1	13.5	5.8	19.2	.4	14.4	.1	1.7	.1	1.6	1.3
Maryland	78,265	.0	3.7	.7	6.0	3.1	7.2	4.1	11.4	1.8	6.9	4.2	7.8	14.4
Massachusetts	91,523	.0	.1	.0	13.5	1.1	13.0	.7	13.1	.4	1.4	.5	1.2	1.5
Michigan	148,520	.2	.2	.2	24.6	4.8	29.3	.5	25.3	.1	3.3	.1	1.4	2.6
Minnesota	67,518	.0	.0	.1	10.2	8.5	17.9	5.1	17.7	1.1	1.8	3.4	8.4	8.3
Mississippi	43,047	.0	.0	.1	30.5	1.0	31.5	.3	31.3	.0	.3	.3	.7	2.0
Missouri	77,872	.0	.0	.2	24.4	.2	18.5	.9	21.4	.0	1.2	.3	1.2	2.5
Montana	11,678	.0	.0	.0	11.1	4.2	15.3	.7	12.0	.1	2.1	.1	.7	.6
Nebraska	24,216	.0	.0	.0	12.1	1.2	13.3	.1	12.3	.0	.5	[3] 2.5	.3	.2
Nevada	19,606	–	.0	.3	19.9	.1	19.9	.6	20.4	.2	1.5	.3	.7	1.2
New Hampshire	17,809	.0	.0	–	9.0	. . .	. . .	.7	9.9	.1	1.1	.2	1.4	1.6
New Jersey	121,841	.3	.3	.0	13.6	.2	11.8	6.6	19.4	1.2	7.6	.7	.2	1.5
New Mexico	27,353	–	.0	.8	25.2	.0	24.0	3.3	28.4	1.1	6.2	.8	7.1	6.7
New York	291,449	.0	.3	.2	19.1	3.5	19.6	[3] 6.2	[3] 27.7	2.4	19.8	.4	5.4	4.0
North Carolina	102,105	–	.0	.0	18.4	.2	18.2	.1	18.4	.1	.3	.1	.3	.3
North Dakota	9,570	–	–	.0	8.6	.6	10.3	.1	9.9	.0	.6	.1	1.5	1.3
Ohio	163,952	.0	.0	.5	13.8	.1	12.9	.7	13.8	.2	3.5	.1	1.3	2.5
Oklahoma	47,385	.0	.0	.1	17.0	. . .	. . .	5.4	23.2	4.9	6.4	[3] 9.9	10.2	9.8
Oregon	41,281	.0	.0	.3	19.7	.1	14.3	1.7	19.2	.1	1.1	.3	.2	.2
Pennsylvania	168,803	.0	.0	.4	6.3	.1	1.9	1.5	5.6	.1	5.3	.2	1.9	1.8
Rhode Island	14,768	–	–	.1	13.9	[4] 19.2	[4] 30.0	1.6	15.2	1.0	2.3	.8	1.9	2.0
South Carolina	57,330	–	.0	.2	29.3	.1	28.1	1.6	30.3	.0	.6	.3	.5	.4
South Dakota	11,086	.0	.0	.1	12.4	.1	13.9	.2	14.0	.0	.4	.2	.6	.6
Tennessee	73,178	–	.0	.1	21.0	.0	20.9	.4	21.2	.0	.5	.2	1.2	1.0
Texas	307,664	.1	.2	.2	19.3	.2	19.8	[3] 24.8	[3] 39.7	.1	[3] 17.1	1.7	2.3	3.6
Utah	35,567	–	.0	.1	8.6	.1	7.2	.7	9.2	.9	6.7	.4	2.6	2.3
Vermont	8,494	–	.1	.4	5.0	12.6	15.6	1.6	6.8	3.1	6.2	.6	4.8	4.3
Virginia	96,798	.0	.4	.2	23.9	[3] 23.3	[3] 41.4	.5	24.4	.2	3.5	.2	.7	1.3
Washington	75,360	.0	.5	.7	19.7	2.5	10.2	. . .	. . .	.0	6.3	1.7	4.9	5.7
West Virginia	22,163	–	.1	.4	21.3	.9	21.2	.6	21.4	.2	1.5	.7	5.7	7.2
Wisconsin	72,002	.0	.0	.0	18.4	.1	14.1	.1	20.1	.0	1.4	.1	.2	.2
Wyoming	6,901	.0	–	.2	10.9	.4	11.1	1.0	11.8	.3	2.3	.1	1.6	1.6
Puerto Rico	66,558	–	.3	.1	1.3	. . .	. . .	.2	1.7	.0	1.4	[3] 3.2	.8	.3
Virgin Islands	2,276	.1	5.4	.2	30.2	6.0	29.0	1.3	25.5	.6	2.4	1.6	1.6	2.3
Guam	3,535	–	.1	.3	24.4	.7	25.3	.8	25.6	.2	1.7	.6	1.1	1.8

Table A. Percent of Birth Records on Which Specified Items Were Not Stated: United States and Each State, Puerto Rico, Virgin Islands, and Guam: 1989—Con.
(Page 2 of 2)
[By place of residence]

Area	Birth weight	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
		1-minute	5-minute									
Total of reporting areas [1]	0.1	0.9	0.9	6.1	7.9	8.2	17.4	5.5	6.0	4.7	6.6	7.1
Alabama	0.1	0.7	0.7	1.0	1.1	1.3	9.3	0.5	1.1	0.5	1.0	1.0
Alaska	.2	1.2	1.2	.1	1.5	1.9	6.6	.1	.1	.7	1	.2
Arizona	.1	.7	.7	.8	2.1	2.5	12.7	.7	.9	.6	1.3	1.7
Arkansas	.1	3.9	4.0	2.1	2.7	2.9	14.3	2.0	2.1	2.4	4.7	2.0
California	.0	. . .	. . .	.1	. . .	. . .	. . .	.1	.1	.3	2	.2
Colorado	.0	.5	.5	1.1	4.9	5.3	14.8	1.0	1.1	.8	1.4	1.5
Connecticut	.1	7.6	7.6	20.2	24.0	26.0	50.6	18.6	20.3	17.1	27.3	29.8
Delaware	.0	.5	.5	1.7	1.4	3.1	3.2	1.1	1.7	2.5	1.2	.7
District of Columbia	.2	.2	.2	[4] 16.9	[4] 16.8	[4] 16.9	[4] 17.8	[4] 16.1	[4] 16.8	[4] 22.1	[4] 18.5	[4] 18.7
Florida	.1	.6	.6	1.6	.5	.5	5.7	1.6	1.5	.9	2.0	1.5
Georgia	.1	.5	.6	2.2	1.6	1.8	21.7	.1	.1	.3	1	1
Hawaii	.1	.7	.7	.4	2.0	2.2	15.4	.1	.1	.0	1	1
Idaho	.1	.6	.6	2.8	4.5	6.1	16.3	2.8	2.9	1.3	4.9	4.9
Illinois	.1	.4	.4	3.5	2.1	2.0	10.4	[5] 2.8	3.7	2.0	4.3	4.6
Indiana	.1	1.1	1.1	1.4	. . .	.8	3.3	.5	.4	4	4	.3
Iowa	.1	.3	.3	2.3	2.6	2.8	5.5	2.2	2.2	2.3	2.3	2.3
Kansas	.0	.9	.8	[7] 1.1	.9	.9	1.2	.9	.9	2.6	1.0	1.1
Kentucky	.2	.6	.6	7.4	5.7	5.9	13.6	4.6	7.1	4.7	7.1	6.5
Louisiana	.1	.9	.9	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. .	. .
Maine	.1	.6	.9	.1	3.9	4.0	10.2	.1	.1	.6	1	1
Maryland	.3	1.3	1.3	30.8	27.3	28.3	38.8	26.3	30.4	. . .	37.0	38.3
Massachusetts	.2	.4	.5	1.2	.3	.3	4.8	1.2	1.2	1.1	[8] 1.3	1.4
Michigan	.2	.6	.5	6.9	2.5	2.8	10.6	2.8	6.4	1.2	8.6	8.6
Minnesota	.1	2.3	2.3	8.1	10.0	11.4	38.2	4.5	7.0	4.1	12.3	13.0
Mississippi	.1	.7	.8	1.6	1.9	2.0	11.8	1.5	1.5	1.3	2.3	2.3
Missouri	.1	.6	.5	.4	.5	.5	2.6	.2	.2	.4	4	.3
Montana	.0	.4	.4	.2	.8	1.0	3.9	.1	.1	.4	1	1
Nebraska	.0	.3	.3	. . .	. . .	. . .	. . .	. . .	. . .	. .	.	.
Nevada	.1	2.1	2.1	.0	1.5	1.7	7.5	.0	[9] 9.6	. .	1	.1
New Hampshire	.2	.7	.5	.2	.4	1.0	2.6	.2	.2	.3	.1	.2
New Jersey	.2	.5	.5	1.9	11.6	12.0	24.7	2.0	1.9	1.8	2.7	5.1
New Mexico	.3	3.5	3.6	1.0	7.2	7.7	15.4	.8	.9	1.0	.9	.
New York	.2	1.0	1.0	[10] 3.5	. . .	. . .	24.9	4.3	[11] 4.0	1.5	[10] 3.0	. .
North Carolina	.1	.7	.8	.2	.6	1.1	5.2	.2	[12] .2	.7	.2	.3
North Dakota	.0	.4	.4	2.7	1.3	2.0	3.4	1.1	2.2	1.2	3.0	2.9
Ohio	.1	.6	.6	.5	1.3	1.5	4.6	.3	.5	.5	.8	.7
Oklahoma	.1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. .	. .	. .
Oregon	.1	.7	.7	2.5	1.1	1.3	4.7	1.1	.1	.2	.1	.1
Pennsylvania	.1	.5	.5	.3	1.5	1.7	8.5	.3	.3	.5	.7	1.2
Rhode Island	.9	.9	.9	[4] 18.2	[4] 14.8	[4] 14.8	[4] 17.8	[4] 18.4	[4] 18.1	[4] 18.0	[4] 24.1	[4] 24.0
South Carolina	.1	.5	.5	.5	.6	.7	4.5	.4	.4	.6	.3	4
South Dakota	.1	.4	.4	8.8	. . .	. . .	9.4	7.9	8.6	7.8	11.4	11.3
Tennessee	.1	.4	.4	1.8	2.2	2.4	18.2	1.7	1.8	1.7	1.8	1.8
Texas	.2	. . .	. . .	[13] [14] 33.7	[13] 33.1	[13] 34.7	[13] 47.3	[13] 32.4	[13] 32.7	[13] 31.7	[13] [16] 33.5	[13] 33.8
Utah	.2	.5	.5	1.8	.3	.3	2.7	.3	2.8	.4	1.9	2.2
Vermont	.3	.8	.8	7.3	8.7	13.5	15.9	7.8	7.5	.7	11.9	11.9
Virginia	.3	.8	.9	[4] 25.0	[4] 25.8	[4] 26.2	[4] 32.7	[4] 24.6	[4] 25.5	[4] 25.7	[4] 25.5	[4] 25.4
Washington	.3	1.2	1.2	14.1	12.8	17.8	26.8	12.5	[15] 13.4	10.5	17.2	18.1
West Virginia	.0	.4	.4	1.1	3.3	4.4	20.5	1.1	1.1	3.4	1.1	1.1
Wisconsin	.0	.5	.5	.2	.3	.3	1.5	.1	.2	.1	[17] .4	.4
Wyoming	.0	.4	.4	1.2	2.0	2.0	3.6	1.1	1.2	1.2	1.4	1.3
Puerto Rico	.1	.4	.4	1.1	.9	1.0	18.4	1.1	1.4	.1	2.2	1.8
Virgin Islands	.4	5.3	5.1	33.6	32.7	33.3	41.4	34.8	31.4	8.0	38.3	36.5
Guam	.6	1.2	1.0	2.0	1.4	1.9	2.6	3.3	21.1	1.2	1.5	1.4

[1] Excludes data for Puerto Rico, Virgin Islands, and Guam.
[2] California, Louisiana, Nebraska, Oklahoma, and Puerto Rico report date last normal menses began but do not report clinical estimate of gestation.
[3] Educational attainment is reported by New York city only.
[4] Revised certificate with this item not implemented until March 1, 1989.
[5] Revised certificate with this item not implemented until April 1, 1989.
[6] Illinois does not report ultrasound.
[7] Kansas does not report Rh sensitization.
[8] Massachusetts does not report birth injury.
[9] Nevada does not report meconium and fetal distress
[10] New York city (but not New York State) reports these factors: genital herpes, hydramnios/oligohydramnios, hemoglobinopathy, incompetent cervix, previous infant 4000+ grams, and previous preterm or small-for-gestational-age infant
[11] Cephalopelvic disproportion is reported by New York city only.
[12] New York State and New York city do not report assisted ventilation less than 30 minutes and assisted ventilation of 30 minutes or more New York city (but not New York State) reports fetal alcohol syndrome and meconium aspiration syndrome.
[13] North Carolina does not report cord prolapse.
[14] Texas does not report genital herpes and uterine bleeding.
[15] Texas does not report cephalopelvic disproportion, anesthetic complications, and fetal distress.
[16] Texas does not report birth injury.
[17] Wisconsin does not report fetal alcohol syndrome.

Marital status

Beginning with 1980 data, national estimates of births to unmarried women are derived from two sources. In 1989 marital status was reported directly on the birth certificates of 44 States and the District of Columbia. In the remaining six States, which lack such an item (California, Connecticut, Michigan, Nevada, New York, and Texas), marital status is inferred from a comparison of the child's and parents' surnames. This procedure represents a substantial departure from the method used before 1980 to prepare national estimates of births to unmarried women, which assumed that the incidence of births to unmarried women in States with no direct question on marital status was the same as the incidence in reporting States in the same geographic division.

The current method uses related information on the birth certificate to improve the quality of national data on this topic, as well as to provide data for the individual nonreporting States. Beginning in 1980, a birth in a nonreporting State is classified as occurring to a married woman if the parents' surnames are the same or if the child's and father's surnames are the same and the mother's current surname cannot be obtained from the informant item of the birth certificate. A birth is classified as occurring to an unmarried woman if the father's name is missing, if the parents' surnames are different, or if the father's and child's surnames are different and the mother's current surname is missing.

Because of the continued substantial increases in nonmarital childbearing throughout the 1980's, the data have been intensively evaluated in each year, 1985–89. There has been continuing concern that the current method might overstate the number of births to unmarried women because it incorporates data based on a comparison of surnames. This is because births to women who have retained their maiden surname as their legal surname after marriage and who are frequently older, well-educated women, would be classified as nonmarital births. The evaluation included comparisons of trends in all measures of births to unmarried mothers in States with a marital status item on the birth certificate and those States providing inferential data based on the comparison of surnames. Comparisons were made for white and black births separately and by age of mother. The results for years 1985–88 were remarkably similar for both data sets. Nonmarital births increased at virtually the same rate for white and black women and for the various age-of-mother groups. For 1989 however, the results of the evaluation have been generally similar in both the reporting States and the States using inferential data, nonmarital births have increased at a slightly faster rate in the States with a marital status item on the birth certificate than in the States providing inferential data. This pattern was observed for both white and black births.

No adjustments are made during the data processing for errors in the reporting of marital status on the birth records of the 44 reporting States and the District of Columbia because the extent of this reporting problem is unknown. When marital status is not stated on the birth certificate of a reporting area, the mother is considered married.

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. In this volume, rates for 1955–89 are based on a smoothed series of population estimates (9). Because of sampling error, the original U.S. Bureau of the Census population estimates fluctuate erratically from year to year; therefore, they have been smoothed so that the rates do not show similar variations. The rates shown in this volume differ from those published in issues 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 issues 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 includes separate categories for freestanding birthing centers, the mother's residence, and clinic or doctor's office as the place of birth. In previous years, 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. For 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 for 1989 compared with recent 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. Tables 1–87 and 1–88 present this more detailed information for the years 1975–89. The 1989 certificate includes separate classifications for "M.D."(Doctor of Medicine), "D.O."(Doctor of Osteopathy), "C.N.M."(certified nurse midwife), "Other midwife," and "Other" attendants. In earlier certificates, births attended by certified nurse midwives were grouped with

those attended by lay midwives. The new certificate also facilitates the identification of home births, births in freestanding birthing centers, and births in clinics or physician offices.

Data shown in this volume for the "In hospital" category for the years 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. Data shown for 1975–77 in tables 1–87 and 1–88, therefore, differ from data published before 1980. As a result of this change, for 1975 an additional 12,352 births are now 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.

The percent distributions by attendant at birth for 1975–81 shown in table 1–88 have been revised to exclude births for which the attendant was unspecified. In recent years, the number of births with unspecified attendant has fluctuated substantially. Excluding these births from the percent distributions allows for a more meaningful year-to-year comparison in the proportion of births for each specified attendant.

Birth weight

Birth weight 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 birth weight were changed in 1979 to be consistent with the recommendations in the *Ninth Revision of the International Classification of Disease* (ICD–9). The revised categories in gram intervals and their equivalents in pounds and ounces are:

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 14 oz- 9 lb 14 oz
4,500–4,999 grams = 9 lb 15 oz- 11 lb 0 oz
5,000 grams or more = 11 lb 1 oz or more

The ICD–9 defines low birth weight 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 1/2 oz–3 lb 4 1/2 oz.

Births for which birth weight 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 as it can be more accurately determined than the date of conception, which usually occurs 2 weeks after the LMP.

Births occurring before 37 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 weeks and over, "postterm." These distinctions are according to the ICD–9 definitions.

The 1989 revision of the U.S. Standard Certificate of Live Birth includes 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 birth weight. This is done for normal weight births of apparently short gestations and very low birth weight 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 3.7 percent of the births in 1989 was based on the clinical estimate of gestation. For all but 0.2 percent of these records, the clinical estimate was used because the LMP date was not

reported. For the remaining 0.2 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 birth weight was inconsistent with both the LMP-computed gestation and the clinical estimate of gestation, the LMP-computed gestation was used and birth weight was reclassified as "not stated." These changes result in a very small discontinuity in the data. For further information on the use of the clinical estimate of gestation see "Computer Edits for Natality Data, Effective 1989," *NCHS Instruction Manual*, Part 12, pages 34–36.

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 birth weight 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 (10).

Because of post-conception 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. 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

One- 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. In 1989 the 1- and 5-minute Apgar scores were included on the birth certificates of 47 States and the District of Columbia.

Tobacco and alcohol use during pregnancy

The checkbox format allows for classification of a mother as a smoker or drinker during pregnancy and for the reporting of 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 numbers of drinkers and number of drinks reported on birth certificates are believed to underestimate actual alcohol use.

Data on tobacco use were collected by 43 States and the District of Columbia in 1989. Information on alcohol use was included on the certificates of 44 States and the District of Columbia. See table A for a listing of reporting areas.

Weight gain during pregnancy

Weight gain is reported in pounds. A loss of weight is reported as zero gain. Computations of median weight gain were based on ungrouped data.

This item was included on the certificates of 46 States and the District of Columbia. See table A for a listing of reporting areas.

Medical risk factors for this pregnancy

This item, which includes 16 specific medical risk factors, was included on the birth certificates of 47 States and the District of Columbia. Several States, however, did not include all factors on their birth certificates. See table A for more detailed information.

The format allows for the designation of more than one risk factor and includes a choice of "None." Accord-

ingly, if the item is not completed, it is classified as "not stated."

The definitions that follow 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 (11).

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 (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 birth weight of a previous live-born child was over 4,000 grams (8 pounds 13 ounces).

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 is a new item on the revised birth certificate. Six specific procedures, including a choice of "None" are offered. Not all States report each procedure. Birth records with "Obstetric procedures" left blank are considered "not stated." Data on obstetric procedures was reported by 47 States and the District of Columbia. See table A for a list of the reporting States.

The definitions that follow 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 (11).

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

Forty-seven States and the District of Columbia included this item on their birth certificates. However, not all of the complications were reported by all reporting States (see table A).

The definitions that follow 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 (11).

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 the 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 47 States in 1989. However, several States did not include all conditions (see table A).

The definitions that follow 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 (11).

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. The completeness of reporting specific anomalies depends on how easily they are recognized in the short time between birth and birth registration.

Forty-five States and the District of Columbia included this item on their birth certificates (see table A). 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 definitions that follow 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 (11).

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 new 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 1989 this information was collected from the birth certificates of 45 States and the District of Columbia. See table A for a listing of reporting areas.

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 which relates the number of women having a primary cesarean delivery to all women giving birth who have never had a cesarean delivery. The denominator for this rate includes all births less those with method of delivery classified as repeat cesareans and vaginal birth after previous cesarean. The *repeat cesarean* rate is the proportion of all cesarean deliveries that were to women having their second (or subsequent) cesarean delivery. 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.

Hispanic parentage

The 1989 revision of the U.S. Standard Certificate of Live Birth includes items to identify the Hispanic origin of the parents. Concurrent with the 1978 revision of the U.S. Certificate of Live Birth, the National Center for Health Statistics 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. Forty-seven States and the District of Columbia reported Hispanic origin of the parents for 1989. Based on data published by the U.S. Bureau of the Census (12) and related unpublished tabulations, it is estimated that 99 percent of the Hispanic population resides in the 1989 reporting area.

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 in the reporting area with origin of mother not stated (1.9 percent) were actually to Hispanic mothers. In order to compute rates for the Hispanic population for the United States as a whole, estimates by Hispanic origin and age of mother were made by inflating the figure for the reporting areas by the proportion of the U.S. Hispanic population in the three nonreporting States, Louisiana, New Hampshire, and Oklahoma. This procedure was performed separately for each Hispanic origin sub-group. The resulting rates are, therefore, estimated for the United States.

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 vitiate the value of the data for most general purposes.

Completeness of registration

An estimated 99.2 percent of all births occurring in the United States in 1989 were registered; for white births registration was 99.4 percent complete and for all other births, 98.5 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 1989 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 (13).

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. The figures for 1951–68 shown in table 1–3 differ slightly from those shown in annual reports for years prior to 1969.

Data adjusted for underregistration for 1951–59 shown in tables 1–1, 1–4, 1–5, 1–9, 1–10, and 1–11 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 underenumeration, biasing the age-specific rates more than when uncorrected birth and population data are used. (For further details see *Vital Statistics of the United States, 1963*, volume I, page 4–11.)

The age-specific rates used in the cohort fertility tables (tables 1–15 through 1–22) are an exception to the above statement. These rates are computed from births corrected for underregistration and population estimates adjusted for underenumeration and misstatement of age. Adjusted births 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 the item completeness of reporting. The percent "not stated" is one measure of the quality of the data. Completeness of reporting varies among items and States. For 1989, the revised certificates of some States were implemented late affecting the level of completeness for new items. See table A for the percent of birth records on which specified items were not stated.

Quality control procedures

States in the Vital Statistics Cooperative Program are required to have an error rate of less than 2.0 percent for each item for 3 consecutive data months during the initial qualifying period. Once a State is qualified, NCHS monitors the quality of data received through independent verification of a sample of records to ensure that the item error rate is not more than approximately 4 percent. In addition, there is verification at the State level before NCHS is sent the data.

After completion of coding, counts of the taped records are balanced against control totals for each shipment of records from a registration area. Impossible codes are eliminated during the editing processes on the computer and corrected on the basis of reference to the source record or adjusted by arbitrary code assignment. All subsequent operations involved in tabulation and table

preparation are verified during the computer processing or by statistical clerks.

Small frequencies

The numbers of births reported for an area represent complete counts. As such, they are not subject to sampling error, although they are subject to errors in the registration process. However, when the figures are used for analytical purposes, such as the comparison of rates over a period of time or for different areas, 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. 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. Estimates of standard errors and tests of significance under this assumption are described in most standard statistics texts. When the number of events is large, the relative standard error, expressed as a percent of the number or rate, is usually small.

When the number of events is small (fewer than 100) and the probability of such an event is small, considerable caution must be observed in interpreting the conditions described by the figures. Events of rare nature may be assumed to follow a Poisson probability distribution. For this distribution, a simple approximation may be used to estimate the error as follows:

If N is the number of births and R is the corresponding rate, the chances are 19 in 20 that

1. The "true" number of events lies between

$$N - 2\sqrt{N} \text{ and } N + 2\sqrt{N}$$

2. The "true" rate lies between

$$R - 2\frac{R}{\sqrt{N}} \quad \text{and } R + 2\frac{R}{\sqrt{N}}$$

If the rate R_1 corresponding to N_1 events is compared with the rate R_2 corresponding to N_2 events, the difference between the two rates may be regarded as statistically significant if it exceeds

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

For example, suppose that the observed birth rate for area A was 15.0 per 1,000 population and that this rate was based on 50 recorded births. Given prevailing conditions, the chances are 19 in 20 that the "true" or underlying birth rate for that area lies between 10.8 and 19.2 per 1,000 population. Let it be further supposed that the birth rate for area A of 15.0 per 1,000 population is being compared with a rate of 20.0 per 1,000 population for area B, which is based on 40 recorded births. Although the difference between the rates for the two areas is 5.0, this difference is less than twice the standard error of the difference

$$2\sqrt{\frac{(15.0)^2}{50} + \frac{(20.0)^2}{40}}$$

of the two rates that is computed to be 7.6. From this, it is concluded that the difference between the rates for the two areas is not statistically significant.

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, and 1980 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 SMSA's 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 1900–89 is shown in table 4–1. In addition, the population including Armed Forces abroad is shown for the United States. Table B shows the sources for these populations.

Population estimates for 1981–89—The population of the United States by age, race, and sex for 1989 is shown in table 4–2. The population for each State is shown in table 4–3 and the monthly population figures were published in *Current Population Reports*, Series P-25, Number 1067. Comparable data for the U.S. population by age, race, and sex and for the State populations for 1981–88, were shown, respectively, in tables 4–2 and 4–3 of *Vital Statistics of the United States*, volume I, for those years. Comparable monthly population data for 1981–88 were shown in *Current Population Reports*, Series P-25, Numbers 931, 949, 961, 980, and 1001, 1021, 1023 and 1045. Data by race are consistent with the modified 1980 populations by race.

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 *Vital Statistics of the United States, 1980*, volume I. The figures by race have been modified as described below. Monthly population

Table B: Sources for resident population and population including Armed Forces abroad: Birth- and death-registration States, 1900–1932, and United States, 1900–1989

Year	Source
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.

figures were published in *Current Population Reports*, Series P–25, Number 899.

The racial counts in the 1980 census are affected by changes in racial reporting practices, particularly by the Hispanic population, and in coding and classifying racial groups in the 1980 census. One particular change has created a major inconsistency between the 1980 census data and historical data series, including censuses, and vital statistics. About 40 percent of the Hispanic population counted in 1980, over 5.8 million persons, did not mark one of the specified races listed on the census questionnaire but instead marked the "Other" category. In the 1980 census, coding procedures were modified for persons who marked "Other" race and wrote in a national origin designation of a Latin American country or a specific Hispanic origin group in response to the racial question. These persons remained in the "Other" racial category in 1980 census data; in previous censuses and in vital statistics such responses were almost always coded into the "White" category.

To maintain comparability, the "Other" racial category in the 1980 census was reallocated to be consistent with previous procedures. Persons who marked the "Other" racial category and reported any Spanish origin on the Spanish origin question (5,840,648 persons) were distributed to white and black races in proportion to the distribution of persons of Hispanic origin who reported their race to be white or black. This was done for each age-sex group.

As a result of this procedure, 5,705,155 persons were added to the white population and 135,493 persons to the black population. Persons who marked the "Other" racial category and reported that they were not of Spanish origin (916,338 persons) were distributed as follows: 20 percent in each age-sex group were added to the "Asian and Pacific Islander" category (183,268 persons), and 80 percent were added to the "White" category (733,070 persons). The count of American Indians, Eskimos, and Aleuts was not affected by these procedures. Unpublished tabulations of these modified census counts were obtained from the U.S. Bureau of the Census and used to compute the 1980 rates for this report, except for tables 1–15 through 1–22.

Population estimates for 1971–79—Birth rates for 1971–79 (except those for cohorts of women in tables 1–15 through 1–22) 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 (14). The revised estimates for the United States by age, race, and sex were published by the U.S. Bureau of the Census in the *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 in this volume for 1961–69 (except for those shown in tables 1–5 and 1–6) 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 shown in tables 1–5 and 1–6 for 1961–64 are based on revised estimates of the population

Table C. Ratio of census-level resident population to resident population adjusted for estimated net census undercount by age, race, and sex: United States, April 1, 1980

Age	All races			White			All other					
							Total			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	0.9862	0.9763	0.9958	0.9916	0.9839	0.9990	0.9543	0.9309	0.9765	0.9392	0.9103	0.9669
10–14 years	0.9978	0.9982	0.9974	1.0003	1.0008	0.9998	0.9858	0.9858	0.9859	0.9808	0.9807	0.9816
15–19 years	1.0011	0.9983	1.0034	1.0003	0.9976	1.0003	1.0051	1.0052	1.0055	0.9980	0.9958	1.0001
20–24 years	0.9834	0.9706	0.9965	0.9879	0.9769	0.9993	0.9590	0.9354	0.9819	0.9390	0.9076	0.9696
25–29 years	0.9742	0.9581	0.9908	0.9799	0.9673	0.9929	0.9422	0.9040	0.9786	0.9168	0.8695	0.9628
30–34 years	0.9850	0.9683	1.0020	0.9905	0.9778	1.0036	0.9519	0.9081	0.9931	0.9197	0.8638	0.9735
35–39 years	0.9776	0.9597	0.9955	0.9860	0.9730	0.9991	0.9248	0.8743	0.9736	0.8968	0.8322	0.9588
40–44 years	0.9743	0.9549	0.9937	0.9849	0.9706	0.9992	0.9107	0.8576	0.9614	0.8782	0.8135	0.9401
45–49 years	0.9734	0.9538	0.9926	0.9828	0.9690	0.9967	0.9124	0.8544	0.9669	0.8833	0.8139	0.9497
50–54 years	...	0.9638	...	...	0.9755	...	...	0.8759	...	...	0.8413	...
55 years and older	...	0.9865	...	...	0.9875	...	...	0.9779	...	...	0.9578	...
15–44 years	...	...	0.9973	...	...	0.9995	...	...	0.9848	...	...	0.9712
15–54 years	...	0.9683	...	...	0.9770	...	...	0.9157	...	...	0.8843	...

SOURCE: U.S. Bureau of the Census: Estimates of the population of the United States, by age, sex, and race: 1980 to 1985. *Current Population Reports*, Series P-25, No. 985. Washington, U.S Government Printing Office, Apr. 1986.

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 *Vital Statistics of the United States, 1966,* volume I. 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 and overcount and misstatement of age, race, and sex) in the last four decennial censuses—1950, 1960, 1970, and 1980. These studies provide estimates of the national population that was not enumerated or overenumerated in the respective censuses, by age, race, and sex (15–17). The report for 1980 (17) includes estimates of net underenumeration and overenumeration for age, sex, and racial subgroups of the national population, modified for race consistency with previous population counts as described in the section "Populations for 1980."

These studies indicate that there is differential coverage 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 (15). 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 the 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 1980 can be computed by multiplying the reported rates by ratios of the 1980 census-level population adjusted for the estimated net census miscounts, which are shown in table C. 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 99 percent complete for all ages. Among women of races other than white, the undercount ranged up to 4 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 in tables 1–15 through 1–22 are computed from

births adjusted for underregistration and population estimates corrected for underenumeration and misstatement of age. The data shown in this volume are not consistent with data published in annual reports before 1974. These data 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 (18).

Parity distribution—The percent distribution of women by parity (number of children ever born alive to mother) shown in tables 1–17 and 1–21 is derived from cumulative birth rates by order of birth, which are shown in tables 1–16 and 1–20. 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:

$$\text{Percent at } N \text{ parity} = \frac{(\text{cum. rate, order } N) - (\text{cum. rate, order } N+1)}{10}$$

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

Birth probabilities—Shown in tables 1–18 and 1–22, 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.

Age-sex-adjusted birth rates

The age-sex-adjusted birth rates shown in table 1–4 are computed by the direct method. The age distribution of women aged 10–49 years as enumerated in 1940 and the total population of the United States for that year are used as the standard populations. The birth rates by age of mother and race that are used to compute these adjusted rates are shown in table 1–9. The age-sex-adjusted birth rates show differences in the level of fertility independent of differences in the age and sex composition of the population. It is important *not* to confuse these adjusted rates with the crude rates shown in other tables.

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. In table 1-9 the rate of 2,014 in 1989, 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 1989, they would have a total of 2,014 children by the time they reached the end of the reproductive period (taken here to be age 50 years), assuming that all of the women survived to that age.

Intrinsic vital rates

The intrinsic vital rates shown in table 1–6 are calculated from a stable population. A stable population is that hypothetical population, closed to external migration, that would become fixed in age-sex structure after repeated applications of a constant set of age-sex specific birth and death rates. For the mathematical derivation of intrinsic vital rates, see *Vital Statistics of the United States, 1962*, volume I, pages 4–13 and 4–14. The technique of calculating intrinsic vital rates is described by Barclay (19).

Seasonal adjustment of rates

The seasonally adjusted birth and fertility rates shown in table 1–8 are computed from X-11 variant of Census Method II (20). 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.

Computation of percents, medians, and means

Percent distributions, medians, and means are computed using only events for which the characteristic is reported. The "Not stated" category is subtracted from the total before computation of these measures.

The asterisk (*) indicates that the numerator and/or denominator number is less than 20.

SYMBOLS USED IN TABLES

Data not available	---
Category not applicable	. . .
Quantity zero	–
Quantity more than 0 but less than 0.05	0.0
Figure does not meet standards of reliability or precision	*

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Table 4-1. Population of Birth- and Death-Registration States, 1900-1932, and United States, 1900-1989

[Population enumerated as of April 1 for 1940, 1950, 1960, 1970, and 1980 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
1989	248,762,000	248,239,000	1944	138,397,000	132,885,000	...	...	...	...
1988	246,329,000	245,807,000	1943	136,739,000	134,245,000	...	...	...	...
1987	243,915,000	243,400,000	1942	134,860,000	133,920,000	...	...	...	...
1986	241,613,000	241,096,000	1941	133,402,000	133,121,000	...	...	...	...
1985	239,283,000	238,741,000	1940	131,820,000	131,669,275	...	...	...	...
1984	237,019,000	236,495,000	1939	131,028,000	130,879,718	...	...	...	...
1983	234,538,000	234,023,000	1938	129,969,000	129,824,939	...	...	...	...
1982	232,309,000	231,786,000	1937	128,961,000	128,824,829	...	...	...	...
1981	229,849,000	229,348,000	1936	128,181,000	128,053,180	...	...	...	...
1980	227,061,000	226,545,805	1935	127,362,000	127,250,232	...	...	...	...
1979	225,055,000	224,567,000	1934	126,485,000	126,373,773	...	...	...	...
1978	222,585,000	222,095,000	1933	125,690,000	125,578,763	...	...	...	...
1977	220,239,000	219,760,000	1932	124,949,000	124,840,471	47	118,903,899	47	118,903,899
1976	218,035,000	217,563,000	1931	124,149,000	124,039,648	46	117,455,229	47	118,148,987
1975	215,973,000	215,465,000	1930	123,188,000	123,076,741	46	116,544,946	47	117,238,278
1974	213,854,000	213,342,000	1929	---	121,769,939	46	115,317,450	46	115,317,450
1973	211,909,000	211,357,000	1928	---	120,501,115	44	113,636,160	44	113,636,160
1972	209,896,000	209,284,000	1927	---	119,038,062	40	104,320,830	42	107,084,532
1971	207,661,000	206,827,000	1926	---	117,399,225	35	90,400,590	41	103,822,683
1970	204,270,000	203,211,926	1925	---	115,831,963	33	88,294,564	40	102,031,555
1969	202,677,000	201,385,000	1924	---	114,113,463	33	87,000,285	39	99,318,098
1968	200,706,000	199,399,000	1923	---	111,949,845	30	81,072,123	38	96,788,197
1967	199,712,000	197,457,000	1922	---	110,054,778	30	79,560,746	37	92,702,901
1966	196,560,000	195,576,000	1921	---	108,541,489	27	70,807,090	34	87,814,447
1965	194,303,000	193,526,000	1920	---	106,466,420	23	63,597,307	34	86,079,263
1964	191,889,000	191,141,000	1919	105,063,000	104,512,110	22	61,212,076	33	83,157,982
1963	189,242,000	188,483,000	1918	104,550,000	103,202,801	20	55,153,782	30	79,008,412
1962	186,538,000	185,771,000	1917	103,414,000	103,265,913	20	55,197,952	27	70,234,775
1961	183,691,000	182,992,000	1916	---	101,965,984	11	32,944,013	26	66,971,177
1960	179,933,000	179,323,175	1915	---	100,549,013	10	31,096,697	24	61,894,847
1959	177,264,000	176,513,000	1914	---	99,117,567	...	...	24	60,963,309
1958	174,141,000	173,320,000	1913	---	97,226,814	...	...	23	58,156,740
1957	171,274,000	170,371,000	1912	---	95,331,300	...	...	22	54,847,700
1956	168,221,000	167,306,000	1911	---	93,867,814	...	...	22	53,929,644
1955	165,275,000	164,308,000	1910	---	92,406,536	...	...	20	47,470,437
1954	162,391,000	161,164,000	1909	---	90,491,525	...	...	18	44,223,513
1953	159,565,000	158,242,000	1908	---	88,708,976	...	...	17	38,634,759
1952	156,954,000	155,687,000	1907	---	87,000,271	...	...	15	34,552,837
1951	154,287,000	153,310,000	1906	---	85,436,556	...	...	15	33,782,288
1950	151,132,000	150,697,361	1905	---	83,819,666	...	...	10	21,767,980
1949	149,188,000	148,665,000	1904	---	82,164,974	...	...	10	21,332,076
1948	146,631,000	146,093,000	1903	---	80,632,152	...	...	10	20,943,222
1947	144,126,000	143,446,000	1902	---	79,160,196	...	...	10	20,582,907
1946	141,389,000	140,054,000	1901	---	77,585,128	...	...	10	20,237,453
1945	139,928,000	132,481,000	1900	---	76,094,134	...	...	10	19,965,446

[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, 1989

[Figures include Armed Forces stationed in the United States but exclude those stationed outside the United States. Due to rounding to the nearest thousand, detailed figures may not add to totals]

Age	All races			White			All other					
							Total			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	248,239,000	120,982,000	127,258,000	208,961,000	102,223,000	106,738,000	39,278,000	18,758,000	20,520,000	30,660,000	14,545,000	16,115,000
Under 1 year	3,945,000	2,020,000	1,925,000	3,163,000	1,623,000	1,541,000	782,000	397,000	385,000	619,000	314,000	305,000
1-4 years	14,807,000	7,578,000	7,229,000	11,887,000	6,093,000	5,794,000	2,920,000	1,485,000	1,435,000	2,271,000	1,155,000	1,116,000
5-9 years	18,212,000	9,321,000	8,891,000	14,628,000	7,504,000	7,124,000	3,584,000	1,817,000	1,767,000	2,802,000	1,423,000	1,378,000
10-14 years	16,950,000	8,689,000	8,260,000	13,574,000	6,973,000	6,601,000	3,375,000	1,716,000	1,659,000	2,679,000	1,362,000	1,318,000
15-19 years	17,812,000	9,091,000	8,721,000	14,343,000	7,327,000	7,015,000	3,469,000	1,764,000	1,705,000	2,758,000	1,394,000	1,365,000
15-17 years	10,169,000	5,214,000	4,955,000	8,123,000	4,168,000	3,955,000	2,046,000	1,046,000	1,001,000	1,623,000	827,000	796,000
18-19 years	7,643,000	3,878,000	3,766,000	6,220,000	3,159,000	3,062,000	1,424,000	718,000	704,000	1,135,000	567,000	567,000
20-24 years	18,702,000	9,368,000	9,334,000	15,359,000	7,731,000	7,628,000	3,343,000	1,637,000	1,706,000	2,651,000	1,279,000	1,372,000
25-29 years	21,699,000	10,865,000	10,834,000	18,103,000	9,142,000	8,960,000	3,597,000	1,723,000	1,874,000	2,827,000	1,342,000	1,485,000
30-34 years	22,135,000	11,078,000	11,058,000	18,567,000	9,385,000	9,182,000	3,568,000	1,693,000	1,875,000	2,744,000	1,289,000	1,455,000
35-39 years	19,621,000	9,731,000	9,890,000	16,625,000	8,342,000	8,283,000	2,996,000	1,389,000	1,606,000	2,260,000	1,035,000	1,225,000
40-44 years	16,882,000	8,294,000	8,588,000	14,550,000	7,229,000	7,321,000	2,331,000	1,064,000	1,267,000	1,726,000	782,000	945,000
45-49 years	13,521,000	6,601,000	6,920,000	11,672,000	5,758,000	5,915,000	1,849,000	843,000	1,006,000	1,395,000	626,000	769,000
50-54 years	11,375,000	5,509,000	5,866,000	9,789,000	4,791,000	4,998,000	1,586,000	719,000	868,000	1,223,000	544,000	679,000
55-59 years	10,726,000	5,121,000	5,605,000	9,310,000	4,480,000	4,830,000	1,416,000	641,000	775,000	1,116,000	508,000	608,000
60-64 years	10,867,000	5,079,000	5,788,000	9,569,000	4,498,000	5,071,000	1,298,000	581,000	718,000	1,035,000	467,000	567,000
65-69 years	10,170,000	4,631,000	5,538,000	9,029,000	4,130,000	4,899,000	1,141,000	502,000	639,000	916,000	402,000	515,000
70-74 years	8,012,000	3,464,000	4,549,000	7,193,000	3,120,000	4,074,000	819,000	344,000	475,000	661,000	274,000	386,000
75-79 years	6,033,000	2,385,000	3,648,000	5,430,000	2,147,000	3,282,000	603,000	238,000	365,000	486,000	187,000	299,000
80-84 years	3,728,000	1,306,000	2,422,000	3,409,000	1,189,000	2,220,000	319,000	117,000	201,000	256,000	91,000	165,000
85 years and over	3,042,000	850,000	2,192,000	2,761,000	761,000	2,000,000	281,000	89,000	192,000	236,000	72,000	165,000

SOURCE: U.S. Bureau of the Census: "Current Population Reports," Series P-25, No. 1057.

Table 4-3. Estimated Total Population and Female Population Aged 15-44 Years: United States, Each Division and State, Puerto Rico, Virgin Islands, and Guam: July 1, 1989

[Figures include Armed Forces stationed in each area and exclude those stationed outside the United States. Due to rounding to the nearest thousand, detailed figures may not add to totals]

Area	Total	Female 15-44 years
United States	248,239,000	58,425,000
Geographic divisions:		
New England	13,046,000	3,128,000
Middle Atlantic	37,726,000	8,768,000
East North Central	42,298,000	9,971,000
West North Central	17,851,000	4,096,000
South Atlantic	43,116,000	10,063,000
East South Central	15,406,000	3,641,000
West South Central	27,003,000	6,424,000
Mountain	13,514,000	3,193,000
Pacific	38,283,000	9,151,000
New England:		
Maine	1,222,000	287,000
New Hampshire	1,107,000	272,000
Vermont	567,000	142,000
Massachusetts	5,913,000	1,441,000
Rhode Island	998,000	235,000
Connecticut	3,239,000	751,000
Middle Atlantic:		
New York	17,950,000	4,223,000
New Jersey	7,736,000	1,807,000
Pennsylvania	12,040,000	2,738,000
East North Central:		
Ohio	10,907,000	2,545,000
Indiana	5,593,000	1,324,000
Illinois	11,658,000	2,752,000
Michigan	9,273,000	2,222,000
Wisconsin	4,867,000	1,128,000
West North Central:		
Minnesota	4,353,000	1,025,000
Iowa	2,840,000	642,000
Missouri	5,159,000	1,186,000
North Dakota	660,000	150,000
South Dakota	715,000	157,000
Nebraska	1,611,000	367,000
Kansas	2,513,000	569,000
South Atlantic:		
Delaware	673,000	162,000
Maryland	4,694,000	1,150,000
District of Columbia	604,000	152,000
Virginia	6,098,000	1,501,000
West Virginia	1,857,000	430,000
North Carolina	6,571,000	1,570,000
South Carolina	3,512,000	851,000
Georgia	6,436,000	1,576,000
Florida	12,671,000	2,671,000
East South Central:		
Kentucky	3,727,000	883,000
Tennessee	4,940,000	1,174,000
Alabama	4,118,000	974,000
Mississippi	2,621,000	610,000
West South Central:		
Arkansas	2,406,000	537,000
Louisiana	4,382,000	1,052,000
Oklahoma	3,224,000	748,000
Texas	16,991,000	4,087,000
Mountain:		
Montana	806,000	183,000
Idaho	1,014,000	233,000
Wyoming	475,000	118,000
Colorado	3,317,000	835,000
New Mexico	1,528,000	358,000
Arizona	3,558,000	806,000
Utah	1,707,000	396,000
Nevada	1,111,000	264,000
Pacific:		
Washington	4,761,000	1,151,000
Oregon	2,820,000	677,000
California	29,063,000	6,932,000
Alaska	527,000	130,000
Hawaii	1,112,000	261,000
Puerto Rico [1]	---	---
Virgin Islands [1]	---	---
Guam [1]	---	---

[1] Populations for Puerto Rico, Virgin Islands, and Guam are not available for 1989.

SOURCE: U.S. Bureau of the Census: "Current Population Reports," Series P-25, No. 1058.

TECHNICAL APPENDIX FROM

VITAL STATISTICS OF THE UNITED STATES

1989

VOLUME II - MORTALITY

U.S. DEPARTMENT OF
HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
CENTERS FOR DISEASE CONTROL AND PREVENTION
NATIONAL CENTER FOR HEALTH STATISTICS

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SOURCES OF DATA

Death and fetal-death statistics

Mortality statistics for 1989 are, as for all previous years except 1972, based on information from records of all deaths occurring in the United States. Fetal-death statistics for every year are based on all reports of fetal death received by the National Center for Health Statistics (NCHS).

The death-registration system and the fetal-death reporting system of the United States encompass the 50 States, the District of Columbia, New York City (which is independent of New York State for the purpose of death registration), Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Trust Territory of the Pacific Islands. In the statistical tabulations of this publication, *United States* refers only to the aggregate of the 50 States (including New York City) and the District of Columbia. Tabulations for Guam, Puerto Rico, and the Virgin Islands are shown separately in this volume. No data have ever been included for American Samoa or the Trust Territory of the Pacific Islands.

The Virgin Islands was admitted to the registration area for deaths in 1924; Puerto Rico, in 1932; and Guam, in 1970. Tabulations of death statistics for Puerto Rico and the Virgin Islands were shown regularly in the annual volumes of *Vital Statistics of the United States* from the year of their admission through 1971 except for the years 1967–69, and tabulations for Guam were included for 1970 and 1971. Death statistics for Puerto Rico, the Virgin Islands, and Guam were not included in the 1972 volume but have been included in section 8 of the volumes for each of the years 1973–78 and in section 9 beginning with 1979. Information for 1972 for these three areas was published in the respective annual vital statistics reports of the Department of Health of the Commonwealth of Puerto Rico, the Department of Health of the Virgin Islands, and the Department of Public Health and Social Services of the Government of Guam.

Procedures used by NCHS to collect death statistics have changed over the years. Before 1971, tabulations of deaths and fetal deaths were based solely on information obtained by NCHS from copies of the original certificates. The information from these copies was edited, coded, and tabulated. For 1960–70, all mortality 'information taken from these records was transferred by NCHS to magnetic tape for computer processing.

Beginning with 1971, an increasing number of States have provided NCHS with computer tapes of data coded according to NCHS specifications and provided to NCHS through the Vital Statistics Cooperative Program. The year State-coded demographic data were first transmitted on computer tape to NCHS is shown below for each of the States, New York City, Puerto Rico, and the District of Columbia, all of which now furnish demographic or nonmedical data on tape.

1971
- Florida

1972
- Maine
- Missouri
- New Hampshire
- Rhode Island
- Vermont

1973
- Colorado
- Michigan
- New York (except New York City)

1974
- Illinois
- Iowa
- Kansas
- Montana
- Nebraska
- Oregon
- South Carolina

1975
- Louisiana
- Maryland
- North Carolina
- Oklahoma
- Tennessee
- Virginia
- Wisconsin

1976
- Alabama
- Kentucky
- Minnesota
- Nevada
- Texas
- West Virginia

1977
- Alaska
- Idaho
- Massachusetts
- New York City
- Ohio
- Puerto Rico

1978
- Indiana
- Utah
- Washington

1979
- Connecticut
- Hawaii
- Mississippi
- New Jersey
- Pennsylvania
- Wyoming

1980
- Arkansas
- New Mexico
- South Dakota

1982
- North Dakota

1985
- Arizona
- California
- Delaware
- Georgia
- District of Columbia

For the Virgin Islands and Guam, mortality statistics for 1989 are based on information obtained directly by NCHS from copies of the original certificates received from the registration offices.

In 1974 States began coding medical (cause-of-death) data on computer tapes according to NCHS specifications. The year State-coded medical data were first transmitted to NCHS is shown below for the 30 States now furnishing such data. For 1989 Georgia, Indiana, Maine, and Wisconsin submitted precoded medical data on computer tape for part of the year. NCHS contracted with Colorado, Kansas, and

Mississippi to precode medical data for all deaths on computer tape for the five States added in 1988. Vermont subcontracted with Pennsylvania to code its medical data.

1974	1984
Iowa	Maryland
Michigan	New York State (except New York City)
	Vermont
1975	1986
Louisiana	California
Nebraska	Florida
North Carolina	Texas
Virginia	
Wisconsin	
1980	1988
Colorado	Alaska
Kansas	Delaware
Massachusetts	Idaho
Mississippi	North Dakota
New Hampshire	Wyoming
Pennsylvania	
South Carolina	
1981	1989
Maine	Georgia
	Indiana
	Washington
1983	
Minnesota	

For 1989 and previous years except 1972, NCHS coded the medical information from copies of the original certificates received from the registration offices for all deaths occurring in those States that were not furnishing NCHS medical data coded according to NCHS specifications. In addition, Georgia, Indiana, Maine, and Wisconsin submitted copies of the original certificates from which NCHS coded the medical data for part of the year. For 1981 and 1982, these procedures were modified because of a coding and processing backlog resulting from personnel and budgetary restrictions. To produce the mortality files on a timely basis with reduced resources, NCHS used State-coded underlying cause-of-death information supplied by 19 States for 50 percent of the records; for the other 50 percent of the records for these States as well as for 100 percent of the records for the remaining 21 registration areas, NCHS coded the medical information. Mortality statistics for 1972 were based on information obtained from a 50-percent sample of death records instead of from all records as in other years. Sampling variation associated with the 50-percent sample is described below in the section "Estimates of errors arising from 50-percent sample for 1972."

Fetal-death data are obtained directly from copies of original reports of fetal deaths received by NCHS from State registration offices, except registration offices in New York State (excluding New York City), which submitted State-coded data in 1989. Fetal-death data are not published by NCHS for the Virgin Islands and Guam.

Standard certificates and reports

For many years, the U.S. Standard Certificate of Death and the U.S. Standard Report of Fetal Death, issued by the Public Health Service, have been used as the principal means to attain uniformity in the contents of documents used to collect information on these events. They have been modified in each State to the extent required by the particular needs of the State or by special provisions of the State vital statistics law. However, the certificates or reports of most States conform closely in content and arrangement to the standards.

The first issue of the U.S. Standard Certificate of Death appeared 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 such fields as public health, social welfare, demography, and insurance. This revision procedure has assured careful evaluation of each item in terms of its current and future usefulness for legal, medical and health, 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, items have been dropped when their usefulness appeared to be limited.

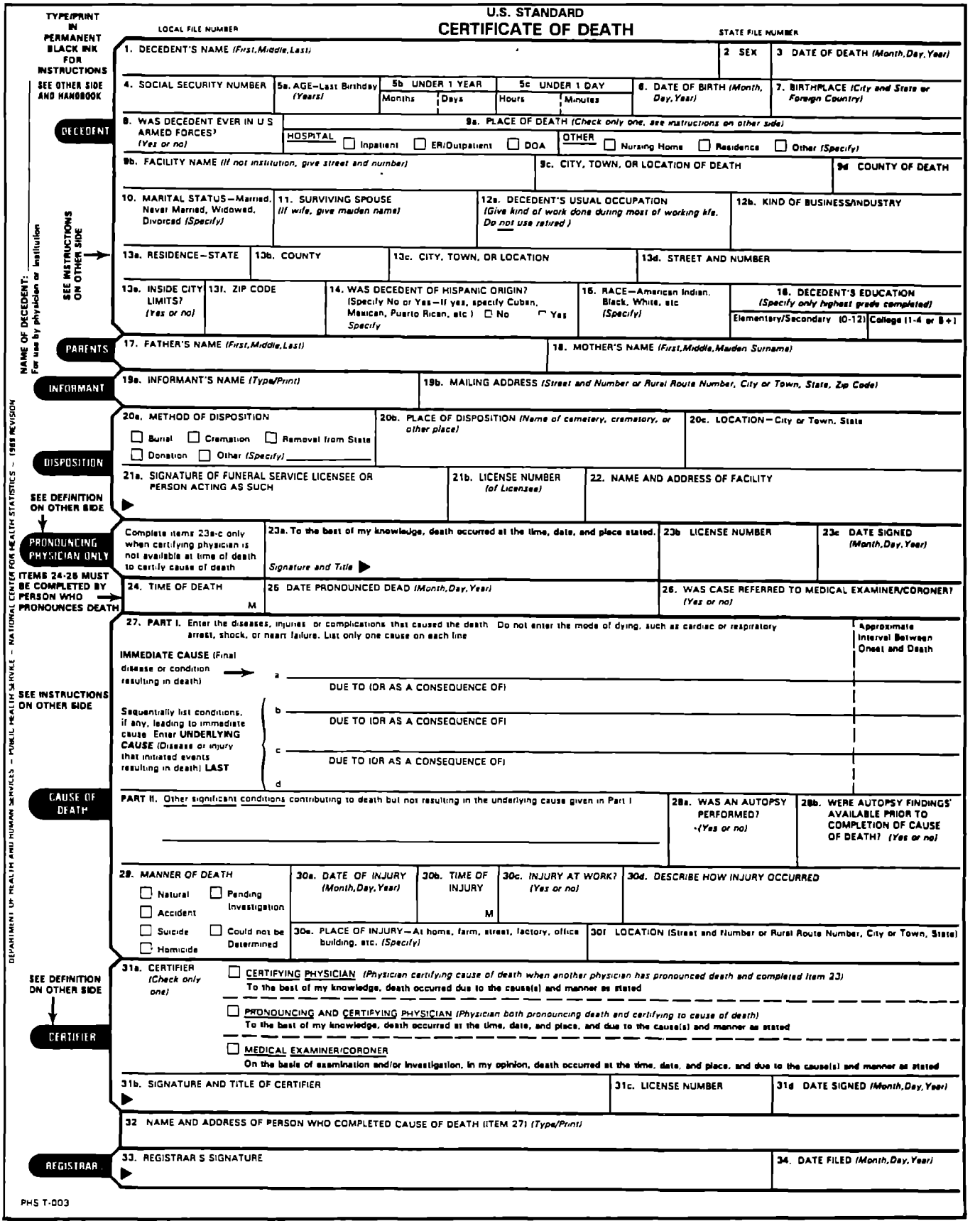
New revisions of the U.S. Standard Certificate of Death and the U.S. Standard Report of Fetal Death were recommended for State use beginning January 1, 1989. The U.S. Standard Certificate of Death and the U.S. Standard Report of Fetal Death are shown in figures 7-A and 7-B (1).

Among the major changes were the addition of a new item on educational attainment and changes to improve the medical certification of cause of death. Additional lines to report causes of death were added as well as more complete instructions with examples for properly completing the cause of death. Also, for the first time, the U.S. Standard Certificate of Death includes a question about the Hispanic origin of the decedent. A number of States had included an Hispanic-origin identifier on their certificates, resulting in data shown in this volume for years before 1989. To obtain information on type of place of death, the format of the item was changed from an open-ended question to a checkbox.

HISTORY

The first death statistics published by the Federal Government concerned events in 1850 and were based on statistics collected during the decennial census of that year. In 1880 a national "registration area" was created for recording deaths. Originally consisting of two States (Massachusetts and New Jersey), the District of Columbia, and several large cities having efficient systems for death regis-

FIGURE 7-A. U.S. Standard Certificate of Death



U.S. STANDARD
CERTIFICATE OF DEATH

TYPE/PRINT IN PERMANENT BLACK INK FOR INSTRUCTIONS SEE OTHER SIDE AND HANDBOOK

LOCAL FILE NUMBER

STATE FILE NUMBER

NAME OF DECEDENT: For use by physician or institution

SEE INSTRUCTIONS ON OTHER SIDE

DECEDENT

1. DECEDENT'S NAME (First, Middle, Last)
2. SEX
3. DATE OF DEATH (Month, Day, Year)
4. SOCIAL SECURITY NUMBER
5a. AGE—Last Birthday (Years)
5b. UNDER 1 YEAR — Months / Days
5c. UNDER 1 DAY — Hours / Minutes
6. DATE OF BIRTH (Month, Day, Year)
7. BIRTHPLACE (City and State or Foreign Country)
8. WAS DECEDENT EVER IN U.S. ARMED FORCES? (Yes or no)
9a. PLACE OF DEATH (Check only one, see instructions on other side)
HOSPITAL ☐ Inpatient ☐ ER/Outpatient ☐ DOA
OTHER ☐ Nursing Home ☐ Residence ☐ Other (Specify)
9b. FACILITY NAME (If not institution, give street and number)
9c. CITY, TOWN, OR LOCATION OF DEATH
9d. COUNTY OF DEATH
10. MARITAL STATUS—Married, Never Married, Widowed, Divorced (Specify)
11. SURVIVING SPOUSE (If wife, give maiden name)
12a. DECEDENT'S USUAL OCCUPATION (Give kind of work done during most of working life. Do not use retired)
12b. KIND OF BUSINESS/INDUSTRY
13a. RESIDENCE—STATE
13b. COUNTY
13c. CITY, TOWN, OR LOCATION
13d. STREET AND NUMBER
13e. INSIDE CITY LIMITS? (Yes or no)
13f. ZIP CODE
14. WAS DECEDENT OF HISPANIC ORIGIN? (Specify No or Yes—If yes, specify Cuban, Mexican, Puerto Rican, etc.) ☐ No ☐ Yes Specify
15. RACE—American Indian, Black, White, etc (Specify)
16. DECEDENT'S EDUCATION (Specify only highest grade completed)
Elementary/Secondary (0-12) / College (1-4 or 5+)

PARENTS

17. FATHER'S NAME (First, Middle, Last)
18. MOTHER'S NAME (First, Middle, Maiden Surname)

INFORMANT

19a. INFORMANT'S NAME (Type/Print)
19b. MAILING ADDRESS (Street and Number or Rural Route Number, City or Town, State, Zip Code)

DISPOSITION

20a. METHOD OF DISPOSITION
☐ Burial ☐ Cremation ☐ Removal from State
☐ Donation ☐ Other (Specify) _____
20b. PLACE OF DISPOSITION (Name of cemetery, crematory, or other place)
20c. LOCATION—City or Town, State
21a. SIGNATURE OF FUNERAL SERVICE LICENSEE OR PERSON ACTING AS SUCH
21b. LICENSE NUMBER (of Licensee)
22. NAME AND ADDRESS OF FACILITY

SEE DEFINITION ON OTHER SIDE

PRONOUNCING PHYSICIAN ONLY

Complete items 23a-c only when certifying physician is not available at time of death to certify cause of death
23a. To the best of my knowledge, death occurred at the time, date, and place stated. Signature and Title
23b. LICENSE NUMBER
23c. DATE SIGNED (Month, Day, Year)

ITEMS 24-26 MUST BE COMPLETED BY PERSON WHO PRONOUNCES DEATH

24. TIME OF DEATH — M
25. DATE PRONOUNCED DEAD (Month, Day, Year)
26. WAS CASE REFERRED TO MEDICAL EXAMINER/CORONER? (Yes or no)

CAUSE OF DEATH

27. PART I. Enter the diseases, injuries, or complications that caused the death. Do not enter the mode of dying, such as cardiac or respiratory arrest, shock, or heart failure. List only one cause on each line.
Approximate Interval Between Onset and Death

IMMEDIATE CAUSE (Final disease or condition resulting in death) → a. _____
DUE TO (OR AS A CONSEQUENCE OF)

SEE INSTRUCTIONS ON OTHER SIDE

Sequentially list conditions, if any, leading to immediate cause. Enter UNDERLYING CAUSE (Disease or injury that initiated events resulting in death) LAST
b. _____
DUE TO (OR AS A CONSEQUENCE OF)
c. _____
DUE TO (OR AS A CONSEQUENCE OF)
d. _____

PART II. Other significant conditions contributing to death but not resulting in the underlying cause given in Part I
28a. WAS AN AUTOPSY PERFORMED? (Yes or no)
28b. WERE AUTOPSY FINDINGS AVAILABLE PRIOR TO COMPLETION OF CAUSE OF DEATH? (Yes or no)

29. MANNER OF DEATH
☐ Natural ☐ Pending Investigation
☐ Accident
☐ Suicide ☐ Could not be Determined
☐ Homicide
30a. DATE OF INJURY (Month, Day, Year)
30b. TIME OF INJURY — M
30c. INJURY AT WORK? (Yes or no)
30d. DESCRIBE HOW INJURY OCCURRED
30e. PLACE OF INJURY—At home, farm, street, factory, office building, etc. (Specify)
30f. LOCATION (Street and Number or Rural Route Number, City or Town, State)

SEE DEFINITION ON OTHER SIDE

CERTIFIER

31a. CERTIFIER (Check only one)
☐ CERTIFYING PHYSICIAN (Physician certifying cause of death when another physician has pronounced death and completed item 23)
To the best of my knowledge, death occurred due to the cause(s) and manner as stated
☐ PRONOUNCING AND CERTIFYING PHYSICIAN (Physician both pronouncing death and certifying to cause of death)
To the best of my knowledge, death occurred at the time, date, and place, and due to the cause(s) and manner as stated
☐ MEDICAL EXAMINER/CORONER
On the basis of examination and/or investigation, in my opinion, death occurred at the time, date, and place, and due to the cause(s) and manner as stated
31b. SIGNATURE AND TITLE OF CERTIFIER
31c. LICENSE NUMBER
31d. DATE SIGNED (Month, Day, Year)

32. NAME AND ADDRESS OF PERSON WHO COMPLETED CAUSE OF DEATH (ITEM 27) (Type/Print)

REGISTRAR

33. REGISTRAR'S SIGNATURE
34. DATE FILED (Month, Day, Year)

PHS T-003

DEPARTMENT OF HEALTH AND HUMAN SERVICES – PUBLIC HEALTH SERVICE – NATIONAL CENTER FOR HEALTH STATISTICS – 1989 REVISION

FIGURE 7-B. U.S. Standard Certificate of Fetal Death

TYPE/PRINT IN PERMANENT BLACK INK FOR INSTRUCTIONS SEE HANDBOOK

U.S. STANDARD

REPORT OF FETAL DEATH

STATE FILE NUMBER

1. FACILITY NAME *(If not institution, give street and number)*

2. CITY, TOWN, OR LOCATION OF DELIVERY | 3. COUNTY OF DELIVERY | 4. DATE OF DELIVERY *(Month, Day, Year)* | 5. SEX OF FETUS

PARENTS

6a. MOTHER'S NAME *(First, Middle, Last)* | 6b. MAIDEN SURNAME | 7. DATE OF BIRTH *(Month, Day, Year)*

8a. RESIDENCE-STATE | 8b. COUNTY | 8c. CITY, TOWN, OR LOCATION | 8d. STREET AND NUMBER

8e. INSIDE CITY LIMITS? *(Yes or no)* | 8f. ZIP CODE | 9. FATHER'S NAME *(First, Middle, Last)* | 10. DATE OF BIRTH *(Month, Day, Year)*

	11. OF HISPANIC ORIGIN? (Specify No or Yes—If yes, specify Cuban, Mexican, Puerto Rican, etc.)	12. RACE—American Indian, Black, White, etc. *(Specify below)*	13. EDUCATION *(Specify only highest grade completed)* Elementary/Secondary (0-12)	13. EDUCATION College (1-4 or 5+)	14. OCCUPATION AND BUSINESS/INDUSTRY *(Worked during last year)* Occupation	Business/Industry
MOTHER	11a. ☐ No ☐ Yes Specify:	12a.	13a.		14a.	14b.
FATHER	11b. ☐ No ☐ Yes Specify:	12b.	13b.		14c.	14d.

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

FETAL DEATH(S)

15. PREGNANCY HISTORY *(Complete each section)*

LIVE BIRTHS		OTHER TERMINATIONS *(Spontaneous and induced at any time after conception)*
15a. Now Living	15b. Now Dead	15d. *(Do not include this fetus)*
Number ____ ☐ None	Number ____ ☐ None	Number ____ ☐ None
15c. DATE OF LAST LIVE BIRTH *(Month, Year)*		15e. DATE OF LAST OTHER TERMINATION *(Month, Year)*

16. MOTHER MARRIED? (At delivery, conception, or any time between) *(Yes or no)*

17. DATE LAST NORMAL MENSES BEGAN *(Month, Day, Year)*

18. MONTH OF PREGNANCY PRENATAL CARE BEGAN—First, Second, Third, etc. *(Specify)*

19. PRENATAL VISITS—Total Number *(If none, so state)*

20. WEIGHT OF FETUS *(Specify Unit)*

21. CLINICAL ESTIMATE OF GESTATION *(Weeks)*

22a. PLURALITY—Single, Twin, Triplet, etc. *(Specify)*

22b. IF NOT SINGLE BIRTH—Born First, Second, Third, etc. *(Specify)*

MEDICAL AND HEALTH INFORMATION

23a. 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 ____ (Specify) ... 17 ☐

23b. 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.

24. 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 ____ (Specify) ... 07 ☐

25. 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 ____ (Specify) ... 16 ☐

26. 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 ☐
Hysterotomy/Hysterectomy ... 07 ☐

27. CONGENITAL ANOMALIES OF FETUS *(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 ____ (Specify) ... 22 ☐

CAUSE OF FETAL DEATH

28. Enter only one cause per line for a, b, and c.

PART I. Fetal or maternal condition directly causing fetal death.
a. IMMEDIATE CAUSE — Specify Fetal or Maternal
DUE TO (OR AS A CONSEQUENCE OF):
b. — Specify Fetal or Maternal
DUE TO (OR AS A CONSEQUENCE OF):
c. — Specify Fetal or Maternal

Fetal and/or maternal conditions, if any, giving rise to the immediate cause(s), stating the underlying cause last.

PART II. Other significant conditions of fetus or mother contributing to fetal death but not resulting in the underlying cause given in Part I.

29. FETUS DIED BEFORE LABOR, DURING LABOR OR DELIVERY, UNKNOWN *(Specify)*

30. ATTENDANT'S NAME AND TITLE *(Type/Print)*
Name ____
☐ M.D. ☐ D.O. ☐ C.N.M. ☐ Other Midwife
☐ Other *(Specify)* ____

31. NAME AND TITLE OF PERSON COMPLETING REPORT *(Type/Print)*
Name ____
Title ____

DEPARTMENT OF HEALTH AND HUMAN SERVICES — PUBLIC HEALTH SERVICE — NATIONAL CENTER FOR HEALTH STATISTICS — 1989 REVISION

PHS-T-007

trations, the death-registration area continued to expand until 1933, when, for the first time, it included the entire United States. Tables showing data for death-registration States include the District of Columbia for all years; registration cities in nonregistration States are not included. For more details on the history of the death-registration area, see the Technical Appendix in *Vital Statistics of the United States, 1979*, Volume II, Mortality, Part A, section 7, pages 3 and 4, and the section "History and Organization of the Vital Statistics System," chapter 1, *Vital Statistics of the United States, 1950*, Volume I, pages 2–19. Statistics on fetal deaths were first published for the birth-registration area in 1918 and then annually beginning in 1922.

CLASSIFICATION OF DATA

The principal value of vital statistics data is realized through the presentation of rates, which are computed by relating the vital events of a class to the population of a similarly defined class. Vital statistics and population statistics must therefore be classified according to similarly defined systems and tabulated in comparable groups. Even when the variables common to both, such as geographic area, age, sex, and race, 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 in the classification of geographic and personal items for deaths and fetal deaths for 1989 appear in two NCHS instruction manuals (2,3). A discussion of the classification of certain important items is presented below.

Classification by occurrence and residence

Tabulations for the United States and specified geographic areas in this volume are classified by place of residence unless stated as by place of occurrence. Before 1970, resident mortality statistics for the United States included all deaths occurring in the United States, with deaths of "nonresidents of the United States" assigned to place of death. "Deaths of nonresidents of the United States" refers to deaths that occur in the United States to nonresident aliens; nationals residing abroad; and residents of Puerto Rico, the Virgin Islands, Guam, and other territories of the United States. Beginning with 1970, "deaths of nonresidents of the United States" are not included in tables by place of residence.

Tables by place of occurrence, on the other hand, include deaths of residents and nonresidents of the United States. Consequently, for each year beginning with 1970, the total number of deaths in the United States by place of occurrence was somewhat greater than the total by place of residence. For 1989 this difference amounted to 3,393 deaths. Mortality statistics by place of occurrence are shown in tables 1-11, 1-19, 1-20, 1-30–1-32, 3-1, 3-6, 8-1, and 8-7.

Before 1970, except in 1964 and 1965, deaths of nonresidents of the United States occurring in the United States were treated as deaths of residents of the exact place of occurrence, which in most instances was an urban area. In 1964 and 1965 deaths of nonresidents of the United States occurring in the United States were allocated as deaths of residents of the balance of the county in which they occurred.

Residence error—Results of a 1960 study showed that the classification of residence information on the death certificates corresponded closely to the residence classification of the census records for the decedents whose records were matched (4).

A comparison of the results of this study of deaths with those for a previous matched record study of births (5) showed that the quality of residence data had improved considerably between 1950 and 1960. Both studies found that events in urban areas were overstated by the NCHS classification in comparison with the U.S. Bureau of the Census classification. The magnitude of the difference was substantially less for deaths in 1960 than it was for births in 1950.

The improvement is attributed to an item added in 1956 to the U.S. Standard Certificates of Birth and of Death, asking whether residence was inside or outside city limits. This new item aided in properly allocating the residence of persons living near cities but outside the corporate limits.

Geographic classification

The rules followed in the classification of geographic areas for deaths and fetal deaths are contained in the two instruction manuals referred to previously (2,3). The geographic codes assigned by NCHS during data reduction of source information on birth, death, and fetal-death records are given in another instruction manual (6). Beginning with 1982 data, the geographic codes were modified to reflect results of the 1980 census. For 1970–81, codes are based on results of the 1970 census.

Standard metropolitan statistical areas—The standard metropolitan statistical areas (SMSA's) used in this volume are those established by the U.S. Office of Management and Budget (7) from final 1980 census population counts and used by the U.S. Bureau of the Census, except in the New England States.

Except in the New England States, an SMSA is a county or a group of contiguous counties containing a city of 50,000 inhabitants or more or an urbanized area of 50,000 with a total metropolitan population of at least 100,000. In addition to the county or counties containing such a city or urbanized area, contiguous counties are included in an SMSA if, according to specified criteria, they are essentially metropolitan in character and are socially

and economically integrated with the central city or urbanized area (8).

In the New England States, the U.S. Office of Management and Budget uses towns and cities rather than counties as geographic components of SMSA's. However, NCHS cannot use the SMSA classification for these States because its data are not coded to identify all towns. Instead, NCHS uses New England County Metropolitan Areas (NECMA's). Made up of county units, these areas are established by the U.S. Office of Management and Budget (8,9).

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

Population-size groups—In 1989 vital statistics data for cities and certain other urban places were classified according to the population enumerated in the 1980 Census of Population. Data are available for individual cities and other urban places of 10,000 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." For the years 1970–81, classification of areas was determined by the population enumerated in the 1970 Census of Population. Beginning with 1982 data, some urban places identified in previous reports were deleted and others were added because of changes occurring in the enumerated population between 1970 and 1980.

Urban places other than incorporated cities for which vital statistics data are shown in this volume include the following:

- Each town in the New England States, 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 a population of 10,000 or more, as no incorporated cities exist in the State.

Before 1964, places were classified as "urban" or "rural." The Technical Appendixes for earlier years discuss the previous classification system.

State or country of birth

Mortality statistics by State or country of birth (table 1-36) became available beginning with 1979. State or country of birth of a decedent is assigned to 1 of the 50 States or the District of Columbia; or to Puerto Rico, the Virgin Islands, or Guam—if specified on the death certificate. The place of birth also is tabulated for Canada, Cuba, Mexico, and for the Remainder of the World. Deaths for which information on State or country of birth was unknown, not stated, or not classifiable accounted for a small proportion, about 1.2 percent, of all deaths in 1989.

Early mortality reports published by the U.S. Bureau of the Census contained tables showing nativity of parents as well as nativity of decedent. Publication of these tables was discontinued in 1933. Mortality data showing nativity of decedent were published again in annual reports for 1939–41 and for 1950.

Age

The age recorded on the death record is the age at last birthday. With respect to the computation of death rates, the age classification used by the U.S. Bureau of the Census is based also on the age of the person in completed years.

For computation of age-specific and age-adjusted death rates, deaths with age not stated are excluded. For life table computation, deaths with age not stated are distributed proportionately.

Race

For vital statistics in the United States for 1989, deaths are classified by race—white, black, American Indian, Chinese, Hawaiian, Japanese, Filipino, Other Asian or Pacific Islander, and Other. Mortality data for Filipino and Other Asian or Pacific Islander were shown for the first time in 1979.

The white category includes, in addition to persons reported as white, those reported as Mexican, Puerto Rican, Cuban, and all other Caucasians. The American Indian category includes American, Alaskan, Canadian, Mexican, Eskimo, and Aleut. If the racial entry on the death certificate indicates a mixture of Hawaiian and any other race, the entry is coded to Hawaiian. If the race is given as a mixture of white and any other race, the entry is coded to the appropriate nonwhite race. If a mixture of races other than white is given (except Hawaiian), the entry is coded to the first race listed. This procedure for coding the first race listed has been used since 1969. Before 1969, if the entry for race was a mixture of black and any other race except Hawaiian, the entry was coded to black.

Most of the tables in this volume, however, do not show data for this detailed classification by race. In all the tables, the divisions are white, all other (including black), and black separately.

Race not stated—For 1989 the number of death records for which race was unknown, not stated, or not classifiable was 4,499, or 0.2 percent of the total deaths. Death records with race entry not stated are assigned to a racial designation as follows: If the preceding record is coded white, the code assignment is made to white; if the code is other than white, the assignment is made to black. Before 1964 all records with race not stated were assigned to white except records of residents of New Jersey for 1962–64.

New Jersey, 1962–64—New Jersey omitted the race item from its certificates of live birth, death, and fetal death used in the beginning of 1962. The item was restored during the latter part of 1962. However, the certificate revision without the race item was used for most of 1962 as well as 1963. Therefore, figures by race for 1962 and 1963 exclude New Jersey. For 1964, 6.8 percent of the death records used for residents of New Jersey did not contain the race item.

Adjustments made in vital statistics to account for the omission of the race item in New Jersey for part of the certificates filed during 1962–64 are described in the Technical Appendix of *Vital Statistics of the United States* for each of those data years.

Hispanic origin

Mortality statistics for the Hispanic-origin population are based on information for those States and the District of Columbia that included items on the death certificate to identify Hispanic or ethnic origin of decedents. Data for 1989 were obtained from the District of Columbia and all States except Louisiana, New Hampshire, and Oklahoma.

Hispanic mortality data were published for the first time in 1984. Generally, the reporting States used items similar to one of two basic formats recommended by NCHS. The first format is directed specifically toward the Hispanic population and appears on the U.S. Standard Certificate of Death as follows:

Was decedent of Hispanic origin?
(Specify No or Yes—If Yes, specify Cuban, Mexican, Puerto Rican, etc.) ____ No ____ Yes
Specify:

The second format is a more general ancestry item and appears as follows:

Ancestry—Mexican, Puerto Rican, Cuban, African, English, Irish, German, Homong, etc., (specify)

For 1989, mortality data in tables 1-37 and 2-19 are based on deaths to residents of all 47 reporting States and the District of Columbia. In tables 1-38, 1-43, and 1-44, mortality data for the Hispanic-origin population are based on deaths to residents of 44 reporting States and the District of Columbia whose data were at least 90 percent complete on a place-of-occurrence basis and considered to be sufficiently comparable to be used for analysis. The 44 States are Alabama, Alaska, Arizona, Arkansas, California, Colorado, Delaware, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, New York (including New York City), North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Washington, West Virginia, Wisconsin, and Wyoming. Data for three States—Connecticut, Maryland, and Virginia—are excluded from tables 1-38, 1-43, and 1-44 because of the large proportion of deaths (in excess of 10 percent) occurring in these States for which Hispanic origin was not stated or was unknown.

In tables 2-20–2-23, the reporting area is based on deaths to residents of 43 reporting States and the District of Columbia whose mortality data for all ages and whose live birth data were at least 90 percent complete on a place-of-occurrence basis and considered to be sufficiently comparable to be used for analysis. The 43 States are Alabama, Alaska, Arizona, Arkansas, California, Colorado, Delaware, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, New York (including New York City), North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Washington, West Virginia, Wisconsin, and Wyoming. Data for Connecticut, Maryland, and Virginia were excluded for the reasons stated above. Rhode Island also was excluded because of the large proportion of unknown.

The 44 and 43 reporting States and the District of Columbia for which general mortality data are shown in this report accounted for about 97 percent of the Hispanic population in the United States in 1980. This included about 99 percent of the Mexican population, 94 percent of the Puerto Rican population, 97 percent of the Cuban population, and 94 percent of the "Other Hispanic" population (10). Accordingly, some caution should be exercised in generalizing mortality patterns from the reporting area to the Hispanic-origin population of the entire United States. For qualifications regarding infant mortality of the Hispanic-origin population, see "Infant deaths."

Marital status

Mortality statistics by marital status (tables 1-34 and 1-35) were published in 1979 for the first time since 1961. (They were previously published in the annual volumes for 1949–51 and 1959–61.) Several reports analyzing mortality by marital status have been published, including the special study based on 1959–61 data (11). Reference to earlier reports is given in the appendix of part B of the 1959–61 special study.

Mortality statistics by marital status are tabulated separately for never married, married, widowed, and divorced. Certificates in which the marriage is specified as being annulled are classified as never married. Where marital status is specified as separated or common-law marriage, it is classified as married. Of the 2,094,043 resident deaths 15 years of age and over in 1989, 20,709 certificates (1.0 percent) had marital status not stated.

Educational attainment

Beginning with the 1989 data year, mortality data on educational attainment are being tabulated from information reported on the death certificate. As a result of the revision of the U.S. Standard Certificate of Death (1), this item was added to the certificates of a large number of States:

- Decedent's Education (specify only highest grade completed)
- Elementary/Secondary (0–12) College (1–4 or 5+)

Mortality data on educational attainment for 1989 are based on deaths to residents of 21 reporting States whose data were at least 90 percent complete on a place-of-occurrence basis. The 21 reporting States are Arizona, California, Colorado, Delaware, Florida, Hawaii, Idaho, Illinois, Iowa, Kansas, Michigan, Minnesota, Missouri, Montana, New Hampshire, Oregon, South Carolina, Utah, Vermont, Wisconsin, and Wyoming.

Place of death and status of decedent

Mortality statistics classified by place of death were published in 1979 for the first time since 1958 (tables 1-30–1-32). In addition, mortality data also were available for the first time in 1979 for the status of decedent when death occurred in a hospital or medical center. The 1989 data were obtained from the following two items appearing on the revised U.S. Standard Certificate of Death (1):

- Item 9a. Place of Death (check only one)
  Hospital: Inpatient, ER/Outpatient, DOA
  Other: Nursing Home, Residence, Other (specify)
- Item 9b. Facility Name (If not institution, give street and number)

Before the 1989 revision of the Standard Certificate of Death, information on place of death and status of decedent could be determined if the hospital or institution indicated Inpatient, Outpatient, ER, and DOA, and if the name of the hospital or institution, which was used to determine the kind of facility, appeared on the certificate. The change to a checkbox format in many States for this item may affect the comparability of data between 1989 and previous years.

Except for Oklahoma, all of the States (including New York City) and the District of Columbia have item 9 (or its equivalent) on their certificates. Louisiana's certificate was revised in 1989, but the computer system was not changed. Therefore, the same detail categories used in 1988 were used in 1989. As a result, not all categories were available. For all reporting States and the District of Columbia in the Vital Statistics Cooperative Program, NCHS accepts the State definition, classification, or code for hospitals, medical centers, nursing homes, or other institutions.

Effective with data year 1980, the coding for place of death and status of decedent was modified. A new coding category was added: "Death on arrival—hospital, clinic, medical center name not given." Deaths coded to this category are tabulated in tables 1-30–1-32. Had the 1979 coding categories been used, these deaths would have been tabulated as "Place unknown."

California—For the first 5 months of data year 1989, California coded "residence" to "other" for "Place of death."

Mortality by month and date of death

Deaths by month have been tabulated regularly and published in the annual volume for each year beginning with data year 1900. For 1989 deaths by month are shown in tables 1-20–1-21, 1-24, 1-33, 2-12–2-14, and 3-7.

Date of death was published for the first time for data year 1972. In addition, unpublished data for selected causes by date of death for 1962 are available from NCHS.

Numbers of deaths by date of death in this volume are shown in table 1–33 for the total number of deaths and for the numbers of deaths for the following three causes, for which the greatest interest in date of occurrence of death has been expressed: Motor vehicle accidents, Suicide, and Homicide and legal intervention.

These data show the frequency distribution of deaths for the selected causes by day of the week. They also make it possible to identify holidays with peak numbers of deaths from specified causes.

Report of autopsy

Before 1972, the last year for which autopsy data were tabulated was 1958. Beginning in 1972, all registration areas requested information on the death certificates as to whether autopsies were performed. For 1989 autopsies were reported on 247,251 death certificates, 11.5 percent of the total (table 1-29).

Information indicating whether autopsy findings were used in determining the cause of death was tabulated for 1972–73 for all but nine registration areas and for 1974–77 for all but eight registration areas. The item "autopsy findings used" was deleted from the 1978 U.S. Standard Certificate of Death.

For eight of the cause-of-death categories shown in table 1-29, autopsies were reported as performed for 50 percent or more of all deaths (Meningococcal infection; Pregnancy with abortive outcome; Other complications of pregnancy, childbirth, and the puerperium; Symptoms, signs, and ill-defined conditions; Motor vehicle accidents; Suicide; Homicide and legal intervention; and All other external causes). There was one other category for which 40 percent or more of the death certificates reported autopsies. Autopsies were reported for only 7.3 percent of the Major cardiovascular diseases.

Cause of death

Cause-of-death classification—Since 1949, cause-of-death statistics have been based on the underlying cause of death, which is defined as "(a) the disease or injury which initiated the train of events leading directly to death, or (b) the circumstances of the accident or violence which produced the fatal injury" (12).

For each death the underlying cause is selected from an array of conditions reported in the medical certification section on the death certificate. This section provides a format for entering the cause of death sequentially. The

conditions are translated into medical codes through use of the classification structure and the selection and modification rules contained in the applicable revision of the *International Classification of Diseases* (ICD), published by the World Health Organization (WHO). Selection rules provide guidance for systematically identifying the underlying cause of death. Modification rules are intended to improve the usefulness of mortality statistics by giving preference to certain classification categories over others and/or to consolidate two or more conditions on the certificate into one classification category.

As a statistical datum, underlying cause of death is a simple, one-dimensional statistic; it is conceptually easy to understand and a well-accepted measure of mortality. It identifies the initiating cause of death and is therefore most useful to public health officials in developing measures to prevent the onset of the chain of events leading to death. The rules for selecting the underlying cause of death are included in ICD as a means of standardizing classification, which contributes toward comparability and uniformity in mortality medical statistics among countries.

Tabulation lists—Beginning with data year 1979, the cause-of-death statistics published by NCHS have been classified according to the Ninth Revision of the International Classification of Diseases (ICD-9) (12). In addition to specifying that ICD-9 be used, WHO also recommends how the data should be tabulated to promote international comparability. The recommended system for tabulating data in ICD-9 allows countries to construct their mortality and morbidity tabulation lists from the rubrics of the WHO Basic Tabulation List (BTL) if the rubrics from the WHO mortality and morbidity lists, respectively, are included. This tabulation system for the Ninth Revision is more flexible than that for the Eighth Revision, in which specific lists were recommended for tabulating mortality and morbidity data.

The BTL recommended under the Ninth Revision consists of 57 two-digit rubrics that when added equal the "all causes" total. Identified within each two-digit rubric are up to nine three-digit rubrics that are numbered from zero to eight and whose total does not equal the two-digit rubric. The two-digit BTL rubrics 01–46 are used for the tabulation of nonviolent deaths according to ICD categories 001–799. Rubrics relating to chapter 17 (nature-of-injury causes 47–56) are not used by NCHS for selecting underlying causes of death; rather, preference is given to rubrics E47–E56. The 57th two-digit rubric VO is the Supplementary Classification of Factors Influencing Health Status and Contact with Health Services and is not appropriate for the tabulation of mortality data. The WHO Mortality List, a subset of the titles contained in the BTL, consists of 50 rubrics that are the minimum necessary for the national display of mortality data.

Five lists of causes have been developed for tabulation and publication of mortality data in this volume—the Each-Cause List, List of 282 Selected Causes of Death, List of 72 Selected Causes of Death, List of 61 Selected Causes of Infant Death, and List of 34 Selected Causes of Death. These lists were designed to be as comparable as possible with the NCHS lists more recently used under the Eighth Revision. However, complete comparability could not always be achieved.

The Each-Cause List is made up of each three-digit category of the WHO Detailed List to which deaths may be validly assigned and most four-digit subcategories. The list is used for tabulation for the entire United States. The published Each-Cause table does not show the four-digit subcategories provided for Motor vehicle accidents (E810–E825); however, these subcategories that identify persons injured are shown in the accident tables of this report (section 5). Special fifth-digit subcategories also are used in the accident tables to identify place of accident when deaths from nontransport accidents are shown. These are not shown in the Each-Cause table.

The List of 282 Selected Causes of Death is constructed from BTL rubrics 01–46 and E47–E56. Each of the 56 BTL two-digit titles can be obtained either directly or by combining titles in the List. The three-digit level of the BTL is modified more extensively. Where more detail was desired, categories not shown in the three-digit rubrics were added to the List of 282 Selected Causes of Death. Where less detail was needed, the three-digit rubrics were combined. Moreover, each of the 50 rubrics of the WHO Mortality List can be obtained from the List of 282 Selected Causes of Death.

The List of 72 Selected Causes of Death was constructed by combining titles in the List of 282 Selected Causes of Death. It is used in tables published for the United States and each State, and for standard metropolitan statistical areas.

The List of 61 Selected Causes of Infant Death shows more detailed titles for Congenital anomalies and Certain conditions originating in the perinatal period than any other list except the Each-Cause List.

The List of 34 Selected Causes of Death was created by combining titles in the List of 72 Selected Causes. A table using this list is published for detailed geographic areas.

Beginning with data for 1987, changes were made in these lists to accommodate the introduction in the United States of new category numbers *042–*044 for Human immunodeficiency virus infection (HIV infection). The changes are described in the Technical Appendix from *Vital Statistics for the United States, 1987.*

Effect of list revisions—The International Lists or adaptations of them, used in the United States since 1900, have been revised approximately every 10 years so the disease classifications may be consistent with advances in medical science and with changes in diagnostic practice. Each revision of the International Lists has produced some break in comparability of cause-of-death statistics. Cause-of-death statistics beginning with 1979 are classified by NCHS according to the ICD-9 (12). For a discussion of each of the classifications used with death statistics since 1900, see the Technical Appendix from *Vital Statistics of the United States, 1979*, Volume II, Mortality, Part A, section 7, pages 9–14.

A dual coding study was undertaken comparing the Ninth and the Eighth Revisions to measure the extent of discontinuity in cause-of-death statistics resulting from introducing the new Revision. A study for the List of 72 Selected Causes of Death and the List of 10 Selected Causes of Infant Death has been published (13). The List of 10 Selected Causes of Infant Death is a basic NCHS tabulation list not used in this volume but used for provisional data in the *Monthly Vital Statistics Report*, another NCHS publication. Comparability studies also were undertaken between the Eighth and Seventh, Seventh and Sixth, and Sixth and Fifth Revisions. For additional information about these studies, see the 1979 Technical Appendix previously mentioned.

Significant coding changes under the Ninth Revision—Since the implementation of ICD-9 in the United States, effective with mortality data for 1979, several coding changes have been introduced. The more important changes are discussed below. In early 1983, a change was made in the coding of acquired immunodeficiency syndrome (AIDS) and HIV infection, which affected data from 1981 to 1986. Also effective with data year 1981 was a coding change for poliomyelitis. For data year 1982, the definition of child was changed (which affects the classification of deaths to a number of categories, including Child battering and other maltreatment), and guidelines for coding deaths to the category Child battering and other maltreatment (ICD No. E967) were changed also. During the calendar year 1985, detailed instructions for coding motor vehicle accidents involving all-terrain vehicles (ATV's) were implemented to ensure consistency in coding these accidents. Effective with data year 1986, "primary" and "invasive" tumors, unspecified, were classified as "malignant"; these neoplasms had been classified to Neoplasms of unspecified nature (ICD-9 No. 239).

Beginning with data for 1987, NCHS introduced new category numbers *042–*044 for classifying and coding HIV infection, formerly referred to as human T-cell lymphotropic virus-III/lymphadenopathy associated virus (HTLV-III/LAV) infection. The asterisk appearing before the category numbers indicates these codes are not part of ICD-9. Also changed effective with data year 1987 were coding rules for the conditions "dehydration" and "disseminated intravascular coagulopathy." Effective with data year 1988, minor content changes were made to the classification for HIV infection. Detailed discussion of these changes may be found in the Technical Appendix for previous volumes.

Coding in 1989—The rules and instructions used in coding the 1989 mortality medical data remained essentially the same as those used for the 1988 data.

Medical certification—The use of a standard classification list, although essential for State, regional, and international comparison, does not ensure strict comparability of the tabulated figures. A high degree of comparability among areas could be attained only if all records of cause of death were reported with equal accuracy and completeness. The medical certification of cause of death can be made only by a qualified person, usually a physician, a medical examiner, or a coroner. Therefore, the reliability and accuracy of cause-of-death statistics are, to a large extent, governed by the ability of the certifier to make the proper diagnosis and by the care with which he or she records this information on the death certificate.

A number of studies have been undertaken on the quality of medical certification on the death certificate. In general, these have been of relatively small samples and for limited geographic areas. A bibliography prepared by NCHS (14), covering 128 references over 23 years, indicates no definitive conclusions have been reached about the quality of medical certification on the death certificate. No country has a well-defined program for systematically assessing the quality of medical certifications reported on death certificates or for measuring the error effects on the levels and trends of cause-of-death statistics.

One index of the quality of reporting causes of death is the proportion of death certificates coded to the Ninth Revision Chapter XVI, Symptoms, signs, and ill-defined conditions (ICD-9 Nos. 780–799). Although deaths occur for which it is impossible to determine the underlying cause, this proportion indicates the care and consideration given to the certification 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 1989 a record low of 1.3 percent of all reported deaths in the United States was assigned to this category compared with 1.4 for 1988. However, trends in the percent of deaths assigned to this category vary by age. Although the percent of deaths in this category for all ages combined has generally remained stable between 1980 and 1988, a slight increase in the percent occurred for the age group 5–14 years and a decrease occurred for all the age groups 55 years and over. However, between 1988 and 1989, the percent decreased for almost all age groups.

Automated selection of underlying cause of death—Beginning with data year 1968, NCHS began using a computer system for assigning the underlying cause of death. It has been used every year since. The system is called "Automated Classification of Medical Entities" (ACME).

The ACME system applies the same rules for selecting the underlying cause as would be applied manually by a nosologist; however, under this system, the computer consistently applies the same criteria, thus eliminating intercoder variation in this step of the process.

The ACME computer program requires the coding of all conditions shown on the medical certification. These codes are matched automatically against decision tables that consistently select the underlying cause of death for each record according to the international rules. The decision tables provide the comprehensive relationships among the conditions classified by ICD when applying the rules of selection and modification.

The decision tables were developed by NCHS staff on the basis of their experience in coding underlying causes of death under the earlier manual coding system and as a result of periodic independent validations. These tables periodically are updated to reflect additional new informa-

tion on the relationship among medical conditions. For data year 1988, these tables were amended to incorporate minor changes to the previously mentioned classification for HIV infection (*042–*044) that originally had been implemented with data year 1987. Coding procedures for selecting the underlying cause of death by using the ACME computer program, as well as by using the ACME decision tables, are documented in NCHS instruction manuals (15–17).

Cause-of-death ranking—Cause-of-death ranking (except for infants) is based on numbers of deaths assigned to categories in the List of 72 Selected Causes of Death and the category Human immunodeficiency virus infection (*042–*044); cause-of-death ranking for infants is based on the List of 61 Selected Causes of Infant Death and HIV infection. HIV infection was added to the list of rankable causes effective with data year 1987.

The group titles Major cardiovascular diseases and Symptoms, signs, and ill-defined conditions from the List of 72 Selected Causes of Death are not ranked; Certain conditions originating in the perinatal period and Symptoms, signs, and ill-defined conditions from the List of 61 Selected Causes of Infant Death are not ranked. In addition, category titles beginning with the words "Other" or "All other" are not ranked to determine the leading causes of death. When one of the titles representing a subtotal is ranked (such as Tuberculosis), its component parts (in this case, Tuberculosis of respiratory system and Other tuberculosis) are not ranked.

Maternal deaths

Maternal deaths are those for which the certifying physician has designated a maternal condition as the underlying cause of death. Maternal conditions are those assigned to Complications of pregnancy, childbirth, and the puerperium (ICD-9 Nos. 630–676). In the Ninth Revision, WHO for the first time defined a maternal death as follows:

> A maternal death is defined 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.

Under the Eighth Revision, maternal deaths were assigned to the category "Complications of pregnancy, childbirth, and the puerperium" (ICDA-8 Nos. 630–78). Although WHO did not define maternal mortality, an NCHS classification rule existed that limited the definition of a maternal death to a death that occurred within a year after termination of pregnancy from any "maternal cause," that is, any cause within the range of ICDA-8 Nos. 630–678. This rule applied only if a duration was given for the condition. If no duration was specified and the underlying cause of death was a maternal condition, the duration was assumed to be within a year and the death was coded by NCHS as a maternal death. The change from an under-1-year limitation for duration used in the Eighth Revision to an under-42-days limitation used in the Ninth Revision did not have much effect on the comparability of maternal mortality statistics. However, comparability was affected by the following classification change. Under the Ninth Revision, maternal causes of death have been expanded to include Indirect obstetric causes (ICD-9 Nos. 647–648). These causes include Infective and parasitic conditions as well as other conditions present in the mother and classifiable elsewhere but that complicate pregnancy, childbirth, and the puerperium, such as Syphilis, Tuberculosis, Diabetes mellitus, Drug dependence, and Congenital cardiovascular disorders.

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. 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.

Race—Beginning with the 1989 data year, NCHS changed the method of tabulating live birth and fetal death data by race from race of child to race of mother. This resulted in a discontinuity in maternal mortality rates by race between 1989 and previous years; see section on "Change in tabulation of race data for live births and fetal deaths" under *Infant deaths*.

Infant deaths

Age—Infant death is defined as a death under 1 year of age. The term excludes fetal deaths. Infant deaths usually are divided into two categories according to age, neonatal and postneonatal. Neonatal deaths are those that occur during the first 27 days of life; postneonatal deaths are those that occur between 28 days and 1 year of age. Generally, it has been believed that different factors influencing the child's survival predominate in these two periods: Factors associated with prenatal development, heredity, and the birth process were considered dominant in the neonatal period; environmental factors, such as nutrition, hygiene, and accidents, were considered more important in the postneonatal period. Recently, however, the distinction between these two periods has blurred due in part to advances in neonatology, which have enabled more very small premature infants to survive the neonatal period.

Rates—Infant mortality rates shown in sections 2 and 8 are the most commonly used indices 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. This measure is an approximation because some live births will not have been exposed to a full year's risk of dying and some of the infants who die during a year will have been born in the previous year. The error

introduced in the infant mortality rate by this inexactness is usually small, especially when the birth rate is relatively constant from year to year (18,19). Other sources of error in the infant mortality rate have been attributed to differences in applying the definitions for infant death and fetal death when registering the event (20,21).

In contrast to infant mortality rates based on live births, infant death rates shown in section 1 are based on the estimated population under 1 year of age. Infant death rates, which appear in tabulations of age-specific death rates, are calculated by dividing the number of infant deaths in a calendar year by the estimated midyear population of persons under 1 year of age and are presented as rates per 100,000 population in this age group. Patterns and trends in the infant death rate may differ somewhat from those of the more commonly used "infant mortality rate," mainly because of differences in the nature of the denominator and in the time reference. Whereas the population denominator for the infant death rate is estimated using data on births, infant deaths, and migration for the 12-month period of July–June, the denominator for the infant mortality rate is a count of births occurring during the 12 months of January–December. The difference in the time reference can result in different trends between the two indices during periods when birth rates are moving up or down markedly.

The infant death rate also is subject to greater imprecision than is the infant mortality rate because of problems of enumerating and estimating the population under 1 year of age (21).

Race—Beginning with the 1989 data year, NCHS changed the method of tabulating live birth and fetal death data by race from race of child to race of mother. This results in infant, fetal, perinatal, and maternal mortality rates for 1989 that are not comparable with those published for previous years, because live births comprise the denominator of these rates. To facilitate continuity and ease of interpretation, key published tables for 1989 and 1990, including all trend tables, will show data computed on the basis of live births and fetal deaths tabulated by both race of mother and race of child. This will make it possible to distinguish the effects of this change from real changes in the data.

As in previous years, race for infant and maternal deaths (the numerator of the rate) is tabulated by the race of the decedent. For fetal and perinatal mortality rates, the numerator and the denominator of the rates are affected because the change to race of mother affects fetal deaths and live births.

As noted in detail in the Technical Appendix to *Vital Statistics of the United States, 1989*, Volume I, Natality, data on live births and fetal deaths are tabulated by the race of the mother. When the race of the mother is unknown, the race of the mother is assigned to the father's race; when information for both parents is missing, the race of the mother is assigned to the specific race of the mother of the preceding record with known race. In previous years, birth and fetal death tabulations were calculated by race of child as determined statistically by an algorithm based on information reported for the mother and father. In cases of mixed parentage where only one parent was white, the child was assigned to the other parent's race. When neither parent was white, the child was assigned the race of the father, except if either parent was Hawaiian, the child was assigned to Hawaiian. If race was not reported for one parent, the child was assigned the race of the parent for whom race was given.

The change in the tabulation of live births and fetal deaths by race reflects three factors over the past 2 decades: the topical content of the birth certificate has been expanded to include considerable health and demographic information related to the mother, the increasing incidence of interracial parentage, and the growing proportion of births for which the race of the father is not reported.

Quantitatively, the change in the basis for tabulating live births and fetal deaths by race results in more white births and fetal deaths and fewer to the black population and to other races. Consequently, infant, fetal, perinatal, and maternal mortality rates under the new classification tend to be lower for white infants and higher for infants of other races (table A). In general, discontinuities are larger for infant and maternal mortality rates, where only the denominator of the rate is affected by the change, than for fetal and perinatal mortality rates, where the numerator

Table A. Ratio of infant, neonatal, postneonatal, maternal, and perinatal mortality rates, with race for live births tabulated according to race of mother to those with race for live births tabulated according to race of child: United States, 1989

Race	Infant deaths	Neonatal deaths	Post-neonatal deaths	Maternal deaths	Fetal deaths	Perinatal definitions		
						I	II	III
All races	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
White	0.98	0.98	0.98	0.98	1.00	0.99	0.99	0.99
Black	1.05	1.05	1.05	1.05	1.02	1.04	1.04	1.04
American Indian	1.25	1.25	1.25	*	1.07	1.17	1.14	1.13
Chinese	1.07	1.07	1.07	*	0.99	1.03	1.03	1.02
Japanese	1.22	1.22	*	*	0.94	1.06	1.05	1.05
Hawaiian	1.45	1.45	1.45	*	1.15	1.31	1.28	1.26
Filipino	1.06	1.06	1.06	*	1.03	1.04	1.04	1.04
Other Asian	1.09	1.09	1.09	*	1.01	1.04	1.04	1.04
Other races	*	*	*	*	1.03	1.21	1.21	1.21

and the denominator are affected. For some minority race groups, the effect of the change is quite large.

The change in the race classification of live births and fetal deaths presents challenges to those analyzing infant, fetal, perinatal, and maternal mortality data, particularly trend data. To facilitate analysis of infant mortality by race, reports will be prepared showing historic data tabulated by race of mother.

Comparison of race data from birth and death certificates—Regardless of whether vital events are tabulated by race of mother or by race of child, inconsistencies exist in reporting race for the same infant between birth and death certificates, based on results of studies in which race on the birth and death certificates for the same infant were compared (22).

These reporting inconsistencies can result in systematic biases in infant mortality rates by specified race, in particular, underestimates for specified races other than white or black. In the computation of race-specific infant mortality rates published in *Vital Statistics of the United States*, the race item for the numerator comes from the death certificate, and for the denominator, from the birth certificate. Biases in the rates may arise because of possible inconsistencies in reporting race on these two vital records. Race of the mother and father is reported on the birth certificate by the mother at the time of delivery; whereas race of the deceased infant is reported on the death certificate by the funeral director based on observation or on information supplied by an informant, such as a parent. Previous studies have noted the race of an infant who died and was of a smaller minority race group is sometimes reported as white on the death certificate, but is reported as the minority race group on the birth certificate, resulting, in the aggregate, in understatement of infant mortality for smaller race groups (22).

Estimates can be made of the degree of bias in race-specific infant mortality rates by comparing rates for birth cohorts based on the newly available linked birth and infant death data set (23,24) with period rates based on mortality data published in *Vital Statistics of the United States* (VSUS) for the same year(s). In this comparison, cohorts rates are based entirely on the linked data set while period rates are constructed using a numerator (infant deaths) based on mortality data published in VSUS and a denominator (live births) based on the linked data set.

The comparison of cohort and period rates is somewhat affected by small differences in the events included in the numerators of the two rates. The numerator of the cohort rate is comprised of infant deaths to the cohort of infants born in a calendar year whereas the numerator of the period rate is comprised of infant deaths occurring in the calendar year.

Based on data from comparing infant mortality rates from the linked data set for the birth cohorts of 1984–85 with period rates constructed for 1984–85, bias in the rates for the two major race groups—white and black—is small (table B). In contrast, period rates for the smaller race groups are estimated to be lower than cohort rates by 10 to 50 percent. Cohort rates have not been adjusted to reflect the approximately 2 percent of infant death records that were not linked to their corresponding birth records. Because of systematic understatement of infant mortality rates based on period data, data from the national linked files should be used to measure infant mortality for these groups. For the major race groups, period data are a close approximation of the rates based on linked files.

Table B. Infant mortality rates by race of mother for the period 1984–85 and for birth cohorts, 1984–85; and ratio of birth cohort to period rates: United States

[Rates per 1,000 live births in specified groups]

Race	Period rate 1984–85	Birth cohort rate 1984–85	Ratio cohort/ period rates
All races	10.7	10.4	0 97
White	9.3	8 9	0 96
Black	19.1	18 4	0 96
American Indian	11.7	13 2	1 13
Chinese	5.9	6 5	1 10
Japanese	5.3	6 2	1 17
Filipino	5.4	8 1	1 50
Other Asian	7.8	9.1	1 17
Other races	7.7	9.8	1 27

NOTE: Births for race not stated are not distributed.

Hispanic origin—Infant mortality rates for the Hispanic-origin population are based on numbers of resident infant deaths reported to be of Hispanic origin (see section "Hispanic origin") and numbers of resident live births by Hispanic origin of mother for the 43 reporting States and the District of Columbia. In computing infant mortality rates, deaths and live births of unknown origin are not distributed among the specified Hispanic and non-Hispanic groups. Because the percent of infant deaths of unknown origin for 1989 was 2.6 percent and the percent of live births of unknown origin was 1.1 percent, infant mortality rates by specified Hispanic origin and race for non-Hispanic origin are underestimated. In addition, as discussed above for specified races, period infant mortality rates for specific Hispanic-origin groups tend to be underestimated when compared with rates based on the national linked birth and infant death data set as shown in table C. Comparisons also are affected by the approximate 2 percent of infant death records that are not linked to the corresponding birth records.

Caution should be exercised when generalizing from the ratios of cohort-to-period rates for 1986 with data for 1989, because the reporting area for Hispanic data has expanded from 18 reporting States and the District of Columbia in 1986 to 43 reporting States and the District of Columbia in 1989. The Hispanic reporting area for 1986 included Arizona, Arkansas, California, Colorado, District of Columbia, Georgia, Hawaii, Illinois, Indiana, Kansas, Mississippi, Nebraska, New Jersey, New York, North Dakota, Ohio, Texas, Utah, and Wyoming.

Small numbers of infant deaths for specific Hispanic-origin groups can result in infant mortality rates subject to

Table C. Infant mortality rates by specified Hispanic origin of mother for the period 1986 and birth cohort of 1986; and ratio of birth cohort to period rates: Total of 18 reporting States and the District of Columbia, 1986

[Rates per 1,000 live births in specified group. Figures for origin not stated included in "All origins" but not distributed among origin groups]

Origin	Period rate 1986	Birth cohort rate 1986	Ratio cohort/ period rates
All origins	10.2	9.9	0.97
Hispanic total	8.0	8.4	1.05
Mexican	7.7	7.9	1.03
Puerto Rican	8.6	11.8	1.37
Cuban	*	8.2	*
Other Hispanic[1]	9.1	8.4	0.90
Non-Hispanic total[2]	10.0	10.1	1.01
White	8.6	8.3	0.97
Black	16.9	17.8	1.05

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

relatively large random variation (see section "Random variation in numbers of deaths, death rates, and mortality rates and ratios").

Tabulation list—Causes of death for infants are tabulated according to a list of causes that is different from the list of causes for the population of all ages, except for the Each Cause List. (See section "Cause-of-death classification.")

California—From 1985 to 1988, data on age at death for California were biased in the categories 1–23 hours and 1 day because of processing errors that affected selected infants who died within 24 hours after birth. Specifically, some infants who died within 1–23 hours of birth were erroneously coded as dying at 1 day after birth. Beginning with 1985 data, California provided NCHS with computer tapes of precoded mortality data through the Vital Statistics Cooperative Program (VSCP); whereas before 1985, data from California were based on information coded by NCHS from copies of original death certificates. The effect of these errors on national data, for 1985–88 shown in table 2–3, is negligible. The problem was identified and corrected for 1989 and subsequent years.

Fetal deaths

In May 1950 WHO recommended the following definition of fetal death be adopted for international use:

> Death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy; the death is indicated by the fact that after such separation, the fetus does not breathe or show any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles (25).

The term "fetal death" was defined on an all-inclusive basis to end confusion arising from the use of such terms as stillbirth, spontaneous abortion, and miscarriage.

Shortly thereafter, this definition was adopted by NCHS as the nationally recommended standard. All registration areas except Puerto Rico have definitions similar to the standard definition (26). Puerto Rico has no formal definition.

As another step toward increasing comparability of data on fetal deaths for different countries, WHO recommended that for statistical purposes fetal deaths be classified as early, intermediate, and late. These groups are defined as follows:

Less than 20 completed weeks of gestation (early fetal deaths) ..... Group I
20 completed weeks of gestation but less than 28 (intermediate fetal deaths) ..... Group II
28 completed weeks of gestation and over (late fetal deaths) ..... Group III
Gestation period not classifiable in groups I, II, and III ..... Group IV

As shown in table 3-11, group IV consists of fetal deaths with gestation not stated but presumed to be 20 weeks or more.

Until 1939 the nationally recommended procedure for registration of a fetal death required the filing of a live-birth certificate and a death certificate. In 1939 a separate Standard Certificate of Stillbirth (fetal death) was created to replace the former procedure. This was revised in 1949, 1955, 1956, 1968, 1978, and 1989. The 1989 U.S. Standard Report of Fetal Death is shown in figure 7-B.

The 1977 revision of the *Model State Vital Statistics Act and Model State Vital Statistics Regulations* (27) recommended spontaneous fetal deaths at a gestation of 20 weeks or more or a weight of 350 grams or more and all induced terminations of pregnancy regardless of gestational age be reported and further be reported on separate forms. These forms should be considered legally required statistical reports rather than legal documents.

Beginning with fetal deaths reported in 1970, procedures were implemented that attempted to separate reports of spontaneous fetal deaths from those of induced terminations of pregnancy. These procedures were implemented because the health implications of spontaneous fetal deaths are different from those of induced terminations of pregnancy. These procedures are still used.

Comparability and completeness of data—Registration area requirements for reporting fetal deaths vary. Most of the areas require reporting of fetal death at gestations of 20 weeks or more. Table D shows the minimum period of gestation required by each State to report a fetal death. Substantial evidence exists that indicates some fetal deaths for which reporting is required are not reported (28).

Underreporting of fetal deaths is most likely to occur in the earlier part of the required reporting period for each State. Thus, for States requiring reporting of all periods of gestation, fetal deaths occurring at younger gestational ages are less completely reported. The reporting of fetal deaths at 20–23 weeks of gestation may be more complete for those States that report fetal deaths at all periods of gestation than for others.

Table D. Period of gestation at which fetal-death reporting is required: Each reporting area, 1989

Area	All periods of gestation	16 weeks	20 weeks	20 weeks or 350 grams	20 weeks or 400 grams	20 weeks or 500 grams	5 months	350 grams	500 grams
Alabama				X					
Alaska			X						
Arizona			[1]X						
Arkansas	[2]X								
California			X						
Colorado	[2]X								
Connecticut			X						
Delaware			X						
District of Columbia						X			
Florida			X						
Georgia	X								
Hawaii	X								
Idaho				X					
Illinois			X						
Indiana			X						
Iowa			X						
Kansas								X	
Kentucky				X					
Louisiana				X					
Maine	[2]X								
Maryland			[3]X						
Massachusetts				X					
Michigan					X				
Minnesota			X						
Mississippi				X					
Missouri				X					
Montana			X						
Nebraska			X						
Nevada			X						
New Hampshire				X					
New Jersey			X						
New Mexico									X
New York									
New York excluding NYC	X								
New York City	X								
North Carolina			X						
North Dakota			X						
Ohio			X						
Oklahoma			X						
Oregon			[4]X						
Pennsylvania		X							
Rhode Island	X								
South Carolina				X					
South Dakota									X
Tennessee									[5]X
Texas			X						
Utah			X						
Vermont			[6]X						
Virginia	X								
Washington			X						
West Virginia			X						
Wisconsin				X					
Wyoming			X						
Puerto Rico							X		
Virgin Islands	X								
Guam			X						

[1]If gestational age is unknown, weight of 350 grams or more
[2]Although state law requires the reporting of fetal deaths of all periods of gestation, only data for fetal deaths of 20 weeks or more gestation are provided to NCHS
[3]If gestational age is unknown, weight of 500 grams or more.
[4]If gestational age is unknown, weight of 400 grams or more, or crown-heel of 28 centimeters or more
[5]If weight is unknown, 22 completed weeks' gestation or more.
[6]If gestational age is unknown, weight of 400 or more grams, 15 or more ounces

To maximize the comparability of data by year and by State, most of the tables in section 3 are based on fetal deaths occurring at gestations of 20 weeks or more. These tables also include fetal deaths for which gestation is not stated for those States requiring reporting at 20 weeks or more gestation only. Beginning with 1969, fetal deaths of not stated gestation were excluded for States requiring reporting of all products of conception except for those with a stated birth weight of 500 grams or more. In 1989 this rule was applied to the following States: Georgia, Hawaii, New York (including New York City), Rhode Island, and Virginia. Each year there are exceptions to this procedure.

Arkansas—Since 1971, Arkansas has been using two reporting forms for fetal deaths: A confidential Spontaneous Abortion form that is not sent to NCHS and a Fetal Death Certificate that is. During the period 1971–80, it is believed that most spontaneous fetal deaths of less than 20 weeks' gestation were reported on the confidential form and, therefore, were not reported to NCHS. During the period 1981–83, Arkansas specified that fetal deaths of less than 28 weeks' gestation or weighing less than 1,000 grams could be reported on the confidential form; beginning with 1984 data, the State specified that fetal deaths of 20 weeks' gestation or weighing 500 grams be reported on the Fetal Death Certificate. Because of these changes, the comparability of counts of early fetal deaths may be affected. In particular, counts of fetal deaths at 20 to 27 weeks for 1981–83 were not comparable between Arkansas and other reporting areas or with Arkansas data for 1984–89. It is believed that reporting has improved but is still not comparable with data for 1980 and earlier years.

Colorado—Although Colorado State law requires reporting fetal deaths of all periods of gestation, beginning in 1989 the State provides to NCHS only data for fetal deaths of 20 weeks' gestation or more.

Maine—Maine uses two reporting forms for fetal deaths: A Report of Abortion (Spontaneous and Induced) and a Report of Fetal Death. Most spontaneous fetal deaths at less than 20 weeks' gestation are reported on the Report of Abortion, and, therefore, are excluded from fetal death counts in this volume.

Maryland—From the counts of frequencies by month, it appears that not all fetal deaths occurring in the first quarter of 1989 were reported. This may account in part for the decrease in the reported number of fetal deaths and in fetal mortality rates for Maryland between 1988 and 1989.

Wisconsin—Beginning in 1986, Wisconsin changed its reporting requirements for spontaneous fetal deaths from "20 weeks" to "20 weeks or 350 grams."

Revised Report of Fetal Death for 1989—Beginning with data for 1989, new items were added to the U.S. Standard Report of Fetal Death, including Hispanic origin of the mother and father, medical and other risk factors of pregnancy, obstetric procedures, and method of delivery. In addition, questions on complications of labor and delivery and congenital anomalies of fetus were changed from an open-ended question to a checkbox format, to ensure more complete reporting of information. However, because of differences in implementation dates of the new fetal death report for reporting States, and because of inexperience in reporting and processing the new items, reporting of the new items in individual States may be incomplete for 1989. The data quality and completeness of many of these items are being evaluated.

Period of gestation—The period of gestation is the number of completed weeks elapsed between the first day of the last normal menstrual period (LMP) and the date of delivery. The first day of 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 LMP. Data on period of gestation are computed from information on "date of delivery" and "date last normal menses began." If "date last normal menses began" is not on the record or if the calculated gestation falls beyond a duration considered biologically plausible, the "Physician's estimate of gestation" is used.

To improve data quality, beginning with data for 1989, NCHS instituted a new computer edit to check for consistency between gestation and birth weight (29). Briefly, if LMP gestation is inconsistent with birth weight, and the physician's estimate is consistent, the physician's estimate is used; if both are inconsistent, LMP gestation is used, and birth weight is assigned to unknown. When the period of gestation is reported in months on the report, it is allocated to gestational intervals in weeks as follows:

1–3 months to under 16 weeks
4 months to 16–19 weeks
5 months to 20–23 weeks
6 months to 24–27 weeks
7 months to 28–31 weeks
8 months to 32–35 weeks
9 months to 40 weeks
10 months and over to 43 weeks and over

All areas reported LMP in 1989 except Puerto Rico, and all areas reported physician's estimate of gestation except California, the District of Columbia, Louisiana, Maryland, and Oklahoma. Nebraska also was excluded because of the large proportion of unknown.

Birth weight—Most of the 55 registration areas do not specify how weight should be given, that is, in pounds and ounces or in grams. In the tabulation and presentation of birth weight data, the metric system (grams) has been used to facilitate comparison with other data published in the United States and internationally. Birth weight specified in pounds and ounces is assigned the equivalent of the gram intervals, as follows:

Less than 350 grams = 0 lb 12 oz or less
350–499 grams = 0 lb 13 oz–1 lb 1 oz
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 14 oz– 9 lb 14 oz
4,500–4,999 grams = 9 lb 15 oz–11 lb 0 oz
5,000 grams or more = 11 lb 1 oz or more

With the introduction of ICD-9, the birth-weight classification intervals for perinatal mortality statistics were shifted downward by 1 gram as shown above. Previously, the intervals were, for example, 1,001–1,500, 1,501–2,000, and so forth. Beginning in 1989, NCHS instituted a consistency check between birth weight and gestation; see previous section on gestation.

Race—Beginning with data for 1989, NCHS changed the method of tabulating fetal death, perinatal, and live birth data by race from race of child to race of mother. This has resulted in a discontinuity in fetal mortality rates by race between 1989 and previous years; see section on "Change in tabulation of race data for live births and fetal deaths," under *Infant deaths*.

Hispanic origin of mother—Fetal mortality data for the Hispanic-origin population are based on fetal deaths to mothers of Hispanic origin who were residents of those States and the District of Columbia that included items on the report of fetal death to identify Hispanic or ethnic origin of mother. Data for 1989 were obtained from 44 States; areas not supplying data were the District of Columbia, Louisiana, Maryland, Massachusetts, New Hampshire, Oklahoma, and Rhode Island.

For 1989, fetal and perinatal mortality data in table 3-19 are for a reporting area of 44 States and tables 3-20, 4-6, and 4-7 are for a reporting area of 31 States that had an item on Hispanic or ethnic origin on the death certificate, birth certificate, and report of fetal death, and whose data for all three files were at least 90 percent complete on a place-of-occurrence basis and considered to be sufficiently comparable to be used for analysis. The States included are Alabama, Arizona, Arkansas, California, Colorado, Florida, Georgia, Hawaii, Idaho, Illinois, Iowa, Kansas, Kentucky, Minnesota, Mississippi, Missouri, Nebraska, Nevada, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, West Virginia, Wisconsin, and Wyoming.

The 31 reporting States for which fetal and perinatal data by Hispanic origin are shown accounted for about 75 percent of the Hispanic population in 1980, including 92 percent of the Mexican population, 27 percent of the Puerto Rican population, 75 percent of the Cuban population, and 57 percent of the "Other Hispanic" population (10). Accordingly, caution should be exercised in generalizing mortality patterns from the reporting area to the Hispanic-origin population (especially Puerto Ricans) of the entire United States. (See also section on Hispanic origin under *Classification of Data*.)

Total-birth order—Total-birth order refers to the sum of live births and other terminations (including spontaneous fetal deaths and induced terminations of pregnancy) a woman has had, including the fetal death being recorded. For example, if a woman has given birth to two live babies and to one born dead, the next fetal death to occur is counted as number four in total-birth order.

Beginning with implementation of the 1989 revision of the U.S. Standard Report of Fetal Death, total-birth order is calculated from three items on pregnancy history: Number of previous live births, now living; number of previous live births, now dead; and number of other terminations (spontaneous and induced at anytime after conception). For prior years, total-birth order was calculated from four items, see the Technical Appendix From *Vital Statistics of the United States 1988*, Volume II, Mortality, Part A.

Although all registration areas use the two standard items pertaining to number of previous live births, registration areas phrase the item pertaining to other terminations of pregnancy differently. Total-birth order for all areas is calculated from the sum of available information. Thus, information on total-birth order may not be completely comparable among the registration areas. In addition, there may be substantial underreporting of other terminations of pregnancy on the fetal death report.

Marital status—Table 3-3 shows fetal deaths and fetal-death rates by mother's marital status. The following States were excluded from this table because their report of fetal death did not include an item on marital status: California, Connecticut, Maryland, Michigan, Nevada, New York (including New York City), Ohio, and Texas. Because live births comprise the denominator of the rate, marital status must be reported for mothers of live births also. Marital status of the mother of the live birth is inferred for States that did not report it on the birth certificate.

Beginning with data for 1989, fetal deaths with marital status not stated are shown as not stated in frequencies, but are proportionally distributed for rate computations into either the married or unmarried categories according to the percent of fetal deaths with stated marital status that fall into each category. Before 1989, fetal deaths with not-stated marital status were assigned to the married category. Because of this change, fetal death frequencies and rates by marital status for 1989 are not strictly comparable with those for previous years.

No quantitative data exist on the characteristics of unmarried women who do not report, misreport their marital status, or fail to register fetal deaths. Underreporting may be greater for the unmarried group than for the married group.

Age of mother—Beginning with data for 1989, the U.S. Standard Report of Fetal Death asks for the mother's date of birth. Age of mother is computed from the mother's date of birth and the date of the termination of the pregnancy. For those States whose certificates do not contain an item for the mother's date of birth, reported age of the mother (in years) is used. The age of the mother is edited in NCHS for upper and lower limits. When mothers are reported to be under 10 years of age or 50 years of age and over, the age of the mother is considered not stated and is assigned as follows: Age on all fetal-death records with age of mother not stated is assigned according to the age appearing on the record previously processed for a mother of identical race

and having the same total-birth order (total of live births and other terminations).

Sex of fetus—Beginning with data for 1989, for all fetal deaths of 20 or more weeks gestation, not-stated sex of fetus is assigned the sex of the fetus from the previous record. Before 1989, no such assignment was made.

Plurality—All registration areas except Louisiana report the plurality of the fetus. Although Louisiana has not reported this item for many years, prior to 1989, data for Louisiana was erroneously converted to a plurality of 1 (single birth) and included in United States totals. Beginning with 1989 data, Louisiana is excluded from tables reporting plurality of the fetus. For reporting areas, not-stated plurality of the fetus is assigned to single births.

Perinatal mortality

Perinatal definitions—Beginning with data year 1979, perinatal mortality data for the United States and each State have been published in section 4. WHO recommends in ICD-9, "national perinatal statistics should include all fetuses and infants delivered weighing at least 500 grams (or when birth weight is unavailable, the corresponding gestational age (22 weeks) or body length (25 cm crown-heel)), whether alive or dead. . . ." It further recommends, "countries should present, solely for international comparisons, 'standard perinatal statistics' in which both the numerator and denominator of all rates are restricted to fetuses and infants weighing 1,000 grams or more (or, where birth weight is unavailable, the corresponding gestational age (28 weeks) or body length (35 cm crown-heel))." Because birth weight and gestational age are not reported on the death certificate in the United States, NCHS was unable to adopt these definitions. Three definitions of perinatal mortality are used by NCHS: Perinatal Definition I, generally used for international comparisons, which includes fetal deaths of 28 weeks' gestation or more and infant deaths of less than 7 days; Perinatal Definition II, which includes fetal deaths of 20 weeks' gestation or more and infant deaths of less than 28 days; and Perinatal Definition III, which includes fetal deaths of 20 weeks' gestation or more and infant deaths of less than 7 days.

Variations in fetal death reporting requirements and practices have implications for comparing perinatal rates among States. Because reporting is generally sporadic near the lower limit of the reporting requirement, States that require reporting of all products of pregnancy regardless of gestation are likely to have more complete reporting of fetal deaths at 20 weeks or more than those States that do not. The larger number of fetal deaths reported for these "all periods" States may result in higher perinatal mortality rates than those rates reported for States whose reporting is less complete. Accordingly, reporting completeness may account, in part, for differences among the State perinatal rates, particularly differences for Definitions II and III, which use data for fetal deaths at 20–27 weeks.

Not stated—Fetal deaths with gestational age not stated are presumed to be of 20 weeks' gestation or more if the State requires reporting of all fetal deaths at a gestational age of 20 weeks or more or the fetus weighed 500 grams or more in those States requiring reporting of all fetal deaths regardless of gestational age. For Definition I, fetal deaths at a gestation not stated but presumed to have been of 20 weeks or more are allocated to the category 28 weeks or more, according to the proportion of fetal deaths with stated gestational age that falls into that category. For Definitions II and III, fetal deaths at a presumed gestation of 20 weeks or more are included with those at a stated gestation of 20 weeks or more.

The allocation of not-stated gestational age for fetal deaths is made individually for each State, for metropolitan and nonmetropolitan areas, and separately for the entire United States. Accordingly, the sum of perinatal deaths for the areas according to Definition I may not equal the total number of perinatal deaths for the United States.

Race—Beginning with the 1989 data year, NCHS changed the method of tabulating fetal death and live birth data by race from race of child to race of mother. This has resulted in a discontinuity in perinatal mortality rates by race between 1989 and previous years; see section on "Change in race classification for live births and fetal deaths" under *Infant deaths*.

Hispanic origin—See section on "Hispanic origin of mother" under *Fetal deaths*.

QUALITY OF DATA

Completeness of registration

All States have adopted laws requiring the registration of births and deaths and the reporting of fetal deaths. It is believed that more than 99 percent of the births and deaths occurring in this country are registered.

Reporting requirements for fetal deaths vary from State to State (see "Comparability and completeness of data"). Overall reporting is not as complete for fetal deaths as for births and deaths, but it is believed to be relatively complete for fetal deaths at a gestation of 28 weeks or more. National statistical data on fetal deaths include only fetal deaths occurring at a stated or presumed gestation of 20 weeks or more.

Massachusetts data

The 1964 statistics for deaths exclude approximately 6,000 deaths registered in Massachusetts, primarily to residents of that State. Microfilm copies of these records were not received by NCHS. Figures for the United States and the New England Division are affected also.

Alabama data

The 1988 statistics for deaths show no deaths assigned to the city of Prattville in Autauga County. The death records that should have been assigned to this area were instead assigned to the Balance of county because of a processing error.

Quality control procedures

Demographic items on the death certificate—As previously indicated, for 1989 the mortality data for these items were obtained from two sources—photocopies of the original certificates furnished by the Virgin Islands and Guam and records on data tape furnished by the 50 States, the District of Columbia, New York City, and Puerto Rico. For the Virgin Islands and Guam, which sent only copies of the original certificates, the demographic items were coded for 100 percent of the death certificates. The demographic coding for 100 percent of the certificates was independently verified.

As part of the quality control procedures for mortality data, each registration area goes through a calibration period, during which it must achieve the specified error tolerance level of 2 percent per item for 3 consecutive months, based on independent verification by NCHS of a 50-percent sample of that area's records. When the area has achieved the required error tolerance level, a sample of 70–80 records per month is used to monitor quality of coding. All areas providing data on computer tapes before 1989 have achieved the specified error tolerance; accordingly, the demographic items on about 70–80 records per area per month were independently verified by NCHS. The estimated average error rate for all demographic items in 1989 was 0.25 percent.

These verification procedures involve controlling for two types of error (coding and entering into the data record tape) at the same time, and the error rates are a combined measure of both types. It may be assumed that the entering errors are randomly distributed across all items on the record, but this assumption cannot be made as readily for coding errors. Although systematic errors in coding infrequent events may escape detection during sample verification, it is probable some of these errors were detected during the initial period when 50 percent of the file was being verified, thus providing an opportunity to retrain the coders.

Medical items on the death certificate—As is true for demographic data, mortality medical data also are subject to quality control procedures to control for errors of both coding and data entry. Each of the 30 registration areas that furnished NCHS with coded medical information in 1989 according to NCHS specifications had to qualify for sample verification first. During an initial calibration period, the area had to demonstrate that its staff could achieve a specified error tolerance level of less than 5 percent for coding all medical items. After the area had achieved the required error tolerance level, a sample of 70–80 records per month was used to monitor quality of medical coding. For the 30 reporting States, the average coding error rate in 1989 was estimated at just over 4 percent.

For the remaining 20 States, the District of Columbia, New York City, Puerto Rico, the Virgin Islands, and Guam, NCHS coded the medical items for 100 percent of the death records. A 1-percent sample of the records was coded independently for quality control purposes. The estimated average error rate for these areas was about 3 percent.

The ACME system for selecting the underlying cause of death through computer application contributes to the quality control of medical items on the death certificate. (See section "Automated selection of underlying cause of death.")

Demographic items on the report of fetal death—For 1989, all data on fetal deaths, except for New York State (excluding New York City), were coded under contract by the U.S. Bureau of the Census. Coding and entering of information on data tapes were verified on a 100-percent basis because of the relatively small number of records involved.

Table E. Sources for resident population and population including Armed Forces abroad: Birth- and death-registration States, 1900–32, and United States, 1900–89

Year	Source
1989	U.S. Bureau of the Census, *Current Population Reports*, Series P-25, No. 1057, 1990
1988	U.S. Bureau of the Census, *Current Population Reports*, Series P-25, No. 1045, 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*, PC80-1A1, 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*, 1900–40, 1947
1920–29	National Office of Vital Statistics, *Vital Statistics Rates in the United States*, 1900–40, 1947.
1917–19	Same as for 1930–39.
1900–16	Same as for 1920–29.

Other control procedures—After coding and entering on data tape are completed, record counts are balanced against control totals for each shipment of records from a registration area. Editing procedures ensure that records with inconsistent or impossible codes are modified. Inconsistent codes are those, for example, indicating a contradiction between cause of death and age or sex of the decedent. Records so identified during the computer editing process are either corrected by reference to the source record or adjusted by arbitrary code assignment (30). Further, conditions specified on a list of infrequent or rare causes of death are confirmed by the certifier or a State Health Officer. All subsequent operations in tabulating and in preparing tables are verified during the computer processing or by statistical clerks.

Estimates of errors arising from 50-percent sample for 1972

Death statistics for 1972 in this report (excluding fetal-death statistics) are based on a 50-percent sample of all deaths occurring in the 50 States and the District of Columbia. A description of the sample design and a table of the percent errors of the estimated numbers of deaths by size of estimate and total deaths in the area are shown in the Technical Appendix From *Vital Statistics of the United States, 1972*, Volume II, Mortality, Part A.

COMPUTATION OF RATES AND OTHER MEASURES

Population bases

The population bases from which death rates shown in this report are computed are prepared by the U.S. Bureau of the Census. Rates for 1940, 1950, 1960, 1970, and 1980 are based on the population enumerated as of April 1 in the censuses for those years. Rates for all other years use the estimated midyear (July 1) population. Death rates for the United States, individual States, and SMSA's 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 populations of the birth- and death-registration States for 1900–32 and of the United States for 1900–89 are shown in table 7-1. In addition, the population including Armed Forces abroad is shown for the United States. Table E lists the sources for these populations.

Population estimates for 1989—The population of the United States estimated by age, race, and sex for 1989 is shown in table 7-2, and the population for each State by broad age groups follows in table 7-3. Population estimates for 1984–89 incorporate new estimation procedures for net migration and net undocumented immigration. The 1989 estimates are comparable with those for 1984–88 but are not strictly comparable with the postcensal estimates for 1981–83 shown in tables 7-2 and 7-3 of *Vital Statistics of the United States*, Volume II, for those years. Although the death rates and estimates of life expectancy for 1984–89 are not strictly comparable with those for previous years, the trends for the total population and most age-race-sex groups are not substantially affected. For additional details, see the Technical Appendix from *Vital Statistics of the United States, 1984*, Volume II, and the report of the U.S. Bureau of the Census (31). Population data by race are consistent with the modified (see below) 1980 population by race.

Population for 1980—The population of the United States by age, race, and sex and the population for each State by age are shown in tables 7-2 and 7-3, respectively, of *Vital Statistics of the United States, 1980*, Volume II. The figures by race have been modified as described below.

Changes in reporting practices affected the racial counts of the 1980 census, particularly those of the Hispanic population. Changes in coding and classifying also affected the racial counts in the 1980 census. One particular change created a major inconsistency between the 1980 census data and historical data series, including censuses and vital statistics. About 40 percent of the Hispanic population counted in 1980, more than 5.8 million persons, did not mark one of the specified races listed on the census questionnaire but instead marked the "Other" category.

In the 1980 census, coding procedures were modified for persons who marked "Other" race and wrote in a national origin designation of a Latin American country or a specific Hispanic-origin group in response to the racial question. These persons remained in the "Other" racial category in 1980 census data; in previous censuses and in vital statistics, such responses had almost always been coded into the "White" category.

To maintain comparability, the "Other" racial category in the 1980 census was reallocated to be consistent with previous procedures. Persons who marked the "Other" racial category and reported any Spanish origin on the Spanish origin question (5,840,648 persons) were distributed to white and black races in proportion to the distribution of persons of Hispanic origin who actually reported their race as "White" or "Black." This was done for each age-sex group.

As a result of this procedure, 5,705,155 persons (98 percent) were added to the white population and 135,493 persons (2 percent) to the black population. Persons who marked the "Other" racial category and reported they were not of Spanish origin (916,338 persons) were distributed as follows: 20 percent in each age-sex group were added to the "Asian and Pacific Islander" category (183,268 persons), and 80 percent were added to the "White" category (733,070 persons). The count of American Indians, Eskimos, and Aleuts was not affected by these procedures. Unpublished tabulations of these modified census counts were obtained from the U.S. Bureau of the Census and used to compute the rates for this volume.

Population estimates for 1971–79—Death rates in this volume for 1971–79 used revised population estimates that

are consistent with the 1980 census levels. The 1980 census enumerated approximately 5.5 million more persons than had been estimated for April 1, 1980 (32). These revised estimates for the United States by age, race, and sex are published by the U.S. Bureau of the Census in *Current Population Reports*, Series P-25, Number 917. Unpublished revised estimates for States were obtained from the U.S. Bureau of the Census. For Puerto Rico, the Virgin Islands, and Guam, revised estimates are published in *Current Population Reports*, Series P-25, Number 919.

Population estimates for 1961–69—Death rates in this volume for 1961–69 are based on revised estimates of the population and thus may differ slightly from rates published before 1976. The rates shown in tables 1-1 and 1-2, the life table values in table 6-5, and the population estimates in table 7-1 for each year during 1961–69 have been revised to reflect modified population bases, as published in the U.S. Bureau of the Census, *Current Population Reports*, Series P-25, Number 519. The data shown in table 1-10 for 1961–69 have not been revised.

Rates and ratios based on live births—Infant and maternal mortality rates and fetal death and perinatal mortality ratios are computed on the basis of the number of live births. Fetal death and perinatal mortality rates are computed on the basis of the number of live births and fetal deaths. Counts of live births are published annually in *Vital Statistics of the United States*, Volume I, Natality.

New Jersey—As previously indicated, data by race are not available for New Jersey for 1962 and 1963. Therefore, for 1962 and 1963 NCHS estimated a population by age, race, and sex that excluded New Jersey for rates shown by race. The methodology used to estimate the revised population excluding New Jersey is discussed in the Technical Appendixes of the 1962 and 1963 volumes.

Net census undercount

Just as the underenumeration of deaths and the misreporting of demographic characteristics on the death certificate can introduce error into the annual rates, so can enumeration errors in the latest decennial census. This is because annual population estimates for the postcensal interval, which are used in the denominator for calculating death rates, are computed using the decennial census count as a base (33). Net census undercount results from the miscounting and misreporting of demographic characteristics such as age. Age-specific death rates are affected by the net census undercount and the misreporting of age on the death certificate (34). To the extent that the net undercount is substantial and that it varies among subgroups and geographic areas, it may have important consequences for vital statistics measures.

Although death rates based on a population adjusted for net census undercount may be more accurate than rates based on an unadjusted population, rates in this volume are not adjusted; rather, they are computed using population estimates that preserve the age pattern of the net census undercount across the postcensal interval. Thus, it is important to consider the possible impact of net census undercount on death rates.

The U.S. Bureau of the Census has conducted extensive research on the completeness of coverage of the U.S. population (including underenumeration and misstatement of age, race, and sex) in the last four decennial censuses—1950, 1960, 1970, and 1980. From this work have come estimates of the national population that were not counted by age, race, and sex (35,36). The reports for 1980 include estimates of net census undercount using alternative methodological assumptions for age, race, and sex subgroups of the national population (37). These studies indicate that, although coverage was improved over previous censuses, there was differential coverage in the 1980 census among the population subgroups; that is, some age, race, and sex groups were more completely counted than others.

Net census undercounts can affect levels of the observed vital rates, differences among groups, and levels and group differences shown by summary measures such as age-adjusted death rates and life expectancy.

Levels and differentials—If adjustments were made for net census undercount, the size of denominators of the death rates generally would increase and the rates, therefore, would decrease. The adjusted rates for 1980 can be computed by multiplying the reported rates by ratios of the census-level resident population to the resident population adjusted for the estimated net census undercount (table 7-4). A ratio of less than 1.0 indicates a net census undercount and, when applied, results in a corresponding decrease in the death rate. A ratio greater than 1.0—indicating a net census overcount—multiplied by the reported rate results in an increase in the death rate.

Coverage ratios for all ages show that, in general, females were more completely enumerated than males and the white population more completely than the population of all other races in the 1980 Census of Population. The black population was undercounted relative to the total population of all other races.

For the total population, underenumeration varied by age group, with the greatest differences found for persons aged 80–84 and 85 years and over. All other age groups were overcounted or undercounted by less than 3 percent.

Among the age-sex-race groups, coverage was lowest for black males aged 40–44 and 45–49 years. Underenumeration for these groups was 19 percent. In contrast, white females in these age groups were essentially completely enumerated. For black females and white males in these same age groups, the undercount ranged from 3 to 6 percent. For the under-1-year age group, the white population was overenumerated by 2 percent, whereas infants of other races were underenumerated by 9 percent.

If vital statistics measures were calculated with adjustments for net census undercounts for each population subgroup, the resulting rates would be differentially reduced from their original levels; that is, rates for those groups with the greatest estimated undercounts would show the greatest relative reductions due to these adjustments.

Similar effects would be evident in the opposite direction for groups with overcounts. As a consequence, the ratio of mortality between the rates for males and females, and between the rates for the white population and the population of other races, or the black population, usually would be reduced.

Similarly, the differences between the death rates among subgroups of the population by cause of death would be affected by adjustments for net census undercounts. For example, for the age group 35–39 years in 1980, the ratio of the death rate for Homicide and legal intervention for black males to that for white males is 7.3, whereas the ratio of the death rates adjusted for net census undercount is 6.2. For Ischemic heart disease for males aged 40–44 years, the ratio of the death rate for the population of all other races to that for the white population is 1.2 using the unadjusted rates, but it is 1.1 when adjusted for estimated underenumeration.

Summary measures—The effect of net census undercount on age-adjusted death rates depends on the underenumeration of each age group and on the distribution of deaths by age. Thus, the age-adjusted death rate in 1980 for All causes would decrease from 585.8 to 579.3 per 100,000 population if the age-specific death rates were corrected for net census undercount.

For Diseases of heart, the age-adjusted death rate for white males would decrease from 277.5 to 273.0 per 100,000 population, a decline of 1.3 percent. For black males the change, from an unadjusted rate of 327.3 to an adjusted rate of 308.3, would amount to 5.8 percent.

If death rates by age were adjusted, the corresponding life expectancy at birth computed from these rates would change. The importance of adjustments varies by age; that is, when calculating life expectancy, the impact of an undercount or overcount is greatest at the younger ages. In general, the effect of correcting the death rates is to increase the estimate of life expectancy at birth. Differential underenumeration among race-sex groups would lead to greater changes in life expectancy for some groups than for others. For white females who were completely enumerated in 1980, revised estimates of life expectancy would remain roughly constant; those for black males would show the greatest increase.

Age-adjusted death rates

Age-adjusted death rates shown in this volume are computed using the distribution in 10-year age intervals of the enumerated population of the United States in 1940 as the standard population. Each figure represents the rate that would have existed had the age-specific rates of the particular year prevailed in a population whose age distribution was the same as that of the United States in 1940. The rates for the total population and for each race-sex group were adjusted using the same standard population. It is important not to compare age-adjusted death rates with crude rates. The standard 1940 population, on the basis of one million total population, is as follows:

Age	*Number*
All ages	1,000,000
Under 1 year	15,343
1–4 years	64,718
5–14 years	170,355
15–24 years	181,677
25–34 years	62,066
35–44 years	139,237
45–54 years	117,811
55–64 years	80,294
65–74 years	48,426
75–84 years	17,303
85 years and over	2,770

Life tables

U.S. abridged life tables are constructed by reference to a standard table (38). Life tables for the decennial period 1979–81 are used as the standard life tables in constructing the 1980–89 abridged life tables. With the availability of the 1979–81 standard life tables, revised life table values were computed for 1980–82; these appeared for the first time in *Vital Statistics of the United States, 1983*.

Life tables for the decennial period 1969–71 are used as the standard life tables in constructing the 1970–79 abridged life tables. Life table values for 1970–73 were first revised in *Vital Statistics of the United States, 1977*; before 1977, life table values for 1970–73 were constructed using the 1959–61 decennial life tables. In addition, life table values for 1951–59, 1961–69, and 1971–79 appearing in this volume are based on revised intercensal estimates of the populations for those years. As such, these life table values may differ from life table values for those years published in previous volumes.

The change in the population estimation methodology (see above section "Population bases") results in life expectancies at certain 5-year age intervals for 1984–89 that are lower than those that would have resulted had they been based on the same methodology used to compute 1983 life expectancies. For additional details, see Technical Appendix for *Vital Statistics of the United States, 1984*, Volume II.

There has been an increasing interest in data on the average length of life ($\mathring{e}_0$) for single calendar years before the initiation of the annual abridged life table series for selected race-sex groups in 1945. The figures in table 6-5 for the race and sex groups for the following years were estimated to meet these needs (39).

Years	*Race and sex groups*
1900–45	Total
1900–47	Male
1900–47	Female
1900–50	White
1900–44	White, male
1900–44	White, female
1900–50	All other
1900–44	All other, male
1900–44	All other, female

The geographic areas covered in life tables before 1929–31 were limited to the death-registration areas. Life tables for 1900–1902 and 1909–11 were constructed using mortality data from the 1900 death-registration States—10 States and the District of Columbia—and for 1919–21 from the 1920 death-registration States—34 States and the District of Columbia. The tables for 1929–31 through 1958 cover the conterminous United States. Decennial life table values for the 3-year period 1959–61 were derived from data that include Alaska and Hawaii for each year (table 6-4). Data for each year shown in table 6-5 include Alaska beginning in 1959 and Hawaii beginning in 1960. It is believed that the inclusion of these two States does not materially affect life table values.

Random variation in numbers of deaths, death rates, and mortality rates and ratios

Deaths and population-based rates—Except for 1972, the numbers of deaths reported for a community represent complete counts of such events. As such, they are not subject to sampling error, although they are subject to errors in the registration process. However, when the figures are used for analytical purposes, such as the comparison of rates over a period or for different areas, 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 (40). 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. Estimates of standard error and tests of significance under this assumption are described in most standard statistics texts. When the number of events is large, the standard error, expressed as a percent of the number or rate, 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 conditions described by the figures. This is particularly true for infant mortality rates, cause-specific death rates, and death rates for counties. Events of a rare nature may be assumed to follow a Poisson probability distribution. For this distribution, a simple approximation may be used to estimate a confidence interval, as follows.

If N is the number of registered deaths in the population and R is the corresponding rate, the chance is 19 in 20 that

1. $N-2\sqrt{N}$ and $N+2\sqrt{N}$

covers the "true" number of events.

2. $R-2\frac{R}{\sqrt{N}}$ and $R+2\frac{R}{\sqrt{N}}$

covers the "true" rate.

If the rate R_1 corresponding to N_1 events is compared with the rate R_2 corresponding to N_2 events, the difference between the two rates may be regarded as statistically significant at the 0.05 level of significance, if it exceeds

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

For example, if the observed death rate for a community were 10.0 per 1,000 population and if this rate were based on 20 recorded deaths, then the chance is 19 in 20 that the "true" death rate for that community lies between 5.5 and 14.5 per 1,000 population. If the death rate for this community of 10.0 per 1,000 population were being compared with a rate of 15.0 per 1,000 population for a second community, which is based on 25 recorded deaths, then the difference between the rates for the two communities is 5.0. This difference is less than twice the standard error of the difference

$$2\sqrt{\frac{(10.0)^2}{20}+\frac{(15.0)^2}{25}}$$

of the two rates, which is computed to be 7.5. From this, it is concluded that the difference between the rates for the two communities is not statistically significant at the 0.05 level of significance.

Rates, proportions, and ratios—Beginning in 1989, an asterisk is shown in place of a rate based on fewer than 20 deaths. These rates have a relative standard error of 23 percent or more and therefore are considered highly variable. For age-adjusted death rates, this criterion is applied to the sum of the age-specific deaths.

SYMBOLS USED IN TABLES

Data not available	---
Category not applicable	. . .
Quantity zero	–
Quantity more than zero but less than 0.05	0.0
Figure does not meet standards of reliability or precision (estimate is based on fewer than 20 events in numerator or denominator)	*

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Table 7-1. Population of Birth- and Death-Registration States, 1900-1932, and United States, 1900-1989

[Population enumerated as of April 1 for 1940, 1950, 1960, 1970, and 1980 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
1989	248,762,000	248,239,000	1944	138,397,000	132,885,000	...	...	...	...
1988	246,329,000	245,807,000	1943	136,739,000	134,245,000	...	...	...	...
1987	243,915,000	243,400,000	1942	134,860,000	133,920,000	...	...	...	...
1986	241,613,000	241,096,000	1941	133,402,000	133,121,000	...	...	...	...
1985	239,283,000	238,741,000	1940	131,820,000	131,669,275	...	...	...	...
1984	237,018,000	236,495,000	1939	131,028,000	130,879,718	...	...	...	...
1983	234,538,000	234,023,000	1938	129,969,000	129,824,939	...	...	...	...
1982	232,309,000	231,786,000	1937	128,961,000	128,824,829	...	...	...	...
1981	229,849,000	229,318,000	1936	128,181,000	128,053,180	...	...	...	...
1980	227,061,000	225,545,805	1935	127,362,000	127,250,232	...	...	...	...
1979	225,055,000	224,357,000	1934	126,485,000	126,373,773	...	...	...	...
1978	222,585,000	222,095,000	1933	125,690,000	125,578,763	...	...	...	...
1977	220,239,000	219,760,000	1932	124,949,000	124,840,471	47	118,903,899	47	118,903,899
1976	218,035,000	217,563,000	1931	124,149,000	124,039,648	46	117,455,229	47	118,148,987
1975	215,973,000	215,465,000	1930	123,188,000	123,076,741	46	116,544,946	47	117,238,278
1974	213,854,000	213,342,000	1929	---	121,769,939	46	115,317,450	46	115,317,450
1973	211,909,000	211,357,000	1928	---	120,501,115	44	113,636,160	44	113,636,160
1972	209,896,000	209,284,000	1927	---	119,038,062	40	104,320,830	42	107,084,532
1971	207,661,000	206,827,000	1926	---	117,399,225	35	90,400,590	41	103,822,683
1970	204,879,000	203,211,926	1925	---	115,831,963	33	88,294,564	40	102,031,555
1969	202,677,000	201,385,000	1924	---	114,113,463	33	87,000,295	39	99,318,098
1968	200,706,000	199,399,000	1923	---	111,949,945	30	81,072,123	38	96,788,197
1967	198,712,000	197,457,000	1922	---	110,054,778	30	79,560,746	37	92,702,901
1966	196,560,000	195,576,000	1921	---	108,541,489	27	70,807,090	34	87,814,447
1965	194,303,000	193,526,000	1920	---	106,466,420	23	63,597,307	34	86,079,263
1964	191,889,000	191,141,000	1919	105,063,000	104,512,110	22	61,212,076	33	83,157,982
1963	189,242,000	188,483,000	1918	104,550,000	103,202,801	20	55,153,782	30	79,008,412
1962	186,538,000	185,771,000	1917	103,414,000	103,265,913	20	55,197,952	27	70,234,775
1961	183,691,000	182,992,000	1916	---	101,965,984	11	32,944,013	26	66,971,177
1960	179,933,000	179,323,175	1915	---	100,549,013	10	31,096,697	24	61,884,847
1959	177,264,000	176,513,000	1914	---	99,117,567	...	...	24	60,963,309
1958	174,141,000	173,320,000	1913	---	97,226,814	...	...	23	58,156,740
1957	171,274,000	170,371,000	1912	---	95,331,300	...	...	22	54,847,700
1956	168,221,000	167,306,000	1911	---	93,657,814	...	...	22	53,929,644
1955	165,275,000	164,308,000	1910	---	92,406,536	...	...	20	47,470,437
1954	162,391,000	161,164,000	1909	---	90,491,525	...	...	18	44,223,513
1953	159,565,000	159,242,000	1908	---	88,708,976	...	...	17	38,634,759
1952	156,954,000	155,687,000	1907	---	87,000,271	...	...	15	34,552,837
1951	154,287,000	153,310,000	1906	---	85,436,556	...	...	15	33,782,288
1950	151,132,000	150,697,361	1905	---	83,819,666	...	...	10	21,767,980
1949	149,188,000	148,665,000	1904	---	82,164,974	...	...	10	21,332,076
1948	146,631,000	146,093,000	1903	---	80,632,152	...	...	10	20,843,222
1947	144,126,000	143,446,000	1902	---	79,160,196	...	...	10	20,582,907
1946	141,389,000	140,054,000	1901	---	77,585,128	...	...	10	20,237,453
1945	139,928,000	132,481,000	1900	---	76,094,134	...	...	10	19,965,446

[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 7-2. Estimated Population of the United States, by 5-Year Age Groups, Race, and Sex: July 1, 1989

[Figures include Armed Forces stationed in the United States and exclude those stationed outside the United States. Due to rounding to the nearest thousand, detailed figures may not add to totals]

Age	All races			White			All other					
							Total			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	248,239,000	120,982,000	127,258,000	208,961,000	102,223,000	106,738,000	39,278,000	18,758,000	20,520,000	30,660,000	14,545,000	16,115,000
Under 1 year	3,945,000	2,020,000	1,925,000	3,163,000	1,623,000	1,541,000	782,000	397,000	385,000	619,000	314,000	305,000
1-4 years	14,807,000	7,578,000	7,229,000	11,887,000	6,093,000	5,794,000	2,920,000	1,485,000	1,435,000	2,271,000	1,155,000	1,116,000
5-9 years	18,212,000	9,321,000	8,891,000	14,628,000	7,504,000	7,124,000	3,584,000	1,817,000	1,767,000	2,802,000	1,423,000	1,378,000
10-14 years	16,950,000	8,689,000	8,260,000	13,574,000	6,973,000	6,601,000	3,375,000	1,716,000	1,659,000	2,679,000	1,362,000	1,318,000
15-19 years	17,812,000	9,091,000	8,721,000	14,343,000	7,327,000	7,015,000	3,469,000	1,764,000	1,705,000	2,758,000	1,394,000	1,365,000
20-24 years	18,702,000	9,368,000	9,334,000	15,359,000	7,731,000	7,628,000	3,343,000	1,637,000	1,706,000	2,651,000	1,279,000	1,372,000
25-29 years	21,699,000	10,865,000	10,834,000	18,103,000	9,142,000	8,960,000	3,597,000	1,723,000	1,874,000	2,827,000	1,342,000	1,485,000
30-34 years	22,135,000	11,078,000	11,058,000	18,567,000	9,385,000	9,182,000	3,568,000	1,693,000	1,875,000	2,744,000	1,289,000	1,455,000
35-39 years	19,621,000	9,731,000	9,890,000	16,625,000	8,342,000	8,283,000	2,996,000	1,389,000	1,606,000	2,260,000	1,035,000	1,225,000
40-44 years	16,882,000	8,294,000	8,588,000	14,550,000	7,229,000	7,321,000	2,331,000	1,064,000	1,267,000	1,726,000	782,000	945,000
45-49 years	13,521,000	6,601,000	6,920,000	11,672,000	5,758,000	5,915,000	1,849,000	843,000	1,006,000	1,395,000	626,000	769,000
50-54 years	11,375,000	5,509,000	5,866,000	9,789,000	4,791,000	4,998,000	1,586,000	719,000	868,000	1,223,000	544,000	679,000
55-59 years	10,726,000	5,121,000	5,605,000	9,310,000	4,480,000	4,830,000	1,416,000	641,000	775,000	1,116,000	508,000	608,000
60-64 years	10,867,000	5,079,000	5,788,000	9,569,000	4,498,000	5,071,000	1,298,000	581,000	718,000	1,035,000	467,000	567,000
65-69 years	10,170,000	4,631,000	5,538,000	9,029,000	4,130,000	4,899,000	1,141,000	502,000	639,000	916,000	402,000	515,000
70-74 years	8,012,000	3,464,000	4,549,000	7,193,000	3,120,000	4,074,000	819,000	344,000	475,000	661,000	274,000	386,000
75-79 years	6,033,000	2,385,000	3,648,000	5,430,000	2,147,000	3,282,000	603,000	238,000	365,000	486,000	187,000	299,000
80-84 years	3,728,000	1,306,000	2,422,000	3,409,000	1,189,000	2,220,000	319,000	117,000	201,000	256,000	91,000	165,000
85 years and over	3,042,000	850,000	2,192,000	2,761,000	761,000	2,000,000	281,000	89,000	192,000	236,000	72,000	165,000

SOURCE: U.S. Bureau of the Census: "Current Population Reports," Series P-25, No. 1057.

Table 7-3. Estimated Population, by Age, for the United States, Each Division and State, Puerto Rico, Virgin Islands, and Guam: July 1, 1989

[Figures include Armed Forces stationed in each area, and exclude Armed Forces stationed outside the United States. Due to rounding to the nearest thousand, detailed figures may not add to totals]

Division and State	Total	Under 5 years	5-19 years	20-44 years	45-64 years	65 years and over
United States	248,239,000	18,752,000	52,974,000	99,039,000	46,489,000	30,985,000
Geographic divisions:						
New England	13,046,000	918,000	2,536,000	5,299,000	2,537,000	1,758,000
Middle Atlantic	37,726,000	2,655,000	7,493,000	14,609,000	7,783,000	5,182,000
East North Central	42,298,000	3,080,000	9,209,000	16,732,000	7,996,000	5,279,000
West North Central	17,851,000	1,302,000	3,842,000	6,979,000	3,272,000	2,458,000
South Atlantic	43,116,000	3,137,000	8,879,000	16,962,000	8,427,000	5,711,000
East South Central	15,406,000	1,090,000	3,515,000	6,011,000	2,845,000	1,945,000
West South Central	27,003,000	2,247,000	6,342,000	10,853,000	4,578,000	2,984,000
Mountain	13,514,000	1,142,000	3,143,000	5,503,000	2,234,000	1,488,000
Pacific	38,283,000	3,183,000	8,018,000	16,091,000	6,821,000	4,172,000
New England:						
Maine	1,222,000	84,000	259,000	484,000	230,000	164,000
New Hampshire	1,107,000	85,000	232,000	463,000	203,000	126,000
Vermont	567,000	40,000	120,000	240,000	100,000	68,000
Massachusetts	5,913,000	413,000	1,105,000	2,441,000	1,142,000	813,000
Rhode Island	998,000	69,000	193,000	397,000	191,000	147,000
Connecticut	3,239,000	227,000	627,000	1,274,000	671,000	440,000
Middle Atlantic:						
New York	17,950,000	1,306,000	3,582,000	7,012,000	3,707,000	2,340,000
New Jersey	7,736,000	548,000	1,514,000	3,009,000	1,643,000	1,022,000
Pennsylvania	12,040,000	801,000	2,397,000	4,588,000	2,433,000	1,820,000
East North Central:						
Ohio	10,907,000	782,000	2,378,000	4,233,000	2,115,000	1,398,000
Indiana	5,593,000	394,000	1,248,000	2,209,000	1,049,000	693,000
Illinois	11,658,000	864,000	2,472,000	4,656,000	2,229,000	1,438,000
Michigan	9,273,000	684,000	2,063,000	3,708,000	1,718,000	1,099,000
Wisconsin	4,867,000	356,000	1,048,000	1,926,000	885,000	651,000
West North Central:						
Minnesota	4,353,000	329,000	932,000	1,764,000	780,000	550,000
Iowa	2,840,000	188,000	606,000	1,100,000	517,000	429,000
Missouri	5,159,000	370,000	1,093,000	1,982,000	997,000	718,000
North Dakota	660,000	50,000	150,000	261,000	108,000	91,000
South Dakota	715,000	55,000	162,000	267,000	127,000	103,000
Nebraska	1,611,000	119,000	355,000	624,000	289,000	223,000
Kansas	2,513,000	191,000	544,000	981,000	454,000	344,000
South Atlantic:						
Delaware	673,000	50,000	139,000	271,000	133,000	79,000
Maryland	4,694,000	358,000	945,000	1,951,000	930,000	510,000
District of Columbia	604,000	46,000	108,000	257,000	115,000	75,000
Virginia	6,098,000	444,000	1,236,000	2,587,000	1,174,000	656,000
West Virginia	1,857,000	110,000	414,000	716,000	346,000	272,000
North Carolina	6,571,000	464,000	1,398,000	2,645,000	1,267,000	799,000
South Carolina	3,512,000	265,000	808,000	1,423,000	626,000	391,000
Georgia	6,436,000	511,000	1,500,000	2,607,000	1,166,000	653,000
Florida	12,671,000	887,000	2,331,000	4,505,000	2,670,000	2,276,000
East South Central:						
Kentucky	3,727,000	250,000	839,000	1,480,000	685,000	472,000
Tennessee	4,940,000	340,000	1,074,000	1,955,000	947,000	624,000
Alabama	4,118,000	297,000	945,000	1,595,000	758,000	522,000
Mississippi	2,621,000	203,000	657,000	981,000	455,000	327,000
West South Central:						
Arkansas	2,406,000	173,000	552,000	875,000	450,000	355,000
Louisiana	4,382,000	362,000	1,050,000	1,761,000	724,000	488,000
Oklahoma	3,224,000	233,000	722,000	1,269,000	571,000	428,000
Texas	16,991,000	1,479,000	4,018,000	6,948,000	2,833,000	1,713,000
Mountain						
Montana	806,000	60,000	183,000	318,000	140,000	106,000
Idaho	1,014,000	79,000	258,000	396,000	159,000	120,000
Wyoming	475,000	36,000	114,000	219,000	60,000	46,000
Colorado	3,317,000	262,000	704,000	1,474,000	553,000	323,000
New Mexico	1,528,000	134,000	368,000	601,000	265,000	160,000
Arizona	3,556,000	310,000	779,000	1,371,000	630,000	465,000
Utah	1,707,000	175,000	517,000	651,000	218,000	147,000
Nevada	1,111,000	86,000	220,000	473,000	209,000	121,000
Pacific:						
Washington	4,761,000	357,000	1,002,000	2,031,000	802,000	568,000
Oregon	2,820,000	194,000	584,000	1,180,000	470,000	392,000
California	29,063,000	2,488,000	6,069,000	12,177,000	5,259,000	3,072,000
Alaska	527,000	55,000	128,000	241,000	82,000	21,000
Hawaii	1,112,000	89,000	235,000	462,000	208,000	119,000
Puerto Rico [1]	---	---	---	---	---	---
Virgin Islands [1]	---	---	---	---	---	---
Guam [1]	---	---	---	---	---	---

[1] Populations for Puerto Rico, Virgin Islands, and Guam are not available for 1989.
SOURCE: U.S Bureau of the Census: "Current Population Reports," Series P-25, Nos. 1058 and unpublished data.

Table 7-2. Enumerated Population of the United States, by 5-Year Age Groups, Race, and Sex: April 1, 1990

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

Age	All races			White			All other					
							Total			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	248,709,873	121,239,348	127,470,525	208,704,165	102,142,817	106,561,348	40,005,708	19,096,531	20,909,177	30,483,281	14,420,331	16,062,950
Under 1 year	3,945,974	2,018,404	1,927,570	3,127,256	1,603,750	1,523,506	818,718	414,654	404,064	638,132	322,435	315,697
1-4 years	14,811,673	7,580,624	7,231,049	11,832,870	6,071,090	5,761,780	2,978,803	1,509,534	1,469,269	2,301,264	1,163,852	1,137,412
5-9 years	18,034,778	9,232,031	8,802,747	14,502,300	7,444,026	7,058,274	3,532,478	1,788,005	1,744,473	2,711,336	1,371,538	1,339,798
10-14 years	17,060,469	8,738,800	8,321,669	13,670,059	7,022,591	6,647,468	3,390,410	1,716,209	1,674,201	2,629,473	1,328,261	1,301,212
15-19 years	17,881,711	9,172,834	8,708,877	14,350,716	7,379,551	6,971,165	3,530,995	1,793,283	1,737,712	2,714,244	1,370,304	1,343,940
20-24 years	19,131,578	9,742,551	9,389,027	15,637,244	8,009,507	7,627,737	3,494,334	1,733,044	1,761,290	2,654,936	1,299,074	1,355,862
25-29 years	21,327,869	10,702,497	10,625,372	17,638,338	8,926,907	8,711,431	3,689,531	1,775,590	1,913,941	2,779,569	1,322,573	1,456,996
30-34 years	21,832,857	10,861,819	10,971,038	18,189,778	9,144,433	9,045,345	3,643,079	1,717,386	1,925,693	2,717,689	1,299,916	1,417,773
35-39 years	19,845,733	9,833,180	10,012,553	16,651,817	8,342,551	8,309,266	3,193,916	1,490,629	1,703,287	2,359,348	1,094,253	1,265,095
40-44 years	17,589,034	8,676,472	8,912,562	15,001,279	7,476,422	7,524,857	2,587,755	1,200,050	1,387,705	1,881,629	867,892	1,013,737
45-49 years	13,743,577	6,739,157	7,004,420	11,826,034	5,851,065	5,974,969	1,917,543	888,092	1,029,451	1,413,272	644,853	768,419
50-54 years	11,313,073	5,493,144	5,819,929	9,744,459	4,773,156	4,971,303	1,568,614	719,988	848,626	1,177,519	530,296	647,223
55-59 years	10,487,443	5,008,415	5,479,028	9,130,851	4,404,374	4,726,477	1,356,592	604,041	752,551	1,040,889	460,001	580,888
60-64 years	10,625,209	4,946,654	5,678,555	9,380,602	4,408,987	4,971,615	1,244,607	537,667	706,940	971,760	418,147	553,613
65-69 years	10,065,835	4,507,539	5,558,296	8,983,978	4,047,535	4,936,443	1,081,857	460,004	621,853	859,694	360,653	499,041
70-74 years	7,979,660	3,399,275	4,580,385	7,191,013	3,079,801	4,111,212	788,647	319,474	469,173	638,077	252,967	385,110
75-79 years	6,102,929	2,388,895	3,714,034	5,518,341	2,165,061	3,353,280	584,588	223,834	360,754	483,535	178,695	304,840
80-84 years	3,909,046	1,355,830	2,553,216	3,566,268	1,232,184	2,334,084	342,778	123,646	219,132	286,283	98,351	189,932
85 years and over	3,021,425	841,227	2,180,198	2,760,962	759,826	2,001,136	260,463	81,401	179,062	222,632	66,270	156,362

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

TECHNICAL APPENDIX FROM

VITAL STATISTICS OF THE UNITED STATES

1990

VOLUME II - MORTALITY

U.S. DEPARTMENT OF
HEALTH AND HUMAN SERVICES

PUBLIC HEALTH SERVICE

CENTERS FOR DISEASE CONTROL AND PREVENTION
NATIONAL CENTER FOR HEALTH STATISTICS

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Sources of data

Death and fetal-death statistics

Mortality statistics for 1990 are, as for all previous years except 1972, based on information from records of all deaths occurring in the United States. Fetal-death statistics for every year are based on all reports of fetal death received by the National Center for Health Statistics (NCHS).

The death-registration system and the fetal-death reporting system of the United States encompass the 50 States, the District of Columbia, New York City (which is independent of New York State for the purpose of death registration), Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Marianas. In the statistical tabulations of this publication, *United States* refers only to the aggregate of the 50 States (including New York City) and the District of Columbia. Tabulations for Guam, Puerto Rico, and the Virgin Islands are shown separately in this volume. No data have ever been included for American Samoa or the Trust Territory of the Pacific Islands.

The Virgin Islands was admitted to the registration area for deaths in 1924; Puerto Rico, in 1932; and Guam, in 1970. Tabulations of death statistics for Puerto Rico and the Virgin Islands were regularly shown in the annual volumes of *Vital Statistics of the United States* from the year of their admission through 1971 except for the years 1967–69, and tabulations for Guam were included for 1970 and 1971. Death statistics for Puerto Rico, the Virgin Islands, and Guam were not included in the 1972 volume but have been included in section 8 of the volumes for each of the years 1973–78 and in section 9 beginning with 1979. Information for 1972 for these three areas was published in the respective annual vital statistics reports of the Department of Health of the Commonwealth of Puerto Rico, the Department of Health of the Virgin Islands, and the Department of Public Health and Social Services of the Government of Guam.

Procedures used by NCHS to collect death statistics have changed over the years. Before 1971, tabulations of deaths and fetal deaths were based solely on information obtained by NCHS from copies of the original certificates. The information from these copies was edited, coded, and tabulated. For 1960–70, all mortality information taken from these records was transferred by NCHS to magnetic tape for computer processing.

Beginning with 1971, an increasing number of States have provided NCHS, via the Vital Statistics Cooperative Program (VSCP), computer tapes of data coded according to NCHS specifications. The year State-coded demographic data were first transmitted on computer tape to NCHS is shown below for each of the States, New York City, Puerto Rico, and the District of Columbia, all of which now furnish demographic or nonmedical data on tape.

1971	1977
Florida	Alaska
	Idaho
	Massachusetts
	New York City
	Ohio
	Puerto Rico
1972	1978
Maine	Indiana
Missouri	Utah
New Hampshire	Washington
Rhode Island	
Vermont	
1973	1979
Colorado	Connecticut
Michigan	Hawaii
New York (except New York City)	Mississippi
	New Jersey
	Pennsylvania
	Wyoming
1974	1980
Illinois	Arkansas
Iowa	New Mexico
Kansas	South Dakota
Montana	
Nebraska	
Oregon	
South Carolina	
1975	1982
Louisiana	North Dakota
Maryland	
North Carolina	
Oklahoma	
Tennessee	
Virginia	
Wisconsin	
1976	1985
Alabama	Arizona
Kentucky	California
Minnesota	Delaware
Nevada	Georgia
Texas	District of Columbia
West Virginia	

For the Virgin Islands and Guam, mortality statistics for 1990 are based on information obtained directly by NCHS from copies of the original certificates received from the registration offices.

In 1974, States began coding medical (cause-of-death) data on computer tapes according to NCHS specifications. The year State-coded medical data were first transmitted to NCHS is shown below for the 30 States now furnishing such data. NCHS contracted with Colorado, Kansas, and Mississippi to precode medical data for all deaths on computer tape for the five States that were added in 1988. Vermont subcontracted with Pennsylvania to code its medical data.

1974
- Iowa
- Michigan

1975
- Louisiana
- Nebraska
- North Carolina
- Virginia
- Wisconsin

1980
- Colorado
- Kansas
- Massachusetts
- Mississippi
- New Hampshire
- Pennsylvania
- South Carolina

1981
- Maine

1983
- Minnesota

1984
- Maryland
- New York State (except New York City)
- Vermont

1986
- California
- Florida
- Texas

1988
- Alaska
- Delaware
- Idaho
- North Dakota
- Wyoming

1989
- Georgia
- Indiana
- Washington

For 1990 and previous years except 1972, NCHS coded the medical information from copies of the original certificates received from the registration offices for all deaths occurring in those States that were not furnishing NCHS with medical data coded according to NCHS specifications. For 1981 and 1982, these procedures were modified because of a coding and processing backlog resulting from personnel and budgetary restrictions. To produce the mortality files on a timely basis with reduced resources, NCHS used State-coded underlying cause-of-death information supplied by 19 States for 50 percent of the records; for the other 50 percent of the records for these States as well as for 100 percent of the records for the remaining 21 registration areas, NCHS coded the medical information. Mortality statistics for 1972 were based on information obtained from a 50-percent sample of death records instead of from all records as in other years. The sampling resulted from personnel and budgetary restrictions. Sampling variation associated with the 50-percent sample is described in "Estimates of errors arising from 50-percent sample for 1972."

Fetal-death data are obtained directly from copies of original reports of fetal deaths received by NCHS, except New York State (excluding New York City), which submitted State-coded data in 1990.

Standard certificates and reports

For many years, the U.S. Standard Certificate of Death and the U.S. Standard Report of Fetal Death, issued by the Public Health Service, have been used as the principal means to attain uniformity in the contents of documents used to collect information on these events. They have been modified in each State to the extent required by the particular needs of the State or by special provisions of the State vital statistics law. However, the certificates or reports of most States conform closely in content and arrangement to the standards.

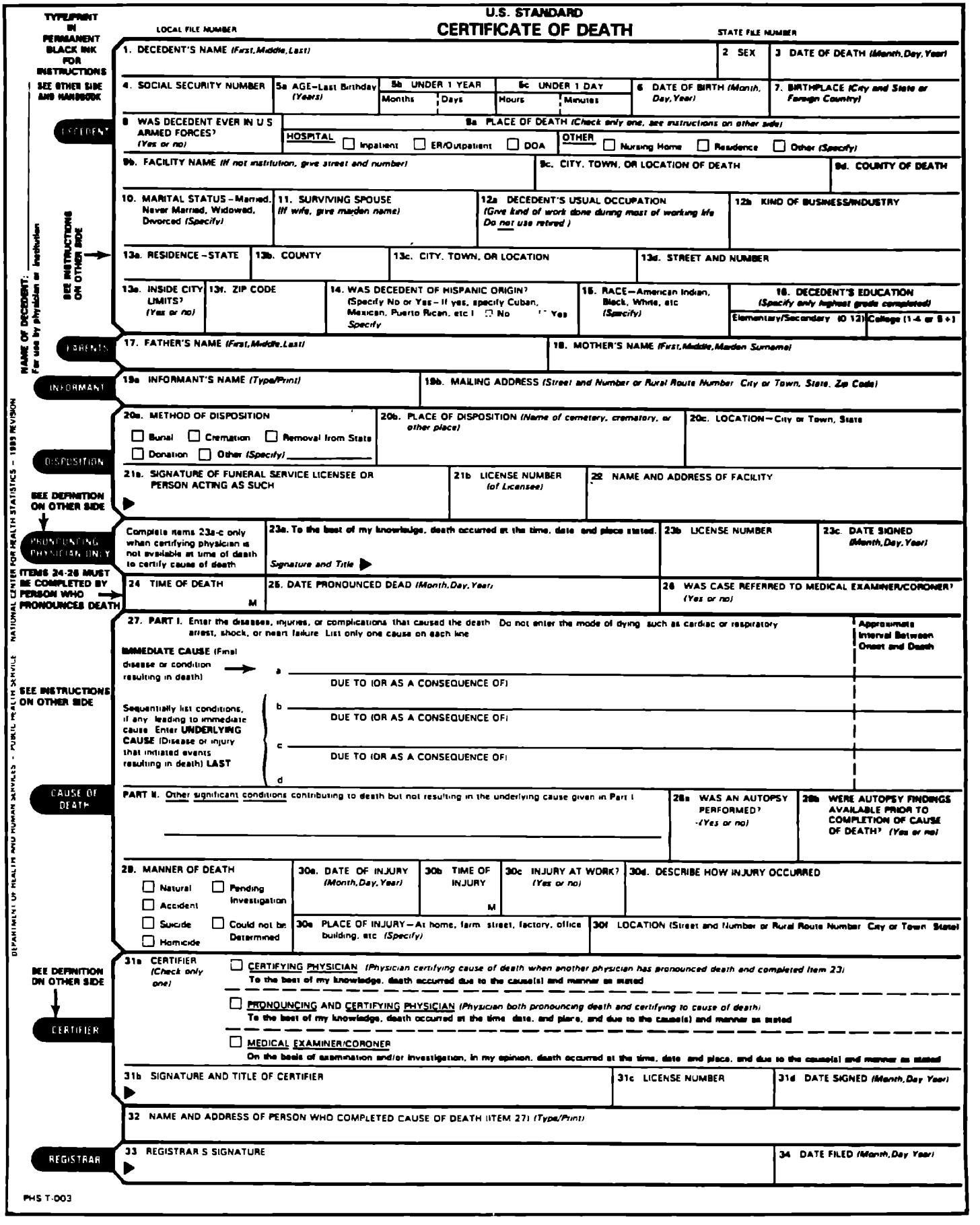
The first issue of the U.S. Standard Certificate of Death appeared in 1900. Since then, it has been revised periodically by the national vital statistics agency through consultation with State health officers and registrars; Federal agencies concerned with vital statistics; national, State, and county medical societies; and others working in such fields as public health, social welfare, demography, and insurance. This revision procedure has assured careful evaluation of each item in terms of its current and future usefulness for legal, medical and health, 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, items have been dropped when their usefulness appeared to be limited.

New revisions of the U.S. Standard Certificate of Death and the U.S. Standard Report of Fetal Death were recommended for State use beginning on January 1, 1989. The U.S. Standard Certificate of Death and the U.S. Standard Report of Fetal Death are in figures 7-A and 7-B (1).

Among the major changes were the addition of a new item on educational attainment and changes to improve the medical certification of cause of death. Additional lines to report causes of death were added as well as more complete instructions with examples for properly completing the cause of death. Also, for the first time, the U.S. Standard Certificate of Death includes a question on the Hispanic origin of the decedent. A number of States had included an Hispanic-origin identifier on their certificates, resulting in data shown in this volume for years before 1989. To obtain information on type of place of death, the format of the item was changed from an open-ended question to a checkbox.

History

The first death statistics published by the Federal Government concerned events in 1850 and were based on statistics collected during the decennial census of that year. In 1880 a national "registration area" was created for deaths. Originally consisting of two States—Massachusetts and New Jersey—the District of Columbia, and several large cities having efficient



U.S. STANDARD
CERTIFICATE OF DEATH

TYPE/PRINT IN PERMANENT BLACK INK FOR INSTRUCTIONS SEE OTHER SIDE AND HANDBOOK

LOCAL FILE NUMBER

STATE FILE NUMBER

DECEDENT

1. DECEDENT'S NAME (First, Middle, Last)
2. SEX
3. DATE OF DEATH (Month, Day, Year)
4. SOCIAL SECURITY NUMBER
5a. AGE–Last Birthday (Years)
5b. UNDER 1 YEAR Months Days
5c. UNDER 1 DAY Hours Minutes
6. DATE OF BIRTH (Month, Day, Year)
7. BIRTHPLACE (City and State or Foreign Country)
8. WAS DECEDENT EVER IN U.S. ARMED FORCES? (Yes or no)
9a. PLACE OF DEATH (Check only one, see instructions on other side)
HOSPITAL ☐ Inpatient ☐ ER/Outpatient ☐ DOA
OTHER ☐ Nursing Home ☐ Residence ☐ Other (Specify)
9b. FACILITY NAME (If not institution, give street and number)
9c. CITY, TOWN, OR LOCATION OF DEATH
9d. COUNTY OF DEATH
10. MARITAL STATUS – Married, Never Married, Widowed, Divorced (Specify)
11. SURVIVING SPOUSE (If wife, give maiden name)
12a. DECEDENT'S USUAL OCCUPATION (Give kind of work done during most of working life. Do not use retired.)
12b. KIND OF BUSINESS/INDUSTRY
13a. RESIDENCE – STATE
13b. COUNTY
13c. CITY, TOWN, OR LOCATION
13d. STREET AND NUMBER
13e. INSIDE CITY LIMITS? (Yes or no)
13f. ZIP CODE
14. WAS DECEDENT OF HISPANIC ORIGIN? (Specify No or Yes – If yes, specify Cuban, Mexican, Puerto Rican, etc.) ☐ No ☐ Yes Specify
15. RACE – American Indian, Black, White, etc. (Specify)
16. DECEDENT'S EDUCATION (Specify only highest grade completed)
Elementary/Secondary (0–12)
College (1–4 or 5+)

PARENTS

17. FATHER'S NAME (First, Middle, Last)
18. MOTHER'S NAME (First, Middle, Maiden Surname)

INFORMANT

19a. INFORMANT'S NAME (Type/Print)
19b. MAILING ADDRESS (Street and Number or Rural Route Number, City or Town, State, Zip Code)

DISPOSITION

20a. METHOD OF DISPOSITION
☐ Burial ☐ Cremation ☐ Removal from State
☐ Donation ☐ Other (Specify) _____
20b. PLACE OF DISPOSITION (Name of cemetery, crematory, or other place)
20c. LOCATION – City or Town, State
21a. SIGNATURE OF FUNERAL SERVICE LICENSEE OR PERSON ACTING AS SUCH
21b. LICENSE NUMBER (of Licensee)
22. NAME AND ADDRESS OF FACILITY

SEE DEFINITION ON OTHER SIDE

PRONOUNCING PHYSICIAN ONLY

Complete items 23a–c only when certifying physician is not available at time of death to certify cause of death
23a. To the best of my knowledge, death occurred at the time, date and place stated. Signature and Title
23b. LICENSE NUMBER
23c. DATE SIGNED (Month, Day, Year)

ITEMS 24–26 MUST BE COMPLETED BY PERSON WHO PRONOUNCES DEATH

24. TIME OF DEATH M
25. DATE PRONOUNCED DEAD (Month, Day, Year)
26. WAS CASE REFERRED TO MEDICAL EXAMINER/CORONER? (Yes or no)

CAUSE OF DEATH

27. PART I. Enter the diseases, injuries, or complications that caused the death. Do not enter the mode of dying, such as cardiac or respiratory arrest, shock, or heart failure. List only one cause on each line.
Approximate Interval Between Onset and Death

IMMEDIATE CAUSE (Final disease or condition resulting in death) → a. _____ DUE TO (OR AS A CONSEQUENCE OF)

Sequentially list conditions, if any, leading to immediate cause. Enter UNDERLYING CAUSE (Disease or injury that initiated events resulting in death) LAST
b. _____ DUE TO (OR AS A CONSEQUENCE OF)
c. _____ DUE TO (OR AS A CONSEQUENCE OF)
d.

SEE INSTRUCTIONS ON OTHER SIDE

PART II. Other significant conditions contributing to death but not resulting in the underlying cause given in Part I
28a. WAS AN AUTOPSY PERFORMED? (Yes or no)
28b. WERE AUTOPSY FINDINGS AVAILABLE PRIOR TO COMPLETION OF CAUSE OF DEATH? (Yes or no)

29. MANNER OF DEATH
☐ Natural ☐ Pending Investigation
☐ Accident
☐ Suicide ☐ Could not be Determined
☐ Homicide
30a. DATE OF INJURY (Month, Day, Year)
30b. TIME OF INJURY M
30c. INJURY AT WORK? (Yes or no)
30d. DESCRIBE HOW INJURY OCCURRED
30e. PLACE OF INJURY – At home, farm, street, factory, office building, etc. (Specify)
30f. LOCATION (Street and Number or Rural Route Number, City or Town, State)

CERTIFIER

SEE DEFINITION ON OTHER SIDE

31a. CERTIFIER (Check only one)
☐ CERTIFYING PHYSICIAN (Physician certifying cause of death when another physician has pronounced death and completed Item 23)
To the best of my knowledge, death occurred due to the cause(s) and manner as stated
☐ PRONOUNCING AND CERTIFYING PHYSICIAN (Physician both pronouncing death and certifying to cause of death)
To the best of my knowledge, death occurred at the time, date, and place, and due to the cause(s) and manner as stated
☐ MEDICAL EXAMINER/CORONER
On the basis of examination and/or investigation, in my opinion, death occurred at the time, date and place, and due to the cause(s) and manner as stated
31b. SIGNATURE AND TITLE OF CERTIFIER
31c. LICENSE NUMBER
31d. DATE SIGNED (Month, Day, Year)

32. NAME AND ADDRESS OF PERSON WHO COMPLETED CAUSE OF DEATH (ITEM 27) (Type/Print)

REGISTRAR

33. REGISTRAR'S SIGNATURE
34. DATE FILED (Month, Day, Year)

NAME OF DECEDENT: For use by physician or institution

SEE INSTRUCTIONS ON OTHER SIDE

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PHS T-003

Figure 7-A. U.S. Standard Certificate of Death

TYPE/PRINT IN PERMANENT BLACK INK FOR INSTRUCTIONS SEE HANDBOOK

U.S. STANDARD

REPORT OF FETAL DEATH

STATE FILE NUMBER

1. FACILITY NAME *(If not institution, give street and number)*

2. CITY, TOWN, OR LOCATION OF DELIVERY | 3. COUNTY OF DELIVERY | 4. DATE OF DELIVERY *(Month, Day, Year)* | 5. SEX OF FETUS

PARENTS

6a. MOTHER'S NAME *(First, Middle, Last)* | 6b. MAIDEN SURNAME | 7. DATE OF BIRTH *(Month, Day, Year)*

8a. RESIDENCE-STATE | 8b. COUNTY | 8c. CITY, TOWN, OR LOCATION | 8d. STREET AND NUMBER

8e. INSIDE CITY LIMITS? *(Yes or no)* | 8f. ZIP CODE | 9. FATHER'S NAME *(First, Middle, Last)* | 10. DATE OF BIRTH *(Month, Day, Year)*

	11. OF HISPANIC ORIGIN? (Specify No or Yes—If yes, specify Cuban, Mexican, Puerto Rican, etc.)	12. RACE—American Indian, Black, White, etc. *(Specify below)*	13. EDUCATION *(Specify only highest grade completed)*		14. OCCUPATION AND BUSINESS/INDUSTRY *(Worked during last year)*	
			Elementary/Secondary (0-12)	College (1-4 or 5+)	Occupation	Business/Industry
MOTHER	11a. ☐ No ☐ Yes Specify:	12a.	13a.		14a.	14b.
FATHER	11b. ☐ No ☐ Yes Specify:	12b.	13b.		14c.	14d.

MULTIPLE BIRTHS Enter State File Number for Mate(s)

LIVE BIRTH(S)

FETAL DEATH(S)

15. PREGNANCY HISTORY *(Complete each section)*

LIVE BIRTHS		OTHER TERMINATIONS *(Spontaneous and induced at any time after conception)*
15a. Now Living: Number ____ ☐ None	15b. Now Dead: Number ____ ☐ None	15d. *(Do not include this fetus)* Number ____ ☐ None
15c. DATE OF LAST LIVE BIRTH *(Month, Year)*		15e. DATE OF LAST OTHER TERMINATION *(Month, Year)*

16. MOTHER MARRIED? (At delivery, conception, or any time between) *(Yes or no)*

17. DATE LAST NORMAL MENSES BEGAN *(Month, Day, Year)*

18. MONTH OF PREGNANCY PRENATAL CARE BEGAN—First, Second, Third, etc. *(Specify)*

19. PRENATAL VISITS—Total Number *(If none, so state)*

20. WEIGHT OF FETUS *(Specify Unit)*

21. CLINICAL ESTIMATE OF GESTATION *(Weeks)*

22a. PLURALITY—Single, Twin, Triplet, etc *(Specify)*

22b. IF NOT SINGLE BIRTH—Born First, Second, Third, etc. *(Specify)*

MEDICAL AND HEALTH INFORMATION

23a. 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 _____ (Specify) ... 17 ☐

23b. 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.

24. 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 _____ (Specify) ... 07 ☐

25. 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 _____ (Specify) ... 16 ☐

26. 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 ☐
Hysterotomy/Hysterectomy ... 07 ☐

27. CONGENITAL ANOMALIES OF FETUS *(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 stenosis/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 _____ (Specify) ... 22 ☐

CAUSE OF FETAL DEATH

28. Enter only one cause per line for a, b, and c.

PART I. Fetal or maternal condition directly causing fetal death.
a. IMMEDIATE CAUSE | Specify Fetal or Maternal

DUE TO (OR AS A CONSEQUENCE OF):
b. | Specify Fetal or Maternal

Fetal and/or maternal conditions, if any, giving rise to the immediate cause(s), stating the underlying cause last.
DUE TO (OR AS A CONSEQUENCE OF):
c. | Specify Fetal or Maternal

PART II. Other significant conditions of fetus or mother contributing to fetal death but not resulting in the underlying cause given in Part I.

29. FETUS DIED BEFORE LABOR, DURING LABOR OR DELIVERY, UNKNOWN *(Specify)*

30. ATTENDANT'S NAME AND TITLE *(Type/Print)*
Name _____
☐ M.D. ☐ D.O. ☐ C.N.M. ☐ Other Midwife
☐ Other *(Specify)* _____

31. NAME AND TITLE OF PERSON COMPLETING REPORT *(Type/Print)*
Name _____
Title _____

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PHS-T-007

Figure 7-B. U.S. Standard Report of Fetal Death

systems for death registrations, the death-registration area continued to expand until 1933, when it included the entire United States for the first time. Tables showing data for death-registration States include the District of Columbia for all years; registration cities in nonregistration States are not included. For more details on the history of the death-registration area, see the *Vital Statistics of the United States, 1979*, Volume II, Mortality, Part A, section 7, pages 3 and 4 and *Vital Statistics of the United States, 1950*, Volume I, chapter 1, pages 2–19. Statistics on fetal deaths were first published for the birth-registration area in 1918 and then every year beginning with 1922.

Classification of data

The principal value of vital statistics data is realized through the presentation of rates, which are computed by relating the vital events of a class to the population of a similarly defined class. Vital statistics and population statistics must therefore be classified according to similarly defined systems and tabulated in comparable groups. Even when the variables common to both, such as geographic area, age, sex, and race, 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 in the classification of geographic and personal items for deaths and fetal deaths for 1990 are set forth in two NCHS instruction manuals (2,3). A discussion of the classification of certain important items is presented below.

Classification by occurrence and residence

Tabulations for the United States and specified geographic areas in this volume are classified by place of residence unless stated as by place of occurrence. Before 1970, resident mortality statistics for the United States included all deaths occurring in the United States, with deaths of "nonresidents of the United States" assigned to place of death. "Deaths of nonresidents of the United States" refers to deaths that occur in the United States of nonresident aliens; nationals residing abroad; and residents of Puerto Rico, the Virgin Islands, Guam, and other territories of the United States. Beginning with 1970, deaths of nonresidents of the United States are not included in tables by place of residence.

Tables by place of occurrence, on the other hand, include deaths of both residents and nonresidents of the United States. Consequently, for each year beginning with 1970, the total number of deaths in the United States by place of occurrence was somewhat greater than the total by place of residence. For 1990, this difference amounted to 3,427 deaths. Mortality statistics by place of occurrence are shown in tables 1-11, 1-19, 1-20, 1-30, 1-31, 1-32, 3-1, 3-6, 8-1, and 8-7.

Before 1970, except for 1964 and 1965, deaths of nonresidents of the United States occurring in the United States were treated as deaths of residents of the exact place of occurrence, which in most instances was an urban area. In 1964 and 1965, deaths of nonresidents of the United States occurring in the United States were allocated as deaths of residents of the balance of the county in which they occurred.

Residence error—Results of a 1960 study showed that the classification of residence information on the death certificates corresponded closely to the residence classification of the census records for the decedents whose records were matched (4).

A comparison of the results of this study of deaths with those for a previous matched record study of births (5) showed that the quality of residence data had improved considerably between 1950 and 1960. Both studies found that events in urban areas were overstated by the NCHS classification in comparison with the U.S. Bureau of the Census classification. The magnitude of the difference was substantially less for deaths in 1960 than it was for births in 1950.

The improvement is attributed to an item added in 1956 to the U.S. Standard Certificates of Birth and of Death, asking whether residence was inside or outside city limits. This new item aided in properly allocating the residence of persons living near cities but outside the corporate limits.

Geographic classification

The rules followed in the classification of geographic areas for deaths and fetal deaths are contained in the two instruction manuals referred to previously (2,3). The geographic codes assigned by the NCHS during data reduction of source information on birth, death, and fetal-death records are given in another instruction manual (6). Beginning with 1982 data, the geographic codes were modified to reflect results of the 1980 census. For 1970–81, codes are based on results of the 1970 census.

Metropolitan statistical areas—The Metropolitan statistical areas (MSA's) and Primary metropolitan statistical areas (PMSA's) used in this volume 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 (7), except in the New England States.

Outside 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 demonstrate very strong internal economic and social links and has a population over 1 million. When PMSA's are defined, the larger area of which they are component parts is designated a Consolidated Metropolitan Statistical Area (CMSA) (8).

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. However, NCHS cannot use this classification for these States because its data are not coded to identify all towns. Instead, NCHS uses New England County Metropolitan Areas (NECMA's). Made up of county units, these areas are established by the U.S. Office of Management and Budget (9).

Metropolitan and nonmetropolitan counties—Independent cities and counties included in MSA's and PMSA's or in

NECMA's are included in data for metropolitan counties; all other counties are classified as nonmetropolitan.

Population-size groups—In 1990, vital statistics data for cities and certain other urban places were classified according to the population enumerated in the 1980 Census of Population. Data are available for individual cities and other urban places of 10,000 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." For the years 1970–81, classification of areas was determined by the population enumerated in the 1970 Census of Population. Beginning with 1982 data, some urban places identified in previous reports were deleted and others were added because of changes occurring in the enumerated population between 1970 and 1980.

Urban places other than incorporated cities for which vital statistics data are shown in this volume include the following:

- Each town in the New England States, 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 a population of 10,000 or more has no incorporated cities in the State.

Before 1964, places were classified as "urban" or "rural." The technical appendixes for earlier years discuss the previous classification system.

State or country of birth

Mortality statistics by State or country of birth (table 1-36) became available beginning with 1979. State or country of birth of a decedent is assigned to 1 of the 50 States or the District of Columbia; or to Puerto Rico, the Virgin Islands, or Guam—if specified on the death certificate. The place of birth is also tabulated for Canada, Cuba, Mexico, and for the Remainder of the World. Deaths for which information on State or country of birth was unknown, not stated, or not classifiable accounted for a small proportion of all deaths in 1990, about 1.1 percent.

Early mortality reports published by the U.S. Bureau of the Census contained tables showing nativity of parents as well as nativity of decedent. Publication of these tables was discontinued in 1933. Mortality data showing nativity of decedent were again published in annual reports for 1939–41 and for 1950.

Age

The age recorded on the death record is the age at last birthday. With respect to the computation of death rates, the age classification used by the U.S. Bureau of the Census is based also on the age of the person in completed years.

For computation of age-specific and age-adjusted death rates, deaths with age not stated are excluded. For life table computation, deaths with age not stated are distributed proportionately.

Race

For vital statistics in the United States in 1990, deaths are classified by race—white, black, American Indian, Chinese, Hawaiian, Japanese, Filipino, Other Asian or Pacific Islander, and Other. Mortality data for Filipino and Other Asian or Pacific Islander were shown for the first time in 1979.

The white category includes, in addition to persons reported as white, those reported as Mexican, Puerto Rican, Cuban, and all other Caucasians. The American Indian category includes American, Alaskan, Canadian, Eskimo, and Aleut. If the racial entry on the death certificate indicates a mixture of Hawaiian and any other race, the entry is coded to Hawaiian. If the race is given as a mixture of white and any other race, the entry is coded to the appropriate nonwhite race. If a mixture of races other than white is given (except Hawaiian), the entry is coded to the first race listed. This procedure for coding the first race listed has been used since 1969. Before 1969, if the entry for race was a mixture of black and any other race except Hawaiian, the entry was coded to black.

Most of the tables in this volume, however, do not show data for this detailed classification by race. In all the tables, the divisions are white, all other (including black), and black separately.

Race not stated—For 1990, the number of death records for which race was unknown, not stated, or not classifiable was 5,424, or 0.3 percent of the total deaths. Death records with race entry not stated are assigned to a racial designation as follows: If the preceding record is coded white, the code assignment is made to white; if the code is other than white, the assignment is made to black. Before 1964, all records with race not stated were assigned to white except records of residents of New Jersey for 1962–64.

New Jersey, 1962–64—New Jersey omitted the race item from its certificates of live birth, death, and fetal death used in the beginning of 1962. The item was restored during the latter part of 1962. However, the certificate revision without the race item was used for most of 1962 as well as 1963. Therefore, figures by race for 1962 and 1963 exclude New Jersey. For 1964, 6.8 percent of the death records used for residents of New Jersey did not contain the race item.

Adjustments made in vital statistics to account for the omission of the race item in New Jersey for part of the certificates filed during 1962–64 are described in the technical appendixes of the *Vital Statistics of the United States* for each of those data years.

Hispanic origin

Mortality statistics for the Hispanic-origin population are based on information for those States and the District of Columbia that included items on the death certificate to identify Hispanic or ethnic origin of decedents. Data for 1990 were

obtained from the District of Columbia and all States except Louisiana, New Hampshire, and Oklahoma.

Hispanic mortality data were published for the first time in 1984. Generally, the reporting States used items similar to one of two basic formats recommended by NCHS. The first format is directed specifically toward the Hispanic population and appears on the U.S. Standard Certificate of Death as follows:

Was decedent of Hispanic origin?

(Specify No or Yes—If Yes, specify Cuban, Mexican, Puerto Rican, etc.) _____ No _____ Yes

Specify:

The second format is a more general ancestry item and appears as follows:

Ancestry—Mexican, Puerto Rican, Cuban, African, English, Irish, German, Homong, etc., (specify)

For 1990, mortality data in tables 1-37 and 2-21 are based on deaths to residents of all 47 reporting States and the District of Columbia. In tables 1-38, 1-43, and 1-44, mortality data for the Hispanic-origin population are based on deaths to residents of 45 States, New York State (excluding New York City), and the District of Columbia whose data were at least 90 percent complete on a place-of-occurrence basis and considered to be sufficiently comparable to be used for analysis. The 45 States are Alabama, Alaska, Arizona, Arkansas, California, Colorado, Delaware, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, New Mexico, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming. Data for Connecticut and New York City are excluded from tables 1-38, 1-43, and 1-44 because of the large proportion of deaths (in excess of 10 percent) occurring in these geographic areas for which Hispanic origin was not stated or was unknown. Because New York City accounts for about one-half of the deaths to Puerto Ricans, the resulting mortality data may not be comparable with previous years. Louisiana, New Hampshire, and Oklahoma were excluded because their death certificates did not have an Hispanic or ancestry item.

In tables 2-22–2-25, the reporting area is based on deaths to residents of the same 45 States, New York State (excluding New York City), and the District of Columbia whose mortality data for all ages and whose live birth data were at least 90 percent complete on a place-of-occurrence basis and considered to be sufficiently comparable to be used for analysis.

The 45 States, New York State (excluding New York City), and the District of Columbia for which general mortality data are shown in this report accounted for about 89 percent of the Hispanic population in the United States in 1990. This included about 99 percent of the Mexican population, 58 percent of the Puerto Rican population, 92 percent of the Cuban population, and 81 percent of the "Other Hispanic" population (10). Accordingly, some caution should be exercised in generalizing mortality patterns from the reporting area to the Hispanic-origin population (especially Puerto Ricans) of the entire United States. For qualifications regarding infant mortality of the Hispanic-origin population, see "Infant deaths."

Alabama—In 1990 for Alabama, 127 deaths were erroneously coded to Puerto Rican rather than to non-Hispanic. The corresponding number of deaths for Puerto Ricans for 1989 was 15. As a result, the number of deaths for Puerto Ricans for the 45 States, New York State (excluding New York City), and the District of Columbia should be about 2 percent lower than the figures shown.

Marital status

Mortality statistics by marital status (tables 1-34 and 1-35) were published in 1979 for the first time since 1961. (They were previously published in the annual volumes for 1949–51 and 1959–61.) Several reports analyzing mortality by marital status have been published, including the special study based on 1959–61 data (11). Reference to earlier reports is given in the appendix of part B of the 1959–61 special study.

Mortality statistics by marital status are tabulated separately for never married, married, widowed, and divorced. Certificates on which the marriage is specified as being annulled are classified as never married. Where marital status is specified as separated or common-law marriage, it is classified as married. Of the 2,094,183 resident deaths 15 years of age and over in 1990, 10,791 certificates (0.5 percent) had marital status not stated.

Educational attainment

Beginning with the 1989 data year, mortality data on educational attainment are being tabulated from information reported on the death certificate. As a result of the revisions of the U.S. Standard Certificate of Death (1), this item was added to the certificates of a large number of States:

- Decedent's Education (specify only highest grade completed)
- Elementary/Secondary (0–12) College (1–4 or 5+)

Mortality data on educational attainment for 1990 (table 1-45) are based on deaths to residents of 43 States and the District of Columbia. Data for seven States—Georgia, Louisiana, New York, Oklahoma, Rhode Island, South Dakota, and Washington—are excluded from this table because their death certificates did not include an educational attainment item, and New York City data are excluded because the education item on its death certificate was considered not comparable to be used for analysis.

In tables 1-46 and 1-47, the data are based on deaths to residents of 28 States and the District of Columbia whose data were at least 90 percent complete on a place-of-occurrence basis. The 28 States are Alabama, Arizona, California, Colorado, Delaware, Florida, Hawaii, Idaho, Illinois, Iowa, Kansas, Massachusetts, Michigan, Minnesota, Missouri, Montana, Nebraska, New Hampshire, North Dakota, Ohio, Oregon, Pennsylvania, South Carolina, Texas, Utah, Vermont, Wisconsin, and Wyoming. Data for Alaska, Arkansas, Connecticut, Indiana, Kentucky, Maine, Maryland, Mississippi, Nevada, New Jersey,

New Mexico, North Carolina, Tennessee, Virginia, and West Virginia are excluded because more than 10 percent of their death certificates were classified to "unknown educational attainment."

Place of death and status of decedent

Mortality statistics by place of death were published in 1979 for the first time since 1958 (tables 1-30–1-32). In addition, mortality data also were available for the first time in 1979 for the status of decedent when death occurred in a hospital or medical center. The 1990 data were obtained from the following two items appearing on the revised U.S. Standard Certificate of Death (1):

- Item 9a. Place of Death (check only one)
  Hospital: Inpatient, ER/Outpatient, DOA
  Other: Nursing Home, Residence, Other (specify)
- Item 9b. Facility Name (If not institution, give street and number)

Before the 1989 revision of the Standard Certificate of Death, information on place of death and status of decedent could be determined if the hospital or institution indicated Inpatient, Outpatient, ER, and DOA, and if the name of the hospital or institution, which was used to determine the kind of facility, appeared on the certificate. The change to a checkbox format in many States for this item may affect the comparability of data between 1989 and previous years.

Except for Oklahoma, all of the States (including New York City) and the District of Columbia have item 9 (or its equivalent) on their certificates. Louisiana's certificate was revised in 1989, but the computer system was not changed. Therefore, the same detail categories used in 1988 were used in 1989 and 1990. As a result, not all categories were available. For all reporting States and the District of Columbia in the VSCP, NCHS accepts the state definition, classification, or code for hospitals, medical centers, nursing homes, or other institutions.

Effective with data year 1980, the coding of place of death and status of decedent was modified. A new coding category was added: "Death on arrival—hospital, clinic, medical center name not given." Deaths coded to this category are tabulated in tables 1-30–1-32. Had the 1979 coding categories been used, these deaths would have been tabulated as "Place unknown."

California—For the first 5 months of data year 1989, California coded "residence" to "other" for "Place of death."

Mortality by month and date of death

Deaths by month have been tabulated regularly and published in the annual volume for each year beginning with data year 1900. For 1990, deaths by month are shown in tables 1-20, 1-21, 1-24, 1-33, 2-14–2-16, and 3-7.

Date of death was published for the first time for data year 1972. In addition, unpublished data for selected causes by date of death for 1962 are available from NCHS.

Numbers of deaths by date of death in this volume are shown in table 1-33 for the total number of deaths and for the numbers of deaths for the following three causes, for which the greatest interest in date of occurrence of death has been expressed: Motor vehicle accidents, Suicide, and Homicide and legal intervention.

These data show the frequency distribution of deaths for the selected causes by day of the week. They also make it possible to identify holidays with peak numbers of deaths from specified causes.

Report of autopsy

Before 1972, the last year for which autopsy data were tabulated was 1958. Beginning in 1972, all registration areas requested information on the death certificate as to whether an autopsy was performed. For 1990, autopsies were reported on 239,591 death certificates, 11.2 percent of the total (table 1-29).

Information indicating whether autopsy findings were used in determining the cause of death was tabulated for 1972–73 for all but nine registration areas and from 1974–77 for all but eight registration areas. The item "autopsy findings used" was deleted from the 1978 U.S. Standard Certificate of Death.

For nine of the cause-of-death categories shown in table 1-29, autopsies were reported as performed for 50 percent or more of all deaths (Meningococcal infection; Measles; Pregnancy with abortive outcome; Other complications of pregnancy, childbirth, and the puerperium; Symptoms, signs, and ill-defined conditions; Motor vehicle accidents; Suicide; Homicide and legal intervention; and All other external causes). Autopsies were reported for only 7.1 percent of the Major cardiovascular diseases.

Cause of death

Cause-of-death classification—Since 1949, cause-of-death statistics have been based on the underlying cause of death, which is defined as "(a) the disease or injury which initiated the train of events leading directly to death, or (b) the circumstances of the accident or violence which produced the fatal injury" (12).

For each death, the underlying cause is selected from an array of conditions reported in the medical certification section on the death certificate. This section provides a format for entering the cause of death sequentially. The conditions are translated into medical codes through use of the classification structure and the selection and modification rules contained in the applicable revision of the *International Classification of Diseases* (ICD), published by the World Health Organization (WHO). Selection rules provide guidance for systematically identifying the underlying cause of death. Modification rules are intended to improve the usefulness of mortality statistics by giving preference to certain classification categories over others and/or to consolidate two or more conditions on the certificate into one classification category.

As a statistical datum, underlying cause of death is a simple, one-dimensional statistic; it is conceptually easy to understand and a well-accepted measure of mortality. It identifies the initiating cause of death and is therefore most useful to public health officials in developing measures to prevent the onset of the chain of events leading to death. The rules for

selecting the underlying cause of death are included in ICD as a means of standardizing classification, which contributes toward comparability and uniformity in mortality medical statistics among countries.

Tabulation lists—Beginning with data year 1979, the cause-of-death statistics published by NCHS have been classified according to the *Ninth Revision of the International Classification of Diseases* (ICD–9) (12). In addition to specifying that ICD–9 be used, WHO also recommends how the data should be tabulated to promote international comparability. The recommended system for tabulating data in ICD–9 allows countries to construct their mortality and morbidity tabulation lists from the rubrics of the WHO Basic Tabulation List (BTL) if the rubrics from the WHO mortality and morbidity lists, respectively, are included. This tabulation system for the Ninth Revision is more flexible than that of the Eighth Revision, in which specific lists were recommended for tabulating mortality and morbidity data.

The BTL recommended under the Ninth Revision consists of 57 two-digit rubrics that when added equal the "all causes" total. Identified within each two-digit rubric are up to nine three-digit rubrics that are numbered from zero to eight and whose total does not equal the two-digit rubric. The two-digit BTL rubrics 01–46 are used for the tabulation of nonviolent deaths according to ICD categories 001–799. Rubrics relating to chapter 17 (nature-of-injury causes 47–56) are not used by NCHS for selecting underlying cause of death; rather, preference is given to rubrics E47–E56. The 57th two-digit rubric VO is the Supplementary Classification of Factors Influencing Health Status and Contact with Health Services and is not appropriate for the tabulation of mortality data. The WHO Mortality List, a subset of the titles contained in the BTL, consists of 50 rubrics that are the minimum necessary for the national display of mortality data.

Five lists of causes have been developed for tabulation and publication of mortality data in this volume—the Each-Cause List, List of 282 Selected Causes of Death, List of 72 Selected Causes of Death, List of 61 Selected Causes of Infant Death, and List of 34 Selected Causes of Death. These lists were designed to be as comparable as possible with the NCHS lists more recently used under the Eighth Revision. However, complete comparability could not always be achieved.

The Each-Cause List is made up of each three-digit category of the WHO Detailed List to which deaths may be validly assigned and most four-digit subcategories. The list is used for tabulation for the entire United States. The published Each-Cause table does not show the four-digit subcategories provided for Motor vehicle accidents (E810–E825); however, these subcategories that identify persons injured are shown in the accident tables of this report (section 5). Special fifth-digit subcategories also are used in the accident tables to identify place of accident when deaths from nontransport accidents are shown. These are not shown in the Each-Cause table.

The List of 282 Selected Causes of Death is constructed from BTL rubrics 01–46 and E47–E56. Each of the 56 BTL two-digit titles can be obtained either directly or by combining titles in the List. The three-digit level of the BTL is modified more extensively. Where more detail was desired, categories not shown in the three-digit rubrics were added to the List of 282 Selected Causes of Death. Where less detail was needed, the three-digit rubrics were combined. Moreover, each of the 50 rubrics of the WHO Mortality List can be obtained from the List of 282 Selected Causes of Death.

The List of 72 Selected Causes of Death was constructed by combining titles in the List of 282 Selected Causes of Death. It is used in tables published for the United States, for each State, and for metropolitan statistical areas.

The List of 61 Selected Causes of Infant Death shows more detailed titles for Congenital anomalies and Certain conditions originating in the perinatal period than any other list except the Each-Cause List.

The List of 34 Selected Causes of Death was created by combining titles in the List of 72 Selected Causes. A table using this list is published for detailed geographic areas.

Beginning with data for 1987, changes were made in these lists to accommodate the introduction in the United States of new category numbers *042–*044 for Human immunodeficiency virus (HIV) infection. The changes are described in the Technical Appendix from *Vital Statistics for the United States, 1987.*

Effect of list revisions—The International Lists or adaptations of them, used in the United States since 1900, have been revised approximately every 10 years so the disease classifications may be consistent with advances in medical science and with changes in diagnostic practice. Each revision of the International Lists has produced some break in comparability of cause-of-death statistics. Cause-of-death statistics beginning with 1979 are classified by NCHS according to the ICD–9 (12). For a discussion of each of the classifications used with death statistics since 1900, see *Vital Statistics of the United States, 1979*, Volume II, Mortality, Part A, section 7, pages 9–14.

A dual coding study was undertaken in which the Ninth and the Eighth Revisions were compared to measure the extent of discontinuity in cause-of-death statistics resulting from introducing the new Revision. A study for the List of 72 Selected Causes of Death and the List of 10 Selected Causes of Infant Death has been published (13). The List of 10 Selected Causes of Infant Death is a basic NCHS tabulation list not used in this volume but used for provisional data in the *Monthly Vital Statistics Report*, another NCHS publication. Comparability studies were also undertaken between the Eighth and Seventh, Seventh and Sixth, and Sixth and Fifth Revisions. For additional information about these studies, see the Technical Appendix from *Vital Statistics for the United States, 1979.*

Significant coding changes under the Ninth Revision—Since the implementation of ICD–9 in the United States, effective with mortality data for 1979, several coding changes have been introduced. The more important changes are discussed as follows. In early 1983, a change that affected data from 1981 to 1986 was made in the coding of acquired immunodeficiency syndrome (AIDS) and HIV infection. Also effective with data year 1981 was a coding change for poliomyelitis. For data year 1982, the definition of child was changed (which affects the classification of deaths to a number of categories, including Child battering and other maltreatment), and guidelines for coding deaths to the category Child battering and other maltreatment (ICD category number E967) were

changed also. During the calendar year 1985, detailed instructions for coding motor vehicle accidents involving all-terrain vehicles (ATV's) were implemented to ensure consistency in coding these accidents. Effective with data year 1986, "primary" and "invasive" tumors, unspecified, were classified as "malignant"; these neoplasms had been classified to Neoplasms of unspecified nature (ICD–9 category number 239).

Beginning with data for 1987, NCHS introduced new category numbers *042–*044 for classifying and coding HIV infection, formerly referred to as human T-cell lymphotropic virus-III/lymphadenopathy associated virus (HTLV-III/LAV) infection. The asterisk appearing before the category numbers indicates these codes are not part of ICD–9. Also changed effective with data year 1987 were coding rules for the conditions "dehydration" and "disseminated intravascular coagulopathy." Effective with data year 1988, minor content changes were made to the classification for HIV infection. Detailed discussion of these changes may be found in the technical appendix for previous volumes.

Coding in 1990—The rules and instructions used in coding the 1990 mortality medical data remained essentially the same as those used for the 1988 and 1989 data.

Medical certification—The use of a standard classification list, although essential for State, regional, and international comparison, does not ensure strict comparability of the tabulated figures. A high degree of comparability among areas could be attained only if all records of cause of death were reported with equal accuracy and completeness. The medical certification of cause of death can be made only by a qualified person, usually a physician, a medical examiner, or a coroner. Therefore, the reliability and accuracy of cause-of-death statistics are, to a large extent, governed by the ability of the certifier to make the proper diagnosis and by the care with which he or she records this information on the death certificate.

A number of studies have been undertaken on the quality of medical certification on the death certificate. In general, these have been for relatively small samples and for limited geographic areas. A bibliography prepared by NCHS (14), covering 128 references over 23 years, indicates no definitive conclusions have been reached about the quality of medical certification on the death certificate. No country has a well-defined program for systematically assessing the quality of medical certifications reported on death certificates or for measuring the error effects on the levels and trends of cause-of-death statistics.

One index of the quality of reporting causes of death is the proportion of death certificates coded to the Ninth Revision, Chapter XVI, Symptoms, signs, and ill-defined conditions (ICD–9 category numbers 780–799). Although deaths occur for which it is impossible to determine the underlying cause, this proportion indicates the care and consideration given to the certification 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 1990, a record low of 1.1 percent of all reported deaths in the United States were assigned to this category compared with 1.3 for 1989. However, trends in the percent of deaths assigned to this category vary by age. Although the percent of deaths in this category for all ages combined has generally remained stable since 1980, decreases have occurred for the age group 55–64 years since 1983, for age group 65–74 years since 1982, for age group 75–84 years since 1986, and for 10-year age groups from 15 to 54 years since 1988. Between 1989 and 1990, the percent decreased for all age groups, except for the age group under 1 year of age; the percent for this age group was unchanged.

Automated selection of underlying cause of death—Before data year 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. This system is called "Automated Classification of Medical Entities" (ACME) (15).

Beginning with data year 1990, another computer system was implemented. This system, called "Mortality Medical Indexing, Classification, and Retrieval" (MICAR) (16,17), automates the coding of the multiple causes of death. The MICAR system is a major and logical step forward in the evolution of processing mortality data. MICAR takes advantage of the increasing capabilities of electronic data processing to produce information that is more consistently handled than manually processed information. In addition, MICAR ultimately will provide more detailed information on the conditions reported on the death certificates than is available in the ICD classification (18). In this first year of implementation, only about 5 percent (94,372) of the Nation's death records were multiple cause coded using MICAR with subsequent processing through ACME. This includes at least a portion of the data from the following States: Alabama, Kentucky, Oregon, Rhode Island, and West Virginia. The remainder of the national file was processed by either NCHS or the States using only the ACME system. Tests have been conducted on the comparability of MICAR and manually-coded records. (See "Medical items on the death certificate.")

The ACME system applies the same rules for selecting the underlying cause as would be applied manually by a nosologist; however, under this system, the computer consistently applies the same criteria, thus eliminating intercoder variation in this step of the process.

The ACME computer program requires the coding of all conditions shown on the medical certification. These codes are matched automatically against decision tables that consistently select the underlying cause of death for each record according to the international rules. The decision tables provide the comprehensive relationships among the conditions classified by ICD when applying the rules of selection and modification.

The decision tables were developed by NCHS staff on the basis of their experience in coding underlying causes of death under the earlier manual coding system and as a result of periodic independent validations. These tables periodically are updated to reflect additional new information on the relationship among medical conditions. For data year 1988, these tables were amended to incorporate minor changes to the previously mentioned classification for HIV infection (*042–*044) that originally had been implemented with data year 1987. Coding procedures for selecting the underlying cause of death by using

the ACME computer program, as well as by using the ACME decision tables, are documented in NCHS instruction manuals (15,19,20).

Cause-of-death ranking—Cause-of-death ranking (except for infants) is based on numbers of deaths assigned to categories in the List of 72 Selected Causes of Death and the category Human immunodeficiency virus infection (*042–*044); cause-of-death ranking for infants is based on the List of 61 Selected Causes of Infant Death and HIV infection. HIV infection was added to the list of rankable causes effective with data year 1987.

The group titles Major cardiovascular diseases and Symptoms, signs, and ill-defined conditions from the List of 72 Selected Causes of Death are not ranked; Certain conditions originating in the perinatal period and Symptoms, signs, and ill-defined conditions from the List of 61 Selected Causes of Infant Death are not ranked. In addition, category titles beginning with the words "Other" or "All other" are not ranked to determine the leading causes of death. When one of the titles representing a subtotal is ranked (such as Tuberculosis), its component parts (in this case, Tuberculosis of respiratory system and Other tuberculosis) are not ranked.

Maternal deaths

Maternal deaths are those for which the certifying physician has designated a maternal condition as the underlying cause of death. Maternal conditions are those assigned to Complications of pregnancy, childbirth, and the puerperium (ICD–9 category numbers 630–676). In the Ninth Revision, WHO for the first time defined a maternal death as follows:

> A maternal death is defined 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.

Under the Eighth Revision, maternal deaths were assigned to the category "Complications of pregnancy, childbirth, and the puerperium" (ICDA–8 category numbers 630–678). Although WHO did not define maternal mortality, an NCHS classification rule existed that limited the definition of a maternal death to a death that occurred within a year after termination of pregnancy from any "maternal cause," that is, any cause within the range of ICDA–8 category numbers 630–678. This rule applied only if a duration was given for the condition. If no duration was specified and the underlying cause of death was a maternal condition, the duration was assumed to be within a year and the death was coded by NCHS as a maternal death. The change from an under-1-year limitation for duration used in the Eighth Revision to an under-42-days limitation used in the Ninth Revision did not have much effect on the comparability of maternal mortality statistics. However, comparability was affected by the following classification change. Under the Ninth Revision, maternal causes of death have been expanded to include Indirect obstetric causes (ICD–9 category numbers 647–648). These causes include Infective and parasitic conditions as well as other conditions present in the mother and classifiable elsewhere but that complicate pregnancy, childbirth, and the puerperium, such as Syphilis, Tuberculosis, Diabetes mellitus, Drug dependence, and Congenital cardiovascular disorders.

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. 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.

Race—Beginning with the 1989 data year, NCHS changed the method of tabulating live birth and fetal death data by race from race of child to race of mother. This resulted in a discontinuity in maternal mortality rates by race between 1989 and 1990 and previous years; see section on "Change in tabulation of race data for live births and fetal deaths" under "Infant deaths."

Infant deaths

Age—Infant death is defined as a death under 1 year of age. The term excludes fetal deaths. Infant deaths usually are divided into two categories according to age, neonatal and postneonatal. Neonatal deaths are those that occur during the first 27 days of life; postneonatal deaths are those that occur between 28 days and 1 year of age. Generally, it has been believed that different factors influencing the child's survival predominate in these two periods: Factors associated with prenatal development, heredity, and the birth process were considered dominant in the neonatal period; environmental factors, such as nutrition, hygiene, and accidents, were considered more important in the postneonatal period. Recently, however, the distinction between these two periods has blurred due in part to advances in neonatology, which have enabled more very small premature infants to survive the neonatal period.

Rates—Infant mortality rates shown in sections 2 and 8 are the most commonly used indices 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. This measure is an approximation because some live births will not have been exposed to a full year's risk of dying and some of the infants who die during a year will have been born in the previous year. The error introduced in the infant mortality rate by this inexactness is usually small, especially when the birth rate is relatively constant from year to year (21,22). Other sources of error in the infant mortality rate have been attributed to differences in applying the definitions for infant death and fetal death when registering the event (23,24).

In contrast to infant mortality rates based on live births, infant death rates shown in section 1 are based on the estimated population under 1 year of age. Infant death rates, which appear in tabulations of age-specific death rates, are calculated by dividing the number of infant deaths in a calendar year by the estimated midyear population of persons under 1 year of age

and are presented as rates per 100,000 population in this age group. Patterns and trends in the infant death rate may differ somewhat from those of the more commonly used "infant mortality rate," mainly because of differences in the nature of the denominator and in the time reference. Whereas the population denominator for the infant death rate is estimated using data on births, infant deaths, and migration for the 12-month period of July–June, the denominator for the infant mortality rate is a count of births occurring during the 12 months of January–December. The difference in the time reference can result in different trends between the two indices during periods when birth rates are moving up or down markedly.

The infant death rate also is subject to greater imprecision than is the infant mortality rate because of problems of enumerating and estimating the population under 1 year of age (24).

Change in tabulation of race data for live births and fetal deaths—Beginning with the 1989 data year, NCHS changed the method of tabulating live birth and fetal death data by race from race of child to race of mother. This results in infant, fetal, perinatal, and maternal mortality rates for 1989 that are not comparable with those published for previous years, because live births comprise the denominator of these rates. To facilitate continuity and ease of interpretation, key published tables for 1989 and 1990, including all trend tables, will show data computed on the basis of live births and fetal deaths tabulated by both race of mother and race of child. This will make it possible to distinguish the effects of this change from real changes in the data.

As in previous years, race for infant and maternal deaths (the numerator of the rate) is tabulated by the race of the decedent. For fetal and perinatal mortality rates, the numerator and the denominator of the rates are affected because the change to race of mother affects fetal deaths and live births.

As noted in detail in the Technical Appendix from *Vital Statistics of the United States, 1989*, Volume I, Natality, data on live births and fetal deaths are tabulated by the race of the mother. When the race of the mother is unknown, the race of the mother is assigned to the father's race; when information for both parents is missing, the race of the mother is assigned to the specific race of the mother of the preceding record with known race. In previous years, birth and fetal death tabulations were calculated by race of child as determined statistically by an algorithm based on information reported for the mother and father. In cases of mixed parentage where only one parent was white, the child was assigned to the other parent's race. When neither parent was white, the child was assigned the race of the father, except if either parent was Hawaiian, the child was assigned to Hawaiian. If race was not reported for one parent, the child was assigned the race of the parent for whom race was given.

The change in the tabulation of live births and fetal deaths by race reflects three factors over the past two decades: the topical content of the birth certificate has been expanded to include considerable health and demographic information related to the mother, the increasing incidence of interracial parentage, and the growing proportion of births for which the race of the father is not reported.

Quantitatively, the change in the basis for tabulating live births and fetal deaths by race results in more white births and fetal deaths and fewer to the black population and to other races. Consequently, infant, fetal, perinatal, and maternal mortality rates under the new classification tend to be lower for white infants and higher for infants of other races (table A). In general, discontinuities are larger for infant and maternal mortality rates, where only the denominator of the rate is affected by the change, than for fetal and perinatal mortality rates, where the numerator and the denominator are affected. For some minority race groups, the effect of the change is quite large.

The change in the race classification of live births and fetal deaths presents challenges to those analyzing infant, fetal, perinatal, and maternal mortality data, particularly trend data. To facilitate analysis of infant mortality by race, reports will be prepared showing historic data tabulated by race of mother.

Comparison of race data from birth and death certificates—Regardless of whether vital events are tabulated by race of mother or by race of child, inconsistencies exist in reporting race for the same infant between birth and death certificates, based on results of studies in which race on the birth and death certificates for the same infant were compared (25).

These reporting inconsistencies can result in systematic biases in infant mortality rates by specified race, in particular, underestimates for specified races other than white or black. In the computation of race-specific infant mortality rates published in *Vital Statistics of the United States*, the race item for the numerator comes from the death certificate, and for the denominator, from the birth certificate. Biases in the rates may arise

Table A. Ratio of infant, neonatal, postneonatal, maternal, and perinatal mortality rates with race for live births tabulated according to race of mother to those with race for live births tabulated according to race of child: United States, 1990

Race	Infant deaths	Neonatal deaths	Postneonatal deaths	Maternal deaths	Fetal deaths	Perinatal definition		
						I	II	III
All races	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
White	0.99	0.98	1.00	1.00	1.00	0.99	0.98	0.99
Black	1.06	1.06	1.05	1.00	1.02	1.04	1.04	1.04
American Indian	1.26	1.26	1.26	*	1.06	1.13	1.13	1.12
Chinese	1.08	1.04	1.09	*	1.00	1.00	1.04	1.04
Japanese	1.20	1.19	*	*	0.96	1.02	1.04	1.03
Hawaiian	1.44	1.42	1.46	*	1.04	1.16	1.21	1.19
Filipino	1.03	1.06	1.09	*	1.00	1.04	1.03	1.03
Other Asian	1.10	1.06	1.05	*	1.03	1.03	1.06	1.06
Other races	*	*	*	*	1.23	1.25	1.24	1.23

Table B. Infant mortality rates by race of mother for the period 1985–87 and for birth cohorts, 1985–87; and ratio of birth cohort to period rates: United States

[Rates per 1,000 live births in specified groups]

Race	Period rate 1985–87	Birth cohort rate 1985–87	Ratio cohort/ period rates
All races	10.4	10.1	0.97
White	8.8	8.5	0.97
Black	18.9	18.2	0.96
American Indian	12.2	13.3	1.09
Chinese	5.5	6.0	1.09
Japanese	5.3	6.6	1.25
Filipino	5.1	7.2	1.41
Other Asian and Pacific Islander	7.0	8.3	1.19

NOTE: Births for race not stated are not distributed.

because of possible inconsistencies in reporting race on these two vital records. Race of the mother and father is reported on the birth certificate by the mother at the time of delivery; whereas race of the deceased infant is reported on the death certificate by the funeral director based on observation or on information supplied by an informant, such as a parent. Previous studies have noted the race for an infant who died and was of a smaller minority race group is sometimes reported as white on the death certificate, but is reported as the minority race group on the birth certificate, resulting, in the aggregate, in understatement of infant mortality for smaller race groups (25).

Estimates can be made of the degree of bias in race-specific infant mortality rates by comparing rates for birth cohorts based on the newly available linked birth and infant death data set (26,27) with period rates based on mortality data published in *Vital Statistics of the United States* for the same year(s).

The comparison of cohort and period rates is somewhat affected by small differences in the events included in the numerators of the two rates. The numerator of the cohort rate is comprised of infant deaths to the cohort of infants born in a calendar year whereas the numerator of the period rate is comprised of infant deaths occurring in the calendar year.

Based on data comparing infant mortality rates from the linked data set for the birth cohorts of 1985–87 with period rates constructed for 1985–87, bias in the rates for the two major race groups—white and black—is small (table B). However, cohort rates for the smaller race groups are estimated to be higher than period rates by 9 to 41 percent. Cohort rates have not been adjusted to reflect the approximately 2 percent of infant death records that were not linked to their corresponding birth records. Because of systematic understatement of infant mortality rates based on period data, data from the national linked files should be used to measure infant mortality for races other than black and white. For the major race groups, period data are a close approximation of the rates based on linked files.

Hispanic origin—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 45 States, New York State (excluding New York City), and the District of Columbia. In computing infant mortality rates, deaths and live births of unknown origin are not distributed among the specified Hispanic and non-Hispanic groups. Because the percent of infant deaths of unknown origin for 1990 was 1.6 percent and the percent of live births of unknown origin was 1.0 percent, infant mortality rates by specified Hispanic origin and race for non-Hispanic origin are slightly underestimated.

Caution should be exercised when comparing infant mortality rates among the Hispanic populations (especially Puerto Ricans) and non-Hispanic populations for 1990. Because the percent unknown origin for all ages for New York City was about 19 percent on a place-of-occurrence basis, infant mortality data for New York City was excluded from tables 2-22–2-25. The percent unknown origin on a place-of-residence basis for infant deaths for New York City for 1990 was about 28 percent (about 5 percent for live births). Also, because New York City accounted for about 33 percent of the live births to Puerto Ricans in the United States in 1990, excluding the data

Table C. Infant mortality rates by specified Hispanic origin and race for non-Hispanic origin for three methods of allocating "unknown origins": Total of 45 States, New York State (including and excluding New York City), and the District of Columbia, 1990

[Rate per 1,000 live births in specific group]

Method and area	All origins	Hispanic					Non-Hispanic		
		Total	Mexican	Puerto Rican	Cuban[1]	Other Hispanic	Total[2]	White	Black
No allocation									
45 States, New York (excluding New York City), D.C.	9.1	7.8	7.7	10.2	7.6	7.2	9.3	7.4	17.9
45 States, New York (including New York City), D.C.	9.2	7.7	7.7	8.7	7.2	7.2	9.3	7.4	17.7
Proportional allocation of all areas combined									
45 States, New York (excluding New York City), D.C.	9.1	7.8	7.8	10.3	7.6	7.2	9.4	7.5	18.0
45 States, New York (including New York City), D.C.	9.2	7.8	7.8	8.8	7.4	7.4	9.5	7.6	18.1
Proportional allocation for each area and summed									
45 States, New York (excluding New York City), D.C.	9.1	7.8	7.8	10.3	7.6	7.2	9.4	7.5	18.1
45 States, New York (including New York City), D.C.	9.2	7.9	7.7	9.4	7.3	7.7	9.5	7.5	18.3

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

for New York City may have an impact on infant mortality rates for the Hispanic population, especially for Puerto Ricans.

Table C shows the effects of including and excluding infant deaths and live births for New York City for 1990 in the infant mortality rates for the total area using three methods. The three methods are as follows: (a) No allocation of infant deaths (or live births), (b) proportional allocation of infant deaths (and live births) for all geographic areas combined, and (c) proportional allocation of infant deaths (and live births) for each geographic area separately and then combined for the total area.

Proportional allocation assumes that the percent distribution of deaths (and live births) of unknown origin is the same as for deaths (and live births) of known origin.

Method c is believed to be the best method for comparing the impact of including or excluding data for New York City, because of geographic variation in the race and ethnic composition of the population. For method c and using the rates excluding New York City as the base, the difference in infant mortality rates is no greater than 1 percent between including and excluding New York City for all origins, total Hispanic, Mexican, total non-Hispanic, non-Hispanic white, and non-Hispanic black. However, the difference is about 10 percent for Puerto Ricans, 7 percent for Other Hispanic, and 4 percent for Cubans. It is unclear whether including or excluding New York City data produces the better rates.

In addition, as discussed above for specified races, period infant mortality rates for specific Hispanic-origin groups tend to be underestimated when compared with rates based on the national linked birth and infant death data set as shown in table D. Comparisons also are affected by the approximate 2 percent of infant death records that are not linked to the corresponding birth records.

Caution should be exercised when generalizing from the ratios of cohort-to-period rates for 1986–87 with data for 1990, because the area for Hispanic data has expanded from 18 States and the District of Columbia in 1986–87 to 45 States, New York State (excluding New York City), and the District of Columbia in 1990. The Hispanic area for 1986–87 included Arizona, Arkansas, California, Colorado, District of Columbia, Georgia, Hawaii, Illinois, Indiana, Kansas, Mississippi, Nebraska, New Jersey, New York, North Dakota, Ohio, Texas, Utah, and Wyoming.

Table D. Infant mortality rates by specified Hispanic origin of mother and race of mother for mothers of non-Hispanic origin for the period 1986–87 and birth cohorts 1986 and 1987 combined; and ratio of birth cohort to period rates: Total of 18 reporting States and the District of Columbia

[Rates per 1,000 live births in specified group. Figures for origin not stated included in "All origins" but not distributed among origin groups]

Origin	Period rate 1986–87	Birth cohort rate 1986–87	Ratio cohort/ period rates
All origins	10.1	9.7	0.96
Hispanic total	8.0	8.3	1.04
Mexican	7.6	7.9	1.04
Puerto Rican	7.9	10.9	1.37
Cuban	6.5	7.9	1.22
Other Hispanic[1]	9.1	8.3	0.91
Non-Hispanic total[2]	9.9	9.9	1.00
Non-Hispanic white	8.3	8.2	0.99
Non-Hispanic black	17.5	17.7	1.01

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

Small numbers of infant deaths for specific Hispanic-origin groups can result in infant mortality rates subject to relatively large random variation (see "Random variation in numbers of deaths, death rates, and mortality rates and ratios."

Tabulation list—Causes of death for infants are tabulated according to a list of causes that is different from the list of causes for the population of all ages, except for the Each Cause List. (See "Cause-of-death classification" under "Cause of death.")

California—From 1985 to 1988, data on age at death for California were biased in the categories 1–23 hours and 1 day because of processing errors that affected selected infants who died within 24 hours after birth. Specifically, some infants who died within 1–23 hours of birth were erroneously coded as dying at 1 day after birth. The effect of these errors on national data for the years 1985–88 shown in table 2-4 is negligible. The problem was identified and corrected for 1989 and subsequent years.

Fetal deaths

In May 1950, WHO recommended the following definition of fetal death be adopted for international use:

> Death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy; the death is indicated by the fact that after such separation, the fetus does not breathe or show any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles (28).

The term "fetal death" was defined on an all-inclusive basis to end confusion arising from the use of such terms as stillbirth, spontaneous abortion, and miscarriage.

Shortly thereafter, this definition was adopted by NCHS as the nationally recommended standard. All registration areas except Puerto Rico have definitions similar to the standard definition (29). Puerto Rico has no formal definition.

As another step toward increasing comparability of data on fetal deaths for different countries, WHO recommended that for statistical purposes fetal deaths be classified as early, intermediate, and late. These groups are defined as follows:

Less than 20 completed weeks of gestation (early fetal deaths) ..... Group I

20 completed weeks of gestation but less than 28 (intermediate fetal deaths) ..... Group II

28 completed weeks of gestation and over (late fetal deaths) ..... Group III

Gestation period not classifiable in groups I, II, and III ..... Group IV

As shown in table 3-11, Group IV consists of fetal deaths with gestation not stated but presumed to be 20 weeks or more.

Until 1939, the nationally recommended procedure for registration of a fetal death required the filing of a live-birth certificate and a death certificate. In 1939, a separate Standard Certificate of Stillbirth (fetal death) was created to replace the former procedure. This was revised in 1949, 1956, 1968, 1978, and 1989. The 1989 U.S. Standard Report of Fetal Death is shown in figure 7-B.

The 1977 revision of the *Model State Vital Statistics Act and Model State Vital Statistics Regulations* (30) recommended spontaneous fetal deaths at a gestation of 20 weeks or more or a weight of 350 grams or more and all induced terminations of pregnancy regardless of gestational age be reported and further be reported on separate forms. These forms should be considered legally required statistical reports rather than legal documents.

Beginning with fetal deaths reported in 1970, procedures were implemented that attempted to separate reports of spontaneous fetal deaths from those of induced terminations of pregnancy. These procedures were implemented because the health implications of spontaneous fetal deaths are different from those of induced terminations of pregnancy. These procedures are still used.

Comparability and completeness of data—Registration area requirements for reporting fetal deaths vary. Most of the areas require reporting of fetal death at gestations of 20 weeks or more. Table E shows the minimum period of gestation required by each State to report fetal death. Substantial evidence exists that indicates some fetal deaths for which reporting is required are not reported (31).

Underreporting of fetal deaths is most likely to occur in the earlier part of the required reporting period for each State. Thus, for States requiring reporting of all periods of gestation, fetal deaths occurring at younger gestational ages are less completely reported. The reporting of fetal deaths at 20–23 weeks of gestation may be more complete for those States that report fetal deaths at all periods of gestation than for others.

To maximize the comparability of data by year and by State, most of the tables in section 3 are based on fetal deaths occurring at gestations of 20 weeks or more. These tables also include fetal deaths for which gestation is not stated for those States requiring reporting at 20 weeks or more gestation only. Beginning with 1969, fetal deaths of not stated gestation were excluded for States requiring reporting of all products of conception except for those with a stated birthweight of 500 grams or more. In 1990, this rule was applied to the following States: Georgia, Hawaii, New York (including New York City), Rhode Island, and Virginia. Each year, there are exceptions to this procedure.

Arkansas—Since 1971, Arkansas has been using two reporting forms for fetal deaths: A confidential Spontaneous Abortion form that is not sent to NCHS and a Fetal Death Certificate that is. During the period 1971–80, it is believed that most spontaneous fetal deaths of less than 20 weeks' gestation were reported on the confidential form and, therefore, were not reported to NCHS. During the period 1981–83, Arkansas specified that fetal deaths of less than 28 weeks' gestation or weighing less than 1,000 grams could be reported on the confidential form; beginning with 1984 data, the State specified that fetal deaths of 20 weeks' gestation or weighing 500 grams be reported on the Fetal Death Certificate. Because of these changes, the comparability of counts of early fetal deaths may be affected. In particular, counts of fetal deaths at 20 to 27 weeks for 1981–83 were not comparable between Arkansas and other reporting areas or with Arkansas data for 1984–90. It is believed that reporting has improved but is still not comparable with data for 1980 and earlier years.

Colorado—Although Colorado State law requires reporting fetal deaths of all periods of gestation, beginning in 1989 the State provides to NCHS only data for fetal deaths of 20 weeks' gestation or more.

Maine—Maine uses two reporting forms for fetal deaths: A Report of Abortion (Spontaneous and Induced) and a Report of Fetal Death. Most spontaneous fetal deaths at less than 20 weeks' gestation are reported on the Report of Abortion, and, therefore, are excluded from fetal death counts in this volume.

Maryland—From the counts of frequencies by month, it appears that not all fetal deaths occurring in the first quarter of 1989 were reported. This may account in part for the lower number of fetal deaths and fetal mortality rates for Maryland for 1989 relative to 1990.

Wisconsin—Beginning in 1986, Wisconsin changed its reporting requirements for spontaneous fetal deaths from "20 weeks" to "20 weeks or 350 grams."

Revised Report of Fetal Death for 1989—Beginning with data for 1989, new items were added to the U.S. Standard Report of Fetal Death, including Hispanic origin of the mother and father, medical and other risk factors of pregnancy, obstetric procedures, and method of delivery. In addition, questions on complications of labor and/or delivery and congenital anomalies of fetus were changed from an open-ended question to a checkbox format to ensure more complete reporting of information. However, because of differences in implementation dates of the new fetal death report for reporting States, and because of inexperience in reporting and processing the new items, reporting of the new items in individual States may be incomplete for 1990. The data quality and completeness of many of these items are being evaluated.

The tabulation of items in the fetal death section is limited to those States whose reporting is sufficiently complete. For fetal deaths, data are published when a State has a response for the item on at least 20 percent of the records.

Period of gestation—The period of gestation is the number of completed weeks elapsed between the first day of the last normal menstrual period (LMP) and the date of delivery. The first day of 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 LMP. Data on period of gestation are computed from information on "date of delivery" and "date last normal menses began." If "date last normal menses began" is not on the record or if the calculated gestation falls beyond a duration considered biologically plausible, the "Physician's estimate of gestation" is used.

To improve data quality, beginning with data for 1989, NCHS instituted a new computer edit to check for consistency between gestation and birthweight (32). Briefly, if LMP gestation is inconsistent with birthweight, and the physician's esti-

Table E. Period of gestation at which fetal-death reporting is required: Each reporting area, 1990

Area	All periods of gestation	16 weeks	20 weeks	20 weeks or 350 grams	20 weeks or 400 grams	5 months	350 grams	500 grams
Alabama			X					
Alaska			X					
Arizona			[1]X					
Arkansas	[2]X							
California			X					
Colorado	[2]X							
Connecticut			X					
Delaware			X					
District of Columbia						X		
Florida			X					
Georgia	X							
Hawaii	X							
Idaho				X				
Illinois			X					
Indiana			X					
Iowa			X					
Kansas								X
Kentucky				X				
Louisiana				X				
Maine	[2]X							
Maryland			[3]X					
Massachusetts				X				
Michigan					X			
Minnesota			X					
Mississippi				X				
Missouri				X				
Montana			X					
Nebraska			X					
Nevada			X					
New Hampshire				X				
New Jersey			X					
New Mexico								X
New York								
New York excluding New York City	X							
New York City	X							
North Carolina			X					
North Dakota			X					
Ohio			X					
Oklahoma			X					
Oregon			[4]X					
Pennsylvania		X						
Rhode Island	X							
South Carolina				X				
South Dakota								
Tennessee								[5]X
Texas			X					
Utah			X					
Vermont			[6]X					
Virginia	X							
Washington			X					
West Virginia			X					
Wisconsin				X				
Wyoming			X					
Puerto Rico							X	
Virgin Islands	X							
Guam			X					

[1] If gestational age is unknown, weight of 350 grams or more.
[2] Although State law requires the reporting of fetal deaths of all periods of gestation, only data for fetal deaths of 20 weeks or more gestation are provided to NCHS.
[3] If gestational age is unknown, weight of 500 grams or more.
[4] If gestational age is unknown, weight of 400 grams or more, or crown-heel length of 28 centimeters or more.
[5] If weight is unknown, 22 completed weeks' gestation or more.
[6] If gestational age is unknown, weight of 400 or more grams, 15 or more ounces.

mate is consistent, the physician's estimate is used; if both are inconsistent, LMP gestation is used, and birthweight is assigned to unknown. When the period of gestation is reported in months on the report, it is allocated to gestational intervals in weeks as follows:

1–3 months to under 16 weeks
4 months to 16–19 weeks
5 months to 20–23 weeks
6 months to 24–27 weeks
7 months to 28–31 weeks
8 months to 32–35 weeks
9 months to 40 weeks
10 months and over to 43 weeks and over

All areas except Puerto Rico reported LMP, and all areas except California, the District of Columbia, Louisiana, Maryland, and Oklahoma reported physician's estimate of gestation. Nebraska also was excluded because of the large proportion of unknown.

Birthweight—Most of the 55 registration areas do not specify how weight should be given, that is, in pounds and ounces or in grams. In the tabulation and presentation of birthweight data, the metric system (grams) has been used to facilitate comparison with other data published in the United States and internationally. Birthweight specified in pounds and ounces is assigned the equivalent of the gram intervals, as follows:

Less than 350 grams	= 0 lb 12 oz or less
350–499 grams	= 0 lb 13 oz–1 lb 1 oz
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 14 oz–9 lb 14 oz
4,500–4,999 grams	= 9 lb 15 oz–11 lb 0 oz
5,000 grams or more	= 11 lb 1 oz or more

With the introduction of ICD–9, the birthweight classification intervals for perinatal mortality statistics were shifted downward by 1 gram as shown above. Previously, the intervals were, for example, 1,001–1,500, 1,501–2,000, and so forth. Beginning in 1989, NCHS instituted a consistency check between birthweight and gestation; see previous section on gestation.

Race—Beginning with data for 1989, NCHS changed the method of tabulating fetal death, perinatal, and live birth data by race from race of child to race of mother. This has resulted in a discontinuity in fetal mortality rates by race between 1989 and 1990 relative to previous years; see "Change in tabulation of race data for live births and fetal deaths" under "Infant deaths."

Hispanic origin of mother—Fetal mortality data for the Hispanic-origin population are based on fetal deaths to mothers of Hispanic origin who were residents of those States and the District of Columbia that included items on the report of fetal death to identify Hispanic or ethnic origin of mother. Data for 1990 were obtained from 44 States and the District of Columbia; areas not supplying data were Louisiana, Maryland, Massachusetts, New Hampshire, Oklahoma, and Rhode Island.

For 1990, fetal and perinatal mortality data in table 3-19 are for 44 States and the District of Columbia and tables 3-20, 4-6, and 4-7 are for 36 States and the District of Columbia that had an item on Hispanic or ethnic origin on the death certificate, birth certificate, and report of fetal death and whose data for all three files were at least 90 percent complete on a place-of-occurrence basis and considered to be sufficiently comparable to be used for analysis. The States included are Alabama, Alaska, Arizona, Arkansas, California, Colorado, Delaware, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Jersey, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, West Virginia, Wisconsin, and Wyoming.

The 36 States and the District of Columbia for which fetal and perinatal data by Hispanic origin are shown accounted for about 81 percent of the Hispanic population in 1990, including 93 percent of the Mexican population, 45 percent of the Puerto Rican population, 88 percent of the Cuban population, and 65 percent of the "Other Hispanic" population (10). Accordingly, caution should be exercised in generalizing mortality patterns from the reporting area to the Hispanic-origin population (especially Puerto Ricans) of the entire United States. (See also "Hispanic origin" under "Classification of Data").

Total-birth order—Total-birth order refers to the sum of live births and other terminations (including spontaneous fetal deaths and induced terminations of pregnancy) a woman has had, including the fetal death being recorded. For example, if a woman has given birth to two live babies and to one born dead, the next fetal death to occur is counted as number four in total-birth order.

Beginning with implementation of the 1989 revision of the U.S. Standard Report of Fetal Death, total-birth order is calculated from three items on pregnancy history: number of previous live births now living; number of previous live births now dead; and number of other terminations (spontaneous and induced at anytime after conception). For prior years, total-birth order was calculated from four items, see the Technical Appendix from *Vital Statistics of the United States, 1988*, Volume II, Mortality, Part A.

Although all registration areas use the two standard items pertaining to number of previous live births, registration areas phrase the item on pertaining to other terminations of pregnancy differently. Total-birth order for all areas is calculated from the sum of available information. Thus, information on total-birth order may not be completely comparable among the registration areas. In addition, there may be substantial underreporting of other terminations of pregnancy on the fetal death report.

Marital status—Table 3-3 shows fetal deaths and fetal-death rates by mother's marital status. The following States were excluded from this table because their reports of fetal death did not include an item on marital status: California, Connecticut, Maryland, Michigan, Nevada, New York (including New York City), Ohio, and Texas. Because live births comprise the denominator of the rate, marital status must be reported for mothers of live births also. Marital status of the mother of the live birth is inferred for States that did not report it on the birth certificate.

Beginning with data for 1989, fetal deaths reports with marital status not stated are shown as not stated in frequencies, but are proportionally distributed for rate computations into either the married or unmarried categories according to the percent of fetal death reports with stated marital status that fall into each category for the reporting States. Before 1989, fetal death reports with not-stated marital status were assigned to the married category. Because of this change, fetal death frequencies and rates by marital status for 1989 and 1990 are not strictly comparable with those for previous years.

No quantitative data exist on the characteristics of unmarried women who do not report, misreport their marital status, or fail to register fetal deaths. Underreporting may be greater for the unmarried group than for the married group.

Age of mother—Beginning with data for 1989, the U.S. Standard Report of Fetal Death asks for the mother's date of birth. Age of mother is computed from the mother's date of birth and the date of the termination of the pregnancy. For those States whose certificates do not contain an item for the mother's date of birth, reported age of the mother (in years) is used. The age of the mother is edited in NCHS for upper and lower limits. When mothers are reported to be under 10 years of age or 50 years of age and over, the age of the mother is considered not stated and is assigned as follows: Age on all fetal-death records with age of mother not stated is assigned according to the age appearing on the record previously processed for a mother of identical race and having the same total-birth order (total of live births and other terminations).

Sex of fetus—Beginning with data for 1989, for all fetal deaths of 20 or more weeks gestation, not-stated sex of fetus is assigned the sex of the fetus from the previous record. Before 1989, no such assignment was made.

Plurality—All registration areas except Louisiana report the plurality of the fetus. Although Louisiana has not reported this item for many years, prior to 1989, data for Louisiana was erroneously converted to a plurality of 1 (single birth) and included in United States totals. Beginning with 1989 data, Louisiana is excluded from tables reporting plurality of the fetus. For reporting areas, not-stated plurality of the fetus is assigned to single births.

Perinatal mortality

Perinatal definitions—Beginning with data year 1979, perinatal mortality data for the United States and each State have been published in section 4. WHO recommends in ICD–9, "national perinatal statistics should include all fetuses and infants delivered weighing at least 500 grams (or when birthweight is unavailable, the corresponding gestational age (22 weeks) or body length (25 cm crown-heel)), whether alive or dead...." It further recommends, "countries should present, solely for international comparisons, 'standard perinatal statistics' in which both the numerator and denominator of all rates are restricted to fetuses and infants weighing 1,000 grams or more (or, where birthweight is unavailable, the corresponding gestational age (28 weeks) or body length (35 cm crown-heel))." Because birthweight and gestational age are not reported on the death certificate in the United States, NCHS was unable to adopt these definitions. Three definitions of perinatal mortality are used by NCHS: Perinatal Definition I, generally used for international comparisons, which includes fetal deaths of 28 weeks' gestation or more and infant deaths of less than 7 days; Perinatal Definition II, which includes fetal deaths of 20 weeks' gestation or more and infant deaths of less than 28 days; and Perinatal Definition III, which includes fetal deaths of 20 weeks' gestation or more and infant deaths of less than 7 days.

Variations in fetal death reporting requirements and practices have implications for comparing perinatal rates among States. Because reporting is generally sporadic near the lower limit of the reporting requirement, States that require reporting of all products of pregnancy, regardless of gestation, are likely to have more complete reporting of fetal deaths at 20 weeks or more than those States that do not. The larger number of fetal deaths reported for these "all periods" States may result in higher perinatal mortality rates than those rates reported for States whose reporting is less complete. Accordingly, reporting completeness may account, in part, for differences among the State perinatal rates, particularly differences for Definitions II and III, which use data for fetal deaths at 20–27 weeks.

Not stated—Fetal deaths with gestational age not stated are presumed to be of 20 weeks' gestation or more if the State requires reporting of all fetal deaths at a gestational age of 20 weeks or more or the fetus weighed 500 grams or more in those States requiring reporting of all fetal deaths, regardless of gestational age. For Definition I, fetal deaths at a gestation not stated but presumed to have been of 20 weeks or more are allocated to the category 28 weeks or more, according to the proportion of fetal deaths with stated gestational age that falls into that category. For Definitions II and III, fetal deaths at a presumed gestation of 20 weeks or more are included with those at a stated gestation of 20 weeks or more.

The allocation of not-stated gestational age for fetal deaths is made individually for each State, for metropolitan and nonmetropolitan areas, and separately for the entire United States. Accordingly, the sum of perinatal deaths for the areas according to Definition I may not equal the total number of perinatal deaths for the United States.

Race—Beginning with the 1989 data year, NCHS changed the method of tabulating fetal death and live birth data by race from race of child to race of mother. This has resulted in a discontinuity in perinatal mortality rates by race between 1989 and previous years; see "Change in tabulation of race data for live births and fetal deaths" under "Infant deaths."

Hispanic origin—See "Hispanic origin of mother" under "Fetal deaths."

Quality of data

Completeness of registration

All States have adopted laws requiring the registration of births and deaths and the reporting of fetal deaths. It is believed that more than 99 percent of the births and deaths occurring in this country are registered.

Table F. Numbers of deaths and ratios of deaths for selected causes according to Alaska and NCHS, 1990

[Data by place of occurrence include deaths of nonresidents. Numbers after causes of death are category numbers of the *Ninth Revision International Classification of Diseases*, 1975]

Causes	Alaska	NCHS	Ratio Alaska/NCHS
All causes[1]	2,214	2,216	1.00
Symptoms, signs, and ill-defined conditions .780–799	48	54	0.89
Accidents and adverse effects .E800–E949	395	446	0.89
Motor vehicle accidents .E810–E825	118	102	1.16
All other accidents and adverse effects .E800–E807,E826–E949	277	344	0.81
Suicide .E950–E959	122	71	1.72
Homicide and legal intervention .E960–E978	45	31	1.45
All other external causes .E980–E999	2	6	0.33

[1]For two deaths underlying cause of death was not on the 1990 Alaska file sent to NCHS for evaluation.

Reporting requirements for fetal deaths vary from State to State (see "Comparability and completeness of data"). Overall reporting is not as complete for fetal deaths as for births and deaths, but it is believed to be relatively complete for fetal deaths at a gestation of 28 weeks or more. National statistical data on fetal deaths include only fetal deaths occurring at a stated or presumed gestation of 20 weeks or more.

Massachusetts data

The 1964 statistics for deaths exclude approximately 6,000 deaths registered in Massachusetts, primarily to residents of that State. Microfilm copies of these records were not received by NCHS. Figures for the United States and the New England Division are affected also.

Alabama data

The 1988 statistics for deaths show no deaths assigned to the city of Prattville in Autauga County. The death records that should have been assigned to this area were instead assigned to the Balance of county because of a processing error.

Alaska data

Numbers of deaths occurring in Alaska for each of the years 1988–90 are in error for all causes of death combined and for selected causes because NCHS did not receive changes resulting from amended records. An estimate of the effect of these omissions can be derived by comparing NCHS counts of records processed through the VSCP with counts prepared by the State of Alaska as shown in table F. Differences are concentrated among selected causes of death, principally Symptoms, signs, and ill-defined conditions (ICD–9 category numbers 780–799) and external causes. Differences for other categories in the List of 72 Selected Causes of Death and Human immunodeficiency virus infection did not exceed a total of three deaths.

Quality control procedures

Demographic items on the death certificate—As previously indicated, for 1990 the mortality data for these items were obtained from two sources—photocopies of the original certificates furnished by the Virgin Islands and Guam and records on data tape furnished by the 50 States, the District of Columbia, New York City, and Puerto Rico. For the Virgin Islands and Guam, which sent only copies of the original certificates, the demographic items were coded for 100 percent of the death certificates. The demographic coding for 100 percent of the certificates was independently verified.

As part of the quality control procedures for mortality data, each registration area goes through a calibration period, during which it must achieve the specified error tolerance level of 2 percent per item for 3 consecutive months, based on independent verification by NCHS of a 50-percent sample of that area's records. When the area has achieved the required error tolerance level, a sample of 70–80 records per month is used to monitor quality of coding. All areas providing data on computer tapes before 1990 have achieved the specified error tolerance; accordingly, the demographic items on about 70–80 records per area per month were independently verified by NCHS. The estimated average error rate for all demographic items in 1990 was 0.25 percent.

These verification procedures involve controlling for two types of error (coding and entering into the data record tape) at the same time, and the error rates are a combined measure of both types. It may be assumed that the entering errors are randomly distributed across all items on the record, but this assumption cannot be made as readily for coding errors. Although systematic errors in coding infrequent events may escape detection during sample verification, it is probable some of these errors were detected during the initial period when 50 percent of the file was being verified, thus providing an opportunity to retrain the coders.

Medical items on the death certificate—As is true for demographic data, mortality medical data also are subject to quality control procedures to control for errors of both coding and data entry. Each of the 30 registration areas that furnished NCHS with coded medical information in 1990 according to NCHS specifications had to qualify for sample verification first. During an initial calibration period, the area had to demonstrate that its staff could achieve a specified error tolerance level of less than 5 percent for coding all medical items. After the area had achieved the required error tolerance level, a sample of 70–80 records per month was used to monitor quality of medical coding. For the 30 reporting States, the average coding error rate in 1990 was estimated at just over 4 percent.

For the remaining 20 States, the District of Columbia, New York City, Puerto Rico, the Virgin Islands, and Guam, NCHS coded the medical items for 100 percent of the death records. A 1-percent sample of the records was coded independently for quality control purposes. The estimated average error rate for these areas was about 3 percent.

The ACME system for selecting the underlying cause of death through computer application contributes to the quality control of medical items on the death certificate. (See "Automated selection of underlying cause of death.")

The MICAR system automates the coding of multiple causes of death. The quality of the data produced by MICAR is better than the quality of the data produced using manual multiple cause-of-death coding. The version of MICAR used to process 1990 records processed about 85 percent of the mortality records with an average error rate of 0.42 percent on an underlying-cause basis and a rate of 0.74 percent on a multiple-cause basis.

Demographic items on the report of fetal death—For 1990, all data on fetal deaths, except for New York State (excluding New York City), were coded under contract by the U.S. Bureau of the Census. Coding and entering of information on data tapes were verified on a 100-percent basis because of the relatively small number of records involved.

Other control procedures—After coding and entering on data tape are completed, record counts are balanced against control totals for each shipment of records from a registration area. Editing procedures ensure that records with inconsistent or impossible codes are modified. Inconsistent codes are those, for example, indicating a contradiction between cause of death and age or sex of the decedent. Records so identified during the computer editing process are either corrected by reference to the source record or adjusted by arbitrary code assignment (33). Further, conditions specified on a list of infrequent or rare causes of death are confirmed by the certifier or a State Health Officer. All subsequent operations in tabulating and in preparing tables are verified during the computer processing or by statistical clerks.

Estimates of errors arising from 50-percent sample for 1972

Death statistics for 1972 in this report (excluding fetal-death statistics) are based on a 50-percent sample of all deaths occurring in the 50 States and the District of Columbia. A description of the sample design and a table of the percent errors of the estimated numbers of deaths by size of estimate and total deaths in the area are shown in the Technical Appendix from *Vital Statistics of the United States, 1972*, Volume II, Mortality, Part A.

Computation of rates and other measures

Population bases

The population bases from which death rates shown in this report are computed are 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 for those years. Rates for all other years use the estimated midyear (July 1) population. Death 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 populations of the birth- and death-registration States for 1900–32, and of the United States for 1900–90, and revised populations for 1981–89 are shown in table 7-1. In addition, the population including Armed Forces abroad is shown for the United States. Table G lists the sources for these populations.

Table G. Source for resident population and population including Armed Forces abroad: Birth- and death-registration States, 1900–32, and United States, 1900–90

Year	Source
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.
1989	U.S. Bureau of the Census, *Current Population Reports*, Series P-25, No. 1057, 1990.
1988	U.S. Bureau of the Census, *Current Population Reports*, Series P-25, No. 1045, 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*, PC80-1A1, 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.
1900–16	Same as for 1920–29.

In 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 (34). 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 and Puerto Rican) as their race. In 1980 and 1990, persons of unspecified race were allocated to one of the four tabulated racial groups (white, black, American Indian, Asian and Pacific Islander) based on their responses to the Hispanic origin question. These four race categories conform with OMB Directive 15 and are more consistent with the race categories in vital statistics.

In 1980, the allocation of unspecified race was determined 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-race-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. Thus, allocation proportions were established at the State level and were used to distribute the non-Hispanic persons of "Other" race in the 100-percent tabulations.

In 1990, the race modification procedure was implemented using individual census records. Persons whose race could not be specified were assigned to a racial category using a pool of "race donors" that consisted of persons of specified race who had the identical responses to the Hispanic origin question and who were within the auspices of the same census District Office. As in the 1980 census, it appeared that the underlying assumption made in the 1990 census was that the Hispanic origin response was the major criterion for allocating race. Unlike those responding to the 1980 census who could be assigned only to the racial groups white or black, persons of Hispanic origin, including Mexican, responding to the 1990 census could be assigned to any racial group. Also, in the 1990 census, 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 for 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 three quarters had age equal 1979 minus year of birth.

In 1990, quarter year of birth was not requested on the census form, so direct determination of age from year of birth was not possible. In 1990 census publications, age is based on respondents' direct reports of age at last birthday. This definition proved inadequate for postcensal estimates as it was apparent that many respondents had reported their age at time of either completion of the census form or interview by an enumerator that could occur several months after the April 1 reference data. As a result, age was biased upward. For most respondents, modification was based on a respecification of age, 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 had provided the elimination of spurious year-of-birth reports in the census data before modification occurred.

Population for 1990—The population of the United States enumerated by age, race, and sex for 1990 is shown in table 7-2, and the population for each State by broad age groups follows in table 7-3. The figures have been modified as described.

Population estimates for 1981–89—Death rates in this volume for 1981–89 are based on revised populations that are consistent with the 1990 census level (34,35). They are, therefore, not comparable with death rates published in *Vital Statistics of the United States*, Volume II, Mortality, for 1981–89, and in other NCHS publications for those years. The 1990 census counted approximately 1.5 million fewer persons than had been estimated earlier for April 1, 1990.

Populations for 1980—The population of the United States by age, race, and sex, and the population for each State are shown in tables 7-2 and 7-3 of *Vital Statistics of the United States, 1980*, Volume II, Mortality. The figures by race have been modified as described.

Population estimates for 1971–79—Death rates in this volume for 1971–79 used revised population estimates that are consistent with the 1980 census levels. The 1980 census enumerated approximately 5.5 million more persons than had been estimated for April 1, 1980 (36). These revised estimates for the United States by age, race, and sex are published by the U.S. Bureau of the Census in *Current Population Reports*, Series P-25, Number 917. Unpublished revised estimates for States were obtained from the U.S. Bureau of the Census. For Puerto Rico, the Virgin Islands, and Guam, revised estimates are published in *Current Population Reports*, Series P-25, Number 919.

Population estimates for 1961–69—Death rates in this volume for 1961–69 are based on revised estimates of the population and thus may differ slightly from rates published before 1976. The rates shown in tables 1-1 and 1-2, the life table values in table 6-5, and the population estimates in table 7-1 for each year during 1961–69 have been revised to reflect modified population bases as published in the U.S. Bureau of the Census, *Current Population Reports*, Series P-5, Number 519. The data shown in table 1-10 for 1961–69 have not been revised.

Rates and ratios based on live births—Infant and maternal mortality rates and fetal death and perinatal mortality ratios are computed on the basis of the number of live births. Fetal death and perinatal mortality rates are computed on the basis of the number of live births and fetal deaths. Counts of live births are published annually in *Vital Statistics of the United States*, Volume I, Natality.

New Jersey—As previously indicated, data by race are not available for New Jersey for 1962 and 1963. Therefore, for 1962 and 1963 NCHS estimated a population by age, race, and sex that excluded New Jersey for rates shown by race. The methodology used to estimate the revised population excluding New Jersey is discussed in the technical appendixes of the 1962 and 1963 volumes.

Net census undercount

Errors can be introduced into the annual rates as a result of underenumeration of deaths and the misreporting of demographic characteristics. Errors in rates can also result from enumeration errors in the latest decennial census. This is because annual population estimates for the postcensal interval, which are used in the denominator for calculating death rates, are computed using the decennial census count as a base (34). Net census undercount results from the miscounting and misreporting of demographic characteristics such as age. Age-specific death rates are affected by the net census undercount and the misreporting of age on the death certificate (37). To the extent that the net undercount is substantial and that it varies among subgroups and geographic areas, it may have important consequences for vital statistics measures.

Because death rates based on a population adjusted for net census undercount may be more accurate than rates based on an unadjusted population, the possible impact of net census undercount on death rates must be considered. This can be done on a national basis using results of studies conducted by the U.S. Bureau of the Census on the completeness of coverage of the U.S. population (including underenumeration and misstatement of age, race, and sex). Such studies were conducted in the last five decennial censuses—1950, 1960, 1970, 1980, and 1990. From this work have come estimates of the national population that were not counted by age, race, and sex (38–41). The reports for 1990 (unpublished data from the U.S. Bureau of the Census) include estimates of net underenumeration and overenumeration 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, although coverage was improved over previous censuses, there was differential coverage among the population subgroups; that is, some age, race, and sex groups were more completely counted than others.

Because estimates of net census undercount are not available by age, race, and sex for individual States and counties, it is not feasible to adjust for net census undercount when presenting rates in routine tabulations. Nevertheless, it is important to be aware that net census undercounts can affect levels of observed vital rates.

Age, race, and sex—If adjustments were made for net census undercount, the size of denominators of the death rates generally would increase and the rates, therefore, would decrease. The adjusted rates for 1990 can be computed by multiplying the reported rates by ratios of the census-level resident population to the resident population adjusted for the estimated net census undercount (table 7-4). A ratio of less than 1.0 indicates a net census undercount and, when applied, results in a corresponding decrease in the death rate. A ratio greater than 1.0—indicates a net census overcount—and when multiplied by the reported rate results in an increase in the death rate.

Coverage ratios for all ages show that, in general, females were more completely enumerated than males and the white population more completely enumerated than the black population in the 1990 Census of Population. Underenumeration varied by age group for the total population, with the greatest differences found for persons aged 85 years and over. All other age groups were overcounted or undercounted by less than 4.0 percent. Among the age-sex-race groups, underenumeration was highest (13.3 percent) for black males aged 25–34 years. In contrast, white females in this age group were underenumerated by 2.5 percent.

If vital statistics measures were calculated with adjustments for net census undercounts for each population subgroup, the resulting rates would be differentially reduced from their original levels; that is, rates for those groups with the greatest estimated undercounts would show the greatest relative reductions due to these adjustments. Similar effects would be evident in the opposite direction for groups with overcounts. Consequently, the ratio of mortality between the rates for males and females and between the rates for the white population and the black population usually would be reduced.

Similarly, the differences between the death rates among subgroups of the population by cause of death would be affected by adjustments for net census undercounts. For example, in 1990 for the age group 35–39 years, the ratio of the unadjusted death rate for Homicide and legal intervention for black males to that for white males is 6.92, whereas the ratio of the death rates adjusted for net census undercount is 7.54. For Ischemic heart disease for males aged 40–44 years, the ratio of the death rate for the black population to that for the white population is 1.12 using the unadjusted rates, but it is 1.22 when adjusted for estimated underenumeration.

Summary measures—The effect of net census undercount on age-adjusted death rates and life table values depends on the underenumeration of each age group and on the distribution of deaths by age. Thus, the age-adjusted death rate in 1990 for All causes would decrease from 520.2 to 512.7 per 100,000 population if the age-specific death rates were corrected for net census undercount (table H). For Diseases of the heart, the age-adjusted death rate for white males would decrease from 202.0 to 198.1 per 100,000 population, a decline of 2.0 percent. For black males, the change from an unadjusted rate of 275.9 to an adjusted rate of 256.7 would amount to a decrease of 7.0 percent. For HIV infection, the rate for black males would decrease from 44.2 to 39.0 and for white males from 15.0 to 14.4.

Table H. Age-adjusted death rates for selected causes by race and sex, unadjusted and adjusted for estimated net census undercount: United States, 1990

[Based on age-specific death rates per 100,000 population in specified group. Computed by the direct method, using as the standard population the age distribution of the total population of the United States as enumerated in 1940. See Age-adjusted death rates. Numbers after causes of death are category numbers of the *Ninth Revision International Classification of Diseases, 1975*. Beginning 1987 includes category numbers *042–*044. See "Cause of death"]

Race, sex, and adjustment for net census undercount	All causes	Human immunodeficiency virus infection (*042–*044)	Malignant neoplasms including neoplasms lymphatic and hematopoietic tissues (140–209)	Diabetes mellitus (250)	Diseases of heart (390–398, 402, 404–424)	Cerebrovascular diseases (430–438)	Homicide and legal intervention (E960–E978)
All Races							
Both Sexes							
Unadjusted	520.2	9.8	135.0	11.7	152.0	27.7	10.2
Adjusted	512.7	9.6	133.3	11.5	149.9	27.3	10.1
Male							
Unadjusted	680.2	17.7	166.3	12.3	206.7	30.2	16.3
Adjusted	664.3	17.0	162.4	12.1	202.1	29.6	15.9
Female							
Unadjusted	390.6	2.1	112.7	11.1	108.9	25.7	4.2
Adjusted	387.9	2.1	112.6	11.0	107.9	25.4	4.2
White							
Both Sexes							
Unadjusted	492.8	8.0	131.5	10.4	146.9	25.5	5.9
Adjusted	485.9	7.8	129.9	10.2	145.0	25.2	5.7
Male							
Unadjusted	644.3	15.0	160.3	11.3	202.0	27.7	8.9
Adjusted	631.0	14.4	156.9	11.1	198.2	27.3	8.7
Female							
Unadjusted	369.9	1.1	111.2	9.5	103.1	23.8	2.8
Adjusted	367.0	1.0	110.8	9.5	102.2	23.5	2.7
Black							
Both Sexes							
Unadjusted	789.2	25.7	182.0	24.8	213.5	48.4	39.5
Adjusted	760.0	23.9	177.0	24.1	207.2	46.9	37.4
Male							
Unadjusted	1,061.3	44.2	248.1	23.6	275.9	56.1	68.7
Adjusted	980.8	39.0	230.9	21.9	256.7	52.3	62.9
Female							
Unadjusted	581.6	9.9	137.2	25.4	168.1	42.7	13.0
Adjusted	579.4	9.7	138.4	25.7	168.2	42.7	12.7

If death rates by age were adjusted, the corresponding life expectancy at birth computed from these rates would change. When calculating life expectancy, the impact of an undercount or overcount is greatest at the younger ages. In general, the effect of correcting the death rates is to increase the estimate of life expectancy at birth. For example, adjustment for net census undercount would increase life expectancy in 1990 by an estimated 0.2 years, from 75.4 years to 75.6 years for the total U.S. population.

Adjustment for differential underenumeration among race-sex groups would lead to greater changes in life expectancy for some groups than for other groups. For males and females, increases would be 0.3 and 0.1 years, respectively; for the black population and white population, 0.6 and 0.2 years, respectively. The largest increase would be for black males, 1.2 years, followed by white males (0.3 years), black females (0.2 years), and white females (0.2 years).

Age-adjusted death rates

Age-adjusted death rates shown in this volume are computed using the distribution in 10-year age intervals of the enumerated population of the United States in 1940 as the standard population. Each figure represents the rate that would have existed had the age-specific rates of the particular year prevailed in a population whose age distribution was the same as that of the United States in 1940. The rates for the total population and for each race-sex group were adjusted using the same standard population. It is important not to compare age-adjusted death rates with crude rates. The standard 1940 population, on the basis of one million total population, is as follows:

Age	Number
All ages	1,000,000
Under 1 year	15,343
1–4 years	64,718
5–14 years	170,355
15–24 years	181,677
25–34 years	162,066
35–44 years	139,237
45–54 years	117,811
55–64 years	80,294
65–74 years	48,426
75–84 years	17,303
85 years and over	2,770

Life tables

U.S. abridged life tables are constructed by reference to a standard table (42). Life tables for the decennial period 1979–81 are used as the standard life tables in constructing the 1980–90 abridged life tables. Life table values for 1981–89 appearing in this volume are based on revised intercensal estimates of the populations for those years. Therefore, these life table values may differ from life table values of those years published in previous volumes.

Life tables for the decennial period 1969–71 are used as the standard life tables in constructing the 1970–79 abridged life tables. Life table values for 1970–73 were first revised in *Vital Statistics of the United States, 1977*; before 1977, life table values for 1970–73 were constructed using the 1959–61 decennial life tables. In addition, life table values for 1951–59, 1961–69, and 1971–79 appearing in this volume are based on revised intercensal estimates of the populations for those years. As such, these life table values may differ from life table values for those years published in previous volumes.

There has been an increasing interest in data on the average length of life ($\mathring{e}_0$) for single calendar years before the initiation of the annual abridged life table series for selected race-sex groups in 1945. The figures in table 6-5 for the race and sex groups for the following years were estimated to meet these needs (43).

Years	Race and sex groups
1900–45	Total
1900–47	Male
1900–47	Female
1900–50	White
1900–44	White, male
1900–44	White, female
1900–50	All other
1900–44	All other, male
1900–44	All other, female

The geographic areas covered in life tables before 1929–31 were limited to the death-registration areas. Life tables for 1900–02 and 1909–11 were constructed using mortality data from the 1900 death-registration States—10 States and the District of Columbia—and for 1919–21 from the 1920 death-registration States—34 States and the District of Columbia. The tables for 1929–31 through 1958 cover the conterminous United States. Decennial life table values for the 3-year period 1959–61 were derived from data that include Alaska and Hawaii for each year (table 6-4). Data for each year shown in table 6-5 include Alaska beginning in 1959 and Hawaii beginning in 1960. It is believed that the inclusion of these two States does not materially affect life table values.

Random variation in numbers of deaths, death rates, and mortality rates and ratios

Deaths and population-based rates—Except for those reported in 1972, the numbers of deaths reported for a community represent complete counts of such events. As such, they are not subject to sampling error, although they are subject to errors in the registration process. However, when the figures are used for analytical purposes, such as the comparison of rates over a period or for different areas, 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 (44). 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. Estimates of standard error and tests of significance under this assumption are described in most standard statistics texts. When the number of events is large, the standard error, expressed as a percent of the number or rate, 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 conditions described by the figures. This is particularly true for infant mortality rates, cause-specific death rates, and death rates for counties. Events of a rare nature may be assumed to follow a Poisson probability distribution. For this distribution, a simple approximation may be used to estimate a confidence interval, as follows.

If N is the number of registered deaths in the population and R is the corresponding rate, the chance is 19 in 20 that

1. $N-2\sqrt{N}$ and $N+2\sqrt{N}$

   covers the "true" number of events.

2. $R-2\frac{R}{\sqrt{N}}$ and $R+2\frac{R}{\sqrt{N}}$

   covers the "true" rate.

If the rate R_1 corresponding to N_1 events is compared with the rate R_2 corresponding to N_2 events, the difference between the two rates may be regarded as statistically significant at the 0.05 level of significance, if it exceeds

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

For example, if the observed death rate for a community were 10.0 per 1,000 population and if this rate were based on 20 recorded deaths, the chance is 19 in 20 that the "true" death rate for that community lies between 5.5 and 14.5 per 1,000 population. If the death rate for this community of 10.0 per 1,000 population were being compared with a rate of 15.0 per 1,000 population for a second community, which is based on 25 recorded deaths, the difference between the rates for the two communities is 5.0. This difference is less than twice the standard error of the difference

$$2\sqrt{\frac{(10.0)^2}{20}+\frac{(15.0)^2}{25}}$$

of the two rates, which is computed to be 7.5. From this, it is concluded that the difference between the rates for the two communities is not statistically significant at the 0.05 level of significance.

Rates, proportions, and ratios—Beginning in 1989, an asterisk is shown in place of a rate based on fewer than 20 deaths. These rates have a relative standard error of 23 percent or more and therefore are considered highly variable. For age-adjusted death rates, this criterion is applied to the sum of the age-specific deaths.

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SYMBOLS USED IN TABLES

Data not available	- - -
Category not applicable	. . .
Quantity zero	–
Quantity more than 0 but less than 0.05	0.0
Figure does not meet standards of reliability or precision (estimate is based on fewer than 20 events in numerator or denominator)	*

Table 7-1. Population of Birth- and Death-Registration States, 1900-1932, and United States, 1900-1990

[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
1990	249,225,000	248,709,873							
1989 [3]	247,342,000	246,819,000	1944	138,397,000	132,885,000	. . .	. . .	. . .	. . .
1988 [3]	245,021,000	244,499,000	1943	136,739,000	134,245,000	. . .	. . .	. . .	. . .
1987 [3]	242,804,000	242,289,000	1942	134,860,000	133,920,000	. . .	. . .	. . .	. . .
1986 [3]	240,651,000	240,133,000	1941	133,402,000	133,121,000	. . .	. . .	. . .	. . .
1985 [3]	238,466,000	237,924,000	1940	131,820,000	131,669,275	. . .	. . .	. . .	. . .
1984 [3]	236,348,000	235,825,000	1939	131,028,000	130,879,718	. . .	. . .	. . .	. . .
1983 [3]	234,307,000	233,792,000	1938	129,969,000	129,824,939	. . .	. . .	. . .	. . .
1982 [3]	232,188,000	231,664,000	1937	128,961,000	128,824,829	. . .	. . .	. . .	. . .
1981 [3]	229,966,000	229,466,000	1936	128,181,000	128,053,180	. . .	. . .	. . .	. . .
1980	227,061,000	226,545,805	1935	127,362,000	127,250,232	. . .	. . .	. . .	. . .
1979	225,055,000	224,567,000	1934	126,485,000	126,373,773	. . .	. . .	. . .	. . .
1978	222,585,000	222,095,000	1933	125,690,000	125,578,763	. . .	. . .	. . .	. . .
1977	220,239,000	219,760,000	1932	124,949,000	124,840,471	47	118,903,899	47	118,903,899
1976	218,035,000	217,563,000	1931	124,149,000	124,039,648	46	117,455,229	47	118,148,967
1975	215,973,000	215,465,000	1930	123,188,000	123,076,741	46	116,544,946	47	117,238,278
1974	213,854,000	213,342,000	1929	- - -	121,769,939	46	115,317,450	46	115,317,450
1973	211,909,000	211,357,000	1928	- - -	120,501,115	44	113,636,160	44	113,636,160
1972	209,896,000	209,284,000	1927	- - -	119,038,062	40	104,320,830	42	107,084,532
1971	207,661,000	206,827,000	1926	- - -	117,399,225	35	90,400,590	41	103,822,683
1970	204,270,000	203,211,926	1925	- - -	115,831,963	33	88,294,564	40	102,031,555
1969	202,677,000	201,385,000	1924	- - -	114,113,463	33	87,000,295	39	99,318,098
1968	200,706,000	199,399,000	1923	- - -	111,949,945	30	81,072,123	38	96,788,197
1967	198,712,000	197,457,000	1922	- - -	110,054,778	30	79,560,746	37	92,702,901
1966	196,560,000	195,576,000	1921	- - -	108,541,489	27	70,807,090	34	87,814,447
1965	194,303,000	193,526,000	1920	- - -	106,466,420	23	63,597,307	34	86,079,263
1964	191,889,000	191,141,000	1919	105,063,000	104,512,110	22	61,212,076	33	83,157,982
1963	189,242,000	188,483,000	1918	104,550,000	103,202,801	20	55,153,782	30	79,008,412
1962	186,538,000	185,771,000	1917	103,414,000	103,265,913	20	55,197,952	27	70,234,775
1961	183,691,000	182,992,000	1916	- - -	101,965,984	11	32,944,013	26	66,971,177
1960	179,933,000	179,323,175	1915	- - -	100,549,013	10	31,096,697	24	61,894,847
1959	177,264,000	176,513,000	1914	- - -	99,117,567	. . .	. . .	24	60,963,309
1958	174,141,000	173,320,000	1913	- - -	97,226,814	. . .	. . .	23	58,156,740
1957	171,274,000	170,371,000	1912	- - -	95,331,300	. . .	. . .	22	54,847,700
1956	168,221,000	167,306,000	1911	- - -	93,867,814	. . .	. . .	22	53,929,644
1955	165,275,000	164,308,000	1910	- - -	92,406,536	. . .	. . .	20	47,470,437
1954	162,391,000	161,164,000	1909	- - -	90,491,525	. . .	. . .	18	44,223,513
1953	159,565,000	158,242,000	1908	- - -	88,708,976	. . .	. . .	17	38,634,759
1952	156,954,000	155,687,000	1907	- - -	87,000,271	. . .	. . .	15	34,552,837
1951	154,287,000	153,310,000	1906	- - -	85,436,556	. . .	. . .	15	33,782,288
1950	151,132,000	150,697,361	1905	- - -	83,819,666	. . .	. . .	10	21,767,980
1949	149,188,000	148,665,000	1904	- - -	82,164,974	. . .	. . .	10	21,332,076
1948	146,631,000	146,093,000	1903	- - -	80,632,152	. . .	. . .	10	20,943,222
1947	144,126,000	143,446,000	1902	- - -	79,160,196	. . .	. . .	10	20,582,907
1946	141,389,000	140,054,000	1901	- - -	77,585,128	. . .	. . .	10	20,237,453
1945	139,928,000	132,481,000	1900	- - -	76,094,134	. . .	. . .	10	19,965,446

[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

[3] Populations are revised and, therefore, differ from those published in "Vital Statistics of the United States," Vol. II, Mortality, Part A, for 1989 and earlier years; see text.

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

Table 7-4. Ratio of Census-Level Resident Population to Resident Population Adjusted for Estimated Net Census Undercount by Age, Sex, and Race: April 1, 1980

Age	All races			White			All other					
							Total			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	0.9862	0.9763	0.9958	0.9916	0.9839	0.9990	0.9543	0.9309	0.9765	0.9392	0.9103	0.9669
Under 5 years	0.9806	0.9800	0.9812	0.9993	0.9988	0.9998	0.9024	0.8998	0.9051	0.9047	0.9018	0.9077
Under 1 year	1.0025	1.0019	1.0031	1.0246	1.0245	1.0246	.9112	.9057	.9169	.9205	.9149	.9262
1-4 years	.9747	.9741	.9754	.9926	.9920	.9932	.9000	.8982	.9019	.9004	.8982	.9027
5-14 years	.9917	.9916	.9919	.9981	.9982	.9980	.9626	.9614	.9638	.9603	.9591	.9623
5-9 years	.9852	.9846	.9859	.9957	.9955	.9960	.9393	.9370	.9416	.9393	.9370	.9424
10-14 years	.9978	.9982	.9974	1.0003	1.0008	.9998	.9858	.9858	.9859	.9808	.9807	.9816
15-24 years	.9921	.9846	.9999	.9940	.9871	1.0011	.9823	.9711	.9937	.9689	.9526	.9850
15-19 years	1.0011	.9988	1.0034	1.0003	.9976	1.0030	1.0051	1.0052	1.0055	.9980	.9958	1.0001
20-24 years	.9834	.9706	.9965	.9879	.9769	.9993	.9590	.9354	.9819	.9390	.9076	.9696
25-34 years	.9793	.9629	.9961	.9850	.9722	.9980	.9466	.9059	.9852	.9181	.8670	.9676
25-29 years	.9742	.9581	.9908	.9799	.9673	.9929	.9422	.9040	.9786	.9168	.8695	.9628
30-34 years	.9850	.9683	1.0020	.9905	.9778	1.0036	.9519	.9081	.9931	.9197	.8638	.9735
35-44 years	.9761	.9575	.9947	.9855	.9719	.9992	.9183	.8665	.9680	.8882	.8235	.9501
35-39 years	.9776	.9597	.9955	.9860	.9730	.9991	.9248	.8743	.9736	.8968	.8322	.9588
40-44 years	.9743	.9549	.9937	.9849	.9706	.9992	.9107	.8576	.9614	.8782	.8135	.9401
45-54 years	.9784	.9589	.9973	.9862	.9723	.9998	.9247	.8648	.9803	.8976	.8272	.9644
45-49 years	.9734	.9538	.9926	.9828	.9690	.9967	.9124	.8544	.9669	.8833	.8139	.9497
50-54 years	.9831	.9638	1.0017	.9894	.9755	1.0027	.9377	.8759	.9945	.9125	.8413	.9796
55-64 years	.9900	.9735	1.0049	.9926	.9783	1.0057	.9678	.9329	.9983	.9514	.9094	.9882
55-59 years	.9884	.9692	1.0060	.9921	.9755	1.0075	.9577	.9178	.9935	.9388	.8913	.9815
60-64 years	.9919	.9786	1.0037	.9932	.9815	1.0036	.9804	.9523	1.0041	.9669	.9324	.9962
65-74 years	1.0092	1.0044	1.0129	1.0055	1.0011	1.0087	1.0439	1.0357	1.0515	1.0372	1.0235	1.0473
65-69 years	1.0131	1.0051	1.0195	1.0086	1.0016	1.0141	1.0548	1.0391	1.0672	1.0494	1.0290	1.0651
70-74 years	1.0042	1.0034	1.0047	1.0016	1.0005	1.0021	1.0293	1.0309	1.0309	1.0207	1.0158	1.0243
75-84 years	.9851	.9937	.9800	.9844	.9918	.9804	.9917	1.0168	.9758	.9689	.9955	.9527
75-79 years	1.0014	1.0053	.9990	.9974	.9997	.9959	1.0428	1.0601	1.0313	1.0235	1.0405	1.0128
80-84 years	.9595	.9735	.9522	.9643	.9780	.9578	.9059	.9380	.8873	.8780	.9150	.8572
85 years and over	.9540	.9792	.9440	.9558	.9760	.9467	.9393	.9961	.9057	.9089	.9638	.8837

SOURCE: U.S. Bureau of the Census: "Current Population Reports," Series P-25, No. 985.

Table 7-3. Enumerated Population, by Age, for the United States, Each Division and State, Puerto Rico, Virgin Islands, and Guam: April 1, 1990

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

Division and State	Total	Under 5 years	5-19 years	20-44 years	45-64 years	65 years and over
United States	248,709,873	18,757,647	52,976,958	99,727,071	46,169,302	31,078,895
Geographic divisions:						
New England	13,206,943	938,290	2,562,402	5,467,240	2,477,353	1,761,658
Middle Atlantic	37,602,286	2,648,699	7,399,498	14,916,434	7,451,081	5,186,574
East North Central	42,008,942	3,146,526	9,183,982	16,498,607	7,899,375	5,280,452
West North Central	17,659,690	1,327,799	3,887,771	6,768,895	3,230,484	2,444,741
South Atlantic	43,566,853	3,124,215	8,810,578	17,509,716	8,320,682	5,801,662
East South Central	15,176,284	1,064,821	3,428,706	5,839,885	2,902,447	1,920,425
West South Central	26,702,793	2,161,937	6,266,467	10,624,056	4,703,741	2,946,592
Mountain	13,658,776	1,130,610	3,185,982	5,432,014	2,393,731	1,516,439
Pacific	39,127,306	3,194,750	8,251,572	16,670,224	6,790,408	4,220,352
New England:						
Maine	1,227,928	87,250	261,032	484,497	232,287	162,862
New Hampshire	1,109,252	85,786	229,047	470,343	199,552	124,524
Vermont	562,758	41,979	121,636	231,048	102,208	65,887
Massachusetts	6,016,425	421,349	1,139,668	2,530,390	1,110,013	815,005
Rhode Island	1,003,464	68,493	194,919	405,355	184,948	149,749
Connecticut	3,287,116	233,433	616,100	1,345,607	648,345	443,631
Middle Atlantic:						
New York	17,990,455	1,292,180	3,554,235	7,274,550	3,529,377	2,340,113
New Jersey	7,730,188	545,807	1,480,989	3,124,278	1,554,093	1,025,021
Pennsylvania	11,881,643	810,712	2,364,274	4,517,606	2,367,611	1,821,440
East North Central:						
Ohio	10,847,115	796,503	2,355,792	4,203,819	2,088,160	1,402,841
Indiana	5,544,159	404,681	1,244,351	2,151,114	1,050,076	693,937
Illinois	11,430,602	866,139	2,450,901	4,551,356	2,132,786	1,429,420
Michigan	9,295,297	713,578	2,055,911	3,683,452	1,738,255	1,104,101
Wisconsin	4,891,769	365,625	1,077,027	1,908,866	890,098	650,153
West North Central:						
Minnesota	4,375,099	341,251	956,839	1,760,484	770,655	545,870
Iowa	2,776,755	195,477	613,238	1,019,447	522,927	425,666
Missouri	5,117,073	374,992	1,101,651	1,946,789	978,133	715,508
North Dakota	638,800	48,510	147,610	241,608	110,133	90,939
South Dakota	696,004	55,324	164,579	251,848	122,139	102,114
Nebraska	1,578,385	121,173	356,482	594,449	283,614	222,667
Kansas	2,477,574	191,072	547,372	954,270	442,883	341,977
South Atlantic:						
Delaware	666,168	49,892	136,429	272,122	127,440	80,285
Maryland	4,781,468	365,079	940,436	2,046,499	915,095	514,359
District of Columbia	606,900	38,457	103,442	275,690	112,227	77,084
Virginia	6,187,358	450,601	1,263,046	2,650,974	1,161,349	661,388
West Virginia	1,793,477	108,490	396,899	653,024	367,234	267,830
North Carolina	6,628,637	469,176	1,376,313	2,702,799	1,280,150	800,199
South Carolina	3,486,703	263,156	786,754	1,397,352	645,392	394,049
Georgia	6,478,216	506,342	1,447,826	2,711,709	1,161,797	650,542
Florida	12,937,926	873,022	2,359,433	4,799,547	2,549,998	2,355,926
East South Central:						
Kentucky	3,685,296	254,595	825,827	1,436,509	703,366	464,999
Tennessee	4,877,185	340,067	1,042,886	1,920,848	957,241	616,143
Alabama	4,040,587	289,923	913,127	1,536,670	780,969	519,898
Mississippi	2,573,216	200,236	646,866	945,858	460,871	319,385
West South Central:						
Arkansas	2,350,725	168,319	529,774	848,646	455,203	348,783
Louisiana	4,219,973	342,606	1,031,033	1,633,627	746,288	466,419
Oklahoma	3,145,585	230,802	708,960	1,183,653	599,214	422,956
Texas	16,986,510	1,420,210	3,996,700	6,958,130	2,903,036	1,708,434
Mountain:						
Montana	799,065	60,258	184,929	297,675	150,006	106,197
Idaho	1,006,749	81,549	260,437	367,645	176,217	120,901
Wyoming	453,588	35,428	114,268	176,291	80,635	46,966
Colorado	3,294,394	256,970	705,465	1,417,964	585,631	328,364
New Mexico	1,515,069	129,274	365,631	590,580	267,684	161,900
Arizona	3,665,228	300,395	800,412	1,442,183	646,222	476,016
Utah	1,722,850	172,252	519,240	637,002	244,874	149,482
Nevada	1,201,833	94,484	235,600	502,674	242,462	126,613
Pacific:						
Washington	4,866,692	374,057	1,031,511	2,010,238	877,972	572,914
Oregon	2,842,321	205,649	600,714	1,115,456	530,737	389,765
California	29,760,021	2,473,619	6,260,172	12,816,880	5,097,499	3,111,851
Alaska	550,043	55,977	131,875	257,621	82,475	22,095
Hawaii	1,108,229	85,448	227,300	470,029	201,725	123,727
Puerto Rico	3,522,037	---	---	---	---	---
Virgin Islands	101,809	---	---	---	---	---
Guam	133,152	---	---	---	---	---

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

Table 7-4. Ratio of Census-Level Resident Population to Resident Population Adjusted for Estimated Net Census Undercount by Age, Sex, and Race: April 1, 1990

Age	All races			White			Black		
	Both sexes	Male	Female	Both sexes	Male	Female	Both sexes	Male	Female
All ages	0.9815	0.9721	0.9906	0.9802	0.9726	0.9873	0.9432	0.9151	0.9699
Under 5 years	0.9632	0.9634	0.9629	0.9677	0.9685	0.9669	0.9160	0.9139	0.9182
Under 1 year	.9686	.9684	.9689	.9730	.9734	.9725	.9239	.9214	.9264
1-4 years	.9617	.9621	.9613	.9664	.9672	.9654	.9139	.9119	.9159
5-14 years	.9761	.9768	.9753	.9740	.9750	.9730	.9410	.9402	.9418
5-9 years	.9649	.9655	.9642	.9657	.9665	.9649	.9241	.9230	.9252
10-14 years	.9882	.9891	.9873	.9830	.9841	.9818	.9591	.9586	.9595
15-24 years	1.0081	1.0088	1.0073	1.0032	1.0053	1.0010	.9789	.9723	.9855
15-19 years	1.0166	1.0198	1.0133	1.0094	1.0128	1.0059	.9988	1.0016	.9959
20-24 years	1.0002	.9987	1.0017	.9975	.9985	.9966	.9593	.9432	.9753
25-34 years	.9639	.9463	.9821	.9614	.9480	.9755	.9126	.8666	.9580
25-29 years	.9591	.9439	.9748	.9558	.9441	.9681	.9123	.8732	.9510
30-34 years	.9687	.9487	.9892	.9669	.9518	.9828	.9129	.8599	.9651
35-44 years	.9842	.9689	.9996	.9816	.9700	.9935	.9350	.8867	.9810
35-39 years	.9790	.9628	.9954	.9764	.9643	.9888	.9303	.8808	.9778
40-44 years	.9901	.9758	1.0044	.9875	.9764	.9988	.9410	.8943	.9850
45-54 years	.9780	.9628	.9929	.9772	.9649	.9894	.9322	.8805	.9799
45-49 years	.9775	.9633	.9916	.9762	.9648	.9877	.9302	.8807	.9782
50-54 years	.9785	.9623	.9944	.9784	.9651	.9914	.9346	.8802	.9844
55-64 years	.9824	.9640	.9995	.9828	.9684	.9962	.9545	.8875	1.0138
55-59 years	.9794	.9609	.9968	.9801	.9656	.9941	.9426	.8790	.9999
60-64 years	.9854	.9671	1.0020	.9853	.9712	.9982	.9675	.8969	1.0287
65-74 years	.9960	.9784	1.0101	.9935	.9781	1.0060	1.0211	.9704	1.0566
65-69 years	.9980	.9776	1.0152	.9943	.9762	1.0096	1.0336	.9786	1.0773
70-74 years	.9934	.9795	1.0040	.9926	.9807	1.0017	1.0049	.9589	1.0376
75-84 years	1.0021	1.0046	1.0006	1.0038	1.0066	1.0021	.9971	.9913	1.0004
75-79 years	1.0082	1.0064	1.0094	1.0077	1.0065	1.0085	1.0258	1.0126	1.0337
80-84 years	.9927	1.0015	.9881	.9978	1.0068	.9931	.9524	.9547	.9512
85 years and over	.9411	.9592	.9342	.9512	.9696	.9444	.8503	.8827	.8373

SOURCE: Unpublished data from the U.S. Bureau of the Census.

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