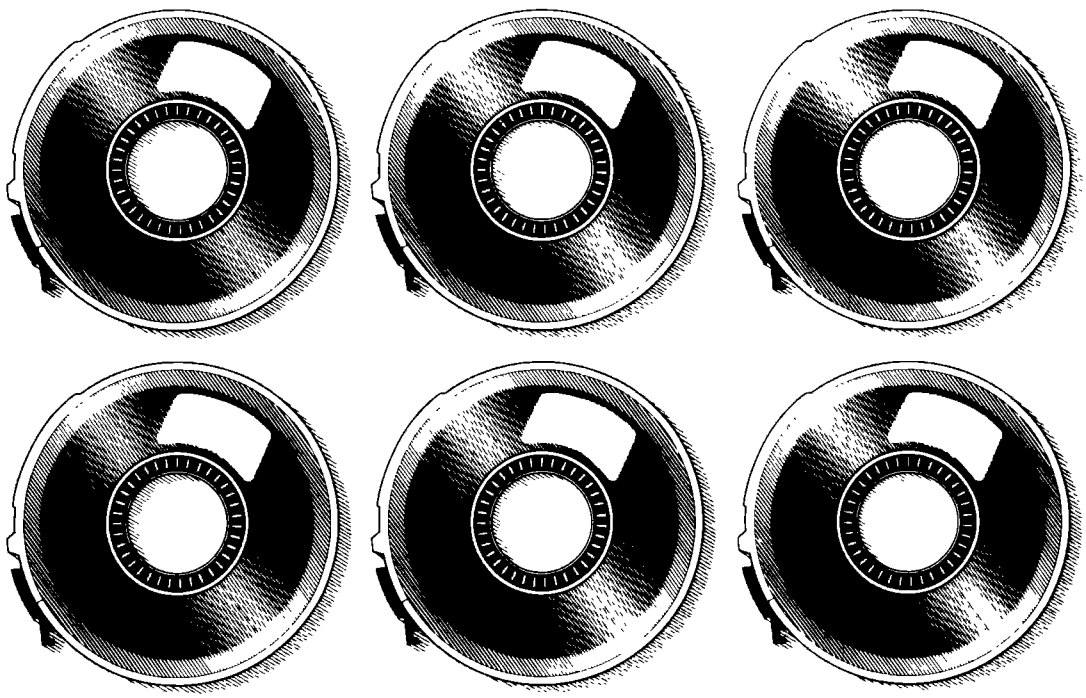
Public Use Data Tape Documentation

Linked Birth/Infant Death Data Set:
1987 Birth Cohort



U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Centers for Disease Control
National Center for Health Statistics

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Linked Birth/Infant Death Data Set: 1987 Birth Cohort

Linked Birth/Infant Death (Numerator) File and Birth (Denominator) File

Table of Contents

1. Introduction, Methodology, and Classification of Data.
2. Machine used, file and data characteristics.
3. List of data elements and locations.
4. Record layout and definition of items and codes.
5. County geographic codes available on the public-use file.
6. City geographic codes available on the public-use file.
7. Titles and codes for the 61 cause-of-death list.
8. Documentation tables 1-6.
9. Technical Appendix for the 1987 Natality file.
10. Technical Appendix for the 1987 Mortality file.
11. Technical Appendix for the 1988 Mortality file.

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

Introduction

The Linked Birth/Infant Death Data Set consists of two separate data files. The first file includes linked records of live births and infant deaths for the 1987 birth cohort -- also referred to as the numerator file. The second file is the live birth file for 1987 -- referred to as the denominator file. The files are offered as a numerator/denominator data set to give users the means to compute infant mortality rates.

The 1987 linked file is comprised of deaths to infants born in 1987 who died in 1987 or 1988 before their first birthday. Infant death records were extracted from the 1987 and 1988 National Center for Health Statistics (NCHS) mortality statistical files. Linked birth records were extracted from a denominator file that contained the 1987 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 includes linked records for births and deaths that occurred in the United States to U.S. residents and to U.S. nonresidents. Excluded 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 1987 Technical Appendix from the Natality Annual Volume; sources for death records included in the numerator file are described in detail in the 1987 and 1988 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 Alaska, Arizona, Delaware, Indiana, 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 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.

The 1987 birth cohort linked file includes 37,349 linked records representing 97.8 percent of the infant deaths to the 1987 birth cohort. After followup, records for some 828 infant deaths, or 2.2 percent of the deaths to the birth cohort, remained unlinked and are not included in the linked file data set. Documentation table 6 presents summary information about the unlinked death records not included in the linked file because they were not linked with their corresponding birth certificates. It is included for users who may want information about the total birth cohort of infant deaths. 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 informtion 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 3-4 of the Natality Technical Appendix and about infant deaths on pages 11-12 of the Mortality Technical Appendix in this documentation.

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 Statisticial 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, 1987.

C. NCHS Instruction Manual Data Preparation, Part 2b, Vital Statistics Instructions for Classifying Multiple Cause-of-Death, 1987.

D. NCHS Instruction Manual Data Preparation, Part 2c, Vital Statistics ICD-9 ACME Decision Tables for Classifying Underlying Causes-of-Death, 1987.

E. NCHS Instruction Manual Data Preparation, Part 2d, Vital Statistics NCHS Procedures for Mortality Medical Data System File Preparation and Maintenance, Effective 1979.

F. NCHS Instruction Manual Data Tabulation, Part 2f, Vital Statistics ICD-9 TRANSAX Disease Reference Tables for Classifying Multiple Causes-of-Death, 1982-87.

G. NCHS Instruction Manual Data Preparation, Part 3a, Vital Statistics Classification and Coding Instructions for Live Birth Records, 1987.

H. NCHS Instruction Manual Data Preparation, Part 4, Vital Statistics Demographic Classification and CodingInstructions for Death Records, 1987.

I. NCHS Instruction Manual Tabulation, Part 11, Vital Statistics Computer Edits for Mortality Data, Effective 1979.

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 1987 and 1988 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 causes-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 certification 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 cautionaed 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.

Machine/File/Data Characteristics:

I. Denominator File:

A. Machine used:	IBM/3091
B. Language used:	PL/I
C. File Organization:	One file, multiple reels
D. Record format:	Blocked, fixed format
E. Record count:	3,813,492
F. Record length:	91
G. Blocksize:	31941
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: 3,813,492
	b. By residence: 3,809,670
	c. To foreign residents: 3,822

II. Numerator File:

A. Machine used:	IBM/3091
B. Language used:	PL/I
C. File Organization:	One file, one reel
D. Record format:	Blocked, fixed format
E. Record count:	37,349
F. Record length:	500
G. Blocksize:	32000
H. Recording mode	IBM/EBCDIC 8-bit code
I. Code scheme:	Numeric/Alphabetic/Blank
J. Last block:	May be a short block
K. Data counts:	a. By occurrence: 37,349
	b. By residence: 37,328
	c. To foreign residents: 21

Linked Birth/Infant Death Data Set

List of Data Elements and Locations

Data Items	Denominator File	Numerator File Birth	Numerator File Death
1. General			
a. Match status	1	1	-
b. Year of birth	2-5	2-5	-
c. Year of death	-	-	194-197
d. Record type	10	10	198
e. Resident status	11	11	199
f. Record weight	91	91	-
2. Occurrence			
a. Region	12	12	200
b. Division	13	13	201
c. Expanded State	15-16	15-16	203-204
d. State	17-18	17-18	205-206
e. County	19-21	19-21	207-209
3. Residence			
a. Region	22	22	210
b. Division	23	23	211
c. Expanded State	25-26	25-26	213-214
d. State	27-28	27-28	215-216
e. County	29-31	29-31	217-219
f. City	32-34	32-34	220-222
4. Infant			
a. Race	36-37	36-37	-
b. Sex	38	38	-
c. Age	-	-	223-227
d. Gestation	39-42	39-42	-
e. Birth weight	43-49	43-49	-
f. Plurality	50	50	-
g. Apgar score	51-54	51-54	-
5. Mother			
a. Origin or descent	55-56	55-56	-
b. Race	57	57	-
c. Age	58-61	58-61	-
d. Education	62-64	62-64	-
e. Marital status	65	65	-
f. State of birth	66-67	66-67	-

Data Items	Denominator File	Numerator File Birth	Numerator File Death
6. Father			
a. Origin or descent	68-69	68-69	-
b. Race	70	70	-
c. Age	71-72	71-72	-
d. Education	73-74	73-74	-
7. Pregnancy items			
a. Interval since last live birth	75	75	-
b. Outcome of last pregnancy	76	76	-
c. Interval since last pregnancy	77	77	-
d. Month prenatal care began	78-80	78-80	-
e. Number of prenatal visits	81-82	81-82	-
f. Total birth order	83-85	83-85	-
g. Live birth order	86-88	86-88	-
8. Medical data			
a. Underlying cause	-	-	231-237
b. Multiple conditions	-	-	238-481
9. Other items			
a. Place of delivery	89	89	-
b. Attendant at birth	90	90	-
c. Hospital and patient status	-	-	228
d. Autopsy performed	-	-	229
e. Place of accident	-	-	230

Tape Location	Field Size	Item and Code Outline
1	1	Match Status

1 ... Matched Birth/Infant Death Record
2 ... Late Filed Matched Birth/Infant Death Record
3 ... Surviving infant record

Locations 2-91 of the linked file contain data from the Birth 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.

2-5	4	Year of Birth

1987 ... Born in 1987

6-9	4	Reserved positions
10	1	Record Type

1 ... RESIDENTS
State and County of Occurrence and Residence are the same.
2 ... NONRESIDENTS
State and/or County of Occurrence and Residence are different.

11	1	Resident Status

1 ... RESIDENTS
State and County of Occurrence and Residence are the same.
2 ... INTRASTATE NONRESIDENTS
State of Occurrence and Residence are the same, but County is different.
3 ... INTERSTATE NONRESIDENTS
State of Occurrence and Residence are different, but both are in the U.S.
4 ... FOREIGN RESIDENTS
State of Occurrence is one of the 50 States or the District of Columbia, but Place of Residence is outside of the U.S.

Tape Location	Field Size	Item and Code Outline
12-21	10	PLACE OF OCCURRENCE
		Refer to the Geographic Code Outline in this document for a list of areas and codes available on the public-use file.
12	1	Region of Occurrence
13-14	2	Division and State Subcode of Occurrence
		Location 12 is Region. Location 13 is Division and Location 14 identifies States within that Division.
		1 ... NORTHEAST
		1 ... New England
		1 ... Maine
		2 ... New Hampshire
		3 ... Vermont
		4 ... Massachusetts
		5 ... Rhode Island
		6 ... Connecticut
		2 ... Middle Atlantic
		1 ... New York
		2 ... New Jersey
		3 ... Pennsylvania
		2 ... MIDWEST
		3 ... East North Central
		1 ... Ohio
		2 ... Indiana
		3 ... Illinois
		4 ... Michigan
		5 ... Wisconsin
		4 ... West North Central
		1 ... Minnesota
		2 ... Iowa
		3 ... Missouri
		4 ... North Dakota
		5 ... South Dakota
		6 ... Nebraska
		7 ... Kansas
		3 ... SOUTH
		5 ... South Atlantic
		1 ... Delaware
		2 ... Maryland
		3 ... District of Columbia
		4 ... Virginia
		5 ... West Virginia
		6 ... North Carolina
		7 ... South Carolina
		8 ... Georgia
		9 ... Florida
		6 ... East South Central
		1 ... Kentucky
		2 ... Tennessee
		3 ... Alabama
		4 ... Mississippi
		7 ... West South Central
		1 ... Arkansas
		2 ... Louisiana
		3 ... Oklahoma
		4 ... Texas

Tape Location	Field Size	Item and Code Outline
12	1	Region - Continued
13-14	2	Division and State Subcode - Continued

4 ... WEST
- 8 ... Mountain
  - 1 ... Montana
  - 2 ... Idaho
  - 3 ... Wyoming
  - 4 ... Colorado
  - 5 ... New Mexico
  - 6 ... Arizona
  - 7 ... Utah
  - 8 ... Nevada
- 9 ... Pacific
  - 1 ... Washington
  - 2 ... Oregon
  - 3 ... California
  - 4 ... Alaska
  - 5 ... Hawaii

Tape Location	Field Size	Item and Code Outline
15-16	2	Expanded State of Occurrence

This item is designed to separately identify New York city records from upstate New York records.

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

Tape Location	Field Size	Item and Code Outline
17-18	2	State of Occurrence

Late filed birth certificates that were needed to match to an infant death record, have been included in this data set.

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

19-21	3	County of Occurrence

Because of confidentiality concerns, counties with a population less than 250,000 cannot be identified on the public-use file.

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

Tape Location	Field Size	Item and Code Outline
22-35	14	PLACE OF RESIDENCE
		Refer to the Geographic Code Outline in this document for a list of areas and codes available on the public-use file.
22	1	Region of Residence
23-24	2	Division and State Subcode of Residence
		Location 22 is Region. Location 23 is Division and Location 24 identifies States within that Division.
		000 ... Foreign Resident
		1 ... NORTHEAST
		1 ... New England
		1 ... Maine
		2 ... New Hampshire
		3 ... Vermont
		4 ... Massachusetts
		5 ... Rhode Island
		6 ... Connecticut
		2 ... Middle Atlantic
		1 ... New York
		2 ... New Jersey
		3 ... Pennsylvania
		2 ... MIDWEST
		3 ... East North Central
		1 ... Ohio
		2 ... Indiana
		3 ... Illinois
		4 ... Michigan
		5 ... Wisconsin
		4 ... West North Central
		1 ... Minnesota
		2 ... Iowa
		3 ... Missouri
		4 ... North Dakota
		5 ... South Dakota
		6 ... Nebraska
		7 ... Kansas
		3 ... SOUTH
		5 ... South Atlantic
		1 ... Delaware
		2 ... Maryland
		3 ... District of Columbia
		4 ... Virginia
		5 ... West Virginia
		6 ... North Carolina
		7 ... South Carolina
		8 ... Georgia
		9 ... Florida
		6 ... East South Central
		1 ... Kentucky
		2 ... Tennessee
		3 ... Alabama
		4 ... Mississippi
		7 ... West South Central
		1 ... Arkansas
		2 ... Louisiana
		3 ... Oklahoma
		4 ... Texas

Tape Location	Field Size	Item and Code Outline
22	1	Region - Continued
23-24	2	Division and State Subcode - Continued

4		...	WEST
	8	...	Mountain
	1	...	Montana
	2	...	Idaho
	3	...	Wyoming
	4	...	Colorado
	5	...	New Mexico
	6	...	Arizona
	7	...	Utah
	8	...	Nevada
	9	...	Pacific
	1	...	Washington
	2	...	Oregon
	3	...	California
	4	...	Alaska
	5	...	Hawaii

Tape Location	Field Size	Item and Code Outline
25-26	2	Expanded State of Residence

This item is designed to separately identify New York city records from upstate New York records.

01	... Alabama
02	... Alaska
03	... Arizona
04	... Arkansas
05	... California
06	... Colorado
07	... Connecticut
08	... Delaware
09	... District of Columbia
10	... Florida
11	... Georgia
12	... Hawaii
13	... Idaho
14	... Illinois
15	... Indiana
16	... Iowa
17	... Kansas
18	... Kentucky
19	... Louisiana
20	... Maine
21	... Maryland
22	... Massachusetts
23	... Michigan
24	... Minnesota
25	... Mississippi
26	... Missouri
27	... Montana
28	... Nebraska
29	... Nevada
30	... New Hampshire
31	... New Jersey
32	... New Mexico
33	... New York
34	... New York city
35	... North Carolina
36	... North Dakota
37	... Ohio
38	... Oklahoma
39	... Oregon
40	... Pennsylvania
41	... Rhode Island
42	... South Carolina
43	... South Dakota
44	... Tennessee
45	... Texas
46	... Utah
47	... Vermont
48	... Virginia
49	... Washington
50	... West Virginia
51	... Wisconsin
52	... Wyoming
53-58,60	... Foreign Residents
53	... Puerto Rico
54	... Virgin Island
55	... Guam
56	... Canada
57	... Cuba
58	... Mexico
60	... Remainder of the world

Tape Location	Field Size	Item and Code Outline	
27-28	2	State of Residence	
		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
		52-57,59	.. Foreign Residents
		52	... Puerto Rico
		53	... Virgin Islands
		54	... Guam
		55	... Canada
		56	... Cuba
		57	... Mexico
		59	... Remainder of the world

Tape Location	Field Size	Item and Code Outline
29-31	3	County of Residence
		Because of confidentiality concerns, counties with a population less than 250,000 cannot be identified on the public-use file.
		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
		ZZZ ... Foreign residents
32-34	3	City of Residence
		Because of confidentiality concerns, cities with a population less than 250,000 cannot be identified on the public-use file.
		001-nnn ... Cities are numbered alphabetically within each State. (Note: To uniquely identify a city, both the State and city codes must be used.)
		999 ... Entire county, Balance of County, or city less than 250,000 population
		ZZZ ... Foreign residents
35	1	Reserved position
36	1	Detail Race of Child
		1 ... White
		2 ... Black
		3 ... American Indian (includes Aleuts and Eskimos)
		4 ... Chinese
		5 ... Japanese
		6 ... Hawaiian (includes Part-Hawaiian)
		7 ... Filipino
		8 ... Other Asian or Pacific Islander
		0 ... Other races
37	1	Race of Child Recode 3
		1 ... White
		2 ... Races other than White or Black
		3 ... Black
38	1	Sex of Child
		1 ... Male
		2 ... Female
39-40	2	Detail Gestation in Weeks
		17-52 ... 17th through 52nd week of gestation
		99 ... Gestation not stated
41-42	2	Gestation Recode 10
		01 ... Under 20 weeks
		02 ... 20 - 27 weeks
		03 ... 28 - 31 weeks
		04 ... 32 - 35 weeks
		05 ... 36 weeks
		06 ... 37 - 39 weeks
		07 ... 40 weeks
		08 ... 41 weeks
		09 ... 42 weeks and over
		10 ... Gestation not stated

Tape Location	Field Size	Item and Code Outline	
43-46	4	Birth weight - Detail in Grams	
		0227-8165	... Number of grams
		9999	... Birth weight not stated
47-48	2	Birth weight Recode 14	
		01	... 499 grams or less
		02	... 500 - 749 grams
		03	... 750 - 999 grams
		04	... 1000 - 1249 grams
		05	... 1250 - 1499 grams
		06	... 1500 - 1999 grams
		07	... 2000 - 2499 grams
		08	... 2500 - 2999 grams
		09	... 3000 - 3499 grams
		10	... 3500 - 3999 grams
		11	... 4000 - 4499 grams
		12	... 4500 - 4999 grams
		13	... 5000 - 8165 grams
		14	... Birth weight not stated
49	1	Birth weight Recode 3	
		1	... 2499 grams or less
		2	... 2500 grams or more
		3	... Birth weight not stated
50	1	Plurality - Detail	
		1	... Single Birth
		2	... Twin
		3	... Other Multiple Births
51-52	2	One Minute Apgar Score	
		00-10	... A score of 0-10
		99	... One minute Apgar score unknown or not stated
53-54	2	Five Minute Apgar Score	
		00-10	... A score of 0-10
		99	... Five minute Apgar score unknown or not stated

Tape Location	Field Size	Item and Code Outline
55-56	2	Origin or Descent of Mother

The Technical Appendix contains a table that shows which States report Detail Ethnicity (codes 01-24, 99), which States report Hispanic Origin or Descent (codes 00-05, 99), and which States do not report either item (code 88).

00	... Non - Spanish
01	... Mexican
02	... Puerto Rican
03	... Cuban
04	... Central or South American
05	... Other and Unknown Spanish
06	... American
07	... American Indian
08	... British, Scottish, Welsh, Scotch-Irish
09	... Irish
10	... German
11	... French
12	... Norwegian, Swedish, Danish
13	... Polish
14	... Italian
15	... Other North, Central and South American
16	... Other Western European
17	... Other Northern European
18	... Other Eastern European
19	... Other Southern European (excluding Spain)
20	... Southeast Asian and Pacific Islander
21	... South Central Asian
22	... Other Asian
23	... North African
24	... Other African
88	... Origin or descent of Mother not reported
99	... Origin or descent of Mother not classifiable

57	1	Detail Race of Mother

1	... White
2	... Black
3	... American Indian (includes Aleuts and Eskimos)
4	... Chinese
5	... Japanese
6	... Hawaiian (includes Part-Hawaiian)
7	... Filipino
8	... Other Asian or Pacific Islander
0	... Other races
9	... Race of Mother not stated

58-59	2	Detail Age of Mother

10-49	... Age in single years

60-61	2	Age of Mother Recode 12

01	... Under 15 years
03	... 15 years
04	... 16 years
05	... 17 years
06	... 18 years
07	... 19 years
08	... 20 - 24 years
09	... 25 - 29 years
10	... 30 - 34 years
11	... 35 - 39 years
12	... 40 - 44 years
13	... 45 - 49 years

Tape Location	Field Size	Item and Code Outline	
62-63	2	Mother's Education - Detail	
		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	... Mother's education not stated
64	1	Mother's Education Recode 6	
		1	... 0 - 8 years
		2	... 9 - 11 years
		3	... 12 years
		4	... 13 - 15 years
		5	... 16 years and over
		6	... Mother's education not stated
65	1	Marital Status	
		1	... Married
		2	... Unmarried

Tape Location	Field Size	Item and Code Outline
66-67	2	Mother's Place of 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
40	... Rhode Island
41	... South Carolina
42	... South Dakota
43	... Tennessee
44	... Texas
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	... Mother's place of birth not classifiable

Tape Location	Field Size	Item and Code Outline
68-69	2	Origin or Descent of Father

The Technical Appendix contains a table that shows which States report Detail Ethnicity (codes 01-24, 99), which States report Hispanic Origin or Descent (codes 00-05, 99), and which States do not report either item (code 88).

00	... Non - Spanish
01	... Mexican
02	... Puerto Rican
03	... Cuban
04	... Central or South American
05	... Other and Unknown Spanish
06	... American
07	... American Indian
08	... British, Scottish, Welsh, Scotch-Irish
09	... Irish
10	... German
11	... French
12	... Norwegian, Swedish, Danish
13	... Polish
14	... Italian
15	... Other North, Central and South American
16	... Other Western European
17	... Other Northern European
18	... Other Eastern European
19	... Other Southern European (excluding Spain)
20	... Southeast Asian and Pacific Islander
21	... South Central Asian
22	... Other Asian
23	... North African
24	... Other African
88	... Origin or decent of Father not report
99	... Origin or decent of Father not

70	1	Detail Race of Father

1	... White
2	... Black
3	... American Indian (includes Aleuts and Eskimos)
4	... Chinese
5	... Japanese
6	... Hawaiian (includes Part-Hawaiian)
7	... Filipino
8	... Other Asian or Pacific Islander
0	... Other races
9	... Race of Father not stated

71-72	2	Detail Age of Father

10-98	... Age in single years
99	... Age of Father not stated

Tape Location	Field Size	Item and Code Outline	
73-74	2	Father's Education - Detail	
		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	... Father's education not stated

Tape Location	Field Size	Item and Code Outline
75	1	Interval Since Last Live Birth
		0 ... Not applicable (no previous live birth)
		1 ... Zero months (plural birth)
		2 ... 1 - 11 months
		3 ... 12 - 23 months
		4 ... 24 - 35 months
		5 ... 36 - 47 months
		6 ... 48 - 71 months
		7 ... 72 months and over
		9 ... Interval since last live birth not stated
76	1	Outcome of Last Pregnancy
		0 ... Not applicable (no previous pregnancy)
		1 ... Last pregnancy was a live birth
		2 ... Last pregnancy was some other termination
		9 ... Last pregnancy's outcome is unknown
77	1	Interval Since Termination of Last Pregnancy
		0 ... Not applicable (no previous pregnancy)
		1 ... Zero months (plural delivery)
		2 ... 1 - 11 months
		3 ... 12 - 17 months
		4 ... 18 - 23 months
		5 ... 24 - 35 months
		6 ... 36 - 47 months
		7 ... 48 - 59 months
		8 ... 60 months and over
		9 ... Interval since termination of last pregnancy not stated
78-79	2	Detail Month of Pregnancy Prenatal Care Began
		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
		00 ... No prenatal care
		99 ... Month of pregnancy prenatal care began not stated
80	1	Month of Pregnancy Prenatal Care Began Recode 6
		1 ... 1st - 2nd month
		2 ... 3rd month
		3 ... 4th - 6th month
		4 ... 7th - 9th month
		5 ... No prenatal care
		6 ... Month of pregnancy prenatal care began not stated
81-82	2	Total Number of Prenatal Visits
		00 ... No prenatal visits
		01-49 ... Stated number of visits
		99 ... Number of prenatal visits not stated

1987 Birth Cohort
Denominator Record and Natality Section of Linked Record

Tape Location	Field Size	Item and Code Outline
83-84	2	Detail Total Birth Order
		01-50 ... Total number of live births and other terminations
		99 ... Total birth order unknown or not stated
85	1	Total Birth Order Recode 9
		1 ... First Child
		2 ... Second Child
		3 ... Third Child
		4 ... Fourth Child
		5 ... Fifth Child
		6 ... Sixth Child
		7 ... Seventh Child
		8 ... Eighth Child and over
		9 ... Total birth order not stated
86-87	2	Detail Live Birth Order
		01-50 ... Number of children ever born alive to mother
		99 ... Live birth order unknown or not stated
88	1	Live Birth Order Recode 9
		1 ... First Child
		2 ... Second Child
		3 ... Third Child
		4 ... Fourth Child
		5 ... Fifth Child
		6 ... Sixth Child
		7 ... Seventh Child
		8 ... Eighth Child and over
		9 ... Live birth order not stated
89	1	Place of Delivery
		1 ... Hospital Births
		2 ... Nonhospital Births
		3 ... En route or born on arrival (BOA)
		9 ... Place of delivery not classifiable
90	1	Attendant at Birth
		1 ... Physician
		2 ... Midwife
		3 ... Attendant specified other than physician or midwife
		9 ... Attendant at birth unknown
91	1	Reserved Position
		The denominator record ends in location 91.

1987 Birth Cohort
Denominator Record and Natality Section of Linked Record

Tape Location	Field Size	Item and Code Outline
92-193	102	These positions are contained in the Numerator (Linked) Record only and are reserved for possible additional data. If data are added in the future, they will be included in both files. The record length of the Denominator file would expand, but it is expected that the Numerator record would remain constant.

Documentation for the mortality section of the Numerator (Linked) Record begins on the following page.

Tape Location	Field Size	Item and Code Outline
		Locations 194-500 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 the mortality section of the Numerator (Linked) Record, these items refer to the residence of the Decedent.
194-197	4	Year of Death
		1987 ... Death occurred in 1987
		1988 ... Death occurred in 1988
198	1	Record Type
		1 ... RESIDENTS State and County of Occurrence and Residence are the same.
		2 ... NONRESIDENTS State and/or County of Occurrence and Residence are different.
199	1	Resident Status
		1 ... RESIDENTS State and County of Occurrence and Residence are the same.
		2 ... INTRASTATE NONRESIDENTS State of Occurrence and Residence are the same, but County is different.
		3 ... INTERSTATE NONRESIDENTS State of Occurrence and Residence are different, but both are in the U.S.
		4 ... FOREIGN RESIDENTS State of Occurrence is one of the 50 States or the District of Columbia, but Place of Residence is outside of the U.S.

Tape Location	Field Size	Item and Code Outline
200-209	10	PLACE OF OCCURRENCE

Refer to the Geographic Code Outline in this document for a list of areas and codes available on the public-use file.

200	1	Region of Occurrence
201-202	2	Division and State Subcode of Occurrence

Location 200 is Region. Location 201 is Division and location 202 identifies States within that Division.

1 ... NORTHEAST
- 1 ... New England
  - 1 ... Maine
  - 2 ... New Hampshire
  - 3 ... Vermont
  - 4 ... Massachusetts
  - 5 ... Rhode Island
  - 6 ... Connecticut
- 2 ... Middle Atlantic
  - 1 ... New York
  - 2 ... New Jersey
  - 3 ... Pennsylvania

2 ... MIDWEST
- 3 ... East North Central
  - 1 ... Ohio
  - 2 ... Indiana
  - 3 ... Illinois
  - 4 ... Michigan
  - 5 ... Wisconsin
- 4 ... West North Central
  - 1 ... Minnesota
  - 2 ... Iowa
  - 3 ... Missouri
  - 4 ... North Dakota
  - 5 ... South Dakota
  - 6 ... Nebraska
  - 7 ... Kansas

3 ... SOUTH
- 5 ... South Atlantic
  - 1 ... Delaware
  - 2 ... Maryland
  - 3 ... District of Columbia
  - 4 ... Virginia
  - 5 ... West Virginia
  - 6 ... North Carolina
  - 7 ... South Carolina
  - 8 ... Georgia
  - 9 ... Florida
- 6 ... East South Central
  - 1 ... Kentucky
  - 2 ... Tennessee
  - 3 ... Alabama
  - 4 ... Mississippi
- 7 ... West South Central
  - 1 ... Arkansas
  - 2 ... Louisiana
  - 3 ... Oklahoma
  - 4 ... Texas

Tape Location	Field Size	Item and Code Outline
200	1	Region - Continued
201-202	2	Division and State Subcode - Continued

4 ... WEST
8 ... Mountain
1 ... Montana
2 ... Idaho
3 ... Wyoming
4 ... Colorado
5 ... New Mexico
6 ... Arizona
7 ... Utah
8 ... Nevada
9 ... Pacific
1 ... Washington
2 ... Oregon
3 ... California
4 ... Alaska
5 ... Hawaii

Tape Location	Field Size	Item and Code Outline
203-204	2	Expanded State of Occurrence

This item is designed to separately identify New York city records from upstate New York records.

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

Tape Location	Field Size	Item and Code Outline
205-206	2	State of Occurrence

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

207-209	3	County of Occurrence

Due to confidentiality requirements, counties with a population less than 250,000 cannot be identified on the public-use file.

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

Tape Location	Field Size	Item and Code Outline
210-223	14	PLACE OF RESIDENCE
		Refer to the Geographic Code Outline in this document for a list of areas and codes available on the public-use file.
210	1	Region of Residence
211-212	2	Division and State Subcode of Residence

Location 210 is Region. Location 211 is Division and location 212 identifies States within that Division.

000 ... Foreign Resident

1 ... NORTHEAST
- 1 ... New England
  - 1 ... Maine
  - 2 ... New Hampshire
  - 3 ... Vermont
  - 4 ... Massachusetts
  - 5 ... Rhode Island
  - 6 ... Connecticut
- 2 ... Middle Atlantic
  - 1 ... New York
  - 2 ... New Jersey
  - 3 ... Pennsylvania

2 ... MIDWEST
- 3 ... East North Central
  - 1 ... Ohio
  - 2 ... Indiana
  - 3 ... Illinois
  - 4 ... Michigan
  - 5 ... Wisconsin
- 4 ... West North Central
  - 1 ... Minnesota
  - 2 ... Iowa
  - 3 ... Missouri
  - 4 ... North Dakota
  - 5 ... South Dakota
  - 6 ... Nebraska
  - 7 ... Kansas

3 ... SOUTH
- 5 ... South Atlantic
  - 1 ... Delaware
  - 2 ... Maryland
  - 3 ... District of Columbia
  - 4 ... Virginia
  - 5 ... West Virginia
  - 6 ... North Carolina
  - 7 ... South Carolina
  - 8 ... Georgia
  - 9 ... Florida
- 6 ... East South Central
  - 1 ... Kentucky
  - 2 ... Tennessee
  - 3 ... Alabama
  - 4 ... Mississippi
- 7 ... West South Central
  - 1 ... Arkansas
  - 2 ... Louisiana
  - 3 ... Oklahoma
  - 4 ... Texas

Tape Location	Field Size	Item and Code Outline
210	1	Region - Continued
211-212	2	Division and State Subcode - Continued

4 ... WEST
8 ... Mountain
1 ... Montana
2 ... Idaho
3 ... Wyoming
4 ... Colorado
5 ... New Mexico
6 ... Arizona
7 ... Utah
8 ... Nevada
9 ... Pacific
1 ... Washington
2 ... Oregon
3 ... California
4 ... Alaska
5 ... Hawaii

Tape Location	Field Size	Item and Code Outline
213-214	2	Expanded State of Residence

This item is designed to separately identify New York city records from upstate New York records.

01	... Alabama
02	... Alaska
03	... Arizona
04	... Arkansas
05	... California
06	... Colorado
07	... Connecticut
08	... Delaware
09	... District of Columbia
10	... Florida
11	... Georgia
12	... Hawaii
13	... Idaho
14	... Illinois
15	... Indiana
16	... Iowa
17	... Kansas
18	... Kentucky
19	... Louisiana
20	... Maine
21	... Maryland
22	... Massachusetts
23	... Michigan
24	... Minnesota
25	... Mississippi
26	... Missouri
27	... Montana
28	... Nebraska
29	... Nevada
30	... New Hampshire
31	... New Jersey
32	... New Mexico
33	... New York
34	... New York city
35	... North Carolina
36	... North Dakota
37	... Ohio
38	... Oklahoma
39	... Oregon
40	... Pennsylvania
41	... Rhode Island
42	... South Carolina
43	... South Dakota
44	... Tennessee
45	... Texas
46	... Utah
47	... Vermont
48	... Virginia
49	... Washington
50	... West Virginia
51	... Wisconsin
52	... Wyoming
53-58,60	... Foreign Residents
53	... Puerto Rico
54	... Virgin Island
55	... Guam
56	... Canada
57	... Cuba
58	... Mexico
60	... Remainder of the world

Tape Location	Field Size	Item and Code Outline	
215-216	2	State of Residence	
		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
		52-57,59	... Foreign Residents
		52	... Puerto Rico
		53	... Virgin Islands
		54	... Guam
		55	... Canada
		56	... Cuba
		57	... Mexico
		59	... Remainder of the world

Tape Location	Field Size	Item and Code Outline
217-219	3	County of Residence
		Due to confidentiality requirements, counties with a population less than 250,000 cannot be identified on the public-use file.
		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
		ZZZ ... Foreign residents
220-222	3	City of Residence
		Due to confidentiality requirements, cities with a population less than 250,000 cannot be identified on the public-use file.
		001-nnn ... Cities are numbered alphabetically within each State.(Note:To uniquely identify a city, both the State and city codes must be used.)
		999 ... Entire county, Balance of County, or city ofless than 250,000 population
		ZZZ ... Foreign residents
223-227	5	AGE
		Age is as computed using the dates of birth and death. For ages less than 2 days and when age could not be computed, the reported age from the death certificate was used.
223	1	Infant Age Recode 5
		1 ... Under 1 hour
		2 ... 1 - 23 hours
		3 ... 1 - 6 days
		4 ... 7 - 27 days (late neonatal)
		5 ... 28 days and over (postneonatal)
224-225	2	Infant Age Recode 76
		00 ... Less than 1 day
		01-27 ... 1 - 27 days
		28 ... 4th week
		29 ... 5th week
		30 ... 6th week
		31-76 ... 7th - 52nd weeks
226-227	2	Infant Age Recode 38
		00 ... Less than 1 day
		01-27 ... 1 - 27 days
		28 ... 1 month
		29 ... 2 months
		30 ... 3 months
		31 ... 4 months
		32 ... 5 months
		33 ... 6 months
		34 ... 7 months
		35 ... 8 months
		36 ... 9 months
		37 ...10 months
		38 ...11 months

Tape Location	Field Size	Item and Code Outline
228	1	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
		5 ... Hospital, Clinic or Medical Center unknown - Patient status not on certificate
		6 ... Other Institution providing patient care
		7 ... All other reported entries
		8 ... Dead on Arrival - Hospital, Clinic or Medical Center name not given
		9 ... Hospital and patient status not stated
229	1	Autopsy Performed
		1 ... Yes
		2 ... No
		8 ... Autopsy performed not on certificate
		9 ... Autopsy performed not stated
230	1	Place of Accident for Causes E850-E929
		Blank ... Causes other than E850-E929
		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
231-237	7	UNDERLYING CAUSE OF DEATH
231-234	4	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 (800-999). 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 234 is blank.
235-237	3	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)

Tape Location	Field Size	Item and Code Outline
238-481	244	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).
238-239	2	Number of Entity-Axis Conditions 00-20 ... Code range
240-379	140	ENTITY - AXIS CONDITIONS Space has been provided for a 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
240-246	7	1st Condition
247-253	7	2nd Condition
254-260	7	3rd Condition
261-267	7	4th Condition
268-274	7	5th Condition
275-281	7	6th Condition
282-288	7	7th Condition
289-295	7	8th Condition
296-302	7	9th Condition
303-309	7	10th Condition
310-316	7	11th Condition
317-323	7	12th Condition
324-330	7	13th Condition
331-337	7	14th Condition
338-344	7	15th Condition
345-351	7	16th Condition

Tape Location	Field Size	Item and Code Outline
		ENTITY - AXIS CONDITIONS - continued
352-358	7	17th Condition
359-365	7	18th Condition
366-372	7	19th Condition
373-379	7	20th Condition
380-381	2	Number of Record-Axis Conditions 00-20 ... Code range
382-481	100	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. Position 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
382-386	5	1st Condition
387-391	5	2nd Condition
392-396	5	3rd Condition
397-401	5	4th Condition
402-406	5	5th Condition
407-411	5	6th Condition
412-416	5	7th Condition
417-421	5	8th Condition
422-426	5	9th Condition
427-431	5	10th Condition
432-436	5	11th Condition
437-441	5	12th Condition
442-446	5	13th Condition
447-451	5	14th Condition
452-456	5	15th Condition
457-461	5	16th Condition
462-466	5	17th Condition
467-471	5	18th Condition
472-476	5	19th Condition
477-481	5	20th Condition
482-500	19	Reserved positions

Linked Birth/Infant Death Data Set

Geographic Code Outline

The following pages show in detail 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. 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. The vital statistics codes are effective with the 1982 data year and are based on results of the 1980 Census.

To aid the user in interpreting the geographic codes, a brief explanation of the codes and of the column headings/abbreviations shown on the following pages are:

State: Each State and the District of Columbia are numbered alphabetically. In addition, several unique codes are used to identify nonresidents of the U.S.

County: Counties and county equivalents (independent and coextensive cities) are numbered alphabetically within each State.

City: Cities are numbered alphabetically within each State.

Name: Each State, county, and city name is listed along with its respective code. In addition, places used to identify nonresidents of the U.S. are also listed along with their codes.

Listing of Counties Identified in the Linked Data Set

State	County	State and County Name
01		Alabama
	037	Jefferson
	049	Mobile
02		Alaska
03		Arizona
	007	Maricopa
	010	Pima
04		Arkansas
	060	Pulaski
05		California
	001	Alameda
	007	Contra Costa
	010	Fresno
	015	Kern
	019	Los Angeles
	027	Monterey
	030	Orange
	033	Riverside
	034	Sacramento
	036	San Bernardino
	037	San Diego
	038	San Francisco, coext. with San Francisco city
	039	San Joaquin
	041	San Mateo
	042	Santa Barbara
	043	Santa Clara
	049	Sonoma
	050	Stanislaus
	056	Ventura
06		Colorado
	003	Arapahoe
	016	Denver, coext. with Denver city
	021	El Paso
	030	Jefferson
07		Connecticut
	001	Fairfield
	002	Hartford
	005	New Haven
08		Delaware
	002	New Castle
09		District of Columbia
	001	District of Columbia
10		Florida
	005	Brevard
	006	Broward
	013	Dade
	016	Duval
	029	Hillsborough
	048	Orange
	050	Palm Beach
	052	Pinellas
	053	Polk
	064	Volusia

Listing of Counties Identified in the Linked Data Set

State	County	State and County Name
11		Georgia
	033	Cobb
	044	De Kalb
	060	Fulton
12		Hawaii
	002	Honolulu
13		Idaho
14		Illinois
	016	Cook
	022	Du Page
	045	Kane
	049	Lake
	082	St. Clair
	099	Will
	101	Winnebago
15		Indiana
	002	Allen
	045	Lake
	049	Marion
16		Iowa
	077	Polk
17		Kansas
	046	Johnson
	087	Sedgwick
18		Kentucky
	056	Jefferson
19		Louisiana
	009	Caddo
	017	East Baton Rouge
	026	Jefferson
	036	Orleans, coext. with New Orleans city
20		Maine
21		Maryland
	002	Anne Arundel
	003	Baltimore
	004	Baltimore city
	016	Montgomery
	017	Prince George's
22		Massachusetts
	003	Bristol
	005	Essex
	007	Hampden
	009	Middlesex
	011	Norfolk
	012	Plymouth
	013	Suffolk
	014	Worcester
23		Michigan
	025	Genesee
	033	Ingham
	041	Kent
	050	Macomb
	063	Oakland
	081	Washtenaw
	082	Wayne

State	County	State and County Name
24		Minnesota
	027	Hennepin
	062	Ramsey
25		Mississippi
	025	Hinds
26		Missouri
	048	Jackson
	096	St. Louis
	097	St. Louis city
27		Montana
28		Nebraska
	028	Douglas
29		Nevada
	003	Clark
30		New Hampshire
	006	Hillsborough
31		New Jersey
	002	Bergen
	003	Burlington
	004	Camden
	007	Essex
	009	Hudson
	011	Mercer
	012	Middlesex
	013	Monmouth
	014	Morris
	015	Ocean
	016	Passaic
	020	Union
32		New Mexico
	001	Bernalillo
33		New York
	001	Albany
	014	Erie
	026	Monroe
	028	Nassau
	029	New York city
	031	Oneida
	032	Onondaga
	034	Orange
	040	Rockland
	048	Suffolk
	056	Westchester
34		North Carolina
	041	Guilford
	060	Mecklenburg
	092	Wake
35		North Dakota
36		Ohio
	009	Butler
	018	Cuyahoga
	025	Franklin
	031	Hamilton
	047	Lorain
	048	Lucas
	050	Mahoning
	057	Montgomery
	076	Stark
	077	Summit

State	County	State and County Name
37		Oklahoma
	055	Oklahoma
	072	Tulsa
38		Oregon
	020	Lane
	026	Multnomah
39		Pennsylvania
	002	Allegheny
	006	Berks
	009	Bucks
	015	Chester
	023	Delaware
	025	Erie
	036	Lancaster
	039	Lehigh
	040	Luzerne
	046	Montgomery
	051	Philadelphia, coext. with Philadelphia city
	065	Westmoreland
	067	York
40		Rhode Island
	004	Providence
41		South Carolina
	010	Charleston
	023	Greenville
	040	Richland
42		South Dakota
43		Tennessee
	019	Davidson
	033	Hamilton
	047	Knox
	079	Shelby
44		Texas
	015	Bexar
	057	Dallas
	071	El Paso
	101	Harris
	108	Hidalgo
	123	Jefferson
	178	Nueces
	220	Tarrant
	227	Travis
45		Utah
	018	Salt Lake
46		Vermont
47		Virginia
	040	Fairfax
	088	Norfolk city
	127	Virginia Beach city
48		Washington
	017	King
	027	Pierce
	031	Snohomish
	032	Spokane

State	County	State and County Name
49		West Virginia
50		Wisconsin
	013	Dane
	041	Milwaukee
	068	Waukesha
51		Wyoming

Listing of Cities Identified in the Linked Data Set

Vital Statistics Geographic Code Outline Effective With 1982 Data

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

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	S T	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: 1987 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	3,813,492	3,809,670	37,349	37,328	37,349	37,330
ALABAMA	58,633	59,584	718	719	742	722
ALASKA	11,540	11,677	116	123	104	119
ARIZONA	63,345	63,370	589	597	589	598
ARKANSAS	34,023	34,565	291	322	291	319
CALIFORNIA	503,758	503,518	4,483	4,481	4,481	4,493
COLORADO	54,096	53,808	550	535	568	535
CONNECTICUT	46,990	46,944	419	415	406	414
DELAWARE	10,398	9,889	110	110	102	110
DISTRICT OF COLUMBIA	20,529	10,208	255	172	393	169
FLORIDA	175,038	175,144	1,816	1,817	1,822	1,819
GEORGIA	103,881	102,507	1,289	1,291	1,277	1,294
HAWAII	18,689	18,604	160	154	156	151
IDAHO	15,737	15,932	162	174	146	172
ILLINOIS	177,488	180,695	2,060	2,119	1,995	2,097
INDIANA	78,515	78,575	776	782	788	789
IOWA	38,356	37,898	322	339	315	343
KANSAS	37,323	38,511	343	357	319	363
KENTUCKY	50,622	51,392	489	506	463	502
LOUISIANA	74,312	73,967	798	795	784	788
MAINE	16,111	16,847	130	137	126	137
MARYLAND	65,346	72,545	655	727	612	781
MASSACHUSETTS	86,272	84,503	624	613	656	609
MICHIGAN	138,937	140,597	1,471	1,481	1,467	1,472
MINNESOTA	64,984	65,173	551	549	573	553
MISSISSIPPI	40,374	41,292	530	549	509	552
MISSOURI	76,918	75,154	820	759	896	758

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: 1987 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	11,924	12,245	102	114	84	116
NEBRASKA	24,106	23,822	211	200	225	201
NEVADA	16,557	16,668	160	160	162	159
NEW HAMPSHIRE	16,685	17,032	131	130	118	126
NEW JERSEY	110,338	113,371	800	853	809	920
NEW MEXICO	26,938	27,304	225	231	215	231
NEW YORK	272,836	272,118	2,757	2,762	2,718	2,722
UPSTATE	145,642	149,318	1,283	1,342	1,196	1,304
CITY	127,194	122,800	1,474	1,420	1,522	1,418
NORTH CAROLINA	93,870	93,504	1,124	1,134	1,130	1,139
NORTH DAKOTA	11,545	10,300	113	92	102	88
OHIO	158,870	157,842	1,385	1,368	1,386	1,364
OKLAHOMA	46,779	47,882	405	422	403	416
OREGON	39,996	38,697	413	407	422	406
PENNSYLVANIA	163,722	162,674	1,679	1,640	1,745	1,623
RHODE ISLAND	14,669	14,047	121	116	122	115
SOUTH CAROLINA	50,662	52,801	655	674	649	673
SOUTH DAKOTA	11,538	11,493	115	114	109	113
TENNESSEE	72,676	67,944	879	801	903	811
TEXAS	305,530	301,972	2,649	2,618	2,642	2,611
UTAH	36,265	35,327	313	293	345	297
VERMONT	7,888	8,130	83	70	76	71
VIRGINIA	87,614	90,334	939	940	859	890
WASHINGTON	69,346	70,361	687	680	697	685
WEST VIRGINIA	23,421	22,425	219	212	207	216
WISCONSIN	70,457	70,940	601	603	596	606
WYOMING	7,045	7,538	56	71	45	72
FOREIGN RESIDENTS	...	3,822	...	21	...	19

DOCUMENTATION TABLE 2

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY RACE OF CHILD, SEX, AND BIRTH WEIGHT: UNITED STATES, 1987 BIRTH COHORT

(RATES ARE PER 1000 LIVE BIRTHS)

RACE OF CHILD AND SEX	TOTAL	<500 GRAMS	500-749 GRAMS	750-999 GRAMS	1000-1249 GRAMS	1250-1499 GRAMS	1500-1999 GRAMS	2000-2499 GRAMS	2500 GRAMS OR MORE	NOT STATED
ALL RACES 1/										
BOTH SEXES										
LIVE BIRTHS.....	3,809,670	5,096	8,671	9,829	10,758	12,902	49,869	165,356	3,542,240	4,949
INFANT DEATHS...	37,328	4,523	6,043	3,220	1,707	1,113	2,368	3,129	14,127	1,098
INF.MORT.RATE...	9.8	887.6	696.9	327.6	158.7	86.3	47.5	18.9	4.0	221.9
MALE										
LIVE BIRTHS.....	1,951,313	2,571	4,434	5,121	5,528	6,532	24,468	75,363	1,824,696	2,600
INFANT DEATHS...	21,194	2,298	3,352	1,958	1,102	672	1,307	1,688	8,196	621
INF.MORT.RATE...	10.9	893.8	756.0	382.3	199.3	102.9	53.4	22.4	4.5	238.8
FEMALE										
LIVE BIRTHS.....	1,858,357	2,525	4,237	4,708	5,230	6,370	25,401	89,993	1,717,544	2,349
INFANT DEATHS...	16,134	2,225	2,691	1,262	605	441	1,061	1,441	5,931	477
INF.MORT.RATE...	8.7	881.2	635.1	268.1	115.7	69.2	41.8	16.0	3.5	203.1
WHITE										
BOTH SEXES										
LIVE BIRTHS.....	2,992,659	2,778	4,820	5,752	6,690	8,087	32,274	109,505	2,819,127	3,626
INFANT DEATHS...	24,553	2,490	3,486	2,086	1,193	779	1,640	2,081	10,163	635
INF.MORT.RATE...	8.2	896.3	723.2	362.7	178.3	96.3	50.8	19.0	3.6	175.1
MALE										
LIVE BIRTHS.....	1,535,619	1,356	2,453	3,091	3,508	4,148	15,968	50,313	1,452,894	1,888
INFANT DEATHS...	14,101	1,227	1,908	1,298	772	482	913	1,139	6,005	357
INF.MORT.RATE...	9.2	904.9	777.8	419.9	220.1	116.2	57.2	22.6	4.1	189.1
FEMALE										
LIVE BIRTHS.....	1,457,040	1,422	2,367	2,661	3,182	3,939	16,306	59,192	1,366,233	1,738
INFANT DEATHS...	10,452	1,263	1,578	788	421	297	727	942	4,158	278
INF.MORT.RATE...	7.2	888.2	666.7	296.1	132.3	75.4	44.6	15.9	3.0	160.0
BLACK										
BOTH SEXES										
LIVE BIRTHS.....	641,661	2,178	3,579	3,725	3,701	4,338	15,668	48,282	559,126	1,064
INFANT DEATHS...	11,235	1,907	2,376	1,029	453	292	622	896	3,250	410
INF.MORT.RATE...	17.5	875.6	663.9	276.2	122.4	67.3	39.7	18.6	5.8	385.3
MALE										
LIVE BIRTHS.....	325,313	1,138	1,835	1,840	1,817	2,123	7,502	21,485	286,988	585
INFANT DEATHS...	6,229	1,004	1,337	593	284	160	338	475	1,800	238
INF.MORT.RATE...	19.1	882.2	728.6	322.3	156.3	75.4	45.1	22.1	6.3	406.8
FEMALE										
LIVE BIRTHS.....	316,348	1,040	1,744	1,885	1,884	2,215	8,166	26,797	272,138	479
INFANT DEATHS...	5,006	903	1,039	436	169	132	284	421	1,450	172
INF.MORT.RATE...	15.8	868.3	595.8	231.3	89.7	59.6	34.8	15.7	5.3	359.1

1/ INCLUDES RACES OTHER THAN WHITE AND BLACK

DOCUMENTATION TABLE 3

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF CHILD, AND GESTATIONAL AGE: UNITED STATES, 1987 BIRTH COHORT

(RATES ARE PER 1000 LIVE BIRTHS)

BIRTH WEIGHT AND RACE OF CHILD	GESTATION									
	TOTAL	<28 WEEKS	28-31 WEEKS	32-35 WEEKS	36 WEEKS	37-39 WEEKS	40 WEEKS	41 WEEKS	42 WEEKS OR MORE	NOT STATED
ALL RACES 1/										
TOTAL										
LIVE BIRTHS	3,809,670	29,294	42,207	178,565	122,395	1,459,905	793,706	531,496	494,099	158,003
INFANT DEATHS	37,328	11,374	3,089	3,334	1,254	7,021	2,818	1,951	2,445	4,042
INF.MORT.RATE	9.8	388.3	73.2	18.7	10.2	4.8	3.6	3.7	4.9	25.6
LESS THAN 2,500 GRAMS										
LIVE BIRTHS	262,481	21,618	27,661	71,572	23,610	67,165	13,286	7,464	11,137	18,968
INFANT DEATHS	22,103	10,700	2,884	2,425	563	1,665	373	254	431	2,808
INF.MORT.RATE	84.2	495.0	104.3	33.9	23.8	24.8	28.1	34.0	38.7	148.0
LESS THAN 500 GRAMS										
LIVE BIRTHS	5,096	3,803	149	76	10	78	26	38	42	874
INFANT DEATHS	4,523	3,474	119	57	9	38	12	15	24	775
INF. MORT. RATE	887.6	913.5	798.7	750.0	900.0	487.2	461.5	394.7	571.4	886.7
500-749 GRAMS										
LIVE BIRTHS	8,671	6,116	811	223	36	171	62	42	59	1,151
INFANT DEATHS	6,043	4,455	434	133	23	92	29	19	32	826
INF. MORT. RATE	696.9	728.4	535.1	596.4	638.9	538.0	467.7	452.4	542.4	717.6
750-999 GRAMS										
LIVE BIRTHS	9,829	5,170	2,339	658	75	221	77	50	85	1,154
INFANT DEATHS	3,220	1,939	557	170	19	64	17	12	21	421
INF. MORT. RATE	327.6	375.0	238.1	258.4	253.3	289.6	220.8	240.0	247.1	364.8
1,000-1,249 GRAMS										
LIVE BIRTHS	10,758	2,549	4,681	1,549	155	380	100	74	130	1,140
INFANT DEATHS	1,707	523	641	200	23	53	15	8	22	222
INF. MORT. RATE	158.7	205.2	136.9	129.1	148.4	139.5	150.0	108.1	169.2	194.7
1,250-1,499 GRAMS										
LIVE BIRTHS	12,902	1,060	5,770	3,215	400	767	187	111	206	1,186
INFANT DEATHS	1,113	139	479	228	33	84	12	13	19	106
INF. MORT. RATE	86.3	131.1	83.0	70.9	82.5	109.5	64.2	117.1	92.2	89.4
1,500-1,999 GRAMS										
LIVE BIRTHS	49,869	1,486	9,269	20,922	3,600	7,498	1,196	737	1,307	3,854
INFANT DEATHS	2,368	110	511	784	172	397	79	47	76	192
INF. MORT. RATE	47.5	74.0	55.1	37.5	47.8	52.9	66.1	63.8	58.1	49.8
2,000-2,499 GRAMS										
LIVE BIRTHS	165,356	1,434	4,642	44,929	19,334	58,050	11,638	6,412	9,308	9,609
INFANT DEATHS	3,129	60	143	853	284	937	209	140	237	266
INF. MORT. RATE	18.9	41.8	30.8	19.0	14.7	16.1	18.0	21.8	25.5	27.7
2,500-2,999 GRAMS										
LIVE BIRTHS	608,389	2,233	5,127	46,466	42,584	292,431	87,825	48,271	55,587	27,865
INFANT DEATHS	4,415	48	74	473	354	1,853	552	327	453	281
INF.MORT.RATE	7.3	21.5	14.4	10.2	8.3	6.3	6.3	6.8	8.1	10.1
3,000-3,499 GRAMS										
LIVE BIRTHS	1,394,698	2,883	5,744	38,272	36,956	608,840	298,569	178,289	170,588	54,557
INFANT DEATHS	5,432	63	40	255	230	2,099	943	673	789	340
INF MORT RATE	3.9	21.9	7.0	6.7	6.2	3.4	3.2	3.8	4.6	6.2

DOCUMENTATION TABLE 3

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF CHILD, AND GESTATIONAL AGE: UNITED STATES, 1987 BIRTH COHORT

(RATES ARE PER 1000 LIVE BIRTHS)

BIRTH WEIGHT AND RACE OF CHILD	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/										
3,500-3,999 GRAMS										
LIVE BIRTHS	1,120,963	1,470	2,719	17,393	15,106	383,996	285,674	200,966	173,329	40,310
INFANT DEATHS	3,063	30	22	89	72	1,001	673	477	510	189
INF.MORT.RATE	2.7	20.4	8.1	5.1	4.8	2.6	2.4	2.4	2.9	4.7
4,000-4,499 GRAMS										
LIVE BIRTHS	347,536	373	608	3,859	3,367	91,083	90,767	78,367	66,917	12,195
INFANT DEATHS	886	13	5	25	14	259	212	161	159	38
INF.MORT.RATE	2.5	34.9	8.2	6.5	4.2	2.8	2.3	2.1	2.4	3.1
4,500-4,999 GRAMS										
LIVE BIRTHS	62,774	63	104	605	559	13,627	15,328	15,987	14,224	2,277
INFANT DEATHS	210	15	3	9	3	51	31	32	49	17
INF.MORT.RATE	3.3	238.1	28.8	14.9	5.4	3.7	2.0	2.0	3.4	7.5
5,000 GRAMS OR MORE										
LIVE BIRTHS	7,880	79	36	115	94	1,799	1,708	1,798	1,953	298
INFANT DEATHS	121	60	8	9	1	13	7	2	17	14
INF.MORT.RATE	15.4	632.9	222.2	78.3	10.6	7.2	4.1	1.1	8.7	47.0
NOT STATED										
LIVE BIRTHS	4,949	575	208	283	119	964	549	354	364	1,533
INFANT DEATHS	1,098	455	53	49	17	80	27	25	37	355
INF.MORT.RATE	221.9	791.3	254.8	173.1	142.9	83.0	49.2	70.6	101.6	231.6

DOCUMENTATION TABLE 3

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF CHILD, AND GESTATIONAL AGE: UNITED STATES, 1987 BIRTH COHORT

(RATES ARE PER 1000 LIVE BIRTHS)

BIRTH WEIGHT AND RACE OF CHILD	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	2,992,659	16,155	25,274	116,878	86,746	1,130,684	651,241	446,243	401,109	118,329
INFANT DEATHS	24,553	6,684	2,061	2,240	858	4,894	2,049	1,510	1,786	2,471
INF.MORT.RATE	8.2	413.7	81.5	19.2	9.9	4.3	3.1	3.4	4.5	20.9
LESS THAN 2,500 GRAMS										
LIVE BIRTHS	169,906	11,822	16,974	48,040	15,847	44,349	8,772	5,076	7,300	11,726
INFANT DEATHS	13,755	6,307	1,937	1,650	391	1,089	241	174	284	1,682
INF.MORT.RATE	81.0	533.5	114.1	34.3	24.7	24.6	27.5	34.3	38.9	143.4
LESS THAN 500 GRAMS										
LIVE BIRTHS	2,778	2,110	79	38	9	42	14	32	27	427
INFANT DEATHS	2,490	1,971	63	29	8	12	5	13	11	378
INF. MORT. RATE	896.3	934.1	797.5	763.2	888.9	285.7	357.1	406.3	407.4	885.2
500-749 GRAMS										
LIVE BIRTHS	4,820	3,398	457	118	21	90	29	26	33	648
INFANT DEATHS	3,486	2,582	254	72	11	48	14	12	15	478
INF. MORT. RATE	723.2	759.9	555.8	610.2	523.8	533.3	482.8	461.5	454.5	737.7
750-999 GRAMS										
LIVE BIRTHS	5,752	2,975	1,397	405	37	141	38	29	49	681
INFANT DEATHS	2,086	1,237	359	124	13	38	9	6	13	287
INF. MORT. RATE	362.7	415.8	257.0	306.2	351.4	269.5	236.8	206.9	265.3	421.4
1,000-1,249 GRAMS										
LIVE BIRTHS	6,690	1,484	3,027	987	91	226	53	39	78	705
INFANT DEATHS	1,193	339	482	136	18	35	7	4	16	156
INF. MORT. RATE	178.3	228.4	159.2	137.8	197.8	154.9	132.1	102.6	205.1	221.3
1,250-1,499 GRAMS										
LIVE BIRTHS	8,087	524	3,723	2,053	269	494	115	70	120	719
INFANT DEATHS	779	84	339	163	26	61	9	8	14	75
INF. MORT. RATE	96.3	160.3	91.1	79.4	96.7	123.5	78.3	114.3	116.7	104.3
1,500-1,999 GRAMS										
LIVE BIRTHS	32,274	644	5,902	13,944	2,384	4,876	731	477	849	2,467
INFANT DEATHS	1,640	64	356	555	120	283	50	30	55	127
INF. MORT. RATE	50.8	99.4	60.3	39.8	50.3	58.0	68.4	62.9	64.8	51.5
2,000-2,499 GRAMS										
LIVE BIRTHS	109,505	687	2,389	30,495	13,036	38,480	7,792	4,403	6,144	6,079
INFANT DEATHS	2,081	30	84	571	195	612	147	101	160	181
INF. MORT. RATE	19.0	43.7	35.2	18.7	15.0	15.9	18.9	22.9	26.0	29.8
2,500-2,999 GRAMS										
LIVE BIRTHS	424,055	1,072	2,478	29,729	30,032	204,844	62,912	35,205	39,138	18,645
INFANT DEATHS	2,917	22	40	305	234	1,241	368	226	311	170
INF.MORT.RATE	6.9	20.5	16.1	10.3	7.8	6.1	5.8	6.4	7.9	9.1
3,000-3,499 GRAMS										
LIVE BIRTHS	1,079,851	1,622	3,350	23,530	26,539	469,278	237,981	143,765	133,067	40,719
INFANT DEATHS	3,929	37	25	159	157	1,512	691	535	579	234
INF.MORT.RATE	3 6	22 8	7 5	6.8	5.9	3.2	2.9	3.7	4.4	5 7

DOCUMENTATION TABLE 3

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF CHILD, AND GESTATIONAL AGE: UNITED STATES, 1987 BIRTH COHORT

(RATES ARE PER 1000 LIVE BIRTHS)

BIRTH WEIGHT AND RACE OF CHILD	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										
3,500-3,999 GRAMS										
LIVE BIRTHS	945,180	964	1,800	11,948	11,084	319,327	244,969	174,773	147,092	33,223
INFANT DEATHS	2,339	18	11	60	46	743	523	392	406	140
INF.MORT.RATE	2.5	18.7	6.1	5.0	4.2	2.3	2.1	2.2	2.8	4.2
4,000-4,499 GRAMS										
LIVE BIRTHS	307,121	272	449	2,893	2,650	78,879	80,834	70,921	59,618	10,605
INFANT DEATHS	718	10	5	17	11	203	177	135	130	30
INF.MORT.RATE	2.3	36.8	11.1	5.9	4.2	2.6	2.2	1.9	2.2	2.8
4,500-4,999 GRAMS										
LIVE BIRTHS	56,051	47	77	470	443	11,768	13,817	14,563	12,856	2,010
INFANT DEATHS	174	9	2	8	3	45	26	29	39	13
INF.MORT.RATE	3.1	191.5	26.0	17.0	6.8	3.8	1.9	2.0	3.0	6.5
5,000 GRAMS OR MORE										
LIVE BIRTHS	6,869	51	24	90	74	1,484	1,504	1,635	1,760	247
INFANT DEATHS	86	34	6	7	1	8	6	2	13	9
INF.MORT.RATE	12.5	666.7	250.0	77.8	13.5	5.4	4.0	1.2	7.4	36.4
NOT STATED										
LIVE BIRTHS	3,626	305	122	178	77	755	452	305	278	1,154
INFANT DEATHS	635	247	35	34	15	53	17	17	24	193
INF.MORT.RATE	175.1	809.8	286.9	191.0	194.8	70.2	37.6	55.7	86.3	167.2

DOCUMENTATION TABLE 3

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF CHILD, AND GESTATIONAL AGE: UNITED STATES, 1987 BIRTH COHORT

(RATES ARE PER 1000 LIVE BIRTHS)

BIRTH WEIGHT AND RACE OF CHILD	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	641,661	12,175	15,277	53,109	29,758	255,493	107,772	64,675	73,297	30,105
INFANT DEATHS	11,235	4,330	942	949	348	1,739	632	360	547	1,388
INF.MORT.RATE	17.5	355.6	61.7	17.9	11.7	6.8	5.9	5.6	7.5	46.1
LESS THAN 2,500 GRAMS										
LIVE BIRTHS	81,471	9,077	9,767	20,757	6,703	19,445	3,913	2,066	3,409	6,334
INFANT DEATHS	7,575	4,053	866	676	157	481	113	72	130	1,027
INF.MORT.RATE	93.0	446.5	88.7	32.6	23.4	24.7	28.9	34.8	38.1	162.1
LESS THAN 500 GRAMS										
LIVE BIRTHS	2,178	1,589	65	37	1	33	9	6	14	424
INFANT DEATHS	1,907	1,406	51	27	1	25	6	2	13	376
INF. MORT. RATE	875.6	884.8	784.6	729.7	1000.0	757.6	666.7	333.3	928.6	886.8
500-749 GRAMS										
LIVE BIRTHS	3,679	2,528	331	96	12	74	29	15	26	468
INFANT DEATHS	2,376	1,735	173	57	11	42	13	7	17	321
INF. MORT. RATE	663.9	686.3	522.7	593.8	916.7	567.6	448.3	466.7	653.8	685.9
750-999 GRAMS										
LIVE BIRTHS	3,725	1,995	867	236	35	68	38	20	35	431
INFANT DEATHS	1,029	634	183	42	6	23	7	5	8	121
INF. MORT. RATE	276.2	317.8	211.1	178.0	171.4	338.2	184.2	250.0	228.6	280.7
1,000-1,249 GRAMS										
LIVE BIRTHS	3,701	964	1,523	506	60	131	42	32	47	396
INFANT DEATHS	453	158	146	54	5	12	8	4	5	61
INF. MORT. RATE	122.4	163.9	95.9	106.7	83.3	91.6	190.5	125.0	106.4	154.0
1,250-1,499 GRAMS										
LIVE BIRTHS	4,338	503	1,849	1,030	122	248	63	35	82	406
INFANT DEATHS	292	52	119	60	6	18	3	4	5	25
INF. MORT. RATE	67.3	103.4	64.4	58.3	49.2	72.6	47.6	114.3	61.0	61.6
1,500-1,999 GRAMS										
LIVE BIRTHS	15,668	795	3,067	6,205	1,057	2,275	409	227	418	1,215
INFANT DEATHS	622	42	143	196	46	86	22	16	20	51
INF. MORT. RATE	39.7	52.8	46.6	31.6	43.5	37.8	53.8	70.5	47.8	42.0
2,000-2,499 GRAMS										
LIVE BIRTHS	48,282	703	2,065	12,647	5,416	16,616	3,323	1,731	2,787	2,994
INFANT DEATHS	896	26	51	240	82	275	54	34	62	72
INF. MORT. RATE	18.6	37.0	24.7	19.0	15.1	16.6	16.3	19.6	22.2	24.0
2,500-2,999 GRAMS										
LIVE BIRTHS	150,628	1,090	2,403	14,462	10,533	70,355	19,938	10,666	13,876	7,305
INFANT DEATHS	1,284	25	32	152	103	505	164	91	121	91
INF.MORT.RATE	8 5	22 9	13 3	10 5	9 8	7 2	8.2	8.5	8.7	12.5
3,000-3,499 GRAMS										
LIVE BIRTHS	243,647	1,176	2,068	12,447	8,601	106,915	45,887	26,541	29,949	10,063
INFANT DEATHS	1,226	25	14	81	61	482	200	107	176	80
INF.MORT RATE	5 0	21 3	6 8	6 5	7 1	4.5	4.4	4.0	5.9	7.9

DOCUMENTATION TABLE 3

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF CHILD, AND GESTATIONAL AGE: UNITED STATES, 1987 BIRTH COHORT

(RATES ARE PER 1000 LIVE BIRTHS)

BIRTH WEIGHT AND RACE OF CHILD	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										
3,500-3,999 GRAMS										
LIVE BIRTHS	130,569	447	792	4,466	3,242	48,161	29,732	19,083	19,774	4,872
INFANT DEATHS	554	12	9	22	22	196	117	66	74	36
INF.MORT.RATE	4.2	26.8	11.4	4.9	6.8	4.1	3.9	3.5	3.7	7.4
4,000-4,499 GRAMS										
LIVE BIRTHS	28,812	91	131	762	541	8,870	7,067	5,194	5,116	1,040
INFANT DEATHS	130	3	-	4	3	42	30	16	24	8
INF.MORT.RATE	4.5	33.0	-	5.2	5.5	4.7	4.2	3.1	4.7	7.7
4,500-4,999 GRAMS										
LIVE BIRTHS	4,730	16	24	105	88	1,358	1,028	982	964	165
INFANT DEATHS	24	6	1	-	-	5	1	2	8	1
INF.MORT.RATE	5.1	375.0	41.7	-	-	3.7	1.0	2.0	8.3	6.1
5,000 GRAMS OR MORE										
LIVE BIRTHS	740	27	12	19	13	233	141	111	147	37
INFANT DEATHS	32	15	2	1	-	5	1	-	3	5
INF.MORT.RATE	43.2	555.6	166.7	52.6	-	21.5	7.1	-	20.4	135.1
NOT STATED										
LIVE BIRTHS	1,064	251	80	91	37	156	66	32	62	289
INFANT DEATHS	410	191	18	13	2	23	6	6	11	140
INF.MORT.RATE	385.3	761.0	225.0	142.9	54.1	147.4	90.9	187.5	177.4	484.4

1/ INCLUDES RACES OTHER THAN WHITE AND BLACK

DOCUMENTATION TABLE 4

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF CHILD, AND AGE AT DEATH: UNITED STATES, 1987 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 CHILD	LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
ALL RACES 1/						
TOTAL (ALL BIRTH WEIGHTS)...NUMBER..	3,809,670	37,328	23,810	19,762	4,048	13,518
RATE..		9.8	6.2	5.2	1.1	3.5
LESS THAN 2,500 GRAMS.....NUMBER..	262,481	22,103	17,876	15,513	2,363	4,227
RATE..		84.2	68.1	59.1	9.0	16.1
LESS THAN 500 GRAMS.....NUMBER..	5,096	4,523	4,493	4,430	63	30
RATE..		887.6	881.7	869.3	12.4	5.9
500-749 GRAMS.....NUMBER..	8,671	6,043	5,545	5,035	510	498
RATE..		696.9	639.5	580.7	58.8	57.4
750-999 GRAMS.....NUMBER..	9,829	3,220	2,622	2,119	503	598
RATE..		327.6	266.8	215.6	51.2	60.8
1,000-1,249 GRAMS.....NUMBER..	10,758	1,707	1,312	967	345	395
RATE..		158.7	122.0	89.9	32.1	36.7
1,250-1,499 GRAMS.....NUMBER..	12,902	1,113	790	595	195	323
RATE..		86.3	61.2	46.1	15.1	25.0
1,500-1,999 GRAMS.....NUMBER..	49,869	2,368	1,543	1,207	336	825
RATE..		47.5	30.9	24.2	6.7	16.5
2,000-2,499 GRAMS.....NUMBER..	165,356	3,129	1,571	1,160	411	1,558
RATE..		18.9	9.5	7.0	2.5	9.4
2,500-2,999 GRAMS.....NUMBER..	608,389	4,415	1,713	1,143	570	2,702
RATE..		7.3	2.8	1.9	.9	4.4
3,000-3,499 GRAMS.....NUMBER..	1,394,698	5,432	1,746	1,127	619	3,686
RATE..		3.9	1.3	.8	.4	2.6
3,500-3,999 GRAMS.....NUMBER..	1,120,963	3,063	959	635	324	2,104
RATE..		2.7	.9	.6	.3	1.9
4,000-4,499 GRAMS.....NUMBER..	347,536	886	303	213	90	583
RATE..		2.5	.9	.6	.3	1.7
4,500-4,999 GRAMS.....NUMBER..	62,774	210	96	74	22	114
RATE..		3.3	1.5	1.2	.4	1.8
5,000 GRAMS OR MORE.....NUMBER..	7,880	121	87	72	15	34
RATE..		15.4	11.0	9.1	1.9	4.3
NOT STATED.....NUMBER..	4,949	1,098	1,030	985	45	68
RATE..		221.9	208.1	199.0	9.1	13.7

DOCUMENTATION TABLE 4

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF CHILD, AND AGE AT DEATH: UNITED STATES, 1987 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)-CONTINUED

BIRTH WEIGHT AND RACE OF CHILD	LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
WHITE						
TOTAL (ALL BIRTH WEIGHTS)...NUMBER..	2,992,659	24,563	15,552	12,778	2,774	9,001
RATE..		8.2	5.2	4.3	.9	3.0
LESS THAN 2,500 GRAMS.....NUMBER..	169,906	13,755	11,326	9,767	1,559	2,429
RATE..		81.0	66.7	57.5	9.2	14.3
LESS THAN 500 GRAMS.....NUMBER..	2,778	2,490	2,476	2,439	37	14
RATE..		896.3	891.3	878.0	13.3	5.0
500-749 GRAMS.....NUMBER..	4,820	3,486	3,259	2,971	288	227
RATE..		723.2	676.1	616.4	59.8	47.1
750-999 GRAMS.....NUMBER..	5,752	2,086	1,772	1,440	332	314
RATE..		362.7	308.1	250.3	57.7	54.6
1,000-1,249 GRAMS.....NUMBER..	6,690	1,193	957	709	248	236
RATE..		178.3	143.0	106.0	37.1	35.3
1,250-1,499 GRAMS.....NUMBER..	8,087	779	583	439	144	196
RATE..		96.3	72.1	54.3	17.8	24.2
1,500-1,999 GRAMS.....NUMBER..	32,274	1,640	1,133	894	239	507
RATE..		50.8	35.1	27.7	7.4	15.7
2,000-2,499 GRAMS.....NUMBER..	109,505	2,081	1,146	875	271	935
RATE..		19.0	10.5	8.0	2.5	8.5
2,500-2,999 GRAMS.....NUMBER..	424,055	2,917	1,223	838	385	1,694
RATE..		6.9	2.9	2.0	.9	4.0
3,000-3,499 GRAMS.....NUMBER..	1,079,851	3,929	1,307	861	446	2,622
RATE..		3.6	1.2	.8	.4	2.4
3,500-3,999 GRAMS.....NUMBER..	945,180	2,339	735	477	258	1,604
RATE..		2.5	.8	.5	.3	1.7
4,000-4,499 GRAMS.....NUMBER..	307,121	718	236	170	66	482
RATE..		2.3	.8	.6	.2	1.6
4,500-4,999 GRAMS.....NUMBER..	56,051	174	77	59	18	97
RATE..		3.1	1.4	1.1	.3	1.7
5,000 GRAMS OR MORE.....NUMBER..	6,869	86	57	48	9	29
RATE..		12.5	8.3	7.0	1.3	4.2
NOT STATED.....NUMBER..	3,626	635	591	558	33	44
RATE..		175.1	163.0	153.9	9.1	12.1

DOCUMENTATION TABLE 4

LIVE BIRTHS, INFANT DEATHS, AND INFANT MORTALITY RATES BY BIRTH WEIGHT, RACE OF CHILD, AND AGE AT DEATH: UNITED STATES, 1987 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)-CONTINUED

BIRTH WEIGHT AND RACE OF CHILD		LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
BLACK							
TOTAL (ALL BIRTH WEIGHTS)	NUMBER	641,661	11,235	7,397	6,314	1,083	3,838
	RATE		17.5	11.5	9.8	1.7	6.0
LESS THAN 2,500 GRAMS	NUMBER	81,471	7,575	5,950	5,245	705	1,625
	RATE		93.0	73.0	64.4	8.7	19.9
LESS THAN 500 GRAMS	NUMBER	2,178	1,907	1,891	1,865	26	16
	RATE		875.6	868.2	856.3	11.9	7.3
500-749 GRAMS	NUMBER	3,579	2,376	2,118	1,913	205	258
	RATE		663.9	591.8	534.5	57.3	72.1
750-999 GRAMS	NUMBER	3,725	1,029	763	614	149	266
	RATE		276.2	204.8	164.8	40.0	71.4
1,000-1,249 GRAMS	NUMBER	3,701	453	307	229	78	146
	RATE		122.4	83.0	61.9	21.1	39.4
1,250-1,499 GRAMS	NUMBER	4,338	292	174	128	46	118
	RATE		67.3	40.1	29.5	10.6	27.2
1,500-1,999 GRAMS	NUMBER	15,668	622	347	262	85	275
	RATE		39.7	22.1	16.7	5.4	17.6
2,000-2,499 GRAMS	NUMBER	48,282	896	350	234	116	546
	RATE		18.6	7.2	4.8	2.4	11.3
2,500-2,999 GRAMS	NUMBER	150,628	1,284	417	257	160	867
	RATE		8.5	2.8	1.7	1.1	5.8
3,000-3,499 GRAMS	NUMBER	243,647	1,226	368	233	135	858
	RATE		5.0	1.5	1.0	.6	3.5
3,500-3,999 GRAMS	NUMBER	130,569	554	176	126	50	378
	RATE		4.2	1.3	1.0	.4	2.9
4,000-4,499 GRAMS	NUMBER	28,812	130	54	35	19	76
	RATE		4.5	1.9	1.2	.7	2.6
4,500-4,999 GRAMS	NUMBER	4,730	24	15	13	2	9
	RATE		5.1	3.2	2.7	.4	1.9
5,000 GRAMS OR MORE	NUMBER	740	32	27	23	4	5
	RATE		43.2	36.5	31.1	5.4	6.8
NOT STATED	NUMBER	1,064	410	390	382	8	20
	RATE		385.3	366.5	359.0	7.5	18.8

1/ INCLUDES RACES OTHER THAN WHITE AND BLACK

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF CHILD AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF CHILD FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1987 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 CHILD		LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
ALL RACES 1/, ALL BIRTH WEIGHTS							
ALL CAUSES	NUMBER...	3,809,670	37,328	23,810	19,762	4,048	13,518
	RATE..		979.8	625.0	518.7	106.3	354.8
CONGENITAL ANOMALIES (740-759)	NUMBER...		7,726	5,604	4,502	1,102	2,122
	RATE..		202.8	147.1	118.2	28.9	55.7
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER...		5,139	350	35	315	4,789
	RATE..		134.9	9.2	.9	8.3	125.7
PREMATURITY (765)	NUMBER...		3,247	3,183	3,165	18	64
	RATE..		85.2	83.6	83.1	.5	1.7
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER...		3,185	2,987	2,426	561	198
	RATE..		83.6	78.4	63.7	14.7	5.2
MATERNAL COMPLICATIONS (761)	NUMBER...		1,370	1,356	1,348	8	14
	RATE..		36.0	35.6	35.4	.2	.4
ACCIDENTS (E800-E949)	NUMBER...		878	70	25	45	808
	RATE..		23.0	1.8	.7	1.2	21.2
INFECTIONS (771)	NUMBER...		850	803	511	292	47
	RATE..		22.3	21.1	13.4	7.7	1.2
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER...		802	789	761	28	13
	RATE..		21.1	20.7	20.0	.7	.3
HYPOXIA AND ASPHYXIA (768)	NUMBER...		767	710	606	104	57
	RATE..		20.1	18.6	15.9	2.7	1.5
PNEUMONIA AND INFLUENZA (480-487)	NUMBER...		675	155	64	91	520
	RATE.		17.7	4.1	1.7	2.4	13.6
ALL OTHER CAUSES (RESIDUAL)	NUMBER...		1,689	623	402	221	1,066
	RATE..		44.3	16.4	10.6	5.8	28.0

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF CHILD AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF CHILD FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1987 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 CHILD		LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
ALL RACES 1/, LESS THAN 2,500 GRAMS							
ALL CAUSES	NUMBER...	262,481	22,103	17,876	15,513	2,363	4,227
	RATE..		8,420.8	6,810.4	5,910.1	900.3	1,610.4
CONGENITAL ANOMALIES (740-759)	NUMBER...		3,734	2,987	2,549	438	747
	RATE..		1,422.6	1,138.0	971.1	166.9	284.6
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER...		980	48	2	46	932
	RATE..		373.4	18.3	.8	17.5	355.1
PREMATURITY (765)	NUMBER...		2,891	2,850	2,839	11	41
	RATE..		1,101.4	1,085.8	1,081.6	4.2	15.6
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER...		2,984	2,819	2,292	527	165
	RATE..		1,136.8	1,074.0	873.2	200.8	62.9
MATERNAL COMPLICATIONS (761)	NUMBER...		1,233	1,228	1,221	7	5
	RATE..		469.7	467.8	465.2	2.7	1.9
ACCIDENTS (E800-E949)	NUMBER...		134	23	13	10	111
	RATE..		51.1	8.8	5.0	3.8	42.3
INFECTIONS (771)	NUMBER...		639	605	385	220	34
	RATE..		243.4	230.5	146.7	83.8	13.0
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER...		640	634	621	13	6
	RATE..		243.8	241.5	236.6	5.0	2.3
HYPOXIA AND ASPHYXIA (768)	NUMBER...		413	400	371	29	13
	RATE..		157.3	152.4	141.3	11.0	5.0
PNEUMONIA AND INFLUENZA (480-487)	NUMBER...		245	77	38	39	168
	RATE..		93.3	29.3	14.5	14.9	64.0
ALL OTHER CAUSES (RESIDUAL)	NUMBER...		720	328	216	112	392
	RATE..		274.3	125.0	82.3	42.7	149.3

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF CHILD AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF CHILD FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1987 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 CHILD		LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
ALL RACES 1/, 2,500 GRAMS OR MORE							
ALL CAUSES	NUMBER	3,542,240	14,127	4,904	3,264	1,640	9,223
	RATE		398.8	138.4	92.1	46.3	260.4
CONGENITAL ANOMALIES (740-759)	NUMBER		3,801	2,443	1,788	655	1,358
	RATE		107.3	69.0	50.5	18.5	38.3
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER		4,152	302	33	269	3,850
	RATE		117.2	8.5	.9	7.6	108.7
PREMATURITY (765)	NUMBER		115	93	86	7	22
	RATE		3.2	2.6	2.4	.2	.6
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER		135	106	80	26	29
	RATE		3.8	3.0	2.3	.7	.8
MATERNAL COMPLICATIONS (761)	NUMBER		34	25	24	1	9
	RATE		1.0	.7	.7	.0	.3
ACCIDENTS (E800-E949)	NUMBER		740	45	10	35	695
	RATE		20.9	1.3	.3	1.0	19.6
INFECTIONS (771)	NUMBER		202	189	118	71	13
	RATE		5.7	5.3	3.3	2.0	.4
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER		111	105	91	14	6
	RATE		3.1	3.0	2.6	.4	.2
HYPOXIA AND ASPHYXIA (768)	NUMBER		316	275	204	71	41
	RATE		8.9	7.8	5 8	2.0	1.2
PNEUMONIA AND INFLUENZA (480-487)	NUMBER		428	77	26	51	351
	RATE		12.1	2.2	.7	1.4	9.9
ALL OTHER CAUSES (RESIDUAL)	NUMBER		944	278	174	104	666
	RATE		26.6	7.8	4.9	2.9	18.8

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF CHILD AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF CHILD FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1987 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 CHILD		LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
ALL RACES 1/, NOT STATED BIRTH WEIGHT							
ALL CAUSES	NUMBER...	4,949	1,098	1,030	985	45	68
	RATE..		22,186.3	20,812.3	19,903.0	909.3	1,374.0
CONGENITAL ANOMALIES (740-759)	NUMBER...		191	174	165	9	17
	RATE..		3,859.4	3,515.9	3,334.0	181.9	343.5
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER...		7	-	-	-	7
	RATE..		141.4	-	-	-	141.4
PREMATURITY (765)	NUMBER...		241	240	240	-	1
	RATE..		4,869.7	4,849.5	4,849.5	-	20.2
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER...		66	62	54	8	4
	RATE..		1,333.6	1,252.8	1,091.1	161.6	80.8
MATERNAL COMPLICATIONS (761)	NUMBER...		103	103	103	-	-
	RATE..		2,081.2	2,081.2	2,081.2	-	-
ACCIDENTS (E800-E949)	NUMBER...		4	2	2	-	2
	RATE..		80.8	40.4	40.4	-	40.4
INFECTIONS (771)	NUMBER...		9	9	8	1	-
	RATE..		181.9	181.9	161.6	20.2	-
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER...		51	50	49	1	1
	RATE..		1,030.5	1,010.3	990.1	20.2	20.2
HYPOXIA AND ASPHYXIA (768)	NUMBER...		38	35	31	4	3
	RATE..		767.8	707.2	626.4	80.8	60.6
PNEUMONIA AND INFLUENZA (480-487)	NUMBER...		2	1	-	1	1
	RATE..		40.4	20.2	-	20.2	20.2
ALL OTHER CAUSES (RESIDUAL)	NUMBER...		25	17	12	5	8
	RATE..		505.2	343.5	242.5	101.0	161.6

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF CHILD AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF CHILD FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1987 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 CHILD		LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
WHITE, ALL BIRTH WEIGHTS							
ALL CAUSES	NUMBER...	2,992,659	24,553	15,552	12,778	2,774	9,001
	RATE..		820.4	519.7	427.0	92.7	300.8
CONGENITAL ANOMALIES (740-759)	NUMBER...		5,938	4,373	3,522	851	1,565
	RATE..		198.4	146.1	117.7	28.4	52.3
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER...		3,443	207	21	186	3,236
	RATE..		115.0	6.9	.7	6.2	108.1
PREMATURITY (765)	NUMBER...		1,699	1,659	1,646	13	40
	RATE..		56.8	55.4	55.0	.4	1.3
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER...		2,160	2,028	1,607	421	132
	RATE..		72.2	67.8	53.7	14.1	4.4
MATERNAL COMPLICATIONS (761)	NUMBER...		873	864	858	6	9
	RATE..		29.2	28.9	28.7	.2	.3
ACCIDENTS (E800-E949)	NUMBER...		599	44	16	28	555
	RATE..		20.0	1.5	.5	.9	18.5
INFECTIONS (771)	NUMBER...		540	510	334	176	30
	RATE..		18.0	17.0	11.2	5.9	1.0
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER...		541	534	515	19	7
	RATE..		18.1	17.8	17.2	.6	.2
HYPOXIA AND ASPHYXIA (768)	NUMBER...		482	439	375	64	43
	RATE..		16.1	14.7	12.5	2.1	1.4
PNEUMONIA AND INFLUENZA (480-487)	NUMBER...		405	95	39	56	310
	RATE..		13.5	3.2	1.3	1.9	10.4
ALL OTHER CAUSES (RESIDUAL)	NUMBER...		1,140	428	278	150	712
	RATE..		38.1	14.3	9.3	5.0	23.8

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF CHILD AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF CHILD FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1987 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 CHILD		LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
WHITE, LESS THAN 2,500 GRAMS							
ALL CAUSES	NUMBER...	169,906	13,755	11,326	9,767	1,559	2,429
	RATE..		8,095.7	6,666.0	5,748.5	917.6	1,429.6
CONGENITAL ANOMALIES (740-759)	NUMBER...		2,797	2,299	1,968	331	498
	RATE..		1,646.2	1,353.1	1,158.3	194.8	293.1
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER...		540	19	-	19	521
	RATE..		317.8	11.2	-	11.2	306.6
PREMATURITY (765)	NUMBER...		1,530	1,508	1,502	6	22
	RATE..		900.5	887.5	884.0	3.5	12.9
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER...		2,017	1,909	1,518	391	108
	RATE..		1,187.1	1,123.6	893.4	230.1	63.6
MATERNAL COMPLICATIONS (761)	NUMBER...		791	789	784	5	2
	RATE..		465.6	464.4	461.4	2.9	1.2
ACCIDENTS (E800-E949)	NUMBER...		72	13	9	4	59
	RATE..		42.4	7.7	5.3	2.4	34.7
INFECTIONS (771)	NUMBER...		394	376	248	128	18
	RATE..		231.9	221.3	146.0	75.3	10.6
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER...		422	420	412	8	2
	RATE..		248.4	247.2	242.5	4.7	1.2
HYPOXIA AND ASPHYXIA (768)	NUMBER...		231	220	205	15	11
	RATE..		136.0	129.5	120.7	8.8	6.5
PNEUMONIA AND INFLUENZA (480-487)	NUMBER...		130	47	24	23	83
	RATE..		76.5	27.7	14.1	13.5	48.9
ALL OTHER CAUSES (RESIDUAL)	NUMBER...		438	212	146	66	226
	RATE..		257.8	124.8	85.9	38.8	133.0

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF CHILD AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF CHILD FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1987 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 CHILD		LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
WHITE, 2,500 GRAMS OR MORE							
ALL CAUSES	NUMBER...	2,819,127	10,163	3,635	2,453	1,182	6,528
	RATE..		360.5	128.9	87.0	41.9	231.6
CONGENITAL ANOMALIES (740-759)	NUMBER...		2,999	1,944	1,429	515	1,055
	RATE..		106.4	69.0	50.7	18.3	37.4
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER...		2,897	188	21	167	2,709
	RATE..		102.8	6.7	.7	5.9	96.1
PREMATURITY (765)	NUMBER...		68	51	44	7	17
	RATE..		2.4	1.8	1.6	.2	.6
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER...		105	82	58	24	23
	RATE..		3.7	2.9	2.1	.9	.8
MATERNAL COMPLICATIONS (761)	NUMBER...		25	18	17	1	7
	RATE..		.9	.6	.6	.0	.2
ACCIDENTS (E800-E949)	NUMBER...		524	30	6	24	494
	RATE..		18.6	1.1	.2	.9	17.5
INFECTIONS (771)	NUMBER...		141	129	82	47	12
	RATE..		5.0	4.6	2.9	1.7	.4
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER...		83	79	68	11	4
	RATE..		2.9	2.8	2.4	.4	.1
HYPOXIA AND ASPHYXIA (768)	NUMBER...		225	195	150	45	30
	RATE..		8.0	6.9	5.3	1.6	1.1
PNEUMONIA AND INFLUENZA (480-487)	NUMBER...		273	47	15	32	226
	RATE..		9.7	1.7	.5	1.1	8.0
ALL OTHER CAUSES (RESIDUAL)	NUMBER...		688	205	125	80	483
	RATE..		24.4	7.3	4.4	2.8	17.1

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF CHILD AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF CHILD FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1987 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 CHILD	LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
WHITE, NOT STATED BIRTH WEIGHT						
ALL CAUSES.....NUMBER...	3,626	635	591	558	33	44
RATE..		17,512.4	16,299.0	15,388.9	910.1	1,213.5
CONGENITAL ANOMALIES (740-759).....NUMBER...		142	130	125	5	12
RATE..		3,916.2	3,585.2	3,447.3	137.9	330.9
SUDDEN INFANT DEATH SYNDROME (798.0)..NUMBER...		6	-	-	-	6
RATE..		165.5	-	-	-	165.5
PREMATURITY (765).....NUMBER...		101	100	100	-	1
RATE..		2,785.4	2,757.9	2,757.9	-	27.6
RESPIRATORY DISTRESS SYNDROME (769)...NUMBER...		38	37	31	6	1
RATE..		1,048.0	1,020.4	854.9	165.5	27.6
MATERNAL COMPLICATIONS (761).....NUMBER...		57	57	57	-	-
RATE..		1,572.0	1,572.0	1,572.0	-	-
ACCIDENTS (E800-E949).....NUMBER...		3	1	1	-	2
RATE..		82.7	27.6	27.6	-	55.2
INFECTIONS (771).....NUMBER...		5	5	4	1	-
RATE..		137.9	137.9	110.3	27.6	-
COMPLICATIONS OF PLACENTA,ETC. (762)..NUMBER...		36	35	35	-	1
RATE..		992.8	965.3	965.3	-	27.6
HYPOXIA AND ASPHYXIA (768).....NUMBER...		26	24	20	4	2
RATE..		717.0	661.9	551.6	110.3	55.2
PNEUMONIA AND INFLUENZA (480-487).....NUMBER...		2	1	-	1	1
RATE..		55.2	27.6	-	27.6	27.6
ALL OTHER CAUSES (RESIDUAL).....NUMBER...		14	11	7	4	3
RATE..		386.1	303.4	193.1	110.3	82.7

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF CHILD AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF CHILD FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1987 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 CHILD		LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
BLACK, ALL BIRTH WEIGHTS							
ALL CAUSES	NUMBER...	641,661	11,235	7,397	6,314	1,083	3,838
	RATE..		1,750.9	1,152.8	984.0	168.8	598.1
CONGENITAL ANOMALIES (740-759)	NUMBER...		1,427	980	788	192	447
	RATE..		222.4	152.7	122.8	29.9	69.7
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER...		1,414	115	12	103	1,299
	RATE..		220.4	17.9	1.9	16.1	202.4
PREMATURITY (765)	NUMBER...		1,461	1,438	1,433	5	23
	RATE..		227.7	224.1	223.3	.8	3.6
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER...		936	878	758	120	58
	RATE..		145.9	136.8	118.1	18.7	9.0
MATERNAL COMPLICATIONS (761)	NUMBER...		453	448	446	2	5
	RATE..		70.6	69.8	69.5	.3	.8
ACCIDENTS (E800-E949)	NUMBER...		247	22	8	14	225
	RATE..		38.5	3.4	1.2	2.2	35.1
INFECTIONS (771)	NUMBER...		270	255	156	99	15
	RATE..		42.1	39.7	24.3	15.4	2.3
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER...		231	226	217	9	5
	RATE..		36.0	35.2	33.8	1.4	.8
HYPOXIA AND ASPHYXIA (768)	NUMBER...		262	250	216	34	12
	RATE..		40.8	39.0	33.7	5.3	1.9
PNEUMONIA AND INFLUENZA (480-487)	NUMBER...		226	55	23	32	171
	RATE..		35.2	8.6	3.6	5.0	26.6
ALL OTHER CAUSES (RESIDUAL)	NUMBER...		461	166	105	61	295
	RATE..		71.8	25.9	16.4	9.5	46.0

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF CHILD AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF CHILD FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1987 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 CHILD	LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
BLACK, LESS THAN 2,500 GRAMS						
ALL CAUSES.....NUMBER...	81,471	7,575	5,950	5,245	705	1,625
RATE..		9,297.8	7,303.2	6,437.9	865.3	1,994.6
CONGENITAL ANOMALIES (740-759).....NUMBER...		751	546	468	78	205
RATE..		921.8	670.2	574.4	95.7	251.6
SUDDEN INFANT DEATH SYNDROME (798.0)..NUMBER...		405	27	2	25	378
RATE..		497.1	33.1	2.5	30.7	464.0
PREMATURITY (765).....NUMBER...		1,285	1,267	1,262	5	18
RATE..		1,577.2	1,555.2	1,549.0	6.1	22.1
RESPIRATORY DISTRESS SYNDROME (769)...NUMBER...		888	835	718	117	53
RATE..		1,090.0	1,024.9	881.3	143.6	65.1
MATERNAL COMPLICATIONS (761).....NUMBER...		405	402	400	2	3
RATE..		497.1	493.4	491.0	2.5	3.7
ACCIDENTS (E800-E949).....NUMBER...		58	9	3	6	49
RATE..		71.2	11.0	3.7	7.4	60.1
INFECTIONS (771).....NUMBER...		216	202	121	81	14
RATE..		265.1	247.9	148.5	99.4	17.2
COMPLICATIONS OF PLACENTA,ETC. (762)..NUMBER...		193	190	185	5	3
RATE..		236.9	233.2	227.1	6.1	3.7
HYPOXIA AND ASPHYXIA (768).....NUMBER...		171	169	157	12	2
RATE..		209.9	207.4	192.7	14.7	2.5
PNEUMONIA AND INFLUENZA (480-487).....NUMBER...		103	27	12	15	76
RATE..		126.4	33.1	14.7	18.4	93.3
ALL OTHER CAUSES (RESIDUAL).....NUMBER...		247	105	61	44	142
RATE..		303.2	128.9	74.9	54.0	174.3

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF CHILD AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF CHILD FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1987 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 CHILD		LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
BLACK, 2,500 GRAMS OR MORE							
ALL CAUSES	NUMBER...	559,126	3,250	1,057	687	370	2,193
	RATE..		581.3	189.0	122.9	66.2	392.2
CONGENITAL ANOMALIES (740-759)	NUMBER...		639	402	290	112	237
	RATE..		114.3	71.9	51.9	20.0	42.4
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER...		1,008	88	10	78	920
	RATE..		180.3	15.7	1.8	14.0	164.5
PREMATURITY (765)	NUMBER...		46	41	41	-	5
	RATE..		8.2	7.3	7.3	-	.9
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER...		24	19	17	2	5
	RATE..		4.3	3.4	3.0	.4	.9
MATERNAL COMPLICATIONS (761)	NUMBER...		8	6	6	-	2
	RATE..		1.4	1.1	1.1	-	.4
ACCIDENTS (E800-E949)	NUMBER...		188	12	4	8	176
	RATE..		33.6	2.1	.7	1.4	31.5
INFECTIONS (771)	NUMBER...		51	50	32	18	1
	RATE..		9.1	8.9	5.7	3.2	.2
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER...		25	23	20	3	2
	RATE..		4.5	4.1	3.6	.5	.4
HYPOXIA AND ASPHYXIA (768)	NUMBER...		80	71	49	22	9
	RATE..		14.3	12.7	8.8	3.9	1.6
PNEUMONIA AND INFLUENZA (480-487)	NUMBER...		123	28	11	17	95
	RATE..		22.0	5.0	2.0	3.0	17.0
ALL OTHER CAUSES (RESIDUAL)	NUMBER...		204	56	40	16	148
	RATE..		36.5	10.0	7.2	2.9	26.5

DOCUMENTATION TABLE 5

LIVE BIRTHS BY BIRTH WEIGHT AND RACE OF CHILD AND INFANT DEATHS AND INFANT MORTALITY RATES BY AGE AT DEATH, BIRTH WEIGHT, AND RACE OF CHILD FOR 10 MAJOR CAUSES OF INFANT DEATH: UNITED STATES, 1987 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 CHILD		LIVE BIRTHS	INFANT DEATHS	TOTAL NEONATAL	EARLY NEONATAL	LATE NEONATAL	POST-NEONATAL
BLACK, NOT STATED BIRTH WEIGHT							
ALL CAUSES	NUMBER...	1,064	410	390	382	8	20
	RATE..		38,533.8	36,654.1	35,902.3	751.9	1,879.7
CONGENITAL ANOMALIES (740-759)	NUMBER...		37	32	30	2	5
	RATE..		3,477.4	3,007.5	2,819.5	188.0	469.9
SUDDEN INFANT DEATH SYNDROME (798.0)	NUMBER...		1	-	-	-	1
	RATE..		94.0	-	-	-	94.0
PREMATURITY (765)	NUMBER...		130	130	130	-	-
	RATE..		12,218.0	12,218.0	12,218.0	-	-
RESPIRATORY DISTRESS SYNDROME (769)	NUMBER...		24	24	23	1	-
	RATE..		2,255.6	2,255.6	2,161.7	94.0	-
MATERNAL COMPLICATIONS (761)	NUMBER...		40	40	40	-	-
	RATE..		3,759.4	3,759.4	3,759.4	-	-
ACCIDENTS (E800-E949)	NUMBER...		1	1	1	-	-
	RATE..		94.0	94.0	94.0	-	-
INFECTIONS (771)	NUMBER...		3	3	3	-	-
	RATE..		282.0	282.0	282.0	-	-
COMPLICATIONS OF PLACENTA,ETC. (762)	NUMBER...		13	13	12	1	-
	RATE..		1,221.8	1,221.8	1,127.8	94.0	-
HYPOXIA AND ASPHYXIA (768)	NUMBER...		11	10	10	-	1
	RATE..		1,033.8	939.8	939.8	-	94.0
PNEUMONIA AND INFLUENZA (480-487)	NUMBER...		-	-	-	-	-
	RATE..		-	-	-	-	-
ALL OTHER CAUSES (RESIDUAL)	NUMBER...		10	5	4	1	5
	RATE..		939.8	469.9	375.9	94.0	469.9

' INCLUDES RACES OTHER THAN WHITE AND BLACK

DOCUMENTATION TABLE 6

UNLINKED INFANT DEATHS BY RACE, AGE AT DEATH, AND STATE OF RESIDENCE:
UNITED STATES, 1987 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 1986 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	914	548	479	69	366
WHITE	563	329	280	49	234
BLACK	313	204	187	17	109
ALABAMA	1	-	-	-	1
WHITE	-	-	-	-	-
BLACK	1	-	-	-	1
ALASKA	3	2	2	-	1
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
ARIZONA	6	2	2	-	4
WHITE	5	1	1	-	4
BLACK	-	-	-	-	-
ARKANSAS	4	1	1	-	3
WHITE	3	1	1	-	2
BLACK	1	-	-	-	1
CALIFORNIA	109	77	70	7	32
WHITE	75	58	53	5	17
BLACK	28	18	16	2	10
COLORADO	3	1	1	-	2
WHITE	3	1	1	-	2
BLACK	-	-	-	-	-
CONNECTICUT	5	1	1	-	4
WHITE	3	1	1	-	2
BLACK	1	-	-	-	1
DELAWARE	3	-	-	-	3
WHITE	3	-	-	-	3
BLACK	-	-	-	-	-
DISTRICT OF COLUMBIA	10	9	8	1	1
WHITE	2	2	2	-	-
BLACK	8	7	6	1	1

DOCUMENTATION TABLE 6

UNLINKED INFANT DEATHS BY RACE, AGE AT DEATH, AND STATE OF RESIDENCE:
UNITED STATES, 1987 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 1986 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	14	2	2	-	12
WHITE	10	1	1	-	9
BLACK	4	1	1	-	3
GEORGIA	1	-	-	-	1
WHITE	1	-	-	-	1
BLACK	-	-	-	-	-
HAWAII	4	-	-	-	4
WHITE	2	-	-	-	2
BLACK	-	-	-	-	-
IDAHO	1	1	1	-	-
WHITE	1	1	1	-	-
BLACK	-	-	-	-	-
ILLINOIS	30	17	16	1	13
WHITE	22	10	9	1	12
BLACK	8	7	7	-	1
INDIANA	15	8	5	3	7
WHITE	12	6	3	3	6
BLACK	3	2	2	-	1
IOWA	5	-	-	-	5
WHITE	1	-	-	-	1
BLACK	1	-	-	-	1
KANSAS	4	2	1	1	2
WHITE	2	1	-	1	1
BLACK	2	1	1	-	1
KENTUCKY	6	4	3	1	2
WHITE	5	3	2	1	2
BLACK	1	1	1	-	-
LOUISIANA	75	55	52	3	20
WHITE	28	18	15	3	10
BLACK	46	36	36	-	10

DOCUMENTATION TABLE 6

UNLINKED INFANT DEATHS BY RACE, AGE AT DEATH, AND STATE OF RESIDENCE:
UNITED STATES, 1987 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 1986 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	3	-	-	-	3
WHITE	3	-	-	-	3
BLACK	-	-	-	-	-
MARYLAND	40	27	24	3	13
WHITE	15	9	7	2	6
BLACK	23	16	16	-	7
MASSACHUSETTS	9	6	6	-	3
WHITE	6	3	3	-	3
BLACK	3	3	3	-	-
MICHIGAN	8	3	3	-	5
WHITE	3	1	1	-	2
BLACK	3	2	2	-	1
MINNESOTA	1	-	-	-	1
WHITE	1	-	-	-	1
BLACK	-	-	-	-	-
MISSISSIPPI	4	1	-	1	3
WHITE	3	1	-	1	2
BLACK	1	-	-	-	1
MISSOURI	8	2	1	1	6
WHITE	8	2	1	1	6
BLACK	-	-	-	-	-
MONTANA	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
NEBRASKA	2	-	-	-	2
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
NEVADA	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-

DOCUMENTATION TABLE 6

UNLINKED INFANT DEATHS BY RACE, AGE AT DEATH, AND STATE OF RESIDENCE:
UNITED STATES, 1987 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 1986 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	2	1	1	-	1
WHITE	2	1	1	-	1
BLACK	-	-	-	-	-
NEW JERSEY	137	81	63	18	56
WHITE	79	47	37	10	32
BLACK	55	32	26	6	23
NEW MEXICO	8	4	2	2	4
WHITE	8	4	2	2	4
BLACK	-	-	-	-	-
NEW YORK	29	16	16	-	13
WHITE	21	12	12	-	9
BLACK	8	4	4	-	4
NEW YORK CITY	43	17	15	2	26
WHITE	24	11	10	1	13
BLACK	18	5	4	1	13
NORTH CAROLINA	7	3	3	-	4
WHITE	3	2	2	-	1
BLACK	4	1	1	-	3
NORTH DAKOTA	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
OHIO	69	51	47	4	18
WHITE	41	29	28	1	12
BLACK	28	22	19	3	6
OKLAHOMA	31	21	21	-	10
WHITE	19	12	12	-	7
BLACK	12	9	9	-	3
OREGON	3	-	-	-	3
WHITE	2	-	-	-	2
BLACK	-	-	-	-	-

DOCUMENTATION TABLE 6

UNLINKED INFANT DEATHS BY RACE, AGE AT DEATH, AND STATE OF RESIDENCE:
UNITED STATES, 1987 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 1986 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	53	34	31	3	19
WHITE	28	14	13	1	14
BLACK	23	18	16	2	5
RHODE ISLAND	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
SOUTH CAROLINA	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
SOUTH DAKOTA	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
TENNESSEE	5	2	1	1	3
WHITE	1	1	-	1	-
BLACK	2	1	1	-	1
TEXAS	110	77	69	8	33
WHITE	82	59	53	6	23
BLACK	26	16	14	2	10
UTAH	3	2	2	-	1
WHITE	1	1	1	-	-
BLACK	-	-	-	-	-
VERMONT	1	1	-	1	-
WHITE	1	1	-	1	-
BLACK	-	-	-	-	-
VIRGINIA	27	11	5	6	16
WHITE	24	9	3	6	15
BLACK	3	2	2	-	1
WASHINGTON	6	1	-	1	5
WHITE	5	1	-	1	4
BLACK	-	-	-	-	-

DOCUMENTATION TABLE 6

UNLINKED INFANT DEATHS BY RACE, AGE AT DEATH, AND STATE OF RESIDENCE:
UNITED STATES, 1987 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 1986 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	5	5	4	1	-
WHITE	5	5	4	1	-
BLACK	-	-	-	-	-
WISCONSIN	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
WYOMING	1	-	-	-	1
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-
FOREIGN RESIDENTS	-	-	-	-	-
WHITE	-	-	-	-	-
BLACK	-	-	-	-	-

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

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 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 areas 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 1–1). These estimates include adjustments for underregistration and for States that were not part of the birth-registration area before 1933.

SOURCES OF DATA

Natality statistics

Since 1985, natality statistics for all States and the District of Columbia have been based on information from the total file of records. The information is received on computer data tapes coded by the States and provided to the National Center for Health Statistics (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 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

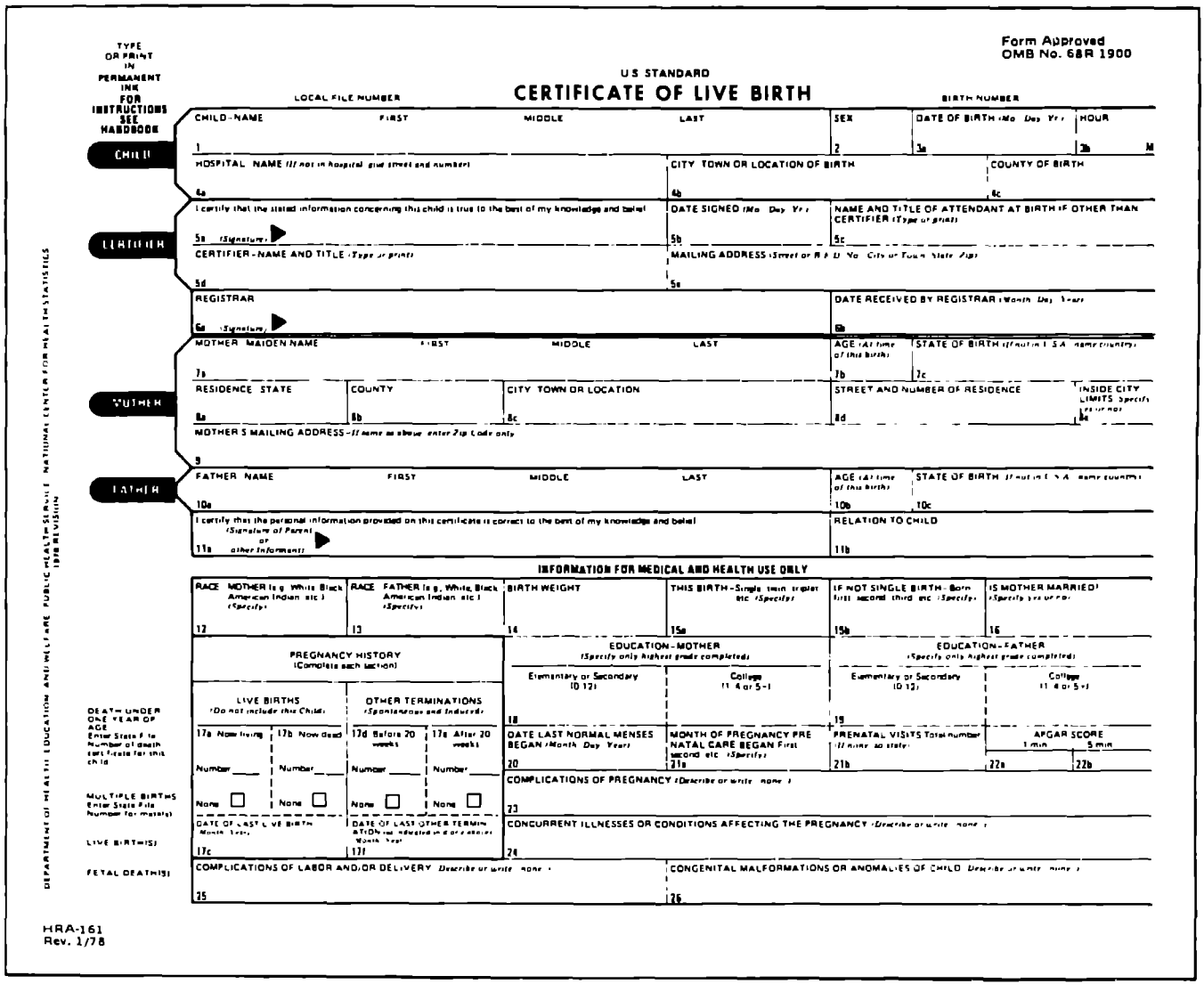
The U.S. Standard Certificate of Live Birth, issued by the Public Health Service, has served for many years as the principal means of attaining uniformity in the content of the documents used to collect information on births in the United States. It has been modified in each State to the extent required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

1978 revision—Effective January 1, 1978, a revised U.S. Standard Certificate of Live Birth (figure 4–A) replaced the 1968 revision. Changes on the 1978 standard certificate include a new item on 1- and 5-minute Apgar scores, the deletion of the item on birth injuries, and revisions of the items on legitimacy status and previous pregnancies.

The item on legitimacy status was changed to read "Is mother married?" This is now a factual piece of information about the mother rather than an attribute ascribed to the child, and the person completing the record does not have the responsibility for making what may be a legal determination.

FIGURE 4–A.



The item on previous deliveries was changed to pregnancy history and expanded to include two categories of fetal loss: before and after 20 completed weeks of gestation. This change provides information on two groups that are of interest in medical research and emphasizes the fact that all previous fetal losses should be included, both spontaneous and induced, regardless of length of gestation. 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 computed by relating the vital events of a class to the population of a similarly defined class. Vital statistics and population statistics, therefore, must be classified according to similarly defined systems and tabulated in comparable groups. Even when the variables common to both, such as geographic area, age, race, and sex, have been similarly classified and tabulated, differences between the enumeration method of obtaining population data and the registration method of obtaining vital statistics data may result in significant discrepancies.

The general rules used to classify geographic and personal items for live births are set forth in "Vital Statistics Classification and Coding Instructions for Live Birth Records, 1987," *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 (1–49, 1–50, 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, when 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 1987 is given in another manual, "Vital Records Geographic Classification, 1982."

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. The National Center for Health Statistics 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

The race or national origin shown in a tabulation is that of the newborn child. Classification of the child's race or national origin for statistical purposes is based on the race or national origin of the parents. The categories 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.

If the parents are of different races or national origins, the following rules are used to assign race or national origin to the newborn child. When only one parent is white, the child is assigned the other parent's race or national origin. When neither parent is white, the child is assigned the father's race or national origin with one exception; if either parent is Hawaiian or part-Hawaiian, the child is assigned to Hawaiian. If race is missing for one parent, the child is assigned the race of the parent for whom race is given. When information on race is missing for both parents, the race of the child is considered not stated and the birth is allocated according to rules discussed in the section "Race or national origin not stated."

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—The race of a child is considered not stated in those cases in which information for both parents is missing. Before 1964 all such cases were tabulated as white. From 1964 through 1968 the race of the child was allocated by the computer as follows: If the race on the preceding record was white, the assignment was to white; otherwise the assignment was to black. Beginning in 1969 the race of the child has been allocated electronically according to the specific race of the child on the preceding record. Consequently, some of the not-stated frequencies that had previously been assigned to the black category may now be assigned to one of the other race or national origin categories.

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 excludes 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 1–31.

Interracial parentage—Because of interracial parentage, the number of births for each racial or national origin group classified according to the child's race by the preceding rules differs from the number of births classified according to the mother's race. For white and black births, the differences are relatively small. In 1987 there were 1.7

percent more white mothers than there were births classified as white and 4.7 percent fewer black mothers than births classified as black. The number of mothers of other racial and national origin groups was considerably lower than the number of births classified according to the child's race: American Indian, 19.2 percent; Chinese, 7.3 percent; Japanese, 18.0 percent; Hawaiian, 29.7 percent; Filipino, 6.2 percent; Other Asian and Pacific Islander, 7.6 percent; and "Other," 16.5 percent.

Age of mother

The birth certificate asks for "Age (at time of this birth)." The age of the mother is edited for upper and lower limits. When mothers are reported to be under 10 years of age or 50 years and 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 1970 censuses, 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 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 thus can be attributed solely to changes in the age-specific birth rates.

Not stated age of mother—Beginning in 1964 birth records with age of mother not stated have been allocated 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 fetal deaths and live births). 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, ages not stated 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 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 unwed 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 which 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

Birth order and parity classifications shown in this volume refer to the total number of live births the mother has had including the 1987 birth. Fetal deaths are excluded.

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 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.

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 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 birth of known live-birth order

Dates of last live birth and last fetal death

Date of last live birth and date of last fetal death were added to the U.S. Standard Certificate of Live Birth in 1968 for the purpose of providing information on child

spacing and pregnancy intervals. Tabulations of these items were presented for the first time in 1969. In 1978 the item "Date of last fetal death" was reworded to "Date of last other termination" to ensure inclusion of both spontaneous fetal deaths and induced terminations of pregnancy. In 1987 this information was obtained from all States except Texas.

Intervals since last live birth and last other termination—These data are computed from the date of birth, date of last live birth, and date of last other termination. The interval since last live birth is the difference between the date of last live birth and the date of present birth; the interval since last other termination is the difference between the date of last other termination and the date of present birth. For an interval to be computed, both the month and year of the last live birth or the last other termination must be valid. These intervals are computed only for events to mothers who have had at least one previous delivery.

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

Interval since last pregnancy and outcome of last pregnancy—These data are derived from the computed intervals since the last live birth and the last other termination.

Before 1982, the outcome of the last pregnancy was considered not stated if the interval since either the last live birth or the last fetal death was not computed because only the year of the event was recorded. Beginning in 1982, the outcome of the last pregnancy was derived for such records if the year of the last live birth and the year of the last fetal death were not the same. The effect of this revised procedure is to reduce substantially the number of records with outcome of last pregnancy not stated.

In addition, for such records, the interval since the termination of the last pregnancy was determined if both the month and year were reported for the event immediately preceding the current live birth. Before 1982, the interval since the termination of the last pregnancy was considered not stated for such births.

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

Zero interval—An interval of zero months since the last live birth or fetal death 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 1987, data on education were obtained from 47 States 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.

Marital status

Beginning with 1980 data, national estimates of births to unmarried women are derived from two sources. For 41 States and the District of Columbia, marital status of the mother was reported directly on the birth certificate in 1987 (see table A); for the remaining 9 States that lack this item, marital status was inferred from a comparison of the child's and parents' surnames. This procedure represents a substantial departure from the previous method used to prepare national estimates, 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. Ratios of births to unmarried women were computed by race for the reporting States in each geographic division, applied to all births in the division, and then summed to obtain national estimates by race. The figures by race were summed to yield the totals for the United States.

The new method attempts to use 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

Table A. Areas reporting selected items on the live-birth certificate: Each State, 1987

Area	Educational attainment of parents	Dates of last live birth and last other termination	Number of prenatal visits	Marital status of mother	1-minute Apgar score	5-minute Apgar score	Ethnic origin	Hispanic origin
Alabama	X	X	X	X	X	X		
Alaska	X	X	X	X	X	X		
Arizona	X	X	X	X	X	X		X
Arkansas	X	X	X	X	X	X		X
California		X						X
Colorado	X	X	X	X	X	X	X	
Connecticut	X	X	X		X	X		
Delaware	X	X	X	X				
District of Columbia	X	X	X	X	X	X		X
Florida	X	X	X	X	X	X	X	
Georgia	X	X	X	X	X	X	X	
Hawaii	X	X	X	X	X	X		X
Idaho	X	X	X	X	X	X		
Illinois	X	X	X	X	X	X	X	
Indiana	X	X	X	X	X	X		X
Iowa	X	X	X	X	X	X		
Kansas	X	X	X	X	X	X	X	
Kentucky	X	X	X	X	X	X		
Louisiana	X	X	X	X	X	X		
Maine	X	X	X	X	X	X	X	
Maryland	X	X	X		X	X		
Massachusetts	X	X	X	X	X	X		
Michigan	X	X	X		X	X		
Minnesota	X	X	X	X	X	X		
Mississippi	X	X	X	X	X	X	X	
Missouri	X	X	X	X	X	X		
Montana	X	X	X		X	X		
Nebraska	X	X	X	X	X	X	X	
Nevada	X	X	X		X	X	X	
New Hampshire	X	X	X	X	X	X		
New Jersey	X	X	X	X	X	X	X	
New Mexico	X	X	X	X	X	X		X
New York	X	X	X		X	X	[1]X	[2]X
North Carolina	X	X	X	X	X	X		
North Dakota	X	X	X	X	X	X	X	
Ohio	X	X	X		X	X	X	
Oklahoma	X	X	X	X				
Oregon	X	X	X	X	X	X		
Pennsylvania	X	X	X	X	X	X		
Rhode Island	X	X	X	X	X	X		
South Carolina	X	X	X	X	X	X		
South Dakota	X	X	X	X	X	X		
Tennessee	X	X	X	X	X	X	X	
Texas			X					X
Utah	X	X	X	X	X	X		X
Vermont	X	X	X	X	X	X		
Virginia	X	X	X	X	X	X		
Washington		X	X	X	X	X		
West Virginia	X	X	X	X	X	X		
Wisconsin	X	X	X	X	X	X		
Wyoming	X	X	X	X	X	X	X	

[1] New York City only
[2] Excludes New York City

surnames are different and the mother's current surname is missing.

Because of the continued increase in all measures of nonmarital childbearing in 1987, the intensive evaluation of the national data performed in 1985 and 1986 was repeated in 1987. There has been continuing concern that the current method, incorporating data based on a comparison of surnames, might overstate the number of births to unmarried women. This is because births to women who have retained their maiden surnames as their legal surnames after marriage would be classified as births to unmarried women. This is more frequently associated with older professional women. 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 with those States providing inferential data based on a comparison of surnames. Comparisons were made for white and black births separately and by age of mother. The results 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.

No adjustments are made during the data processing for errors in the reporting of marital status on the birth records of the 41 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 previously married or unmarried when the 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 1955–87 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

Births occurring in hospitals, institutions, clinics, centers, or homes are 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 unwed mothers. 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 1–37 and 1–38 of this report present this more detailed information for the years 1975–87.

Data shown in this volume for the "In hospital" category for the years 1975–87 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 1–37 and 1–38, 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 percent. Similarly, for 1976 the number of births occurring in hospitals is increased by 14,133 and the percent in hospitals raised from 98.6 to 99.1 percent; for 1977, the increase is 15,937 and the percent in hospitals raised from 98.5 to 99.0 percent. 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.

For births occurring outside of hospitals, separate classifications are shown for physicians, midwives, and "Other" attendants. The "Out-of-hospital" category also includes births for which no information is reported on place of birth. Before 1975, the category "In hospital" included births for which the stated place of birth was a "doctor's office" and delivery was by a physician. Beginning in 1975, births that were delivered by physicians in a "doctor's office" 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 1–38 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 Diseases (ICD–9). The revised categories in gram intervals and their equivalents in pounds and ounces are as follows:

Less than 500	grams	=	1 lb	1 oz	or less	
500 – 999	grams	=	1 lb	2 oz–	2 lb	3 oz
1,000–1,499	grams	=	2 lb	4 oz–	3 lb	4 oz
1,500–1,999	grams	=	3 lb	5 oz–	4 lb	6 oz
2,000–2,499	grams	=	4 lb	7 oz–	5 lb	8 oz
2,500–2,999	grams	=	5 lb	9 oz–	6 lb	9 oz
3,000–3,499	grams	=	6 lb	10 oz–	7 lb	11 oz
3,500–3,999	grams	=	7 lb	12 oz–	8 lb	13 oz
4,000–4,499	grams	=	8 lb	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 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 1 lb 3½ oz–3 lb 4½ 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 because 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 "preterm" or "premature" for purposes of classification. At 37–41 weeks' gestation, births are considered "term," and at 42 weeks and over, "postterm." These distinctions are according to the ICD–9 definitions.

Before 1981, the period of gestation was computed only when there was a valid month, day, and year of LMP. However, length of gestation could not be determined from a substantial number of live birth certificates each year because the day of LMP was missing. Beginning in 1981 weeks of gestation have been imputed for records with missing day of LMP when there is a valid month and year. 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 premature 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).

The calculated period of gestation in completed weeks is edited for upper and lower limits. If the interval between date of LMP and date of birth is 16 weeks or less, or 53 weeks or more, the period of gestation is considered not stated.

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 1987 these data were collected from the birth certificates of all States except California.

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 1987 the 1- and 5-minute Apgar scores were included on the birth certificates of 46 States and the District of Columbia. See table A for a listing of reporting areas.

Hispanic parentage

Concurrent with the 1978 revision of the U.S. Standard Certificate of Live Birth, the National Center for Health Statistics recommended that States add items to identify

the Hispanic or ethnic origin of the newborn's parents. Two formats were used: (1) an open-ended item to obtain the specific origin or descent of each parent, for example, Italian, Mexican, or English; and (2) an item directed toward the Hispanic population, requesting only the specific Hispanic origin (Mexican, Puerto Rican, Cuban, and so forth). In 1987 items requesting Hispanic or ethnic origin were included on the birth certificates of 23 States and the District of Columbia (see table A).

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 99.3 percent of all births occurring in the United States in 1987 were registered; for white births registration was 99.5 percent complete and for all other births, 98.6 percent complete. These estimates are based on the results of the 1964–68 test of birth-registration completeness according to place of delivery (in or out of hospital) and race and on the 1987 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 (11).

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 then was computed. The figures for 1951–68 shown in table 1–21 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, 1–3, 1–4, 1–6, and 1–8 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 1–12 through 1–19) 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.

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, the National Center for Health Statistics (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 elim-

inated 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 time period or for different areas, the number of events that actually occurred may be considered 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 standard error, expressed as a percent of the number or rate, usually is small.

When the number of events is small (perhaps 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

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

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 at the 0.05 level 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 standard metropolitan statistical areas (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 1900–87 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 1981–87—The population of the United States by age, race, and sex for 1987 is shown in table 4–2. The population for each State is shown in table 4–3; the monthly population figures were published in *Current population reports*, series P–25, number 1023. Comparable data for the U.S. population by age, race, and sex and for the State populations for 1981–86, 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 1981–86 were shown in *Current population reports*, series P–25, numbers 931, 949, 961, 980, 1001, and 1021. Population 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 figures were published in *Current population reports*, series P–25, number 899.

Table B. Sources for resident population and population including Armed Forces abroad: Birth- and death-registration States, 1900–1932, and United States, 1900–1987

Year	Source
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.

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 1–12 through 1–19.

Population estimates for 1971–79—Birth rates for 1971–79 (except those for cohorts of women in tables 1–12 through 1–19) 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 (12). The revised estimates for the United States by age, race, and sex were published by the U.S. Bureau of the Census in *Current population reports*, series P–25, number 917. Population estimates by month are based on data published in *Current population reports*, series P–25, number 899. Unpublished revised estimates for States were obtained from the U.S. Bureau of the Census.

Population estimates for 1961–69—Birth rates in this volume for 1961–69 (except for those shown in tables 1–4 and 1–5) 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 1–4 and 1–5 for 1961–64 are based on revised estimates of the population published in *Current population reports*, series P–25, numbers 321 and 324, and may differ slightly from rates published in those years.

Population estimates for 1951–59—Final intercensal estimates of the population by age, race, and sex and total population by State for 1951–59 are shown in tables 4–4 and 4–5 of *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 (13–15). The report for 1980 (15) 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 (13). 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 generally would 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 was as high as 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 1–12 through 1–19 are computed from

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	0.9806	0.9807	0.9816
15–19 years	1.0011	0.9988	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	0.9078	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	0.9536	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.

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 (16).

Age-sex-adjusted birth rates

The age-sex-adjusted birth rates shown in table 1–3 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 1–6. 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 1–6 the rate of 1,871 in 1987, 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 1987, they would have a total of 1,871 children by the time they reached the end of the reproductive period (assumed for purposes of these calculations 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 1–5 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 (17).

Parity distribution

The percent distribution of women by parity (number of children ever born alive to mother) shown in tables 1–13 and 1–17 is derived from cumulative birth rates by order of birth, shown in tables 1–15 and 1–19. 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 and higher parities is found by dividing the cumulative rate for seventh-order births by 10.

Seasonal adjustment of rates

The seasonally adjusted birth and fertility rates shown in table 1–23 are computed from the X–11 variant of Census Method II (18). 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 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.

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	*

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SOURCES OF DATA

Death and fetal-death statistics

Mortality statistics for 1987 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 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 through 1969, 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 in which 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 1987 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 in which State-coded medical data were first transmitted to NCHS is shown below for the 22 States now furnishing such 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

For 1987 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, it was necessary to change these procedures because of a backlog in coding and processing that resulted 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 sample resulted from personnel and budgetary restrictions. 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, except New York State (excluding New York City), which submitted State-coded data in 1987. Fetal-death data are not published by NCHS for the Virgin Islands and Guam.

Standard certificates and reports

The U.S. Standard Certificate of Death and the U.S. Standard Report of Fetal Death, issued by the Public Health Service, have served for many years as the principal means of attaining uniformity in the content 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 have been dropped when their usefulness appeared to be limited.

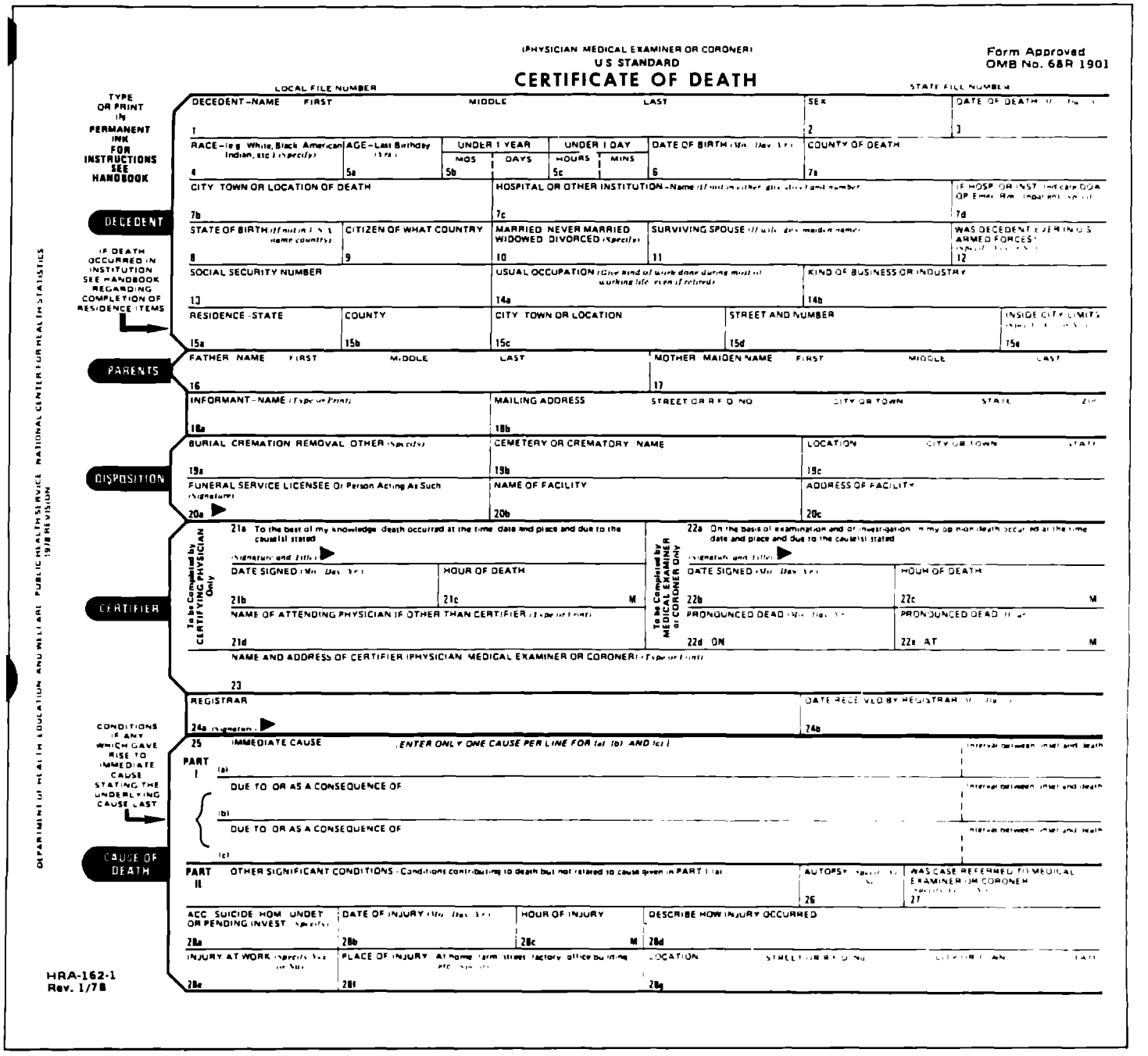
New revisions of the U.S. Standard Certificate of Death and the U.S. Standard Report of Fetal Death were recommended for State use beginning January 1, 1978. The U.S. Standard Certificate of Death and the U.S. Standard Report of Fetal Death are shown in figures 7–A and 7–B. The certificate of death shown in figure 7–A is for use by a physician, a medical examiner, or a coroner. Two other forms of the U.S. Standard Certificate of Death are available; they are similar to the one shown except that the section on certification is designed for the physician's signature on one, and for the medical examiner's or coroner's signature on the other.

Among the changes in the new revision were the additions of (1) an item asking "If Hosp. or Inst., Indicate DOA, OP/Emer. Rm., Inpatient" and (2) an item asking "Was Decedent Ever in U.S. Armed Forces?" The latter item was previously on the certificate but was deleted from 1968 through 1977. An item on whether autopsy findings were considered for determining cause of death was dropped.

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 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 that show data for death-registration States include the District of Columbia for all years; registration cities in nonregis-

FIGURE 7-A.



tration 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 3-4, 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 every year beginning with 1922.

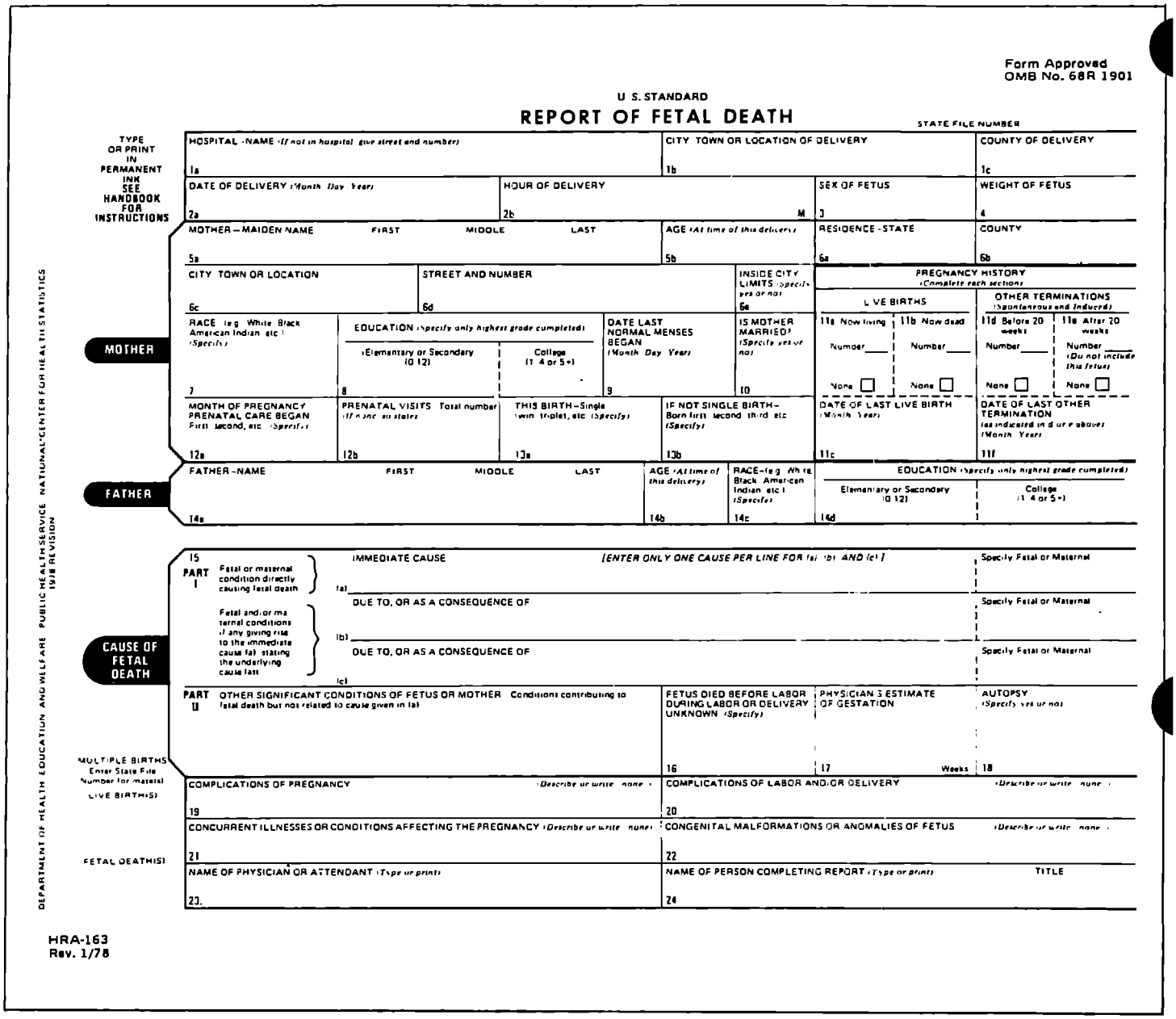
CLASSIFICATION OF DATA

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 1987 are set forth in two NCHS instruction manuals (1,2).

A discussion of the classification of certain important items is presented below.

FIGURE 7-B.



Form Approved
OMB No. 68R 1901

U.S. STANDARD

REPORT OF FETAL DEATH

STATE FILE NUMBER

TYPE OR PRINT IN PERMANENT INK SEE HANDBOOK FOR INSTRUCTIONS

DEPARTMENT OF HEALTH EDUCATION AND WELFARE PUBLIC HEALTH SERVICE NATIONAL CENTER FOR HEALTH STATISTICS 1978 REVISION

HOSPITAL - NAME (If not in hospital give street and number) 1a

CITY TOWN OR LOCATION OF DELIVERY 1b

COUNTY OF DELIVERY 1c

DATE OF DELIVERY (Month Day Year) 2a

HOUR OF DELIVERY 2b

SEX OF FETUS 3

WEIGHT OF FETUS 4

MOTHER

MOTHER - MAIDEN NAME FIRST MIDDLE LAST 5a

AGE (At time of this delivery) 5b

RESIDENCE - STATE 6a

COUNTY 6b

CITY TOWN OR LOCATION 6c

STREET AND NUMBER 6d

INSIDE CITY LIMITS (Specify yes or no) 6e

PREGNANCY HISTORY (Complete each section)

LIVE BIRTHS

11a Now living Number None

11b Now dead Number None

OTHER TERMINATIONS (Spontaneous and Induced)

11d Before 20 weeks Number None

11e After 20 weeks Number (Do not include this fetus) None

RACE (e.g. White Black American Indian etc.) (Specify) 7

EDUCATION (Specify only highest grade completed)

(Elementary or Secondary (0 12)) 8

College (1 4 or 5+) 8

DATE LAST NORMAL MENSES BEGAN (Month Day Year) 9

IS MOTHER MARRIED? (Specify yes or no) 10

MONTH OF PREGNANCY PRENATAL CARE BEGAN First second etc (Specify) 12a

PRENATAL VISITS Total number (If none so state) 12b

THIS BIRTH - Single twin triplet etc (Specify) 13a

IF NOT SINGLE BIRTH - Born first second third etc (Specify) 13b

DATE OF LAST LIVE BIRTH (Month Year) 11c

DATE OF LAST OTHER TERMINATION (as indicated in d or e above) (Month Year) 11f

FATHER

FATHER - NAME FIRST MIDDLE LAST 14a

AGE (At time of this delivery) 14b

RACE (e.g. White Black American Indian etc.) (Specify) 14c

EDUCATION (Specify only highest grade completed)

Elementary or Secondary (0 12) 14d

College (1 4 or 5+) 14d

CAUSE OF FETAL DEATH

15 PART I Fetal or maternal condition directly causing fetal death

IMMEDIATE CAUSE (ENTER ONLY ONE CAUSE PER LINE FOR (a) (b) AND (c).) Specify Fetal or Maternal

(a)

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

DUE TO, OR AS A CONSEQUENCE OF Specify Fetal or Maternal

(b)

DUE TO, OR AS A CONSEQUENCE OF Specify Fetal or Maternal

(c)

PART II OTHER SIGNIFICANT CONDITIONS OF FETUS OR MOTHER Conditions contributing to fetal death but not related to cause given in (a)

FETUS DIED BEFORE LABOR DURING LABOR OR DELIVERY UNKNOWN (Specify) 16

PHYSICIAN'S ESTIMATE OF GESTATION 17 Weeks

AUTOPSY (Specify yes or no) 18

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

COMPLICATIONS OF PREGNANCY (Describe or write none) 19

COMPLICATIONS OF LABOR AND/OR DELIVERY (Describe or write none) 20

CONCURRENT ILLNESSES OR CONDITIONS AFFECTING THE PREGNANCY (Describe or write none) 21

CONGENITAL MALFORMATIONS OR ANOMALIES OF FETUS (Describe or write none) 22

FETAL DEATH(S)

NAME OF PHYSICIAN OR ATTENDANT (Type or print) 23.

NAME OF PERSON COMPLETING REPORT (Type or print) TITLE 24

HRA-163
Rev. 1/78

Classification by occurrence and residence

Tabulations for the United States and specified geographic areas in this volume are 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 1987 this difference amounted to 3,019 deaths. Mortality statistics by place of occurrence are shown in tables 1–11, 1–19, 1–20, 1–29, 1–30, 3–1, 3–8, 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 (3).

A comparison of the results of this study of deaths with those for a previous matched record study of births (4) showed that the quality of residence data had considerably improved 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 if 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 (1,2).

The geographic codes assigned by the National Center for Health Statistics during data reduction of source information on birth, death, and fetal-death records are given in another instruction manual (5). 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 (6) 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 (7).

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. The National Center for Health Statistics cannot, however, 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 (7,8).

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—Vital statistics data for cities and certain other urban places in 1987 are 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, 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 volume 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, as there are 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 1–33) 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 1987, about 0.6 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 also based 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 1987, 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 other 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 in use 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 about half of all the tables the divisions are white, all other (including black), and black separately. In other tables by race, where the main purpose is to isolate the major groups, the classifications are simply white and all other.

Race not stated—For 1987 the number of death records for which race was unknown, not stated, or not classifiable was 5,650, 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 in use 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 in use for residents of New Jersey did not contain the race item.

Adjustments made in vital statistics to take into account the omission of the race item in New Jersey for part of the certificates filed during 1962 through 1964 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 were published in 1984 for the first time. They 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 were obtained from the District of Columbia and the following 22 States: Arizona, Arkansas, California, Colorado, Georgia, Hawaii, Illniois, Indiana, Kansas, Maine, Mississippi, Nebraska, Nevada, New Jersey, New Mexico, New York (including New York City), North Dakota, Ohio, Tennessee, Texas, Utah, and Wyoming. Generally, the reporting States used items similar to one of two basic formats recommended by NCHS. The first format is open-ended to obtain the specific origin or descent of the decedent (for example, Italian, Mexican, Puerto Rican, English, and Cuban). The second format is directed specifically toward the Hispanic population and asks whether the decedent is of Spanish origin. If so, the specific origin—for example, Mexican, Puerto Rican, or Cuban—is to be indicated.

For 1987, mortality data in tables 1–34 and 2–18 are based on deaths to residents of all 22 reporting States and the District of Columbia. In tables 1–35, 1–41, 1–42, 2–19, 2–20, 2–21, and 2–22 mortality data for the Hispanic-origin population are based on deaths to residents of 18 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 18 States are as follows: Arizona, Arkansas, California, Colorado, Georgia, Hawaii, Illinois, Indiana, Kansas, Mississippi, Nebraska, New Jersey, New York (including New York City), North Dakota, Ohio, Texas, Utah, and Wyoming. Excluded from these tables are data for New Mexico because the format for the Hispanic item on the New Mexico death certificate departs sufficiently from that of other areas to result in noncomparable data. In addition, in tables 1–34 and 2–18 for New Mexico, no deaths are shown for the category "not stated" origin. Because of the way in which the item on the death certificate for New Mexico is worded, it was not possible to determine whether a blank entry represented a response of "non-Hispanic origin" or of "unknown origin." Accordingly, blank entries were coded to "non-Hispanic." Data for three other States—Maine, Nevada, and Tennessee—are excluded from tables 1–35, 1–41, 1–42, 2–19, 2–20, 2–21, and 2–22 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 1980, the 18 reporting States and the District of Columbia accounted for about 80 percent of the Hispanic population in the United States, including about 89 percent of the Mexican population, 78 percent of the Puerto Rican population, 34 percent of the Cuban population, and 68 percent of the "Other Hispanic" population (9). Accordingly, caution should be exercised in generalizing mortality patterns from the reporting area to the Hispanic-origin population (especially Cubans) of the entire United States. For qualifica-

tions regarding infant mortality of the Hispanic-origin population, see "Infant deaths."

Marital Status

Mortality statistics by marital status (table 1–32) were published in 1979 for the first time since 1961. (Previously they had been published in the annual volumes for the years 1949–51 and 1959–61.) Several reports analyzing mortality by marital status have been published, including the special study based on 1959–61 data (10). 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 2,068,117 resident deaths 15 years of age and over in 1987, 10,596 certificates (0.5 percent) had marital status not stated.

Place of death and status of decedent

Mortality statistics by place of death were published in 1979 for the first time since 1958 (tables 1–29 and 1–30). In addition, mortality data were also available for the first time in 1979 for the status of decedent when death occurred in a hospital or medical center (table 1–29). These data were obtained from the following two items that appear on the U.S. Standard Certificate of Death:

- Item 7c. Hospital or Other Institution—Name (If not in either, give street and number)
- Item 7d. If Hosp. or Inst. Indicate DOA, OP/Emer. Rm., Inpatient (Specify)

All of the States and the District of Columbia have item 7c (or its equivalent) on the death certificate. For all States and the District of Columbia in the Vital Statistics Cooperative Program, NCHS accepts the State definition, classification, or codes for hospitals, medical centers, or other institutions.

Table 1–29 shows mortality data for the total of the following 43 States (including New York City) that have item 7d or its equivalent on their death certificates:

Alaska
Arizona
Arkansas
Colorado
Connecticut
Florida
Georgia
Hawaii
Idaho
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
Nevada
New Hampshire
New Jersey
New Mexico
New York
North Carolina
North Dakota
Ohio
Oregon
Pennsylvania
Rhode Island
South Carolina
South Dakota
Tennessee
Utah
Vermont
Virginia
Washington
West Virginia
Wisconsin
Wyoming

Effective with data for 1980, the coding of place of death and status of decedent was changed. A new coding category was added: "Dead on arrival—hospital, clinic, medical center name not given." Deaths coded to this category are tabulated in table 1–29 as "Dead on arrival" and in table 1–30 as "Not in hospital or medical center." Had the 1979 coding categories been used, these deaths would have been tabulated as "Place unknown."

Mortality by month and date of death

Deaths by month have been regularly tabulated and published in the annual volume for each year beginning with data year 1900. For 1987, deaths by month are shown in tables 1–20, 1–21, 1–24, 1–31, 2–12, 2–13, 2–14, and 3–9.

Date of death was first published 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 in this volume are shown in table 1–31 for the total number of deaths and for the number 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 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 autopsies were performed. For 1987, autopsies were reported on 253,023 death certificates, 11.9 percent of the total (table 1–28).

Information as to whether the 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 eight of the cause-of-death categories shown in table 1–28, 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; Motor vehicle accidents; Suicide; Homicide and legal intervention; and All other external causes). There were four other categories for which 40 percent or more of the death certificates reported autopsies. Autopsies were reported for only 7.6 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"(11).

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 causes of death in a sequential order. These 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 a single classification category.

As a statistical datum, the 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 start of the chain of events leading to death. The rules for selecting the underlying cause of death are included with the 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 the National Center for Health Statistics have been classified according to the Ninth Revision of the *International Classification of Diseases* (ICD–9) (11). In addition to specifying that the classification be used, WHO also recommends how the data should be tabulated in order to promote international comparability. The recommended system for tabulating data in the Ninth Revision allows countries to construct their own mortality and morbidity tabulation lists from the rubrics of the WHO Basic Tabulation List as long as 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 Basic Tabulation List (BTL) recommended under the Ninth Revision consists of 57 two-digit rubrics that add to the "all causes" total. Within each two-digit rubric, up to 9 three-digit rubrics numbered from 0 to 8 are identified, but these do not add to the total of the two-digit rubric. The two-digit rubrics of the BTL 01 through 46 provide for the tabulation of nonviolent deaths to ICD categories 001–799. Rubrics relating to chapter 17 (nature-of-injury causes 47 through 56) are not used by NCHS for selecting underlying cause of death; rather, preference is given to rubrics E47 through 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 which are a minimum 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 in use 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, which identify persons injured, are shown in the accident tables of this report (section 5). Special fifth-digit subcategories are also 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. The following new categories have been incorporated into the Each-Cause List:

Human immunodeficiency virus infection	*042–*044
Human immunodeficiency virus infection with specified conditions	*042
With specified infections	*042.0
Causing other specified infections	*042.1
With specified malignant neoplasms	*042.2
Acquired immunodeficiency syndrome, unspecified	*042.9
Human immunodeficiency virus infection causing other specified conditions	*043
Causing lymphadenopathy	*043.0
Causing specified diseases of the central nervous system	*043.1
Causing other disorders involving the immune mechanism	*043.2
Causing other specified conditions	*043.3
Acquired immunodeficiency syndrome-related complex, unspecified	*043.9
Other human immunodeficiency virus infection	*044
Causing specified acute infections	*044.0
Human immunodeficiency virus infection, unspecified	*044.9

The following changes have been made in the List of 282 Selected Causes of Death:

from

Viral diseases 045–079
Other viral diseases 046–049, 051–054, 057–061, 065–066, 071–079

to

Viral diseases *042–*044, 045–079
Other viral diseases *042–*044, 046–049, 051–054, 057–061, 065–066, 071–079

The following change has been made in the List of 72 Selected Causes of Death:

from

All other infectious and parasitic diseases 001–003, 005, 020–032, 037, 039–041, 046–054, 56–066, 071–088, 098–139

to

All other infectious and parasitic diseases 001–003, 005, 020–032, 037, 039–041, *042–*044, 046–054, 056–066, 071–088, 098–139

The following change has been made in the List of 61 Selected Causes of Infant Death:

from

Remainder of infectious and parasitic diseases 001–007, 010–032, 034–035, 037, 039–041, 080–088, 091–139

to

Remainder of infectious and parasitic diseases 001–007, 010–032, 034–035, 037, 039–041, *042–*044, 080–088, 091–139

The following change has been made in the List of 34 Selected Causes of Death:

from

Residual of infectious and parasitic diseases 001–009, 020–088, 098–139

to

Residual of infectious and parasitic diseases 001–009, 020–041, *042–*044, 045–088, 098–139

Effect of list revisions—The International Lists or adaptations of them, in use in this country since 1900, have been revised approximately every 10 years so that the disease classification 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 (11). For a discussion of each of the classifications used with death statistics since 1900, see Technical Appendix in *Vital Statistics of the United States, 1979,* Volume II, Mortality, Part A, Section 7, pages 9–14.

A dual coding study was undertaken between the Ninth and the Eighth Revisions to measure the extent of discontinuity in cause-of-death statistics resulting from introducing the new Revision. An initial study for the List of 72 Selected Causes of Death and the List of 10 Selected Causes of Infant Death has been published (12). 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, again see the 1979 Technical Appendix.

Significant coding changes during 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 will be discussed below. In early 1983, a change was made in the coding of Acquired immunodeficiency syndrome (AIDS) and Human immunodeficiency virus (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, a change was made in the definition of child (which affects the classification of deaths to a number of

categories, including Child battering and other maltreatment), and in guidelines for coding deaths to the category Child battering and other maltreatment (ICD No. E967). 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 previously been classified to Neoplasms of unspecified nature (ICD–9 No. 239). Detailed discussion of these changes may be found in the Technical Appendix for previous volumes.

Coding in 1987—The rules and instructions used in coding the 1987 mortality medical data remained essentially the same as those used for the 1986 data except for notable changes described below. Beginning with data for 1987, NCHS introduced new category numbers *042–*044 for classifying and coding Human immunodeficiency virus (HIV) infection, formerly referred to as human T-cell lymphotropic virus-III/lymphadenopathy associated virus (HTLV-III/LAV) infection. The asterisk before the category numbers indicates that these codes are not part of the Ninth Revision of the *International Classification of Diseases* (ICD–9). Deaths classified to these categories for 1987 are shown in Tables 1–36, 1–37, 1–38, 1–39, 1–40, 1–41, 1–42, 2–22, and 2–23, and are also shown in the Each Cause List in Table 1–23. Deaths classified to category numbers *042–*044 are not shown separately in the other tables showing cause-of-death data. In the List of 282 Selected Causes of Death, deaths classified to category numbers *042–*044 are included in the category Other viral diseases; in the List of 72 Selected Causes of Death they are included in All other infectious and parasitic diseases; in the List of 61 Selected Causes of Infant Death they are included in Remainder of infectious and parasitic diseases; and, in the List of 34 Selected Causes of Death they are included in Residual of infectious and parasitic diseases.

For data years 1983–86, human immunodeficiency virus (HIV) infection, when reported on the death certificate, was assigned to the category Deficiency of cell-mediated immunity (ICD No. 279.1). Because the selection rules for underlying cause of death were developed prior to the identification of AIDS, other conditions mentioned on the death certificate and not in the category No. 279.1 were often selected as the underlying cause of death during this period. The underlying cause of death for these certificates involving HIV infection was therefore classified to a number of different categories including Deficiency of cell-mediated immunity (ICD No. 279.1), Pneumocystosis (ICD–9 No. 136.3, and Site unspecified (ICD–9 No. 173.9), under Other malignant neoplasm of skin (ICD–9 No. 173). As a consequence, cause-of-death statistics for 1987 are not strictly comparable with data for previous years. Also, the category No. 279.1 was not uniquely specific for HIV conditions. There were 1,141 death certificates which had mention of conditions coded to ICD No. 279.1 in 1983, 2,943 in 1984, 6,040 in 1985, and 10,900 in 1986. It is believed that HIV infection was involved in most of these deaths.

Also, coding rules for the conditions "dehydration" and "disseminated intravascular coagulopathy" were changed. Beginning with data year 1987, "dehydration" was considered to be a "direct sequel of" any malignant neoplasm; previously, for data years 1981–86, dehydration was considered to be a "direct sequel of" only certain specified malignant neoplasms. In addition, effective with data year 1985 for NCHS and with data year 1986 for those States that provide coded medical data to NCHS, "disseminated intravascular coagulopathy" was changed to be considered a "direct sequel of" surgery. As a result, trends in deaths due to Volume depletion (ICD–9 No. 276.5) and Defibrination syndrome (ICD–9 No. 286.6), respectively, are affected.

Medical certification—The use of a standard classification list, although essential for State, regional, and international comparison, does not assure strict comparability of the tabulated figures. A high degree of comparability between 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 (13), covering 128 references over a period of 23 years, indicates that 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 there are deaths for which it is not possible to determine the cause, this proportion indicates the care and consideration given to the certification by the medical certifier. It may also be used as a rough measure of the specificity of the medical diagnoses made by the certifier in various areas. In 1987, 1.5 percent of all reported deaths in the United States were assigned to ill-defined or unknown causes, about the same as in 1986. However, in 1987 this percentage varied among the States, from 0.5 percent to 4.4 percent. While the percent for the United States for all ages combined has generally remained stable since 1979, declines have occurred for persons in age groups 55–64 years and 65–74 years, while increases have occurred for persons in age groups 25–34 years and 35–44 years. There has been no clear pattern of change in the percent of deaths assigned to Symptoms, signs, and ill-defined conditions for the other age groups for the United States as a whole.

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 to select the underlying cause of death. The system is called "Automated Classification of Medical Entities" (ACME).

The ACME system applies the same rules for selecting the underlying cause as 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 between 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 are periodically updated to reflect additional new information on the relationship among medical conditions. For 1987, these tables were amended to incorporate the new categories for Human immunodeficiency virus infection (*042–*044) and to reflect the relationships between HIV infection and other diseases. They were also amended to incorporate the relationship that dehydration is considered as a "direct sequel of" malignant neoplasms. 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 (14,15,16).

Cause-of-death ranking—Cause-of-death ranking (except for infants) is based on the List of 72 Selected Causes of Death and the category Human immunodeficiency virus infection (HIV 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 are not ranked from the List of 72 Selected Causes of Death; and Certain conditions originating in the perinatal period and Symptoms, signs, and ill-defined conditions are not ranked from the List of 61 Selected Causes of Infant Death. In addition, category titles that begin with the words "Other" or "All other" are not ranked to determine the leading causes of death. When one of the titles that represents 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, the World Health Organization (1977, p. 764) 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 category title "Complications of pregnancy, childbirth, and the puerperium" (ICDA–8 Nos. 630–678). Although WHO did not define maternal mortality, there was an NCHS classification rule that limited a maternal death to a death 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 of time for the condition was given. If no duration was specified and the underlying cause of death was a maternal condition, then 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 on 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 have been expanded to include Indirect obstetric causes (ICD–9 Nos. 647–648). These causes include Infective and parasitic conditions as well as other current conditions in the mother that are classifiable elsewhere but which 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 that a pregnant woman will die from 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.

Infant deaths

Age—An infant death is defined as a death under 1 year of age. The term excludes fetal deaths. Infant deaths are usually divided into two categories according to age, neonatal and postneonatal. Neonatal deaths are those that occur during the first 27 days of life, and postneonatal deaths are those that occur between 28 days and 1 year of age. It has generally 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; and 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 section 2 and section 8 are the most commonly used index for measuring the risk of dying during the first year of life; they are calculated by dividing the number of infant deaths in a calendar year by the number of live births registered for the same period and are presented as rates per 1,000 or per 100,000 live births. Infant mortality rates use the number of live births in the denominator to approximate the population at risk of dying before the first birthday. This measure is an approximation of the risk of dying in infancy because some of the live births will not have been exposed to a full year's risk of dying and some of the infants that die during a year will have been born in the previous year. The error introduced into the infant mortality rate by this inexactness is usually small, especially when the birth rate is relatively constant from year to year (17,18). 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 (19,20).

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 period. 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 through June, the denominator for the infant mortality rate is a count of births occurring during the 12 months of January through December. The difference in the time reference period can result in different trends between the two indices during periods when birth rates are markedly moving up or down.

In addition, the infant death rate is also subject to greater imprecision than is the infant mortality rate because of problems of enumerating and estimating the population under 1 year of age (20).

Race—Infant mortality rates for specified races other than white or black may be underestimated, based on results of studies in which race on the birth and death certificates for the same infant were compared (21). The figures should be interpreted with caution because of possible inconsistencies in reporting of race between the numerator and denominator of the rates. This reflects differences in the nature of reporting and processing race on these two vital records. On the birth certificate, race of parents is reported by the mother at the time of delivery. On the death certificate, race of the deceased infant is reported by the funeral director based on observation or on information supplied by an informant, such as a parent. With respect to processing, race of infant at birth is coded using coding rules that take account of the race of each parent (see the Technical Appendix in *Vital Statistics of the United States, 1987*, Volume I, Natality, section entitled "Race or national origin"). For infant deaths, the race of child is coded directly from the race reported on the death certificate.

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 18 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 for 1987 the percent of infant deaths of unknown origin was 8.0 percent and the percent of live births of unknown origin was 2.9 percent, infant mortality rates by specified Hispanic origin and race for non-Hispanic origin may be somewhat underestimated.

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

Fetal deaths

In May 1950 the World Health Organization 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 (22).

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

Shortly thereafter, this definition of fetal death was adopted by the National Center for Health Statistics as the nationally recommended standard. Currently all registration areas except Puerto Rico have definitions similar to the standard definition (23). Puerto Rico has no formal definition.

As another step toward increasing the comparability of data on fetal deaths for different countries, the World Health Organization 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

Note that in table 3–13, group IV consists of fetal deaths with gestation not stated but presumed to be 20 weeks or more gestation.

Until 1939 the nationally recommended procedure for registration of a fetal death required the filing of both a live-birth 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, and 1968. In 1978 the Standard Certificate of Fetal Death was replaced by the Standard Report of Fetal Death (figure 7–B).

The 1977 revision of the *Model State Vital Statistics Act and Model State Vital Statistics Regulations* (24) recommended that spontaneous fetal deaths of 20 weeks or more gestation, or a weight of 350 grams or more, and all induced terminations of pregnancy regardless of gestational age be reported and further that they be reported on separate forms. These forms are to be considered legally required statistical reports rather than legal documents.

Beginning with 1970 fetal deaths, 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 are different for spontaneous fetal deaths and induced terminations of pregnancy. These procedures are still in use.

Comparability and completeness of data—Registration area requirements for reporting fetal deaths vary. Most of these areas require reporting fetal deaths of gestations of 20 weeks or more. Table A shows the minimum period of gestation required by each State for fetal-death reporting. There is substantial evidence that not all fetal deaths for which reporting is required are reported (25).

Underreporting of fetal deaths is more 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 of 20–23 weeks of gestation may be more complete for those States that report fetal deaths of all periods of gestation.

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 of not-stated gestation for those States requiring reporting at 20 weeks or more 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 1987 this rule was applied to the following States: Colorado, Georgia, Hawaii, New York (including New York City), Rhode Island, and Virginia. Each year there are some exceptions to this procedure.

The data in table 3–3 include only fetal deaths to residents of selected areas in the United States that reported all periods of gestation. The areas are Colorado, Georgia, Hawaii, New York (including New York City), Rhode Island, and Virginia; excluded are fetal deaths to residents of Maine.

Arkansas—Since 1971, Arkansas has been using two reporting forms for fetal deaths: A confidential Spontaneous Abortion form that is not sent to the National Center for Health Statistics and a Fetal Death Certificate that is. During the period 1971 through 1980, 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 through 1983, 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 aged 20 to 27 weeks during 1981–83 were not comparable between Arkansas and other reporting areas nor with data for 1984–87. It is believed that reporting has improved but is still not comparable with data for 1980 and earlier years.

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 of less than 20 weeks' gestation are reported on the Report of Abortion, and, therefore, are excluded from fetal death counts in this volume.

Missouri—Beginning in 1984, Missouri changed its reporting requirements for spontaneous fetal deaths from "after 20 weeks" to "after 20 weeks or a weight of 350 grams or more."

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

Period of gestation—The period of gestation is the number of completed weeks elapsed between the first day of the last normal menstrual period and the date of delivery. The first day of the last normal menstrual period (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 the calculated gestation falls beyond a duration considered biologically plausible, "gestation in weeks" or "Physician's estimate of gestation" is used. When

Table A. Period of gestation at which fetal-death reporting is required: Each reporting area, 1987

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	X								
California			X						
Colorado	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	X								
Maryland			[2]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			[3]X						
Pennsylvania		X							
Rhode Island	X								
South Carolina				X					
South Dakota									X
Tennessee									[4]X
Texas			X						
Utah			X						
Vermont			[5]X						
Virginia	X								
Washington			X						
West Virginia			X						
Wisconsin				X					
Wyoming			X						

[1] If gestational age is unknown, weight of 350 grams or more.
[2] If gestational age is unknown, weight of 500 grams or more.
[3] If gestational age is unknown, weight of 400 grams or more, or crown-heel length of 28 centimeters or more
[4] If weight is unknown, 22 completed weeks' gestation or more.
[5] If gestational age is unknown, weight of 400 or more grams, 15 or more ounces.

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 1987 except Delaware, New Mexico, Puerto Rico, and South Dakota.

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 the Ninth Revision, International Classification of Diseases, 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; etc.

Race—The race of the fetus is ordinarily classified based on the race of the parents. If the parents are of different races, the following rules apply. (1) When only one parent is white, the fetus is assigned the other parent's race. (2) When neither parent is white, the fetus is assigned the father's race with one exception: If the mother is Hawaiian or Part-Hawaiian, the fetus is classified as Hawaiian.

When the race of one parent is missing or ill defined, the race of the other determines that of the fetus. When race of both parents is missing, the race of the fetus is allocated to the specific race of the fetus on the preceding record.

Total-birth order—Total-birth order refers to the sum of the live births and other terminations (including both spontaneous fetal deaths and induced terminations of pregnancy) that a woman has had including the fetal death being recorded. For example, if a woman has previously 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.

In the 1978 revision of the Standard Report of Fetal Death, total-birth order is calculated from four items on pregnancy history: Number of previous live births, now living; number of previous live births, now dead; number of other terminations before 20 weeks; and number of other terminations after 20 weeks.

All registration areas use the two standard items pertaining to the number of previous live births. Most areas use the two standard items pertaining to the number of "other terminations" before and after 20 weeks' gestation, but some areas use other criteria. 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.

Marital status—Table 3–4 shows fetal deaths and fetal-death ratios by mother's marital status. States excluded from this table are as follows: California, Connecticut, Maryland, Michigan, Montana, New York (including New York City), Ohio, Texas, and Vermont. Because live births comprise the denominator of the ratio, marital status must also be reported for mothers of live births. Marital status of the mother of the live birth is inferred for States that did not report it on the birth certificate.

There are no quantitative data on the characteristics of unmarried women who may misreport their marital status or who fail to register fetal deaths. Underreporting may be greater for the unmarried group than for the married group.

Age of mother—The fetal-death report asks for the mother's "age (at time of delivery)," and the ages are edited in NCHS for upper and lower limits. When mothers are reported to be under 10 years of age or 50 years 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 allocated 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).

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. The World Health Organization in the Ninth Revision of the International Classification of Diseases (ICD–9) recommended that "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 was further recommended that " 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 recommend adopting these definitions. Three definitions of perinatal mortality are currently used by NCHS: Perinatal Definition I, generally used for international comparisons, which includes fetal deaths of 28 weeks or more gestation and infant deaths of less than 7 days; Perinatal Definition II, which includes fetal deaths of 20 weeks or more gestation and infant deaths of less than 28 days; and Perinatal Definition III, which includes fetal deaths of 20 weeks or more gestation 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 poorer 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 of 20 weeks or more than are other States. The larger number of fetal deaths reported by these "all periods" States may result in higher perinatal rates compared with 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 of 20–27 weeks.

Not stated—Fetal deaths with gestational age not stated are presumed to be of 20 weeks' gestation or more if (1) the State requires reporting of all fetal deaths of gestational age 20 weeks or more or (2) 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 with gestation not stated but presumed to be 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 with presumed gestation of 20 weeks or more are included with those of stated gestation of 20 weeks or more.

For all three definitions, following the distribution of gestation not stated described above, fetal deaths with not-stated sex are allocated within gestational age groups on the basis of the distribution of stated cases. The allocation of not-stated gestational age and sex for fetal deaths is made individually for each State, for metropolitan and nonmetropolitan areas, and separately for the United States as a whole. 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.

QUALITY OF DATA

Completeness of registration

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

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

Massachusetts data

The 1964 statistics for deaths exclude approximately 6,000 events 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 also somewhat affected.

Quality control procedures

Demographic items on the death certificate—As previously indicated, for 1987 the mortality data for these items were obtained from two sources: (1) Microfilm images of the original certificates furnished by the Virgin Islands and photocopies from Guam; and (2) 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 has to go 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 NCHS independent verification of a 50-percent sample of that area's records. Once 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 prior to 1987 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 1987 was 0.25 percent.

These verification procedures involve controlling 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 that 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 for demographic data, mortality medical data are also subject to quality control procedures which control for errors of both coding

and data entry. Each of the 22 registration areas in 1987 that furnished NCHS with coded medical information according to NCHS specifications first had to qualify for sample verification. 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 has achieved the required error tolerance level, a sample of 70–80 records per month is used to monitor quality of medical coding. For these 22 States, the average coding error rate in 1987 was estimated at just over 4 percent.

For the remaining 33 registration areas—28 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 independently coded 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 1987, 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 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, where there is 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 (26). Further, conditions specified on a list of infrequent or rare causes of death need to be confirmed by the certifier or State Health Officer. For 1985 records, cryptosporidiosis was no longer confirmed by NCHS although this condition was still on the list of infrequent or rare causes of death through 1987. Because cryptosporidiosis has increased in frequency due to its association with human immunodeficiency virus (HIV) infection, it is no longer considered infrequent. 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 of *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 of 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 1900–87 are shown in table 7–1. In addition, the population including Armed Forces abroad is shown for the United States. Table B lists the sources for these populations.

Population estimates for 1987—The population of the United States estimated by age, race, and sex for 1987 is shown in table 7–2, and the population for each State by broad age groups follows in table 7–3. Population estimates for 1984–87 incorporate new estimation procedures for net migration and net undocumented immigration. The 1987 estimates are comparable with those for 1984–86 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 1984–1987 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 in *Vital Statistics of the United States, 1984*, Volume II, and the report of the U.S. Bureau of the Census (27). 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.

The racial counts in the 1980 census are affected by changes in reporting practices, particularly of the Hispanic population, and in coding and classifying. 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, 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

Table B. Sources for resident population and population including Armed Forces abroad: Birth- and death-registration States, 1900–1932, and United States, 1900–1987

Year	Source
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*, 1943.
1920–29	National Office of Vital Statistics, *Vital Statistics Rates in the United States, 1900–1940*, 1943.
1917–19	Same as for 1930–39.
1900–1916	Same as for 1920–29.

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.

In order 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 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 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 previously been estimated for April 1, 1980 (28). 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 in the period 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 the National Center for Health Statistics estimated a population by age, race, and sex excluding 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

(27). Net census undercount is the result of miscounting and misreporting of demographic characteristics such as age. Age-specific death rates are affected by both the net census undercount and the misreporting of age on the death certificate (29). 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 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 was not counted by age, race, and sex (30,31). The reports for 1980 include estimates of net census undercount using alternative methodological assumptions for age, race, and sex subgroups of the national population (32). 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 (1) levels of the observed vital rates, (2) differences among groups, and (3) 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 in 1980 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, then 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 by 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 if 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 (33). Life tables for the decennial period 1979–81 are used as the standard life tables in constructing the 1980–87 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 1984–87 that are lower than those that would have occurred 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 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 (34).

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 both 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 time 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 (35). 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 chances are 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 .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 Community A were 10.0 per 1,000 population and if this rate were based on 20 recorded deaths, then the chances are 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 Community A of 10.0 per 1,000 population were being compared with a rate of 20.0 per 1,000 population for Community B, which is based on 10 recorded deaths, then the difference between the rates for the two communities is 10.0. This difference is less than twice the standard error of the difference

$$2\sqrt{\frac{(10.0)^2}{20} + \frac{(20.0)^2}{10}}$$

of the two rates, which is computed to be 13.4. From this, it is concluded that the difference between the rates for the two communities is not statistically significant at the .05 level of significance.

SYMBOLS USED IN TABLES

Data not available	---
Category not applicable	...
Quantity zero	–
Quantity more than zero but less than 0.05	0.0
Quantity more than zero but less than 500 where numbers are rounded to thousands	Z
Figure does not meet standards of reliability or precision	*

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Table 7-1. Population of Birth- and Death-Registration States, 1900-1932, and United States, 1900-1987

[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 [2]		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 [3]	Population residing in area	Number of States [3]	Population residing in area
1987	243,915,000	243,400,000	1943	136,739,000	134,245,000	...	...	.	.
1986	241,613,000	241,096,000	1942	134,860,000	133,920,000	.	.		
1985	239,283,000	238,741,000	1941	133,402,000	133,121,000	...	...		
1984	237,019,000	236,495,000	1940	131,820,000	131,669,275	.	. .		
1983	234,538,000	234,023,000	1939	131,028,000	130,879,718	...	. .		
1982	232,309,000	231,786,000	1938	129,969,000	129,824,939	...	...	. .	
1981	229,849,000	229,348,000	1937	128,961,000	128,824,829	..	...	.	
1980	227,061,000	226,545,805	1936	128,181,000	128,053,180	..	..		
1979	225,055,000	224,567,000	1935	127,362,000	127,250,232	..	...	.	
1978	222,585,000	222,095 000	1934	126,485,000	126,373,773	..	..		
1977	220,239,000	219,760,000	1933	125,690,000	125,578,763	.	.		
1976	218,035,000	217,563,000	1932	124,949,000	124,840,471	47	118,903,899	47	118,903,899
1975	215,973,000	215,465,000	1931	124,149,000	124,039,848	46	117,455,229	47	118,148,987
1974	213,854,000	213,342,000	1930	123,188,000	123,076,741	46	116,544,946	47	117,238,278
1973	211,909,000	211,357,000	1929	- - -	121,769,939	46	115,317,450	46	115,317,450
1972	209,896,000	209,284,000	1928	- - -	120,501,115	44	113,636,160	44	113,636,160
1971	207,661,000	206,827,000	1927	- - -	119,038,062	40	104,320,830	42	107,084,532
1970	204,270,000	203,211,926	1926	- - -	117,399,225	35	90,400,590	41	103,822,683
1969	202,677,000	201,385,000	1925	- - -	115,831,963	33	88,294,564	40	102,031,555
1968	200,706,000	199,399,000	1924	- - -	114,113,463	33	87,000,295	39	99,318,098
1967	198,712,000	197,457,000	1923	- - -	111,949,945	30	81,072,123	38	96,788,197
1966	196,560,000	195,576,000	1922	- - -	110,054,778	30	79,560,748	37	92,702,901
1965	194,303,000	193,526,000	1921	- - -	108,541,489	27	70,807,090	34	87,814,447
1964	191,889,000	191,141,000	1920	- - -	106,466,420	23	63,597,307	34	86,079,263
1963	189,242,000	188,483,000	1919	105,063,000	104,512,110	22	61,212,076	33	83,157,982
1962	186,538,000	185,771,000	1918	104,550,000	103,202,801	20	55,153,782	30	79,008,412
1961	183,691,000	182,992,000	1917	103,414,000	103,265,913	20	55,197,952	27	70,234,775
1960	179,933,000	179,323,175	1916	- - -	101,965,984	11	32,944,013	26	66,971,177
1959	177,264,000	176,513,000	1915	- - -	100,549,013	10	31,096,697	24	61,894,847
1958	174,141,000	173,320,000	1914	- - -	99,117,567	...	...	24	60,960,309
1957	171,274,000	170,371,000	1913	- - -	97,226,814	...	...	23	58,156,740
1956	168,221,000	167,306,000	1912	- - -	95,331,300	..	..	22	54,847,700
1955	165,275,000	164,308,000	1911	- - -	93,867,814	...	..	22	53,929,644
1954	162,391,000	161,164,000	1910	- - -	92,406,536			20	47,470,437
1953	159,565,000	158,242,000	1909	- - -	90,491,525			18	44,220,513
1952	156,954,000	155,687,000	1908	- - -	88,708,976			17	38,634,759
1951	154,287,000	153,310,000	1907	- - -	87,000,271			15	34,552,837
1950	151,132,000	150,697,361	1906	- - -	85,436,556			15	33,782,268
1949	149,188,000	148,665,000	1905	- - -	83,819,666			10	21,767,980
1948	146,631,000	146,093,000	1904	- - -	82,164,974			10	21,332 076
1947	144,126,000	143,446,000	1903	- - -	80,632,152			10	20,943,222
1946	141,389,000	140,054,000	1902	- - -	79,160,196			10	20,562,907
1945	139,928,000	132,481,000	1901	- - -	77,585,128			10	20,237,453
1944	138,397,000	132,885,000	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, 1987

[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	243,400,000	118,531,000	124,869,000	205,820,000	100,589,000	105,231,000	37,580,000	17,942,000	19,639,000	29,736,000	14,103,000	15,633,000
Under 1 year	3,771,000	1,931,000	1,841,000	3,054,000	1,567,000	1,487,000	717,000	363,000	354,000	572,000	289,000	283,000
1-4 years	14,481,000	7,411,000	7,070,000	11,700,000	6,000,000	5,700,000	2,780,000	1,411,000	1,369,000	2,173,000	1,104,000	1,069,000
5-9 years	17,661,000	9,037,000	8,625,000	14,240,000	7,305,000	6,935,000	3,421,000	1,731,000	1,690,000	2,728,000	1,383,000	1,345,000
10-14 years	16,485,000	8,450,000	8,035,000	13,246,000	6,803,000	6,442,000	3,239,000	1,646,000	1,592,000	2,589,000	1,314,000	1,275,000
15-19 years	18,459,000	9,412,000	9,047,000	15,014,000	7,664,000	7,350,000	3,445,000	1,748,000	1,697,000	2,790,000	1,406,000	1,384,000
20-24 years	19,793,000	9,915,000	9,878,000	16,367,000	8,238,000	8,129,000	3,426,000	1,677,000	1,748,000	2,762,000	1,334,000	1,428,000
25-29 years	21,980,000	11,009,000	10,971,000	18,435,000	9,313,000	9,121,000	3,545,000	1,696,000	1,850,000	2,811,000	1,334,000	1,477,000
30-34 years	21,335,000	10,661,000	10,674,000	17,975,000	9,071,000	8,903,000	3,360,000	1,589,000	1,771,000	2,583,000	1,215,000	1,378,000
35-39 years	18,738,000	9,273,000	9,465,000	15,968,000	7,994,000	7,974,000	2,770,000	1,279,000	1,491,000	2,108,000	964,000	1,144,000
40-44 years	15,587,000	7,639,000	7,928,000	13,505,000	6,686,000	6,809,000	2,062,000	943,000	1,119,000	1,546,000	699,000	846,000
45-49 years	12,350,000	6,025,000	6,326,000	10,631,000	5,239,000	5,392,000	1,719,000	786,000	934,000	1,323,000	594,000	729,000
50-54 years	10,926,000	5,285,000	5,641,000	9,437,000	4,612,000	4,825,000	1,489,000	674,000	816,000	1,169,000	523,000	646,000
55-59 years	11,121,000	5,298,000	5,823,000	9,735,000	4,673,000	5,063,000	1,385,000	625,000	760,000	1,112,000	506,000	607,000
60-64 years	10,898,000	5,068,000	5,831,000	9,647,000	4,507,000	5,139,000	1,251,000	560,000	691,000	1,012,000	455,000	557,000
65-69 years	9,889,000	4,495,000	5,394,000	8,824,000	4,028,000	4,796,000	1,064,000	467,000	598,000	872,000	381,000	491,000
70-74 years	7,779,000	3,329,000	4,450,000	6,993,000	3,000,000	3,992,000	786,000	329,000	457,000	646,000	266,000	380,000
75-79 years	5,777,000	2,264,000	3,513,000	5,211,000	2,038,000	3,173,000	565,000	225,000	340,000	465,000	180,000	285,000
80-84 years	3,524,000	1,225,000	2,298,000	3,227,000	1,116,000	2,111,000	297,000	110,000	187,000	245,000	88,000	157,000
85 years and over	2,887,000	806,000	2,081,000	2,610,000	723,000	1,887,000	257,000	83,000	174,000	221,000	69,000	152,000

SOURCE: U.S. Bureau of the Census: "Current Population Reports," Series P-25, No. 1022.

Table 7-3. Estimated Population, by Age, for the United States, Each Division and State, Puerto Rico, Virgin Islands, and Guam: July 1, 1987

[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 [1]	243,400,000	18,252,000	52,605,000	97,413,000	45,295,000	29,835,000
Geographic divisions:						
New England	12,844,000	866,000	2,561,000	5,226,000	2,472,000	1,719,000
Middle Atlantic	37,433,000	2,543,000	7,617,000	14,506,000	7,698,000	5,068,000
East North Central	41,904,000	3,047,000	9,304,000	16,571,000	7,869,000	5,113,000
West North Central	17,634,000	1,314,000	3,812,000	6,901,000	3,205,000	2,403,000
South Atlantic	41,684,000	2,947,000	8,694,000	16,561,000	8,075,000	5,408,000
East South Central	15,290,000	1,092,000	3,543,000	5,975,000	2,798,000	1,882,000
West South Central	26,910,000	2,318,000	6,346,000	10,817,000	4,554,000	2,874,000
Mountain	13,167,000	1,142,000	3,051,000	5,415,000	2,170,000	1,389,000
Pacific	36,533,000	2,983,000	7,677,000	15,440,000	6,453,000	3,980,000
New England						
Maine	1,187,000	83,000	257,000	468,000	220,000	159,000
New Hampshire	1,057,000	76,000	223,000	446,000	191,000	121,000
Vermont	548,000	40,000	118,000	231,000	94,000	65,000
Massachusetts	5,855,000	389,000	1,129,000	2,418,000	1,119,000	800,000
Rhode Island	986,000	85,000	195,000	393,000	190,000	145,000
Connecticut	3,211,000	214,000	639,000	1,271,000	659,000	429,000
Middle Atlantic						
New York	17,825,000	1,248,000	3,646,000	6,871,000	3,651,000	2,309,000
New Jersey	7,672,000	513,000	1,549,000	2,994,000	1,620,000	994,000
Pennsylvania	11,936,000	783,000	2,422,000	4,542,000	2,425,000	1,764,000
East North Central						
Ohio	10,784,000	773,000	2,390,000	4,186,000	2,089,000	1,346,000
Indiana	5,531,000	390,000	1,251,000	2,189,000	1,031,000	670,000
Illinois	11,582,000	861,000	2,517,000	4,610,000	2,190,000	1,405,000
Michigan	9,200,000	665,000	2,088,000	3,691,000	1,697,000	1,058,000
Wisconsin	4,807,000	356,000	1,059,000	1,896,000	863,000	633,000
West North Central						
Minnesota	4,246,000	323,000	915,000	1,725,000	749,000	534,000
Iowa	2,834,000	198,000	619,000	1,087,000	511,000	421,000
Missouri	5,103,000	369,000	1,089,000	1,965,000	977,000	703,000
North Dakota	672,000	55,000	152,000	266,000	110,000	90,000
South Dakota	709,000	58,000	159,000	267,000	126,000	100,000
Nebraska	1,594,000	122,000	349,000	619,000	284,000	220,000
Kansas	2,476,000	192,000	530,000	971,000	447,000	336,000
South Atlantic						
Delaware	644,000	47,000	135,000	261,000	127,000	75,000
Maryland	4,535,000	333,000	933,000	1,897,000	886,000	486,000
District of Columbia	622,000	46,000	106,000	275,000	118,000	77,000
Virginia	5,904,000	421,000	1,226,000	2,518,000	1,115,000	623,000
West Virginia	1,897,000	117,000	432,000	728,000	356,000	264,000
North Carolina	6,413,000	438,000	1,396,000	2,599,000	1,226,000	754,000
South Carolina	3,425,000	256,000	797,000	1,398,000	607,000	367,000
Georgia	6,222,000	477,000	1,459,000	2,552,000	1,111,000	623,000
Florida	12,023,000	812,000	2,210,000	4,333,000	2,526,000	2,140,000
East South Central:						
Kentucky	3,727,000	258,000	855,000	1,478,000	678,000	457,000
Tennessee	4,855,000	328,000	1,070,000	1,933,000	922,000	602,000
Alabama	4,083,000	295,000	949,000	1,585,000	749,000	505,000
Mississippi	2,625,000	211,000	668,000	979,000	449,000	318,000
West South Central:						
Arkansas	2,388,000	173,000	548,000	877,000	443,000	348,000
Louisiana	4,461,000	385,000	1,072,000	1,787,000	735,000	481,000
Oklahoma	3,272,000	258,000	733,000	1,283,000	580,000	418,000
Texas	16,789,000	1,502,000	3,993,000	6,870,000	2,796,000	1,627,000
Mountain:						
Montana	809,000	64,000	183,000	320,000	140,000	101,000
Idaho	998,000	84,000	253,000	391,000	156,000	115,000
Wyoming	490,000	43,000	119,000	219,000	65,000	44,000
Colorado	3,296,000	268,000	703,000	1,475,000	544,000	305,000
New Mexico	1,500,000	134,000	359,000	586,000	259,000	150,000
Arizona	3,386,000	287,000	733,000	1,333,000	603,000	430,000
Utah	1,680,000	184,000	499,000	645,000	215,000	136,000
Nevada	1,007,000	77,000	201,000	434,000	189,000	106,000
Pacific:						
Washington	4,538,000	342,000	960,000	1,942,000	759,000	536,000
Oregon	2,724,000	190,000	572,000	1,138,000	451,000	373,000
California	27,663,000	2,302,000	5,786,000	11,664,000	4,968,000	2,944,000
Alaska	525,000	60,000	128,000	240,000	78,000	19,000
Hawaii	1,083,000	89,000	230,000	456,000	198,000	109,000
Puerto Rico	3,292,000	---	---	---	---	---
Virgin Islands	106,100	---	---	---	---	---
Guam	130,400	---	---	---	---	---

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

SOURCE U.S. Bureau of the Census. "Current Population Reports," Series P-25, Nos. 1024 and 1030, and unpublished data.

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	.9821	.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	.9783	.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	.9880	.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	1.0018	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	.9585	.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.

Section 7. Technical Appendix

	Page
Sources of data	1
Death and fetal-death statistics	1
Standard certificates and reports	2
History	2
Classification of data	3
Classification by occurrence and residence	4
Geographic classification	5
State or country of birth	5
Age	5
Race	6
Hispanic origin	6
Marital status	7
Place of death and status of decedent	7
Mortality by month and date of death	7
Report of autopsy	8
Cause of death	8
Maternal deaths	10
Infant deaths	11
Fetal deaths	12
Perinatal mortality	15
Quality of data	16
Completeness of registration	16
Massachusetts data	16
Alabama data	16
Quality control procedures	16
Estimates of errors arising from 50-percent sample for 1972	17
Computation of rates and other measures	17
Population bases	17
Net census undercount	18
Age-adjusted death rates	19
Life tables	19
Random variation in numbers of deaths, death rates, and mortality rates and ratios	20
Symbols used in tables	22
References	21

Figures

7-A.	U.S. Standard Certificate of Death	3
7-B.	U.S. Standard Report of Fetal Death	4

Text tables

A.	Infant mortality rates by race for period 1983–85 and for birth cohorts, 1983–85; and percent difference between period and birth cohort rates, by race: United States	12
B.	Period of gestation at which fetal-death reporting is required: Each reporting area, 1988	14
C.	Sources for resident population and population including Armed Forces abroad: Birth- and death-registration States, 1900–1932, and United States, 1900–1988	18

Population tables

7-1.	Population of birth- and death-registration States, 1900–1932, and United States, 1900–1988	23
7-2.	Estimated population of the United States, by 5-year age groups, race, and sex: July 1, 1988	24
7-3.	Estimated population, by age, for the United States, each division and State, Puerto Rico, Virgin Islands, and Guam: July 1, 1988	25
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	26

SOURCES OF DATA

Death and fetal-death statistics

Mortality statistics for 1988 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 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 through 1969, 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 in which 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 1988 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 in which State-coded medical data were first transmitted to NCHS is shown below for the 27 States now furnishing such data. Some States coded medical items for other States, under contract.

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

For 1988 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, it was necessary to change these procedures because of a backlog in coding and processing that resulted 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 sample resulted from personnel and budgetary restrictions. 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, except New York State (excluding New York City), which submitted State-coded data in 1988. Fetal-death data are not published by NCHS for the Virgin Islands and Guam.

Standard certificates and reports

The U.S. Standard Certificate of Death and the U.S. Standard Report of Fetal Death, issued by the Public Health Service, have served for many years as the principal means of attaining uniformity in the content 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 have been dropped when their usefulness appeared to be limited.

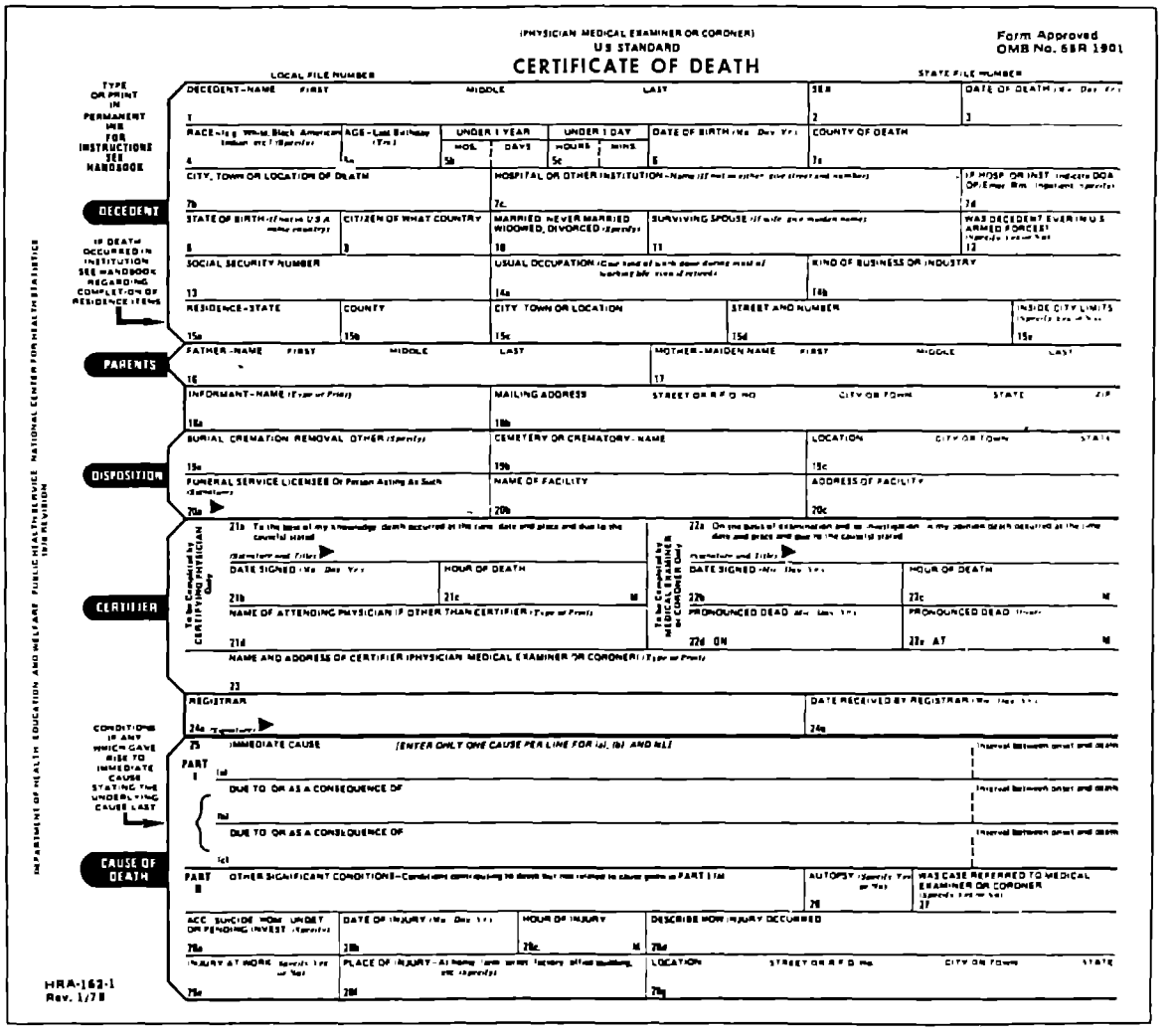
New revisions of the U.S. Standard Certificate of Death and the U.S. Standard Report of Fetal Death were recommended for State use beginning on January 1, 1978. The U.S. Standard Certificate of Death and the U.S. Standard Report of Fetal Death are shown in figures 7-A and 7-B. The certificate of death shown in figure 7-A is for use by a physician, a medical examiner, or a coroner. Two other forms of the U.S. Standard Certificate of Death are available; they are similar to the one shown, except that the section on certification is designed for the physician's signature on one, and for the medical examiner's or coroner's signature on the other.

Among the changes in the new revision were the additions of an item asking, "If Hosp. or Inst., Indicate DOA, OP/Emer. Rm., Inpatient" and an item asking, "Was Decedent Ever in U.S. Armed Forces?" The latter item was previously on the certificate but was deleted from 1968 through 1977. An item on whether autopsy findings were considered for determining cause of death was dropped.

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 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 that show 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*

FIGURE 7-A.



States, 1979, Volume II, Mortality, Part A, Section 7, pages 3–4, 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.

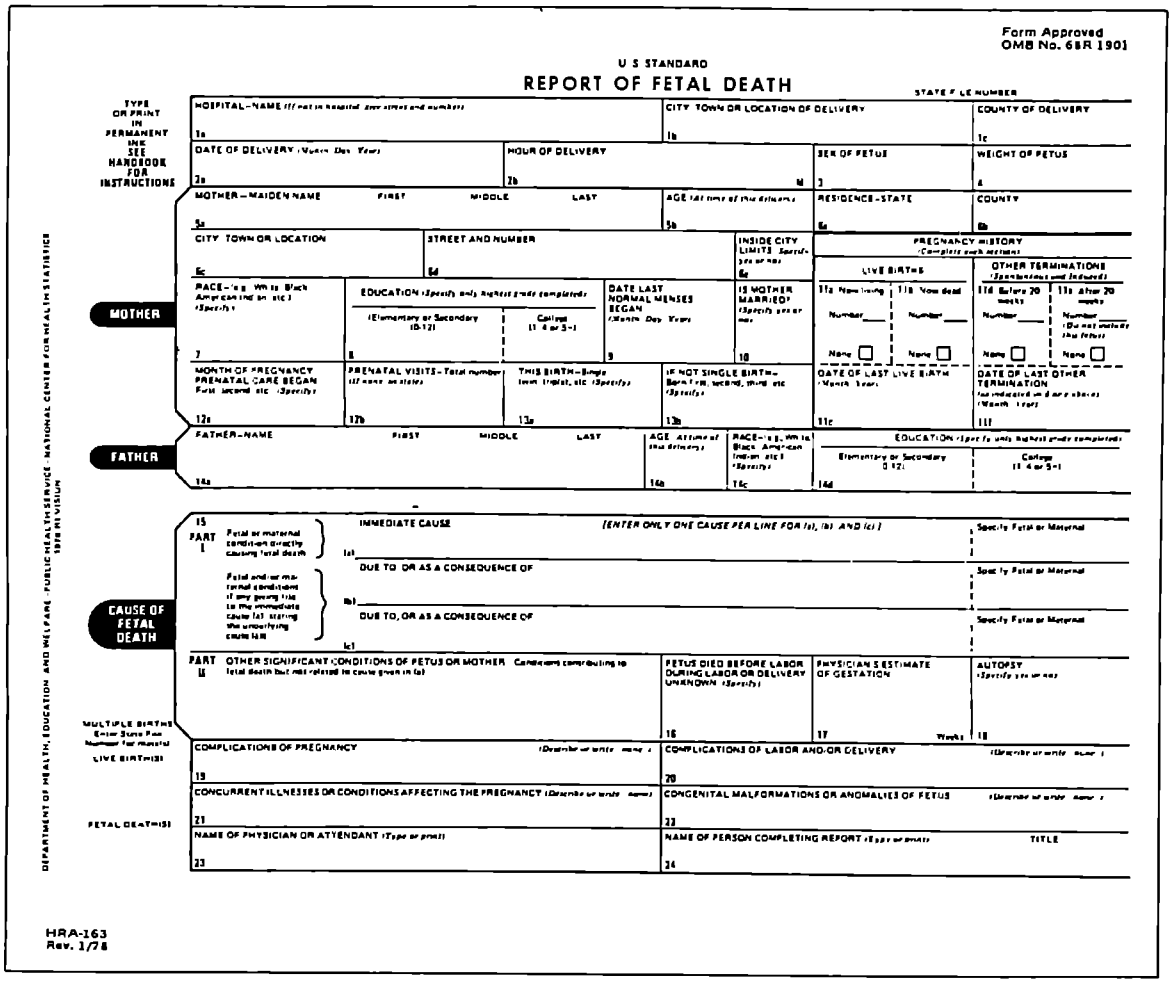
Statistics on fetal deaths were first published for the birth-registration area in 1918, and then every year beginning with 1922.

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 1988 are set forth in two NCHS instruction manuals (1,2).

FIGURE 7-B.



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 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 1988 this difference amounted to 3,197 deaths. Mortality statistics by place of occurrence are shown in tables 1-11, 1-19, 1-20, 1-29, 1-30, 3-1, 3-8, 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 (3).

A comparison of the results of this study of deaths with those for a previous matched record study of births (4) showed that the quality of residence data had considerably improved 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 if 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 (1,2). The geographic codes assigned by the National Center for Health Statistics during data reduction of source information on birth, death, and fetal-death records are given in another instruction manual (5). 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 (6) 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 (7).

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. The National Center for Health Statistics cannot, however, 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 (7,8).

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—Vital statistics data for cities and certain other urban places in 1988 are 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, 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 volume 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, as there are 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 1-33) 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 1988, about 0.6 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 also based 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 1988, 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 other 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 in use 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 about half of all the tables the divisions are white, all other (including black), and black separately. In other tables by race, where the main purpose is to isolate the major groups, the classifications are simply white and all other.

Race not stated—For 1988 the number of death records for which race was unknown, not stated, or not classifiable was 4,094, 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 in use 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 in use for residents of New Jersey did not contain the race item.

Adjustments made in vital statistics to take into account the omission of the race item in New Jersey for part of the certificates filed during 1962 through 1964 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 1988 were obtained from the District of Columbia and the following 29 States: Alabama, Arizona, Arkansas, California, Colorado, Georgia, Hawaii, Illinois, Indiana, Kansas, Kentucky, Maine, Mississippi, Montana, Nebraska, Nevada, New Jersey, New Mexico, New York (including New York City), North Carolina, North Dakota, Ohio, Oregon, Rhode Island, Tennessee, Texas, Utah, Washington, and Wyoming.

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 open-ended to obtain the specific origin or descent of the decedent (for example, Italian, Mexican, Puerto Rican, English, and Cuban). The second format is directed specifically toward the Hispanic population and asks whether the decedent is of Spanish origin. If so, the specific origin—for example, Mexican, Puerto Rican, or Cuban—is to be indicated.

For 1988, mortality data in tables 1-34 and 2-18 are based on deaths to residents of all 29 reporting States and the District of Columbia. In tables 1-35, 1-40, and 1-41, general mortality data for the Hispanic-origin population are based on deaths to residents of 26 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 26 States are as follows: Alabama, Arizona, Arkansas, California, Colorado, Georgia, Hawaii, Illinois, Indiana, Kansas, Kentucky, Maine, Mississippi, Montana, Nebraska, New Jersey, New York (including New York City), North Carolina, North Dakota, Ohio, Oregon, Rhode Island, Texas, Utah, Washington, and Wyoming. Excluded from these tables are data for New Mexico, because the format for the Hispanic item on the New Mexico death certificate departs sufficiently from that of other areas to result in noncomparable data. In addition, in tables 1-34 and 2-18 for New Mexico, no deaths are shown for the category "not stated" origin. Because of the way in which the item on the death certificate for New Mexico is worded, it was not possible to determine whether a blank entry represented a response of "non-Hispanic origin" or of "unknown origin." Accordingly, blank entries were coded to "non-Hispanic." Data for two other States—Nevada and Tennessee—are excluded from tables 1-35, 1-40, and 1-41 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 2-19, 2-20, 2-21, and 2-22, the reporting area is based on deaths to residents of 23 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 23 States are as follows: Alabama, Arizona, Arkansas, California, Colorado, Georgia,

Hawaii, Illinois, Indiana, Kansas, Kentucky, Maine, Mississippi, Montana, Nebraska, New Jersey, New York (including New York City), North Carolina, North Dakota, Ohio, Texas, Utah, and Washington. Data for New Mexico, Nevada, and Tennessee were excluded for the reasons stated above. Oregon and Rhode Island were excluded because their live birth certificates did not include an item to identify Hispanic or ethnic origin. Wyoming was excluded because of the large proportion of live births (in excess of 10 percent) for which Hispanic origin was not stated or was unknown.

The 26 reporting States and the District of Columbia for which general mortality data are shown in this report accounted for about 82 percent of the Hispanic population in the United States in 1980. This included about 91 percent of the Mexican population, 79 percent of the Puerto Rican population, 35 percent of the Cuban population, and 72 percent of the "Other Hispanic" population (9). The 23 reporting States and the District of Columbia for which Hispanic infant mortality data are shown in this report accounted for about 81 percent of the Hispanic population, including about 90 percent of the Mexican population, 79 percent of the Puerto Rican population, 35 percent of the Cuban population, and 71 percent of the "Other Hispanic" population. Accordingly, caution should be exercised in generalizing mortality patterns from the reporting area to the Hispanic-origin population (especially Cubans) 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 (table 1-32) were published in 1979 for the first time since 1961. (Previously they had been published in the annual volumes for the years 1949–51 and 1959–61.) Several reports analyzing mortality by marital status have been published, including the special study based on 1959–61 data (10). 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 2,112,148 resident death certificates for residents 15 years of age and over in 1988, 12,603 certificates (0.6 percent) had marital status not stated.

Place of death and status of decedent

Mortality statistics by place of death were published in 1979 for the first time since 1958 (tables 1-29 and 1-30). In addition, mortality data were also available for the first time in 1979 for the status of decedent when death occurred in a hospital or medical center (table 1-29). These data were obtained from the following two items that appear on the U.S. Standard Certificate of Death:

- Item 7c. Hospital or Other Institution—Name (If not in either, give street and number)
- Item 7d. If Hosp. or Inst. Indicate DOA, OP/Emer. Rm., Inpatient (Specify)

All of the States and the District of Columbia have item 7c (or its equivalent) on the death certificate. For all States and the District of Columbia in the Vital Statistics Cooperative Program, NCHS accepts the State definition, classification, or code for hospitals, medical centers, or other institutions.

Table 1-29 shows mortality data for the total of the following 44 States (including New York City) that have item 7d or its equivalent on their death certificates:

Alabama	Nebraska
Alaska	Nevada
Arizona	New Hampshire
Arkansas	New Jersey
Colorado	New Mexico
Connecticut	New York
Florida	North Carolina
Georgia	North Dakota
Hawaii	Ohio
Idaho	Oregon
Illinois	Pennsylvania
Indiana	Rhode Island
Iowa	South Carolina
Kansas	South Dakota
Kentucky	Tennessee
Louisiana	Utah
Maine	Vermont
Michigan	Virginia
Minnesota	Washington
Mississippi	West Virginia
Missouri	Wisconsin
Montana	Wyoming

Effective with data for 1980, the coding of place of death and status of decedent was changed. A new coding category was added: "Death on arrival—hospital, clinic, medical center name not given." Deaths coded to this category are tabulated in table 1-29 as "Dead on arrival" and in table 1-30 as "Not in hospital or medical center." Had the 1979 coding categories been used, these deaths would have been tabulated as "Place unknown."

Mortality by month and date of death

Deaths by month have been regularly tabulated and published in the annual volume for each year beginning with data year 1900. For 1988, deaths by month are shown in tables 1-20, 1-21, 1-24, 1-31, 2-12, 2-13, 2-14, and 3-9.

Date of death was first published 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 1-31 for the total number of deaths and for the number 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 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 1988, autopsies were reported on 251,095 death certificates, 11.6 percent of the total (table 1-28).

Information as to whether the 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 10 of the cause-of-death categories shown in table 1-28, autopsies were reported as performed for 50 percent or more of all deaths (Shigellosis and amebiasis; Whooping cough; Meningococcal infection; Acute poliomyelitis; Pregnancy with abortive outcome; Other complications of pregnancy, childbirth, and the puerperium; Motor vehicle accidents; Suicide; Homicide and legal intervention; and All other external causes). There were two other categories 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" (11).

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 causes of death in a sequential order. These 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 a single 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 start 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) (11). In addition to specifying that ICD-9 be used, WHO also recommends how the data should be tabulated in order to promote international comparability. The recommended system for tabulating data in the Ninth Revision allows countries to construct their own mortality and morbidity tabulation lists from the rubrics of the WHO Basic Tabulation List as long as 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 Basic Tabulation List (BTL) recommended under the Ninth Revision consists of 57 two-digit rubrics that add to the "all causes" total. Within each two-digit rubric, up to 9 three-digit rubrics numbered from 0 to 8 are identified, but these do not add to the total of the two-digit rubric. The two-digit BTL rubrics 01 through 46 provide for the tabulation of nonviolent deaths according to ICD categories 001–799. Rubrics relating to chapter 17 (nature-of-injury causes 47 through 56) are not used by NCHS for selecting underlying cause of death; rather, preference is given to rubrics E47 through E56. The 57th two-digit rubric V0 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 in use 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, which identify persons injured, are shown in the accident tables of this report (section 5). Special fifth-digit subcategories are also 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. The changes are described in the Technical Appendix From *Vital Statistics of the United States, 1987.*

Effect of list revisions—The International Lists, or adaptations of them, in use in this country since 1900, have been revised approximately every 10 years so that the disease classifications may be consistent with advances in medical science and with changes in diagnostic practice. Each revision of the International Lists have 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 (11). 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 (12). 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 1979 Technical Appendix.

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 human immunodeficiency virus (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, a change was made in the definition of child (which affects the classification of deaths to a number of categories, including Child battering and other maltreatment), and in guidelines for coding deaths to the category Child battering and other maltreatment (ICD No. E967). 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 previously 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 Human immunodeficiency virus (HIV) infection, formerly referred to as human T-cell lymphotropic virus-III/lymphadenopathy-associated virus (HTLV-III/LAV) infection. The asterisk before the category numbers indicates that these codes are not part of the Ninth Revision. Also changed effective with data year 1987 were coding rules for the conditions "dehydration" and "disseminated intravascular coagulopathy." Detailed discussion of these changes may be found in the Technical Appendix for previous volumes.

Coding in 1988—The rules and instructions used in coding the 1988 mortality medical data remained essentially the same as those used for the 1987 data except for minor content changes to the classification for Human immunodeficiency virus (HIV) infection that had initially been implemented for United States mortality data beginning in data year 1987. The basic structure of the HIV classification, the codes and category titles within the classification, and the manner in which the codes may be used remained unchanged for data year 1988.

The 1988 modifications to the HIV classification included the addition of the following four clinical conditions to the "Includes only" notes under several categories: isosporosis (007.2) under *042.0; diarrhea—noninfectious (558) and infectious (009)—under *043.3; and lymphoid interstitial pneumonitis (516.8) under *043.3. In addition, several other terms were considered synonymous with HIV infection, and the following was added under the category *043.0:

enlarged lymph nodes (785.6)
swollen glands (785.6)] Due to HIV infection

Deaths classified to categories *042–*044 for 1988 are shown in Tables 1-36, 1-37, 1-38, 1-39, 1-40, 1-41, 2-22, and 2-23, and are also shown in the Each-Cause List in Table 1-23. Deaths classified to these categories are not shown separately in other tables showing cause-of-death data.

Medical certification—The use of a standard classification list, although essential for State, regional, and international comparison, does not assure strict comparability of the tabulated figures. A high degree of comparability between 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 (13),

covering 128 references over a period of 23 years, indicates that 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 there are deaths for which it is not possible to determine the cause, this proportion indicates the care and consideration given to the certification by the medical certifier. It may also be used as a rough measure of the specificity of the medical diagnoses made by the certifier in various areas. In 1988, 1.4 percent of all reported deaths in the United States were assigned to ill-defined or unknown causes, a slight decrease from 1.5 in 1987. However, in 1988 this percentage varied among the States from 0.4 percent to 4.1 percent. Although the percent for the United States for all ages combined has generally remained stable since 1979, declines have occurred for persons in age groups 55–64 years and 65–74 years, whereas increases have occurred for persons in age groups under 45 years. However, between 1987 and 1988, 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 between 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 are periodically 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 Human immunodeficiency virus infection (*042–*044) that had originally 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 (14–16).

Cause-of-death ranking—Cause-of-death ranking (except for infants) is based on the List of 72 Selected Causes of Death and the category Human immunodeficiency virus infection (HIV 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, and 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 that begin with the words "Other" or "All other" are not ranked to determine the leading causes of death. When one of the titles that represents 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. 630–678). Although WHO did not define maternal mortality, there was an NCHS classification rule that limited a maternal death to a death 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 of time for the condition was given. If no duration was specified and the underlying cause of death was a maternal condition, then 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 on 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 have been expanded to include Indirect obstetric causes (ICD-9 Nos. 647–648). These causes include Infective and parasitic conditions as well as other current conditions in the mother that are 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 that a pregnant woman will die 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.

Infant deaths

Age—Infant death is defined as a death under 1 year of age. The term excludes fetal deaths. Infant deaths are usually 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. It has generally 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 section 2 and section 8 are the most commonly used index for measuring the risk of dying during the first year of life; they are calculated by dividing the number of infant deaths in a calendar year by the number of live births registered for the same period and are presented as rates per 1,000 or per 100,000 live births. Infant mortality rates use the number of live births in the denominator to approximate the population at risk of dying before the first birthday. This measure is an approximation because some live births will not have been exposed to 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 (17,18). 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 (19,20).

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 period. 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 through June, the denominator for the infant mortality rate is a count of births occurring during the 12 months of January through December. The difference in the time reference period can result in different trends between the two indices during periods when birth rates are moving up or down markedly.

The infant death rate is also subject to greater imprecision than is the infant mortality rate because of problems of enumerating and estimating the population under 1 year of age (20).

Race—Infant mortality rates for specified races other than white or black may be understated, based on results of studies in which race on the birth and death certificates for the same infant were compared (21). In the computation of regular race-specific infant mortality rates, the race item for the numerator comes from the death certificate, and for the denominator, from the birth certificate. Understatement may arise because of possible inconsistencies in reporting race between the death and birth certificates. Differences exist in the nature of reporting and processing race on these two vital records. With respect to reporting, race of parents is reported on the birth certificate by the mother at the time of delivery; whereas on the death certificate, race of the deceased infant is reported by the funeral director based on observation or on information supplied by an informant, such as a parent. With respect to processing, race of infant at birth is coded using coding rules that take account of the race of each parent (see the Technical Appendix From *Vital Statistics of the United States, 1988*, Volume I, Natality, section titled "Race or national origin"); whereas race of infant decedent is coded directly from the race item as reported on the death certificate. There is a tendency for race of infant that was reported, for example, as American Indian or other specific race other than white at the time of birth to be reported as white at the time of death, resulting in understatement of infant mortality rates for smaller race groups.

Estimates are made below of the degree of reporting bias in race-specific infant mortality rates by comparing two rates that differ in terms of the source of information about race of the decedent (22,23). The two rates are as follows: the birth cohort rate, based on data from the national linked birth and infant death data set, and the period rate, based on mortality and natality data for the same year(s). For the birth cohort, the race is that which is reported at the time of birth for the deceased infant and is the standard against which the race that is reported at the time of death is compared.

The comparison of cohort and period rates is affected slightly by small differences in the events included in the numerators of the two rates. Thus, 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 that occur in the calendar year.

Based on a comparison of infant mortality rates from the linked data set for the birth cohorts of 1983–85 with rates from the annual files for the 1983–85 period, bias in the rates for the two major race groups—the white and the black populations—is small. In contrast, period rates for the smaller race groups are estimated to be understated by between 21 and 44 percent, shown in table A.

Because of these differences in race-specific infant mortality rates, one should use, if possible, data from the national linked birth and infant death data set to measure infant mortality for the smaller race groups.

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

Table A. Infant mortality rates by race for period 1983–85 and for birth cohorts, 1983–85; and percent difference between period and birth cohort rates, by race: United States
[Rates per 1,000 live births in specified group]

Race	Period 1983–85	Birth cohorts 1983–85	Percent difference[1]
		Rate	
All races	10.9	10.6	–2.67
White	9.5	9.0	–5.01
Black	18.6	18.4	–1.01
Indian	9.7	13.1	25.70
Chinese	5.7	7.2	21.01
Japanese	4.3	6.6	34.45
Filipino	4.7	8.3	43.15
Other Asian	6.9	8.9	23.15
Other nonwhite	6.7	11.8	43.59

[1] Percent difference = (1 – period rate/cohort rate) x 100

origin") and numbers of resident live births by Hispanic origin of mother for the 23 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 1988 was 6.7 percent and the percent of live births of unknown origin was 2.8 percent, infant mortality rates by specified Hispanic origin and race for non-Hispanic origin are underestimated. In addition, infant mortality rates for specific Hispanic-origin groups are believed to include biases similar to those described above for specified races; however, precise estimates are not yet available.

Small numbers of infant deaths for specific Hispanic-origin groups can result in infant mortality rates subject to 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—Data on age at death for California, as shown in table 2-11, are 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, for each of the years 1985 through 1988. The degree of bias can be estimated by comparing the percents of infant deaths in these two age groups in the period before the error occurred, 1983–84, with the subsequent period, 1985–88, as follows:

Age of infant	*1983–84*	*1985–88*
	Percent distribution	
All infants	100.00	100.00
1-23 hours	27.72	19.58
1 day	5.49	10.51
All other ages	66.80	69.91

Beginning with 1985 data, California provided NCHS with computer tapes of precoded mortality data through the Vital Statistics Cooperative Program (VSCP); whereas prior to 1985, data from the State of California were based on information coded by NCHS from copies of original death certificates. The effect of these errors on national data for the years 1985–88, shown in tables 2-2, 2-3, 2-12, and 2-16, is negligible. The problem has been identified and corrected for subsequent years.

Fetal deaths

In May 1950, the World Health Organization (WHO) recommended that the following definit on 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 (24).

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

Shortly thereafter, this definition of fetal death was adopted by the National Center for Health Statistics (NCHS) as the nationally recommended standard. Currently all registration areas except Puerto Rico have definitions similar to the standard definition (25). Puerto Rico has no formal definition.

As another step toward increasing the 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

Note that in table 3-13, 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 both a live-birth 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, and 1968. In 1978 the Standard Certificate of Fetal Death was replaced by the Standard Report of Fetal Death (figure 7-B).

The 1977 revision of the *Model State Vital Statistics Act and Model State Vital Statistics Regulations* (26) recommended that 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 that they be reported on separate forms. These forms are to be considered legally required statistical reports rather than legal documents.

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

Comparability and completeness of data—Registration area requirements for reporting fetal deaths vary. Most of these areas require reporting of fetal death at gestations of 20 weeks or more. Table B shows the minimum period of gestation required by each State for fetal-death reporting. There is substantial evidence that not all fetal deaths for which reporting is required are reported (27).

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 only. Beginning with 1969, fetal deaths of not-stated gestation were excluded for States requiring reporting of all products of conception except those with a stated birth weight of 500 grams or more. In 1988 this rule was applied to the following States: Colorado, Georgia, Hawaii, New York (including New York City), Rhode Island, and Virginia. Each year there are some exceptions to this procedure.

The data in table 3-3 include only fetal deaths to residents of selected areas in the United States that reported all periods of gestation. The areas are Colorado, Georgia, Hawaii, New York (including New York City), Rhode Island, and Virginia; excluded are fetal deaths to residents of Maine.

Arkansas—Since 1971, Arkansas has been using two reporting forms for fetal deaths: A confidential Spontaneous Abortion form that is not sent to the National Center for Health Statistics (NCHS) and a Fetal Death Certificate that is. During the period 1971 through 1980, 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 through 1983, 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 1984–88. It is believed that reporting has improved but is still not comparable with data for 1980 and earlier years.

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.

Missouri—Beginning in 1984, Missouri changed its reporting requirements for spontaneous fetal deaths from "after 20 weeks" to "after 20 weeks or a weight of 350 grams or more."

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

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 the 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 the calculated gestation falls beyond a duration considered biologically plausible, "gestation in weeks" or "Physician's estimate of gestation" is used. 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 1988 except Delaware, New Mexico, Puerto Rico, and South Dakota.

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 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

Table B. Period of gestation at which fetal-death reporting is required: Each reporting area, 1968

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	X								
California			X						
Colorado	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	X								
Maryland			[2]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			[3]X						
Pennsylvania		X							
Rhode Island	X								
South Carolina				X					
South Dakota									X
Tennessee									[4]X
Texas			X						
Utah			X						
Vermont			[5]X						
Virginia	X								
Washington			X						
West Virginia			X						
Wisconsin				X					
Wyoming			X						

[1] If gestational age is unknown, weight of 350 grams or more.
[2] If gestational age is unknown, weight of 500 grams or more.
[3] If gestational age is unknown, weight of 400 grams or more, or crown-heel length of 28 centimeters or more.
[4] If weight is unknown, 22 completed weeks' gestation or more.
[5] If gestational age is unknown, weight of 400 or more grams, 15 or more ounces.

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.

Race—The race of the fetus is ordinarily classified based on the race of the parents. If the parents are of different races, the following rules apply: When only one parent is white, the fetus is assigned the other parent's race. When neither parent is white, the fetus is assigned the father's race, with one exception: If the mother is Hawaiian or part-Hawaiian, the fetus is classified as Hawaiian.

When the race of one parent is missing or ill defined, the race of the other determines that of the fetus. When the race of both parents is missing, the race of the fetus is allocated to the specific race of the fetus on the preceding record.

Total-birth order—Total-birth order refers to the sum of the live births and other terminations (including both spontaneous fetal deaths and induced terminations of pregnancy) that a woman has had, including the fetal death being recorded. For example, if a woman has previously 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.

In the 1978 revision of the Standard Report of Fetal Death, total-birth order is calculated from four items on pregnancy history: Number of previous live births, now living; number of previous live births, now dead; number of other terminations before 20 weeks; and number of other terminations after 20 weeks.

All registration areas use the two standard items pertaining to the number of previous live births. Most areas use the two standard items pertaining to the number of "other terminations" before and after 20 weeks' gestation, but some areas use other criteria. 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.

Marital status—Table 3-4 shows fetal deaths and fetal-death ratios by mother's marital status. States excluded from this table are as follows: California, Connecticut, Maryland, Michigan, New York (including New York City), Ohio, Texas, and Vermont. Because live births comprise the denominator of the ratio, marital status must also be reported for mothers of live births. Marital status of the mother of the live birth is inferred for States that did not report it on the birth certificate.

There are no quantitative data on the characteristics of unmarried women who misreport their marital status or who fail to register fetal deaths. Underreporting may be greater for the unmarried group than for the married group.

Age of mother—The fetal-death report asks for the mother's "age (at time of delivery)," and the ages are 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 allocated 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).

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. The World Health Organization, in its ICD-9, recommends that "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 that "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 recommend adopting these definitions. Three definitions of perinatal mortality are currently used by NCHS: Perinatal Definition I, generally used for international comparisons, which includes fetal deaths at 28 weeks' gestation or more and infant deaths of less than 7 days; Perinatal Definition II, which includes fetal deaths at 20 weeks' gestation or more and infant deaths of less than 28 days; and Perinatal Definition III, which includes fetal deaths at 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 poorer 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 are other States. The larger number of fetal deaths reported by these "all periods" States may result in higher perinatal death rates than in 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.

For all three definitions, following the distribution of gestation not stated described above, fetal deaths with not-stated sex are allocated within gestational age groups on the basis of the distribution of stated cases. The allocation of not-stated gestational age and sex for fetal deaths is made individually for each State, for metropolitan and nonmetropolitan areas, and separately for the United States as a whole. 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.

QUALITY OF DATA

Completeness of registration

All States have adopted laws that require 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 somewhat 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 events 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 also somewhat affected.

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 due to a processing error.

Quality control procedures

Demographic items on the death certificate—As previously indicated, for 1988 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. Once 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 prior to 1988 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 1988 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 that 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 are subject to quality control procedures to control for errors of both coding and data entry. Each of the 27 registration areas that in 1988 furnished NCHS with coded medical information according to NCHS specifications first had to qualify for sample verification. 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 these 27 States, the average coding error rate in 1988 was estimated at just over 4 percent.

For the remaining 23 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 independently coded 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 1988, 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 (28). 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 1900–88 are shown in table 7-1. In addition, the population including Armed Forces abroad is shown for the United States. Table C lists the sources for these populations.

Population estimates for 1988—The population of the United States estimated by age, race, and sex for 1988 is shown in table 7-2, and the population for each State by broad age groups follows in table 7-3. Population estimates for 1984–88 incorporate new estimation procedures for net migration and net undocumented immigration. The 1988 estimates are comparable with those for 1984–87 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 1984–88 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 (29). 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.

The racial counts in the 1980 census are affected by changes in reporting practices, particularly of the Hispanic population, and in coding and classifying. 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 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 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 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 previously been estimated for April 1, 1980 (30). 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 in the period 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.

Table C. Sources for resident population and population including Armed Forces abroad: Birth- and death-registration States, 1900–1932, and United States, 1900–1988

Year	Source
United States	
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

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 (29). Net census undercount is the result of miscounting and misreporting of demographic characteristics such as age. Age-specific death rates are affected by both the net census undercount and the misreporting of age on the death certificate (31). 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 was not counted by age, race, and sex (32, 33). The reports for 1980 include estimates of net census undercount using alternative methodological assumptions for age, race, and sex subgroups of the national population (34). 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 the 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, then 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 1 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 (35). Life tables for the decennial period 1979–81 are used as the standard life tables in constructing the 1980–88 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 1984–88 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 (36).

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 both 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 time 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 (37). 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. $R - 2\dfrac{R}{\sqrt{N}}$ and $R + 2\dfrac{R}{\sqrt{N}}$

   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 20.0 per 1,000 population for a second community, which is based on 10 recorded deaths, then the difference between the rates for the two communities is 10.0. This difference is less than twice the standard error of the difference

$$2\sqrt{\frac{(10.0)^2}{20} + \frac{(20.0)^2}{10}}$$

of the two rates, which is computed to be 13.4. 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.

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