

## ***Technical Appendix-Fetal Death***

The U.S. Standard Report of Fetal Death closely resembles the U.S. Certificate of Live Birth in both format and content. Although reporting areas for some items are sometimes different for the two data sources, the majority of items on the Fetal Death Report are the same as those on the birth certificate. For fetal death information not found in the following discussion on the fetal death data file, please see *The Technical Appendix from the Vital Statistics of the United States, 1998 Volume 1- Natality* (attached) .

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## **Sources of data**

### **Fetal-death statistics**

Fetal-death statistical files for every year are based on all reports of fetal death received by the National Center for Health Statistics (NCHS). The fetal-death reporting system of the United States encompasses the 50 States, the District of Columbia, New York City (which is independent of New York State for the purpose of fetal death registration), Puerto Rico, the Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands. In statistical tabulations, United States refers only to the aggregate of the 50 States (including New York City) and the District of Columbia. Data for Guam, Puerto Rico, and the Virgin Islands are presented separately from data for the United States. No data are included for American Samoa or the Commonwealth of the Northern Mariana Islands.

Procedures used by NCHS to collect fetal death statistics have changed over the years. Before 1971 tabulations of 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. In 1998, 45 States, New York City, the District of Columbia, Puerto Rico, and the Virgin Islands provided NCHS, via the Vital Statistics Cooperative Program, electronic data files of fetal-death data coded according to NCHS specifications. The remaining seven States-- Arizona, California, Nevada, Ohio, and Wyoming-- and Guam submitted photocopies of original reports of fetal deaths and the data were coded by NCHS.

### **Standard report**

For many years, the U.S. Standard Report of Fetal Death, issued by the Public Health Service, has been used as the principal means to attain uniformity in the contents of documents used to collect information on these events. It has 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 reports or certificates of most States conform closely in content and arrangement to the standard.

Statistics on fetal deaths were first published for the birth-registration area in 1918 and then every year beginning with 1922. The first issue of the U.S. Standard Certificate of Fetal Death appeared in 1939. 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 ensured careful evaluation of each item in terms of its current and future usefulness for legal, medical and health, demographic, and research purposes. New items have been added when

necessary, and old items have been modified to ensure better reporting; or in some cases, items have been dropped when their usefulness appeared to be limited.

The current version of the U.S. Standard Report of Fetal Death was recommended for State use beginning on January 1, 1989. The U.S. Standard Report of Fetal Death is shown in figures 7-A (1). New items were added to the U.S. Standard Report of Fetal Death for 1989, including Hispanic origin of the mother and father, medical and other risk factors of pregnancy, obstetric procedures, and method of delivery. In addition, questions on complications of labor and/or delivery and congenital anomalies of fetus were changed from an open-ended question to a checkbox format to ensure more complete reporting of information (2).

### **Fetal death definition**

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

Death prior to the complete expulsion or extraction from its mother of a product of conception, irrespective of the duration of pregnancy; the death is indicated by the fact that after such separation, the fetus does not breathe or show any other evidence of life such as beating of the heart, pulsation of the umbilical cord, or definite movement of voluntary muscles (3).

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

Shortly thereafter, this definition was adopted by NCHS as the nationally recommended standard. All registration areas except Puerto Rico have definitions similar to the standard definition (4,5). Puerto Rico has no formal definition.

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

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

Group IV consists of fetal deaths with gestation not stated but presumed to be 20 weeks or more.

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

The 1977 revision of the *Model State Vital Statistics Act and Model State Vital Statistics Regulations* (6) recommended spontaneous fetal deaths at a gestation of 20 weeks or more or a weight of 350 grams or more be reported. The Model Law also recommended that the form for reporting fetal deaths be changed from a certificate to a legally required statistical report. The 1992 revision of the *Model State Vital Statistics Act and Regulations* (7) changed the recommended reporting requirement to all spontaneous fetal deaths weighing 350 grams or more, or if weight is unknown, fetal deaths of 20 completed weeks of gestation.

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

### **Reporting requirements and completeness**

Registration area requirements for reporting fetal deaths vary (5). Most of the areas require reporting of fetal death at gestations of 20 weeks or more. Table A shows the minimum period of gestation required by each State to report a fetal death in 1998. Substantial evidence exists that indicates some fetal deaths for which reporting is required are not reported (8,9,10,11).

Under reporting of fetal deaths is most likely to occur in the earlier part of the required reporting period for each State (8). Thus, for States requiring reporting of all periods of gestation, fetal deaths occurring under 20 weeks of gestation are less completely reported; for States requiring reporting of fetal deaths of 20 weeks or more, fetal deaths occurring at 20-23 weeks are less completely reported. Thus, 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 on fetal deaths published by NCHS are based on fetal deaths occurring at gestations of 20 weeks or more. These tabulations also include fetal deaths for which gestation is not stated for those States requiring reporting at 20 weeks of gestation 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 birthweight of 500 grams or more. In 1998 this rule was applied to the following States: Georgia, Hawaii, New York (including New York City), Rhode Island, and Virginia.

*Montana*--Beginning in January 1996, Montana changed its reporting requirements for spontaneous fetal deaths from 20 weeks of gestation or more or 500 grams to 20 weeks of gestation or more or 350 grams or more (table C).

## **Classification of Data**

### **Period of gestation**

The period of gestation is the number of completed weeks elapsed between the first day of the last normal menstrual period (LMP) and the date of delivery. The first day of the LMP is used as the initial date because it can be more accurately determined than the date of conception, which usually occurs 2 weeks after LMP. Data on period of gestation are computed from information on "date of delivery" and "date last normal menses began." If "date last normal menses began" is not on the record or if the calculated gestation falls beyond a duration considered biologically plausible, the "Physician's estimate of gestation" is used.

To improve data quality, beginning with data for 1989, NCHS instituted a new computer edit to check for consistency between gestation and birthweight (12). Briefly, if LMP gestation is inconsistent with birthweight, and the physician's estimate is consistent, the physician's estimate is used; if both are inconsistent with birthweight but are consistent with each other, LMP

gestation is used, and birthweight is assigned to unknown. When the period of gestation is reported in months on the report, it is allocated to gestational intervals in weeks as follows:

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

All areas reported LMP in 1998, and all areas except California, Maryland, and Oklahoma reported physician's estimate of gestation.

*Not stated gestational age*--Fetal deaths with gestational age not stated are presumed to be of 20 weeks of 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.

### **Birthweight**

Most of the 55 registration areas do not specify how weight should be given, that is, in pounds and ounces or in grams. In the tabulation and presentation of birthweight data, the metric system (grams) has been used to facilitate comparison with other data published in the United States and

internationally. Birthweight specified in pounds and ounces is assigned the equivalent of the gram intervals, as follows:

Less than 350 grams = 0 lb 12 oz or less  
350-499 grams = 0 lb 13 oz-1 lb 1 oz  
500-999 grams = 1 lb 2 oz-2 lb 3 oz  
1,000-1,499 grams = 2 lb 4 oz-3 lb 4 oz  
1,500-1,999 grams = 3 lb 5 oz-4 lb 6 oz  
2,000-2,499 grams = 4 lb 7 oz-5 lb 8 oz  
2,500-2,999 grams = 5 lb 9 oz-6 lb 9 oz  
3,000-3,499 grams = 6 lb 10 oz-7 lb 11 oz  
3,500-3,999 grams = 7 lb 12 oz-8 lb 13 oz  
4,000-4,499 grams = 8 lb 14 oz-9 lb 14 oz  
4,500-4,999 grams = 9 lb 15 oz-11 lb 0 oz  
5,000 grams or more = 11 lb 1 oz or more

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

### **Race of mother**

Fetal deaths are classified by race of mother--white, black, American Indian, Chinese, Hawaiian, Japanese, Filipino, and Other Asian or Pacific Islander. Beginning with 1992 data, an expanded code structure was used for seven States (increased to eight States for 1998) showing five additional Asian or Pacific Islander groups. These groups are Asian Indian, Korean, Samoan, Vietnamese, and Guamanian. These groups are coded only for fetal deaths occurring in California, Hawaii, Illinois, New Jersey, New York, Texas, and Washington (and Minnesota beginning with 1996). In 1990, at least two-thirds of the U.S. population of each of these groups lived in this seven-State reporting area: Asian Indian, Korean, and Vietnamese, 63-66 percent; Guamanian, 74 percent; and Samoan, 84 percent (13). This additional race detail is available on the fetal death public-use data tapes for 1992-98, (14), and on CD-ROM (beginning with data year 1995) (15).

Beginning with data for 1989, NCHS is tabulating fetal death, perinatal, and live birth data by race of mother. When the race of the mother is unknown, the mother is assigned the father's race; when information for both parents is missing, the race of the mother is assigned to the specific race of the mother of the preceding record with known race. In 1988 and prior years,



births were tabulated by the race of the child, which was determined from the race of the parents as entered on the certificate or report.

The change in tabulation of race has resulted in a discontinuity in fetal mortality rates by race for data year 1989-98 relative to previous years; see the series report, "Effect on Mortality Rates of the 1989 Change in Tabulating Race" (16).

### **Hispanic origin of mother**

Fetal mortality data for the Hispanic-origin population are based on fetal deaths to mothers of Hispanic origin who were residents of those States and the District of Columbia that included items on the report of fetal death to identify Hispanic or ethnic origin of mother. Data for 1998 were obtained from 47 States and the District of Columbia; areas not supplying data were Maryland, Massachusetts, and Oklahoma. Persons of Hispanic origin may be of any race.

### **Marital status**

Fetal deaths and fetal mortality rates by mother's marital status are based on data from 43 States and the District of Columbia. Reports of fetal death for the remaining seven States-- California, Connecticut, Maryland, Michigan, Nevada, New York (including New York City), and Texas--did not include an item on marital status.

Beginning with data for 1989 in the *Vital Statistics of the United States, vol 2, mortality*, fetal-death reports with marital status not stated for the 43 reporting States are shown as not stated in frequencies, but are proportionally distributed for rate computations into either the married or unmarried categories according to the percent of fetal-death reports with stated marital status that fall into each category for the reporting States. Before 1989 fetal-death reports with not-stated marital status were assigned to the married category. Because of this change, fetal-death frequencies and rates by marital status for 1989-98 are not strictly comparable with those for previous years.

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

### **Age of mother**

Beginning with data for 1989, the U.S. Standard Report of Fetal Death asks for the mother's date of birth. Age of mother is computed from the mother's date of birth and the date of the termination of the pregnancy. For those States whose certificates do not contain an item for the mother's date of birth, reported age of the mother (in years) is used. The age of the mother is edited in NCHS for upper and lower limits. When mothers are reported to be under 10 years of

age or 50 years of age and over, the age of the mother is considered not stated and is assigned as follows: Age on all fetal-death records with age of mother not stated is assigned according to the age appearing on the record previously processed for a mother of identical race and having the same total-birth order (total of live births and other terminations).

### **Sex of fetus**

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

### **Total-birth order**

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

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

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

### **Quality of data**

#### **Completeness of registration**

All States have adopted laws requiring the reporting of fetal deaths. Reporting requirements for fetal deaths vary from State to State (see “Comparability and completeness of data” and table A). Responsibility for completing the report rests with either the hospital or funeral director, depending on State requirements. 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.

### **Item completeness**

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

### **Computation of rates and ratios**

*Rates and ratios based on live births-* 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 *The Report of Final Natality Statistics(17)*.

### **Perinatal mortality**

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

Variations in fetal death reporting requirements and practices have implications for comparing perinatal rates among States. Because reporting is generally sporadic near the lower limit of the reporting requirement, States that require reporting of all products of pregnancy, regardless of gestation, are likely to have more complete reporting of fetal deaths at 20 weeks or more than those States that do not. The larger number of fetal deaths reported for these “all

periods” States may result in higher perinatal mortality rates than those rates reported for States whose reporting is less complete. Accordingly, reporting completeness may account, in part, for differences among the State perinatal rates, particularly differences for Definitions II and III, which use data for fetal deaths at 20-27 weeks.

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

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

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<b>SYMBOLS USED IN TABLES</b>	
Data not available.....	---
Category not applicable.....	...
Quantity zero.....	-
Quantity more than 0 but less than 0.05.....	0.0
Figure does not meet standards of reliability or precision.....	*