TECHNICAL NOTES

SOURCES OF DATA

Data in this publication are from certificates and reports filed with the Center for Health Statistics (CHS) in the Alabama Department of Public Health according to Alabama Vital Statistics Laws. The State Registrar of Vital Records enforces the laws and administers the system of vital statistics. Certificates (birth, death, marriage, and divorce) and reports (fetal death and induced termination of pregnancy) provide most of the information included in this publication. The statewide data for Alabama are also sent to the National Center for Health Statistics (NCHS) for inclusion in national reports and tabulations.

BIRTHS. If a birth occurs in a birthing hospital, the birth certificate is filed by that hospital with CHS. Information on a birth certificate is obtained from a parent and from medical files for the mother and infant. All birthing hospitals in Alabama use an internet-based Electronic Birth Registration System to complete and transmit birth certificates to CHS. If a birth occurs outside of a birthing hospital, the birth information is submitted by the parent or staff in non-birthing facility who is aware of the facts of birth. Because the legal requirements for certified copies of births have increased, 100 percent of all births are filed with CHS.

In 2014, CHS implemented the revised certificate of birth. Capturing data from the revised certificate now makes Alabama data more comparable with other states.

DEATHS. Mortality data are obtained from death certificates filed with CHS. In Alabama, the funeral director who first takes custody of the body is responsible for obtaining the demographic data from the next of kin and filing the death certificate. The medical certification is completed by the medical professional in charge of the care of the decedent for the illness or condition that resulted in death or by the county medical examiner or coroner. Registration of deaths is thought to be nearly 100 percent complete since the death certificate is needed by the next of kin for legal purposes. In addition, listings of deaths, which are independently prepared by funeral directors, coroners, hospitals, nursing homes and other institutions where deaths occur, are compared to certificates received to ensure that all deaths are filed.

In 2016, CHS implemented the revised certificate of death. Capturing data from the revised certificate now makes Alabama data more comparable with other states.

MARRIAGES. Starting August 29, 2019, marriage licenses are no longer issued and certified in Alabama. On and after that date, a marriage certificate is completed by the persons entering the marriage and delivered to a county probate court. The certificate is recorded by the probate court who forwards it to CHS. Marriage data are believed to be nearly 100 percent representative of valid marriage certificates recorded in the probate courts.

DIVORCES. Divorce certificates are prepared by the petitioner or his or her legal representatives and presented to the clerk of a court where divorces are granted. The court clerk completes the information certifying the divorce and forwards the certificate to CHS. While the law does require the divorce certificate to be filed before a divorce is granted, the

filing of these records may not be as complete as other vital records since court procedures vary.

FETAL DEATHS. Reports of fetal death are required to be filed with CHS if the fetus has advanced to or beyond the twentieth week of utero-gestation. If the fetal death occurs in an institution, the person in charge of the institution or his or her representative is responsible for filing the report. If the fetal death occurs outside of an institution, the medical professional/coroner who is aware of the fact of the event is responsible for filing the report. Since not all fetal deaths are medically attended, it is likely that there is some under-reporting of these events. Evidence indicates that reporting may be better in metropolitan counties.

In 2014, CHS implemented the revised report of fetal death. Capturing data from the revised report now makes Alabama data more comparable with other states.

INDUCED TERMINATIONS OF PREGNANCY. Since 1993, reports of induced termination of pregnancy have been required for all events occurring in Alabama. If the induced termination of pregnancy occurs in an institution, the person in charge of the institution is required to file the report. If the induced termination of pregnancy occurs outside of an institution, the physician in attendance is required to file the report. From September 1987 to December 1992, the only reporting requirement for induced terminations of pregnancy was for events to females under 18 years of age as part of the Parental Consent Act. The degree of completeness for these reports is not known. However, if CHS learns of institutions that are not aware of the reporting requirements, they are contacted, and reporting is immediately initiated.

OUT OF STATE EVENTS. To have complete data for state residents, offices of vital statistics in all states have entered into an agreement to share data for statistical purposes. When a report or certificate is filed for a vital event that occurred in Alabama to a resident of another state or Canada, Alabama notifies that government. Likewise, Alabama receives information and reports about events happening to Alabama residents in other states or in Canada. Data from these out of state events are included in the tabulations of resident data presented in this publication.

Most states send reports of out of state events to CHS on an ongoing basis, and these reports are believed to be complete since laws and procedures in other states are similar to Alabama's. The exceptions are reports of induced termination of pregnancy which have different reporting requirements in other states. Florida, a neighboring state, does not have a procedure for reporting induced terminations of pregnancy for Alabama residents to CHS. Since it is unknown how many Alabama residents might have these events in neighboring states, the number of reported induced terminations of pregnancy for Alabama residents might be somewhat low.

QUALITY AND COMPLETENESS OF DATA

Certificates and reports received at CHS are reviewed to ensure all information has been entered correctly. If records are found to be incomplete or completed improperly, queries are submitted to obtain the information. Once the information is accurate and consistent, the record is accepted into the official vital records files for Alabama.

Data for 100 percent of the births and fetal deaths are submitted by hospitals through the Electronic Birth Registration System. This electronic system contains edits and consistency checks to verify data prior to being submitted.

Data for approximately 99 percent of the deaths were submitted through the Electronic Death Registration System in 2022. This electronic system contains edits and consistency checks to verify data prior to being submitted. The remainder of the deaths are filed using paper certificates. These certificates are manually checked for accuracy and completeness. If data are incomplete or missing, the provider is queried and asked to verify the information provided or to furnish the correct data. Once these certificates are complete, they are keyed into a computer database by CHS staff.

Data for approximately 96 percent of the divorces are received electronically from the Administrative Office of Courts. The remainder of the divorces are filed using the paper certificate. These certificates are manually checked for accuracy and completeness. If data are incomplete or missing, the provider is queried and asked to verify the information provided or to furnish the correct data. Once these certificates or reports are complete, they are keyed into a computer database by CHS staff.

Data for induced terminations of pregnancy and marriages are manually checked for accuracy and completeness. If data are incomplete or missing, the provider is queried and asked to verify the information provided or to furnish the correct data. Once these certificates or reports are complete, they are keyed into a computer database by CHS staff.

Numerous edits and consistency checks are performed on all computer files to ensure the data are as accurate as possible. Additional procedures cross check that all births and deaths are reported, particularly infant deaths.

RESIDENCE DATA

Unless specifically noted otherwise, data from vital events in this publication are reported according to the county or place of residence where the person, patient or decedent actually lived. Birth, fetal death and induced termination of pregnancy statistics are reported according to the mother's residence. Deaths are reported by the residence of the decedent. The exceptions are marriage and divorce data that are reported by the residence of the decedent. The exceptions are marriage and divorce data that are reported according to the county where the marriage certificate was issued, or the divorce was finalized.

Vital events for Alabama residents occurring in other states and Canada are also included in the residence data in this publication. See discussion under SOURCES OF DATA – OUT OF STATE EVENTS

POPULATION DENOMINATORS

Different population denominators have been used in this publication depending on the year. For 1990, 2000, 2010, and 2020, actual Census counts were used for the denominators for the rates. For the years 1991 through 1999, the population figures used were prepared by the Alabama State Data Center, Center for Business and Economic Research, University of Alabama (CBER) projecting forward from the 1990 Census. Caution should be used in comparing rates over time, since the further away from the Census, the less accurate the populations and associated rates become. Based on 2000 Census data,

the CBER population projections for the late 1990s appear to be too low, and thus the rates for those years may be too high.

Population figures used to calculate rates for 2001 and 2002 were again from projections provided by CBER. These population figures were based on 2000 U.S. Census counts and projecting forward. Beginning in 2003, U.S. Census estimates (rather than CBER projections) were used for population denominators in CHS publications.

The rates in this publication may not be the same as those given in other publications if population data are from a different source. For the years between decennial national Censuses, the National Center for Health Statistics (NCHS) calculates crude rates using population estimates provided by the U.S. Census Bureau. These figures are calculated in retrospect based on various housing, labor and vital statistics.

RACE

Birth, fetal death and induced termination of pregnancy statistics are reported according to the race of the mother since many of the health conditions related to these events are directly associated with the mother. Deaths are reported by the race of the decedent. Infant deaths are also tabulated by the race of the infant. However, the infant mortality rates, with the number of births used as the denominator, are based on the race of the mother. Data for marriages and divorces are shown for both parties to the event.

RACE IN MARRIAGE, DIVORCE AND INDUCED TERMINATION OF PREGNANCY. For processing purposes, 10 racial groups were used: White, Black, American Indian, Chinese, Japanese, Hawaiian, Filipino, Other Asian or Pacific Islander, other entries and unknown race. However, for tables shown in this publication, these groups are consolidated into "White" and "Black and Other". "White" encompasses Mexican, Puerto Rican, Cajun, Creole and Other Caucasian. The "Black and Other" group includes Black, American Indian, Chinese, Japanese, Hawaiian, Filipino and Other Asian or Pacific Islander. Events of unknown race are included in the "White" category.

RACE IN LIVE BIRTH, DEATH AND FETAL DEATH. In 2014, Alabama implemented the most recent NCHS revisions of the U.S. Standard Certificate of Live Birth and Fetal Death which allows parent(s) to select more than one race. In 2016, Alabama implemented the most recent NCHS revisions of the U.S. Standard Certificate of Death which allows informant(s) to select more than one race for decedent. Twenty racial groupings are now used: White, Black, American Indian, Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, Hawaiian, Other Asian or Pacific Islander, Guamanian or Chamorro, Samoan, other entries, Bridged White, Bridged Black, Bridged American Indian/Alaska Native, Bridged Asian/Pacific Islander and unknown race. However, for tables shown in this publication, these groups are consolidated into two categories: "White" and "Black and Other". "White" encompasses Mexican, Puerto Rican, Cajun, Creole, Other Caucasian and Bridged White. The "Black and Other" group includes Black, American Indian, Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, Hawaiian, Other Asian or Pacific Islander, Guamanian or Chamorro, Samoan, other entries, Bridged Black, Bridged American Indian/Alaska Native and Bridged Asian/Pacific Islander. Events of unknown race are included in the "White" category.

Population figures from the 2022 Census show the population for Alabama as 68.9 percent White, 26.8 percent Black and 4.3 percent other races. Just under two percent of the population reported two or more races and were included in the "Black and Other" population for tables shown in this publication.

CAUSE OF DEATH

Alabama law requires the physician in charge of the care of the patient for the illness or condition that resulted in death to complete the medical certification section on the death certificate. The physician is requested to state the diseases or conditions that caused the death and other significant conditions contributing to death. If a death occurs with no medical professional in charge of the patient's care, the county coroner, or in a few counties, the medical examiner is responsible for determining the cause of death.

CLASSIFICATION. For tabulation purposes, causes of death are coded according to the *International Classification of Diseases*[1] (ICD) which provides the essential ground rules for the coding and classification of cause of death data. ICD was developed collaboratively between the World Health Organization (WHO) and 10 international centers, one of which is housed at NCHS. The purpose of ICD is to promote international comparability in the collection, classification, processing and presentation of health statistics. The United States is required to use ICD under an agreement with WHO that has the force of an international treaty.

Besides being a classification system for the cause of death, ICD includes coding rules. These rules identify the single condition on the death certificate considered most informative from a public health point of view, called the *underlying cause of death*. The underlying cause is the disease or injury initiating the sequence of events that led directly to death or the circumstances of the accident or violence that produced the fatal injury.

Cause of death data in this publication are coded according to procedures established by NCHS[2]. Starting with death records for 1999, cause of death data are processed through computer software programs from NCHS which allow CHS staff to enter the literal information provided by the physician or coroner in the medical certification section of the death certificate. The software programs are written to apply WHO rules to select the underlying cause of death from all the conditions given on the death certificate. Tables in this publication contain the underlying cause of death as determined through these procedures.

TABULATION LISTS AND CAUSE OF DEATH RANKINGS. For dissemination and presentation of data, NCHS developed several tabulation lists which group causes of death codes into categories that are of public health interest and medical importance. The lists have increasing levels of detail or are for specific categories of death and are published in Part 9 of the NCHS Instruction Manual Series[3]. Certain groups of causes on these lists are used for ranking causes of death to determine the leading causes of death. Starting with 1999 data, the list most widely used to identify and rank the leading causes of death in the United States is the *ICD-10 List of 113 Selected Causes of Death.* This list replaces the *ICD-9 List of 72 Selected Causes of Death* used from 1979 through 1998. A condensed list of selected causes was also developed to present cause of death data in Alabama.

CHANGE IN ICD. The ICD has been revised approximately once every 10 years to stay abreast with advances in medical science and to ensure the international comparability

of health statistics. The tenth and most recent revision, known as the ICD-10, was first used to classify deaths that occurred on January 1, 1999 and after. The previous version, the ICD-9, was used from 1979 through 1998. The ICD-10 is much more detailed with about 8,000 possible categories for cause of death compared with 4,000 categories in the previous version. For the first time, the ICD-10 uses alphanumeric codes. In the tenth revision of the ICD, cause of death titles have been changed and conditions have been regrouped. Some coding rules have also been changed. In addition, ICD-10 tabulation lists used in publications have also changed, so mortality data prepared under different revisions of the ICD may not be comparable.

COMPARISON OF CAUSE OF DEATH DATA. Changes in moving to a new revision of the ICD can cause major discontinuities in trend data for certain causes of death. To understand the changes in mortality rates that are simply due to the new ICD revision, NCHS double codes a large sample of deaths under each revision to develop *comparability ratios*. This is simply the ratio of deaths coded under the new revision (ICD-10) divided by the number under the old revision (ICD-9) for a particular cause of death. These ratios are given in Robert Anderson, et. al., *Comparability of Cause of Death between ICD-9 and ICD-10*: *Preliminary Estimates*, Hyattsville, MD, National Vital Statistics Reports, Volume 49, Number 2, May 18, 2001. Comparability ratios can be applied to specific cause of death groups that were coded under ICD-9 to see how many deaths in that specific group would result if those same deaths had been coded under the new ICD-10. Application of the comparability ratios is crucial in time trend analyses. For additional information on comparability ratios, see the NCHS web site at *www.cdc.gov/nchs*.

HANDLING OF UNKNOWNS

Items with a missing value or a response of “unknown” are shown as “not stated” in tables of frequency distributions and are included in totals and subtotals. However, for calculation of rates and ratios, “unknowns” are subtracted from denominators before calculations are made.

The only exceptions to this rule are for race, sex and county of residence. Events with race “unknown” are included with “White” for tabulation purposes. If sex cannot be determined, sex is considered male if the date of the event is odd and female if the day is even. Events with county of residence “unknown” are included in the statewide number. Therefore, the statewide number may be higher than the combined county numbers.

DATA TECHNIQUES

Data in this publication are generally presented as frequencies, rates, ratios and percentages. Frequency distributions tell how many times an event occurred for a particular population. For purposes of comparison, rates, ratios and percentages are provided to standardize the figures. A ratio is a comparison of two quantities and is generally expressed as a fraction. A rate is the number of times having a certain characteristic divided by the total number of items. Rates are generally expressed to a standard base of 100, 1,000, or 100,000. Percentages are rates standardized to a base of 100. Rounding errors may exist because of the estimation techniques.

Demographic rates make all populations equal in size. Demographic rates such as the death rate and birth rate are calculated by dividing the number of events in a given period

by the population at risk during that period. Thus, rates give the number of events per person, or the average. By standardizing all populations to the same size, we eliminate one factor that makes comparisons among areas difficult.

The base of demographic rate may be the total population or a sub population. Rates based on the total population are called crude rates. Others are called specific rates such as age-specific rates used for children or teenage populations or the sex-specific rate for prostate cancer. For information on specific calculations, see Appendix B – ALABAMA VITAL STATISTICS FORMULAS.

SMALL NUMBER LIMITATIONS

When using vital events data for studying small geographic areas or for examining specific medical or social factors, the number of events reported in a given year may be very small. Understanding the statistical limitations of small numbers is important in conducting analyses. Any time something is measured, error is almost inevitable. Error can be based on the accuracy of the reports, or alternately, the number of the events or the size of the population. Some error is random, and when the numbers are very large, random error does not affect the usefulness of the data. However, when the number of vital events is very small or the population of the area is very low, random errors in data collection, or even randomly occurring events, can cause drastic fluctuations in rates.

One way to counteract random error is to increase the number of years or enlarge the area being studied. Otherwise, calculations may be correct, but of very limited practical value. In this publication, rates are given regardless of their stability; however, for rates based on very small numbers, warnings are issued in the footnotes.

REFERENCES

[1] World Health Organization. "International Statistical Classification of Diseases and Related Health Problems, Tenth Revision." Geneva: World Health Organization, 1992.

[2] National Center for Health Statistics. "NCHS Instruction Manual, Part 2a, Vital Statistics, Instructions for Classifying the Underlying Causes of Death." Hyattsville, Maryland: Public Health Service, published annually.

[3] National Center for Health Statistics, Centers for Disease Control and Prevention. "Instruction Manual Part 9, ICD-10 Cause-of-Death Lists for Tabulation Mortality Statistics, Effective 1999." Hyattsville, Maryland: October 1997.