
Appendix B: Technical Notes – Definitions

BIRTHS

Apgar Score is a numerical expression of the condition of a newborn shortly after birth. It is the sum of points accumulated upon assessment of the heart rate, respiratory effort, muscle tone, reflex irritability, and color. The highest possible score is ten. A low Apgar score (seven or less) measured five minutes after birth indicates the infant is at increased risk of morbidity and mortality.

Births to Unmarried Mothers Ratio is the number of births to unmarried mothers per 1,000 live births. Ratios differ from rates.

Crude Birth Rate is the number of live births per 1,000 total population.

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 a 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 live born.¹

Low Birthweight Infant is a live born infant with a birthweight of less than 5 pounds, 8 ounces (2,500 grams) as reported on the birth certificate.

Birth rate per 1,000 men is the number of births per 1,000 males in Oregon. In computing birth rates by age of father, the NCHS method of distributing births where age of father was not stated in the same proportion as births where age of father was stated within each 5-year age interval of mother was used to facilitate national comparisons. NCHS uses this procedure to avoid distortion in rates that would result if the relationship between age of mother and age of father were disregarded.

DEATHS

Crude Death Rate—is the number of deaths per 1,000 or 100,000 total population. The crude death rate represents the average chance of dying during a specified period for persons in the entire population.

Age Specific Death Rate—deaths per 100,000 population in a specified age group, such as 1–4 years or 5–9 years for a specified period.

Age adjusted death rate—The death rate used to make comparisons of relative mortality risks across groups and over time. This rate should be viewed as a construct or an index rather than as direct or actual measure of mortality risk. Statistically, it is a weighted average of the age-specified death rates, where the weights represent the fixed population proportions by age.

Fetal Death is death prior to the complete expulsion or extraction from its mother of a product of conception whose birthweight is at least 350 grams or, if birth weight was unknown, after 20 weeks gestation, except where such expulsion results from a therapeutic abortion; 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.

Fetal Death Ratio is the number of fetal deaths per 1,000 live births. Ratios differ from rates.

Infant Death is the death of a child prior to its first birthday.

Infant Death Rate is the number of infant deaths per 1,000 live births.

Maternal Death Rate is the number of female deaths attributed to childbirth or to complications of pregnancy or the puerperium, per 100,000 live births.

Neonatal Death is the death of a child within the first 27 days of life.

Neonatal Death Rate is the number of neonatal deaths per 1,000 live births.

Postneonatal Death is the death of a child after 27 days of life and before its first birthday.

Postneonatal Death Rate is the number of postneonatal deaths per 1,000 live births.

Perinatal Death includes fetal deaths at 28 weeks gestation or more and infant deaths of less than 7 days (definition I) or fetal deaths at 20 weeks gestation or more and deaths of infants less than 28 days (definition II).

Perinatal Death Ratio is the number of perinatal deaths per 1,000 total live births. Ratios differ from rates.

MEDICAL PERSONNEL — ABBREVIATIONS USED IN TABLES

C.N.M. — certified nurse midwife.

D.C. — doctor of chiropractic medicine.

D.O. — doctor of osteopathic medicine.

L.D.E.M. — licensed direct entry midwife.

M.D. — medical doctor.

N.D. — naturopathic doctor.

R.N. — registered nurse.

ENDNOTE

- 1 *Vital Statistics of the United States*, 1982, vol. 1, section 4, page 1. U.S. Department of Health and Human Services, Public Health Service, National Center for Health Statistics, Maryland, 1986.

Technical Notes — Methodology

"That, sir, is the good of counting; it brings everything to a certainty, which before floated in the mind indefinitely."

—Samuel Johnson

MORTALITY

Comparability Between ICD-9 and ICD-10 Codes

The *International Classification of Diseases* (ICD) codes are periodically revised to reflect progress in the identification of diseases.¹ This practice began in 1900 and occurs every 10 to 20 years. Each of these revisions has produced some breaks in the comparability of cause of death statistics.

ICD-10 has many changes from ICD-9, including: considerably greater detail for some causes (and less detail for others); shifts of inclusion in terms and titles from one category, section, or chapter to another; regrouping of diseases; new titles and sections; and modifications in coding rules. As a result, serious breaks occur in comparability for a number of causes of death. Measures of this discontinuity are essential to the interpretation of mortality trends. Comparability ratios between ICD-9 and ICD-10 have been computed for this purpose (please see the table at the end of Appendix B). Note that data tables showing cause of death information for years prior to 1999 are based on the original ICD-9 codes and have not been adjusted using comparability ratios.

Studies of the comparability between revisions of the ICD have been carried out and published since at least the fifth revision. Comparability studies, also called bridge-coding studies, involve the dual classification of a single year of mortality data, that is classifying the underlying cause of death on mortality records by the new revision and the previous revision. The key element of the comparability study is the comparability ratio, which is derived from the dual classification. It is calculated by dividing the number of deaths for a selected cause of death classified by the new revision by the number of deaths classified to the most nearly comparable cause of death using the previous revision (in this case the number of deaths identified as being attributable to a particular cause using ICD-10 codes and rules divided by the number of deaths attributed to the same cause using ICD-9 codes and rules). The resulting ratio represents the net effect of the new revision on statistics for this cause and can be used as a factor to adjust previously calculated mortality statistics.

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

A ratio less than 1.00 results from a decrease in assignments of death to a cause in ICD-10 compared with ICD-9. A ratio of more

than 1.00 results from an increase in assignments of deaths to a cause in ICD-10 compared to the corresponding ICD-9 cause.

In regard to the magnitude of coding effects produced by rule changes, that of Rule 3 is among the most prominent. This rule is used to determine the direct sequels of causes. It states "If the conditions selected by the general principle or by Rule I or by Rule 2 is obviously a direct consequence of another reported condition, whether in Part I or Part II [of the medical certification portion of the death certificate], select this primary condition." The cause of death most affected by Rule 3 is pneumonia, which is often the consequence of another condition or injury. In ICD-10 the applicability of Rule 3 to pneumonia is broader than in ICD-9, so pneumonia is considered a consequence of a much wider range of conditions. As a result, pneumonia is much less likely to be selected as the underlying cause of death under ICD-10 than under ICD-9.

The following describes selected leading causes of death affected by changes in classification and underlying cause of death rules.

Heart Disease. The comparability ratio (CR) for this cause is 0.9858, indicating a net decrease of nearly 1.5 percent in the allocation of heart disease as the underlying cause of death when using the ICD-10 classification scheme. This net decrease is a result primarily of shifts away from heart disease to other causes of death due to Rule A; under this rule, certain disorders are considered ill-defined and not reflecting the true underlying cause of death. Cardiac arrest is one such disorder. Thus, it is ignored in the selection of underlying cause of death if another more specific cause is listed on the death certificate.

Malignant Neoplasms. The CR for cancer is 1.0068, indicating considerable comparability in numbers and rates between revisions. Nevertheless, a substantial number of deaths are classified under malignant neoplasms in ICD-10 that were not classified as such under ICD-9. Most of these were classified as pneumonia in ICD-9 and were affected by the change in Rule 3 (described above). In ICD-10, the applicability of Rule 3 to pneumonia is broader than in ICD-9; that is, pneumonia is considered a consequence of a much wider range of conditions. As a result, pneumonia is much less likely to be selected as the underlying cause of death under ICD-10 than under ICD-9. In addition, some deaths shifted out of the malignant neoplasm category due to the revision. Most of these are classified in ICD-10 as HIV or, *in situ* neoplasms, benign neoplasms, and neoplasms of uncertain or unknown behavior.

Nearly all of the specified malignant neoplasm categories show some shifts of deaths into and out of the specified category. For example, because of changes in the rule governing the selection of the primary site, deaths involving cancer of the trachea, bronchus, and lung are a little less likely to be attributed to this cause. (The comparability ratio is 0.9837.) This occurred because ICD-10, in contrast to ICD-9, classifies malignant neoplasms of the lung as secondary to many other cancers. Further, when classifying deaths according to ICD-10, unlike ICD-9, selection of the primary site is not determined by order of entry on the death certificate. Thus, when

two primary sites from different organ systems are listed, the deaths are classified to C97, the category for independent (primary) multiple sites.

Alzheimer's Disease. The CR published in the previously described NCHS publication should not be applied to Oregon data. Unlike the nation, deaths assigned to this category have included both Alzheimer's disease (ICD-9 331.0) and presenile dementia (ICD-9 290.1). A study of deaths coded to ICD-9 290.1 showed that 99 out of 100 were attributable to Alzheimer's dementia and that physicians were using the terms "Alzheimer's disease" and "Alzheimer's dementia" essentially interchangeably. To provide a more realistic measure of the impact of Alzheimer's disease, both diseases were included in Oregon's "Alzheimer's Disease" category. ICD-10 eliminated the separate category for "Alzheimer's dementia"; just one code (G30) is present in the current revision.

Unintentional Injuries. With a comparability ratio of 1.0303, deaths were slightly more likely to be attributed to unintentional injuries than previously. Virtually all of this increase involves shifts from natural causes in ICD-9 to unintentional injuries in ICD-10. Most of these deaths were classified as pneumonia or cardiac arrest in ICD-9 but were coded to unintentional injuries as a consequence of the changes in Rule 3 and Rule A, respectively. The CR for the largest subset in this group, motor vehicles, is 0.9754, but the specific category with the largest difference (CR = 0.8409) is falls. This 16 percent decrease is the result of the change in the classification of unspecified fractures. In ICD-9, if the term "fracture" was listed on the death certificate without mention of an external cause, the death was classified to "Fracture, cause unspecified" (E887) within the greater "Accidental Falls" (E880-888) category. In ICD-10, a fall is not assumed to be responsible for an unspecified fracture, and the death is classified to "Exposure to Unspecified Factor," (X59), which is classified as an unintentional injury, but in a residual category, not a fall.

Intentional Self-Harm. This category (i.e., suicide) has a comparability ratio of 0.9962. The slight decline may have resulted from records pending amendment that were unable to be identified at the time of the study. Some changes in coding categories have resulted in less specific data. For example, the type of firearm used in suicide (and all other external cause categories) is no longer distinguished other than handgun vs. long gun; previously, rifles, shotguns, and military (assault) weapons were categorized individually. Further, suffocation suicides involving plastic bags are no longer identified (The number of deaths in this category was typically about the same as the number resulting from cutting and piercing injuries).

Assault. Like suicide, this category (i.e., homicide) showed little difference between ICD-9 and ICD-10 coding; the comparability ratio was 0.9983. The reader is cautioned that this CR is applicable only to prior years' categories based on ICD-9 codes E960-E969. Under the ICD-9 classification, legal intervention (E970-E979) deaths were included in the leading cause of death category "Homicide."