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R. LESTHAEGHE

VITAL STATISTICS

In population studies the term *vital events* generally includes births, deaths, marriages, divorces, fetal deaths (stillbirths), and induced terminations of pregnancy (abortions). In a majority of countries most, if not all, of these events are recorded through the government's civil registration system, which creates a permanent record of each event.

Vital records have two primary uses. First, they are personal legal documents that are needed by citizens to prove the facts surrounding the event (e.g., age, identity). Second, vital statistics—the data derived from these administrative records—constitute one of the most widely used statistical data systems in the world. Vital statistics form the basis of fundamental demographic and epidemiologic measures and are used in planning and operating health programs, commercial enterprises ranging from life insurance to the marketing of products for infants, and a wide range of government activities.

Early Registration of Vital Events

An early form of the registration of vital events in Western countries were baptisms, burials, and weddings typically recorded in church registers. The first systematic parish register system was established in Sweden in 1608, and similar systems were soon established in Quebec (1610), Finland (1628), and Denmark (1646). However, consolidation of records for entire countries was not attempted until the

eighteenth century in France and the early nineteenth century in the United Kingdom.

The Massachusetts Bay Colony was the first government derived from the European tradition to establish a secular vital registration system, requiring that the actual events rather than the ceremonies be recorded and that registration be done by government officials rather than by the clergy. In 1804 France, as part of the Napoleonic Code, made the state responsible for recording births, deaths, and marriages and prescribed who should record each event and what the record should include.

The registration of births, marriages, and deaths in the United States began with registration laws enacted by the Grand Assembly of Virginia in 1632 and the General Court of the Massachusetts Bay Colony in 1639. Connecticut, Plymouth, and eventually the other colonies followed suit. Little or no statistical use was made of these records. They were regarded as statements of fact essential to the protection of individual rights, especially rights relating to the ownership and distribution of property.

Modern Use of Vital Records

The impetus for using vital records as the basis of a statistical data system came from the realization that records of births and deaths constituted a source of information about the condition of the human population. The modern origin of vital statistics can be traced to the analysis of the English Bills of Mortality published by the pioneer demographer John Graunt (1620–1674), in 1662. Graunt's work was followed by that of Edmund Halley (1656–1742), mathematician and astronomer, who in 1693 constructed the first scientific life expectancy table. Over time the analysis of mortality data by cause of death became an important source of information that was used in the control of epidemics and to support sanitary reform.

The United States Constitution, adopted in 1787, provided for a decennial census but not a national vital registration system. Thus, legal authority for the registration of vital events was left to the states. The geographic scope of the U.S. registration areas expanded rapidly, but it was not until the 1930s that it included all the states and the District of Columbia. When the U.S. Census Bureau became a permanent agency of the federal government in 1902, the enabling legislation authorized the bureau to obtain annually copies of records filed in the vital

statistics offices of states and cities that had adequate death registration systems and to publish data from those records. This marked the beginning of the National Vital Statistics System. Ten states and cities provided death records to the Census Bureau in 1902. In 1915 birth registration was added to the system, and by 1933 all states were registering live births and deaths with acceptable event coverage and providing the required data.

In 1946 responsibility for collecting and publishing national vital statistics in the United States was transferred from the Census Bureau to the Public Health Service, first in the National Office of Vital Statistics and later (1960) in the National Center for Health Statistics (NCHS), which is now part of the Centers for Disease Control and Prevention, Department of Health and Human Services.

International Statistics

Vital statistics are one of the few data systems that are generally available throughout the world. The United Nations and the World Health Organization have led efforts to standardize registration practices, definitions, and statistical measurement. Most industrialized nations have vital statistics systems that in scope and accuracy equal or exceed that of the United States. In addition, most developing countries have at least a rudimentary vital statistics system. Although there are intercountry variations, in general countries adhere to similar registration principles and statistical measures. These data, ideally in combination with census statistics, are widely used to make international comparisons of life expectancy, cause-specific mortality, infant deaths, and the like. Vital statistics also are used to monitor population growth through measures such as total fertility rates. The United Nations publishes many international vital statistics comparisons in its *Demographic Yearbook*, which has been issued annually since 1948.

Sources of Vital Statistics

The best source of vital statistics is a complete civil registration system. In countries in which data from civil registration do not exist or are deficient, other demographic data collection methods may be used to gather information on the incidence of vital events and to estimate vital statistics. These methods include population censuses, demographic sample surveys, and sample registration areas.

A *population census* is a complete enumeration of the population of a defined area with reference to a specified date. If the census includes appropriate questions (e.g., births and deaths in each household during the past year), the data can be used to estimate vital rates in the recent past.

A *sample survey* collects more detailed information than does a census, but from only a portion of the population. Thus, although it provides added depth, rare events may be missed and reliability may be diminished because of sampling errors.

In general population censuses and sample surveys are less desirable sources of vital statistics because they typically do not provide the detail available from a civil registration system. In addition, the methods used to estimate vital statistics rates from these data sources are based on assumptions about and approximations of the relationships between various characteristics of the population. Thus, they may be less useful for the analysis of trends and detailed statistics. Furthermore, data from these sources cannot serve the important legal purposes of administrative records from a civil registration system.

In countries where civil registration is not fully developed *sample registration* may be used to register vital events and estimate vital rates. Events are registered in a specific area of the country on a continuous basis. If it is gradually expanded, a sample registration system can evolve into national civil registration. The main drawback of a sample registration system is that it does not provide vital rates for local areas outside the sample area.

See also: *Census; Demographic Surveillance Systems; Demographic Surveys, History and Methodology of; Farr, William; Graunt, John; Population Registers.*

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MARY ANNE FREEDMAN
JAMES A. WEED