

In a recently established research program, the National Office of Vital Statistics is developing sampling survey methods and conducting studies to collect supplementary data "anchored to vital records."

Expanding and Improving Vital Statistics

MONROE G. SIRKEN, Ph.D., and HALBERT L. DUNN, M.D.

VITAL STATISTICIANS generally think of their program as consisting of two related parts, registration and statistics. Traditionally, "statistics" has meant tabulation of data derived routinely from registration certificates. These tabulations may be considered basic vital statistics. To meet a growing demand for additional data, the concept of vital statistics is being expanded to cover supplementary statistics anchored to the vital records.

The increasing demand for supplementary vital statistics is not difficult to understand. Vital events are crucial in people's lives, and consequently they are central to many other events. Economists, demographers, and social scientists are among the host of nonhealth users of basic and supplementary vital statistics. In public health, the demand for supplementary vital data has been stimulated by the growing concern with chronic diseases, which has created interest in studies that relate the person to his total environment.

The demands for more vital and related statistics presently exceed our ability to supply them. With a few notable exceptions, such as

tabulations of multiple causes of deaths, we have pretty well exploited the items on the vital records. We do not mean to imply that all possible applications are being made of our tabulations of basic vital statistics; this is not the case. We mean merely that there is little possibility of developing tabulations of vital statistics involving new variables from the data now provided on the vital records.

How, then, should we proceed in developing new vital statistics as needs materialize? It is natural to think first of the possibility of adding new items to the vital records, but the prospects here are not encouraging. The records are legal as well as statistical documents; they cannot be encumbered with what the legal mind regards as extraneous. In fact, vital statisticians themselves would be reluctant to add too many new items or certain items. If we should ask the physician, the hospital staff, or the funeral director to provide routinely a lot of supplementary information, the request might endanger the quality of the basic data they are now providing. Furthermore, the possibility of getting more vital data by revising the vital records is not good because our system binds us to infrequent revisions.

Even if we could overcome these difficulties, we would find it inefficient routinely to collect supplementary information on the vital record itself because it is rarely necessary to obtain such information for every vital event, be it birth, death, marriage, or divorce. Because of the sampling errors that can be tolerated,

Dr. Sirken is chief of the Actuarial Analysis and Survey Methods Section, National Office of Vital Statistics, Public Health Service. Dr. Dunn is chief of the National Office of Vital Statistics. This paper is adapted from a talk Dr. Sirken gave at the 1957 meeting of the Southern Branch of the American Public Health Association and the North Carolina Public Health Association.

the collection of supplementary information can usually be confined to a relatively small subsample of the appropriate events occurring in a specified time period. In most studies, supplementary information is applicable only to a subset of events such as deaths due to selected causes or births of specified weights. Moreover, the information is needed for a single year or less or on a cyclical basis less frequently than annually.

The kinds of supplementary vital statistics that are being requested can be grouped according to their uses into three main categories. One, supplementary vital statistics are of administrative value in planning or evaluating a program, say statistics on the circumstances of fatal accidents in planning an accident prevention program. Two, such data are used in epidemiological studies to search for the etiological determinants of disease; for example, to relate cancer to cigarette smoking or fetal deaths to radiation exposure of the parents. Three, in population studies they are used in combination with information collected from other sources to get an accurate picture of what is going on in the general population. Thus, data on hospital utilization by persons who die during the study period are combined with comparable information collected from household surveys to get unbiased estimates of total hospital utilization for the exposed population.

The foregoing exemplify types of supplementary statistics related primarily to expanding the scope of vital statistics. Another important use of supplementary data is to evaluate and improve the quality of vital statistics. For example, inquiries are being made into the diagnostic evidence on which medical certification of death is based. In another study, the concept of usual place of residence as applied to tabulations of mortality statistics is being evaluated on the basis of supplementary information covering the lifetime residences of the decedent.

Since the lack of knowledge concerning methods of collecting supplementary data is probably the chief deterrent to expansion and improvement of vital statistics, the National Office of Vital Statistics of the Public Health Service has recently initiated research on

sampling survey methods as applied to this field. It is hoped that the continuity of research assured by this new activity will contribute to the development of appropriate methods and stimulate interest in others to do likewise.

Record-Anchored Studies

NOVS feels that studies anchored to the vital records hold the most promise of success in getting the needed supplementary data.

What is meant by "studies anchored to vital records"? These are studies in which the universe is defined by registered vital events. The records of appropriate vital events are the basic units, and supplementary information is collected for a sample of these units. Three main types of studies anchored to vital records are (*a*) the retrospective, or followback, study, (*b*) the cohort study, and (*c*) the record-matching study. In followback and cohort studies, supplementary data are collected by conducting surveys. The followback study is based on information collected in a single survey, whereas the cohort study entails collecting information for an identical set of persons on two or more occasions. In the record-matching study, the death certificate or other vital record of a person is matched with his other records, such as the census enumeration or OASI record.

The record-anchored method of collecting supplementary vital statistics has several good features. First, complete files of vital records are available for the Nation, for each State, and for communities; from these, all cases of rare vital events and probability samples of less unusual events can be readily selected. Second, basic facts concerning the vital event are contained in the vital record and therefore need not be collected again. Third, the established vital statistics system provides an operating organization for conducting these studies.

According to NOVS experience, studies anchored to the vital records are generally problem oriented. The data are usually collected for specific purposes such as estimating the amount and kind of hospital care given to persons during the year before death or testing hypotheses associating respiratory cancer with cigarette smoking. Consequently, the survey design is tailor-made, as are the decisions regard-

ing the size of the sample, the type of questionnaire and kinds of questions, and the sources queried for information. As has been indicated, each of these surveys is usually of short duration. However, the possibility of establishing a continuous sampling procedure for conducting retrospective and cohort studies to collect certain kinds of supplementary information routinely and other kinds on a one-time or cyclical basis deserves consideration.

This brings us to consideration of the question, what are the most efficient ways of conducting the record-anchored studies to collect the needed data? An answer to this question requires consideration of costs and of sampling and response errors associated with collection of the information.

During the past year, NOVS has been developing optimum procedures for conducting retrospective studies anchored to the death certificate. The first methodological study, the Pennsylvania mortality study, tested procedures for collecting supplementary information about decedents by the retrospective method (1).

Data Collection Procedures

The Pennsylvania mortality study was sponsored by NOVS and the National Cancer Institute, Public Health Service, in cooperation with the Pennsylvania Department of Health. Undertaken primarily to determine procedures for conducting retrospective studies of decedents, it also served as a pilot test for an epidemiological lung cancer study in which smoking and residence histories were to be collected retrospectively for a nationwide sample of deaths. Physicians were requested to supply information about the diagnostic procedures on which they had based their certification of the causes of death. Relatives or close friends were asked to supply information about the smoking habits, residence, and job histories of the deceased.

More than 1,700 deaths were selected from those registered with the Pennsylvania Department of Health during May, June, and July 1956. Included were all lung cancer deaths, about 600, occurring during the 3-month period; for these the Pennsylvania Department of

Health provided copies of the death records. The remainder were a sample of the deaths from other causes selected at NOVS from Pennsylvania's monthly shipment of death certificates in the 10 percent current mortality sample. (The current mortality sample is a 10 percent systematic sample of death certificates received each month in the vital statistics offices of the 48 States, the District of Columbia, and 3 independent registration cities—Baltimore, New Orleans, and New York. Each month, the vital statistics offices send copies of the death certificates in the sample to NOVS.)

Collection of data for each death began with a mail query to the funeral director requesting the name and address of the certifying physician or for identification of the family informant if this information was missing, incomplete, or illegible on the death certificate. Next, the medical certifier of each death was sent a query by regular mail. Followup letters by regular and then by certified mail and telephone reminders for nonresponding physicians were the subsequent steps.

The original query to the certifying physician stated that the family informant would be asked for supplementary information about the decedent unless the certifier advised against it. Such advice was given rarely, and relatives or friends of virtually all decedents were queried. The survey of informants was initiated with a regular mail query, and followup actions included both regular and certified mailings. Personal interviews were conducted on a subsample of nonrespondents who lived in standard metropolitan areas.

Unusually high response rates in the Pennsylvania mortality study indicate the feasibility of collecting data by means of retrospective studies anchored to the death records. More than 95 percent of the certifying physicians eventually answered the queries. More than 85 percent of the family informants answered the mail queries, and the response rate was increased to 95 percent by means of the personal interview.

Another phase of the study, not yet completed, consisted of personal interviews with a random subsample of about 300 family informants living in standard metropolitan areas who had answered the mail queries. The purpose of these interviews was to measure the quality of infor-

mation reported by mail by comparing it with responses given in the personal interviews.

Other NOVS Objectives

In addition to the activities related directly to basic methodological research, two other objectives of special interest are included in NOVS's program for supplementing vital statistics. First, NOVS hopes to establish a service to provide technical consulting assistance on these matters to other agencies, including State and local health departments. Second, a survey-operations unit has been established for conducting survey studies to supplement and improve vital statistics. NOVS, in collaboration with other agencies, is currently undertaking one such survey and is planning another for 1958. The first, a joint project with the National Health Survey Program, is an illness study of deceased persons in the Middle Atlantic States. The second, which NOVS is undertaking for the National Cancer Institute, is a national lung cancer mortality study based on lessons learned from the Pennsylvania mortality study.

The national lung cancer study will use for the first time a procedure that may be called dual sampling. Corresponding data will be collected for a sample of vital events and for a sample of the exposed population in order to obtain estimates of vital rates. The national lung cancer mortality study will comprise one phase of a national lung cancer study that includes collecting information on smoking habits and residence history for both a national sample of lung cancer deaths and a sample of the national population. The information for a sample of the national population will be collected by the Bureau of the Census as a supplement to its current population survey. National estimates of lung cancer mortality rates in association with smoking habits and places of lifetime residence will be derived from ratios of the two sets of data.

NOVS will need the assistance and cooperation of State health departments in conducting national studies anchored to the vital records. What we have in mind is the kind of relationship that NOVS had with the Pennsylvania Department of Health in the Pennsylvania mor-

tality study. Most important was the fact that the State health officer endorsed the study. Also important was his assistance and that of his associates in the health department in obtaining the endorsement of the State medical society.

The national lung cancer mortality study will entail following back on a relatively small number of lung cancer deaths selected from the death records sent to NOVS in the 10 percent mortality sample. The study has been endorsed by the Association of State and Territorial Health Officers. However, it cannot be completely successful without the approval of health departments in the 52 independent registration areas in the continental United States. We feel confident of Federal-State cooperation in this study in view of the long-standing cooperative relationships between NOVS and State offices of vital statistics.

Conclusions

At the beginning of this paper, we spoke of three activities of vital statistics programs: registration, production of basic vital statistics, and production of supplementary vital statistics. We believe that there will be a considerable increase in the research use of vital records at the local, State, and national levels, particularly as the records serve as focal points in sample surveys to collect supplementary vital statistics. Consequently, the activities of vital statisticians in this area will increase. It will be important, however, to continue to pay close attention to the other activities as well. Survey studies anchored to vital records may be visualized as the superstructure of the vital statistics system. Registration practices and the compilation of basic statistics are the foundation. Of necessity, the foundation must be kept in good repair in order to serve the needs for continuous series of the basic statistics and to support the supplementary statistics.

REFERENCE

- (1) Haenszel, W., Moriyama, I. M., and Sirken, M. G.: A proposed study for extending the scope and improving the quality of mortality data. *In* Improving the quality of statistical surveys. Washington, D. C., American Statistical Association, 1956.