



Insights

A Primer on Major U.S. Mortality Databases Used in Health Services Research

Introduction

A core public health function in the United States is the collection of vital statistics. These records on important life events - particularly births, deaths, migration, and marriages - are housed in various databases. Because some of these databases focus primarily on mortality records, they are helpful when health services researchers need to obtain death and cause of death information. Researchers may need these data elements to calculate a death rate for a particular disease, to assess survival rates for treatments or procedures, or to examine death from an epidemiological standpoint for a multi-site clinical trial. This *VIReC Insights* informational article has been developed to provide researchers with a concise overview of major mortality databases currently available in the United States.

National Center for Health Statistics (NCHS) National Death Index (NDI)

The National Death Index (NDI) is currently considered the "gold standard" of mortality databases. It was implemented in 1981 by the National Center for Health Statistics (NCHS) in response to a growing need for a national source of mortality information. Death data, after being collected at the local level, are compiled at the county and state levels and are then sent to the NCHS Division of Vital Statistics. NDI is available to researchers solely for statistical purposes in medical and health services research.

Beginning with 1979 deaths, NDI data items include first and last names, middle initial, father's surname, Social Security Number, date of birth, state of birth, state of residence, gender, race, marital status, and age at death. For the most accurate results when searching the database, the NCHS encourages researchers to compile as many of these data items as possible.

NDI can then be used to confirm death and determine the state of death, the corresponding death certificate number, and the date of death. NDI users can make arrangements with the appropriate state offices to obtain copies of death certificates. Each state holds the authority to grant NDI users copies of death certificates according to their own respective legislation and policies.

Numerous studies on the accuracy of the National Death Index place it at or above 96% (Rich-Edwards, et al.; Boyle, et al.; Fisher, et al.; Stampfer, et al.). In 1992, Williams, et al., reported that the accuracy of the NDI was dependent upon the identifiers that the researchers submitted for the search. The study suggested that the most accurate identifier when using the National Death Index was the subject's Social Security Number.

To use the National Death Index, researchers must first submit an NDI application form to the NCHS. Review and approval of the application takes about 2 to 3 months. If the application is approved, the investigator is notified by mail and is asked to submit the required identifying information on his or her study subjects on magnetic tape, floppy disk, or NCHS coding sheets for a search of the NDI database. The results are then mailed to the user within three weeks from when NCHS receives the user's data.

Two searches - an NDI search and an NDI Plus search - are available. Although the NDI Plus search is more expensive, it includes cause of death information and, thus, is most relevant to researchers. At this time, the NDI is the only place for useful cause of death information, except for going back to the states directly. The fees for NDI Plus searches consist of a \$350.00 service charge for the first 2,500 records searched, plus \$0.36 per user record for each year of death searched. If the subject is a known decedent, the fee is \$4.71.

Fees are reduced for NDI searches involving more than 2,500 records. To obtain a free NDI User's Manual and an NDI application form, researchers should call (301) 458-4444 or write to Robert Bilgrad, MA, MPH, National Death Index, Division of Vital Statistics, National Center for Health Statistics, 6525 Belcrest Road, Room 820, Hyattsville, Maryland 20782. More information is also available online at <http://www.cdc.gov/nchs/r&d/ndi.htm>.

The Department of Veterans Affairs (VA)

Beneficiary Identification and Records Locator Subsystem (BIRLS)

In its current form, the Beneficiary Identification and Records Locator Subsystem (BIRLS) is a Department of Veterans Affairs (VA) Veterans Benefits Administration (VBA) database containing records of all beneficiaries, including veterans whose survivors applied for death benefits (e.g., lump sum burial payment, burial flag, and grave marker). In addition to these applicants for VA benefits, sources of data include veterans discharged from the military service since March 1973, Medal of Honor recipients, and service members with accounts for VA education benefits.

BIRLS was originally created in 1970 as an extension of the Master Index, a manual system used by the veteran's benefits programs. BIRLS completely replaced the Master Index in 1972. Today, the file consists of approximately 44 million master records, from pre-Civil War to the present, and almost 700,000 dependent master records.

Data fields for BIRLS include the veteran's name, Social Security Number, gender, period(s) of service, claim number, current address, benefits information, and date of birth. The location of the veteran's hard copy file is also included, as are the date of death and the rudimentary cause of death (e.g., natural death, combat death, unknown, or other). However, the cause of death data are of minimal research value, not only because they are entered sporadically, but because they fail to provide the specific cause of death as indicated by an ICD-9 code.

Fisher, et al., reported that BIRLS had a 94.5% accuracy rate in ascertaining mortality.

Similarly, Page and Braun found a 95.4% sensitivity rate. However, although Boyle and Decoufle reported an overall hit rate of 80% when using BIRLS, they also reported that the accuracy of the file varied over time. They found a lower hit rate for the pre-1972 time period than for the post-1972 period. The inclusion of death data is dependent on the submission of a copy of the veteran's death certificate to the Department of Veterans Benefits for death benefits. Although the 1981 Omnibus Budget Reconciliation Act (OBRA) limited the lump sum death payment to fewer veterans, the effect of this act on the completeness of BIRLS mortality data is not known.

BIRLS data are maintained by the Austin Automation Center (AAC) and are directly accessible to authorized users. However, the BIRLS file is generally not available to researchers, as access is highly restricted.

An extract of the BIRLS file is the BIRLS Death File. This SAS dataset, consisting of approximately 10.7 million records, is available to VA investigators - typically at no charge. Deceased veterans who received compensation and pension are usually more likely to show up in the BIRLS Death File than are veterans with a non-service connected disability without cash benefits (Dominitz, et al.). AAC users with proper clearance can access the data directly on an AAC computer. For more information on the BIRLS Death File, contact Cyndi Cavalier at the AAC at (512) 326-6728 or contact Mike Baker at the VBA Central Office at (202) 273-7280. For more information on BIRLS, contact Andres Munoz at the AAC at (512) 326-6258 or contact Marsha Cilino at (512) 326-6336. Additional assistance with BIRLS and with the BIRLS Death File is available at the Austin Help Desk at (512) 326-6569.

Patient Treatment File (PTF)

The Patient Treatment File (PTF) is a national database for inpatient care in the Veterans Health Administration. Stored at the Austin Automation Center, the PTF consists of four files, referred to as Main, Bedsection, Procedure and Surgery. There are two additional sets of four files that have an identical structure to the above. One set contains records for non-VA hospital inpatient stays, while the other consists of records for extended care facility (nursing home) inpatient stays.





The date of death is available in the PTF Main file from FY 92 to the present. The date of death is recorded if the patient dies while in the hospital or if a survivor reports the death to the hospital.

AAC users with proper clearance can access data directly on an AAC computer. More information on the PTF is available online at http://www.virec.research.va.gov/DATABASES/NPCD/NPC_PTF_PDF.PDF or by contacting Gail Graham, Department of Veterans Affairs, VACO 193B3, 810 Vermont Ave., NW Washington, DC 20420, Phone: (202) 273-9220. Additional assistance is available at the Austin Help Desk at (512) 326-6569.

Please note that researchers interested in tracking mortality in the VA should check both the BIRLS Death File and the PTF.

Social Security Administration (SSA)

Service to Epidemiological Researchers

The Social Security Administration (SSA) offers a special service to epidemiological researchers through the Office of Research, Evaluation, and Statistics. Utilizing the Numident file (a file that contains all of the information collected when an individual applies for a Social Security card), the Master Beneficiary Record (a database that includes information on all individuals receiving benefits), and the Master Earnings file (a database that contains detailed earnings information on people that work and have a residence), the vital status of study subjects is determined. Researchers wishing to use this service must first submit an application. If the SSA believes that the proposed research will contribute to a national health interest, the application is approved, and the researcher must submit the following information on each study subject: Social Security Number, full name, date of birth, and gender. The SSA will then provide one of the following vital status determinations for each subject:

- ◆Death Information (date of death and state where claim was filed or state of residence at the time of death);
- ◆Presumption that the person is living;
- ◆Status Unknown (SSA either has no record of death for the subject or there is not sufficient information to presume that the person is alive);
- ◆Social Security Number verification failed;
- ◆Social Security Number was impossible or never issued.

The cost of this service is \$0.16 per record up to 25,000 records and \$0.012 for each additional record. More information on this service is available online at <http://www.ssa.gov/policy/research/epidemiology.html> or through Michael Risha at mike.risha@ssa.gov or at 410-966-4868. Requests can also be mailed to his attention at Social Security Administration, Office of Research, Evaluation and Statistics, 4-C-15 Operations Building, 6401 Security Boulevard, Baltimore, MD 21235-6401.

SSA files date back to the 1940s. However, due to a procedural misunderstanding, deaths were not routinely posted for the years 1978-1980. Consequently, some data were lost. In addition, a Congressional law that went into effect in October of 1981 cut back on eligibility for some death benefit programs. The effects of this bill on the completeness of the SSA death information are unknown.

Boyle and Decoufle reported an accuracy rate of 83% in their investigation of the Master Beneficiary Record, the Numident file, and the Summary Earnings Record. However, the authors also mentioned that the average age of their cohort was only 36. Other studies have noted that the number of successful hits was positively correlated with the age at death. Boyle and Decoufle speculated that the positive correlation could be due to the lack of incentive to report deaths of persons under retirement age. Curb, et al., reported an 83.6% success rate when using the SSA Master Beneficiary Record and Summary Earnings Record, while Page and Braun discovered a 98.6% sensitivity rate for the Master Beneficiary Record.

Death Master File (DMF)

The Death Master File (DMF) - consisting of over 60 million records - is created from the Social Security Administration Numident file for sale to the public. The file contains the following fields: Social Security Number, name, date of birth, date of death, state or country of residence (February 1998 and prior), Zip Code of last residence, and Zip Code of lump sum payment. Most of the deaths reported in the DMF are from the mid-1960s to the present.

The DMF is available in a tape format or on CD-ROM. Prices range from about \$1,725 for a one-time order of the entire DMF, to about \$6,900 for the entire file with monthly updates.

To order, call 1-800-553-6847 (for one-time purchases), call 1-800-363-2068 (for subscriptions), or write the United States Department of Commerce, National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161. Additional information is available online at <http://www.ssa.gov/pubs/deathfile.htm>.

Summary

Of the many databases that record vital status information, both the National Death Index (NDI) and the Beneficiary Identification and Records Locator Subsystem (BIRLS) Death File are most frequently utilized by VA health services researchers. While the NDI demonstrates the highest sensitivity ratings according to research and includes the cause of death, the BIRLS Death File is typically free of charge to all VA investigators.

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