

## **Assessing and Improving the Quality of Data From Medical Examiners and Coroners**

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### **Background**

Medical examiners and coroners (ME/C) investigate and certify approximately 400,000 (20 percent) of the two million deaths that occur annually in the United States, including virtually all homicides and suicides and most deaths related to unintentional injuries (Table 1).<sup>1</sup> To gather information about the cause, manner, and circumstances of investigated deaths, ME/Cs conduct scene investigations, autopsies, and toxicological tests in many, though not all, of these investigations (Table 2). As a result, data collected by ME/Cs are a valuable source of information on deaths due to injuries. They are used by researchers to conduct epidemiologic studies of these deaths and by government agencies, including the U.S. Departments of Health and Human Services, Labor, and Transportation, to monitor trends and patterns of injury-related mortality (Table 3). Because of the usefulness of data collected by ME/Cs, considerable recent effort has been expended to assess and, when necessary, to improve the quality of these data. This effort has addressed three aspects of the quality of ME/C data: 1) the completeness of reporting to ME/Cs of deaths that fall under their legal jurisdiction; 2) the quality of the investigation of reported deaths; and 3) the quality, completeness, and usefulness of the data recorded—either manually or electronically—about investigated deaths.

### **Completeness of Reporting**

Most studies of the completeness of reporting of injury-related deaths to ME/Cs have relied on linking computerized state or federal vital records data files with ME/C data files and subsequently assessing the overlap of the two data sources for specific causes of death. Recent studies of this type have addressed head and neck injury,<sup>2</sup> occupational injury,<sup>2,3</sup> disaster-related injury, child abuse, and carbon monoxide poisoning. Some of these studies have also assessed the availability and comparability of information contained in ME/C records with that contained in automated vital records files. One recent study in Iowa by Dijkhuis et al., linked ME/C records with vital records for all injury-related deaths and found that age, cause, manner, and county of death were strong predictors of whether a particular death was reported to and investigated by a ME in Iowa.<sup>2</sup> The 1993 National Mortality Follow-back Survey currently being conducted by the National Center for Health Statistics will assess the completeness of the reporting of deaths to ME/Cs, as well as the comparability of ME/C data with the data contained on the death certificate, for a nationally representative sample of injury-related and non-injury-related deaths.

### **Quality of Investigations**

Wide variation exists in the quality and extent of the investigation of deaths reported to ME/Cs (Table 4). This variation is partly due to the existence of approximately 2,200 separate death investigation jurisdictions in the United States.<sup>1</sup> The lack of standardized methods for investigating deaths, the lack of adequate training for many ME/Cs and other death investigators, and the lack of adequate resources for conducting investigations add further to this variation.<sup>2</sup> Assessments of the quality and extent of investigations have primarily relied on process measures, such as the autopsy rates in different jurisdictions. For example, Pollock et al., found that autopsy rates in 1989 for deaths due to nonhomicidal blunt and penetrating trauma—deaths typically investigated by ME/Cs—ranged from 10 percent in Oklahoma to 95 percent in Hawaii and were higher in metropolitan (58.2 percent) than in nonmetropolitan (29.9 percent) counties. Furthermore, rates for blunt and penetrating trauma (homicidal and nonhomicidal

combined) were higher in jurisdictions served by medical examiners (63.9 percent) than in those served by coroners (52.3 percent).<sup>3</sup>

To improve the quality of death investigations, the American Academy of Forensic Sciences has developed model guidelines for investigating deaths;<sup>4</sup> the National Association of Medical Examiners has developed an inspection and accreditation program for ME/C offices;<sup>5</sup> seven states now require specific training for their coroners;<sup>1,6</sup> several states have developed training materials, including investigation manuals, to aid their ME/Cs; and at least five academic centers offer short-term, continuing education courses in death investigation.<sup>3</sup> Other efforts to improve the quality of death investigation, including the passage of legislation in almost half of the states to establish programs to review childhood fatalities due to injuries and other causes, are currently being planned or implemented.<sup>7</sup>

### **Quality and Usefulness of Data**

The quality and completeness of the data recorded—either manually or electronically—for investigated deaths has also received attention (Table 5). Two recent surveys of ME/C offices have assessed the extent and nature of the automation of their death investigation and administrative data.<sup>8,9</sup> These surveys found that data collection and storage methods vary tremendously for different ME/C jurisdictions. Some jurisdictions lack any record-keeping system, whereas others have detailed, computerized, high-quality records that are maintained by staff specifically hired to manage their jurisdiction's information system. For those offices that have computerized their records, the amount of data on each case varies widely, from offices that automate only basic demographic and cause-of-death information to those with extensive information on each case, including a detailed, narrative description of the circumstances of death and the quantitative results of post-mortem toxicological tests. In most states, the lack of centralized data collection and storage hampers wider use of ME/C data.

To assist in the effort to improve the quality, completeness, and use of data collected by ME/C offices, the Centers for Disease Control and Prevention established the Medical Examiner/Coroner Information Sharing Program (MECISP) in 1987. MECISP has 1) developed guidelines for collecting data, including model death investigation forms and a model data set—the Death Investigation Data Set or “DIDS”;<sup>4</sup> 2) provided on-site consultation on information management to more than 20 large ME/C offices; 3) provided financial resources to assist offices in upgrading their information management systems; and 4) facilitated the analysis and use of data from 16 ME/C offices.

### **Conclusions and Recommendations**

The investigations performed by medical examiners and coroners are potentially the best source of data on injury-related mortality, and most other sources of data on injury-related mortality are based on information obtained during these investigations. Nevertheless, major logistical and resource barriers to improved quality and optimal use of data from ME/C offices remain. To overcome these barriers, the public and those responsible for making public health and public safety policy at the local, state, and federal levels need to recognize the importance of high-quality death investigations and the data derived from them and to provide the resources necessary to continue and expand efforts at improving the completeness of reporting, the quality of investigation, and the quality of data (Table 6). Federal programs that work with ME/C offices or that use their data need better coordination to ensure that available federal resources produce the greatest benefit. Since resources are limited, initial federal efforts should focus on statewide medical examiner systems and on populous metropolitan counties in order to maximize population coverage and to minimize administrative and other program costs. States without statewide

death investigation systems can increase the usefulness of ME/C from their county-based jurisdictions by centrally collecting data from these jurisdictions. Local, state, and federal programs that monitor or study injury-related mortality should consider the benefits of placing staff and resources directly in ME/C offices, where the investigations are conducted and the data collected. Finally, since any source of data has both its strengths and weaknesses, ME/C data should be used in conjunction with other data sources, such as vital records, to provide the most complete and accurate picture of injury-related mortality.

**Table 1. Deaths Investigated by Medical Examiners and Coroners**

- Homicides
- Suicides
- Accidental traumatic deaths (e.g., falls, burns, drownings)
- Deaths caused by drugs or toxic agents
- Deaths caused by agents that threaten public health
- Deaths that occur during employment
- Deaths that occur while a person is in custody or confinement
- Sudden, unexplained deaths

**Table 2. Components of Death Investigation**

- Report of death to ME/C
- Determination of circumstances of death
- Scene investigation
- Post-mortem examination
  - external exam
  - autopsy
  - laboratory tests (e.g., the presence of alcohol, drugs)
- Certification of cause and manner of death
- Report of findings to interested parties
- Medicolegal testimony

**Table 3. Examples of the Use of Data from Death Investigations**

To monitor trends and patterns of injury-related mortality:

- State and local injury control programs
- Fatal Accident Reporting System for motor vehicle-related deaths
- Drug Abuse Warning Network for substance abuse-related deaths
- Medical Examiner Coroner Alert Project for consumer product-related deaths
- Census of Fatal Occupational Injuries for work-related deaths
- Violent Criminal Apprehension Program for serial homicides

To conduct epidemiologic studies of specific causes of death:

- Hypo- and hyperthermia
- Substance abuse
- Motor vehicle crashes

- Carbon monoxide poisoning
- Drowning
- Firearms
- Injuries while at work

**Table 4. Quality of Death Investigations–Issues**

- 2,200 separate death investigation jurisdictions in the United States
- Variety of organizational locations (e.g., law enforcement agencies, health departments)
- Lack of standardized methods for investigating deaths
- Lack of standardized definitions (e.g., manner, cause of death)
- Inadequate training for many ME/Cs and other death investigators
- Inadequate resources for conducting investigations

**Table 5. Barriers to Quality and Completeness of Death Investigation Data**

- Variety of data collection and management methods
  - Most ME/C offices not fully computerized
  - Variety of hardware and software systems
- Inadequate budget for information management
- Lack of staff trained in information management and analysis
- Records not centralized in many states
- Lack of coordinated data collection by federal agencies

**Table 6. Recommendations**

- Increase recognition of importance of high-quality death investigations and data
- Provide resources at local, state, and federal levels for improvements
- Improve coordination of federal programs to provide greatest benefit
- Focus efforts on statewide ME systems and large urban counties
- Encourage states to coordinate investigations and data collection
- Base surveillance and studies of injury-related mortality in ME/C offices
- Use ME/C data in conjunction with other sources of data

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