

The role of E-codes in injury prevention

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HEALTH INFORMATION managers are in a position to create an important advancement in the prevention of injuries. Currently, we lack adequate information on severely injured people—information that would allow us to plan for prevention programs and improve treatment. Computerized hospital discharge data systems are a potential source of data on injured people, but E-codes (which reflect the external cause of injuries) are not widely available in hospital records or data systems. Their inclusion offers a feasible and affordable option to improve injury data. In fact, E-codes have been called the “missing link” in injury prevention.¹ There is a growing national movement to mandate E-codes on the uniform hospital bill. Hospitals could benefit by beginning now to make plans for this. Hospitals could also use E-codes for improving the quality of medical care for injured people, risk management, and community relations, providing an enormous benefit to the nation.

We describe in this article why injuries are a public health problem that deserves widespread

attention, what can be done to prevent injuries, and why existing data sources are inadequate for injury prevention. We address why E-codes are becoming a topic of national attention, some misconceptions about their use, and how health information managers can assist in enhancing the data required for injury prevention and control.

INJURIES AND INJURY PREVENTION

Injuries, by all measures, pose an immense burden to society. They are the leading cause of death for U.S. citizens from age 1 to 44 years. More years of life are lost to injury than to heart disease and cancer. Because injuries result in severe, life-long disability and disfigurement, as well as early death, the economic burden is especially great. Treatment costs are high. Injuries account for one of every six hospital days per year, more physician contacts than any single disease, and substantial percentages of emergency department and other medical resource utilization. This, coupled with lost work time and disability payments, accounts for the estimated annual costs of \$180 billion in the United States.^{2,3,4} The Box shows causes of injury deaths in the United States. Behind the statistics in the Box ("Leading Causes of Injury Death in the United States—1985") is the human toll described in the medical records of badly injured patients.

Fortunately, many strategies have been shown to prevent injuries. Many of them involve reducing the hazards inherent in the design of familiar objects in our environment—automobiles, utility poles, and playgrounds, for example. Others require individual action to be effective, so education is necessary: for example, using seat belts and bicycle helmets (see the Box, "Examples of Injury Prevention Strategies of Known Effectiveness").

Despite their heavy toll and the multitude of known methods for prevention, injuries receive a disproportionately small amount of governmental and public health attention. Distribution of federal funds for research shows the discrepancy between action on injuries and their importance as a problem (Figure 1). However, in the past few years, interest in injury prevention has increased substantially; hence, there has also been increased attention to injury data.^{5,6}

THE NEED FOR INJURY DATA

How are injury prevention strategies implemented and brought into the fabric of daily life? This is often the hard part of injury prevention; health information managers have an opportunity to play a helpful role. Injury prevention, like other public health programs, is accomplished by legislation, education, regulation, and tax and insurance incentives. Information and data convince citizens and policymakers to take these steps and are also necessary for evaluating the effectiveness of injury-prevention strategies.

Leading Causes of Injury Death United States—1985

Motor vehicles	46,000
Firearms	32,000
Suicide	(17,600)
Homicide	(12,800)
Unintentional	(1,600)
Falls	13,000
Poisonings and overdoses	12,000
Drownings	6,000
Fire and burns	6,000
Other—electric shock, air and railway transportation, explosions, machinery, etc.	29,000

Examples of Injury Prevention Strategies of Known Effectiveness³

Motor vehicles

- Child passenger restraint laws
- Seat belt use laws
- Motorcycle helmet laws
- Automatic restraints, especially airbags
- Laceration protective windshields
- Nighttime curfews for teenaged drivers
- Pedestrian-friendly front ends of automobiles
- Break-away utility poles

Firearms

- Removal of handguns from homes with children and teenagers
- Waiting period on firearm purchase

Fire/Burns

- Manufacture of fire-safe cigarettes
- Smoke detectors installed and working
- Fire exits and fire drills

Recreational

- Four-sided barriers for swimming pools
- Promoting bicycle helmet use
- Break-away bases for softball sliding injuries

Falls, Poisoning, etc.

- Window guards in high-rise buildings
- Treatment of osteoporosis in women
- Fall-cushioning materials beneath playground equipment
- Packaging of children's aspirin in sublethal dose
- Rollover-protective structures on farm tractors

All Injuries

- 21 minimum drinking age
- Increase in excise tax for alcohol
- 911 response systems

Child safety restraints in automobiles are an example. Data showed that the leading cause of death for children from one to four years was injury, most often as a passenger in an automobile. In response to this and data demonstrating that restraint systems reduced injury and death, a Tennessee pediatrician started action on what became in 1977 the first state law requiring child passengers to be restrained in a car seat.⁷ In less than 10 years the entire 50 states had similar laws. During this time, passenger restraint use for infants and toddlers rose to around 80 percent, and death rates declined. Since 1985, however, the downward trend has been reversed and child passenger fatality rates have been increasing.⁸ Some suggest the declining number of restraint loaner programs, as well as increased speed limits and smaller car sizes^{8,9} as reasons for this, but data from hospitalizations would help to determine why.

Another example of a successful injury prevention strategy has to do with childhood poisonings. In 1960, aspirin was the leading cause of poisoning death for children younger than four years with 144 deaths per year. In 1988, there were only three deaths. This decrease can be attributed in large part to the Poison Prevention Packaging Act that required in 1973 childproof packaging for aspirin and other drugs. An important part of this act limits the number of aspirin tablets in a bottle to a sublethal dose, so that even if a child manages to ingest an entire bottleful, chances of survival are good.

Both of these important injury-control measures were identified and evaluated using E-codes from death certificates. Surveillance, the measuring and reporting of events, is a crucial public health strategy for many kinds of problems, for example, infectious diseases such as influenza and acquired immunodeficiency syndrome (AIDS). Surveillance for injuries has

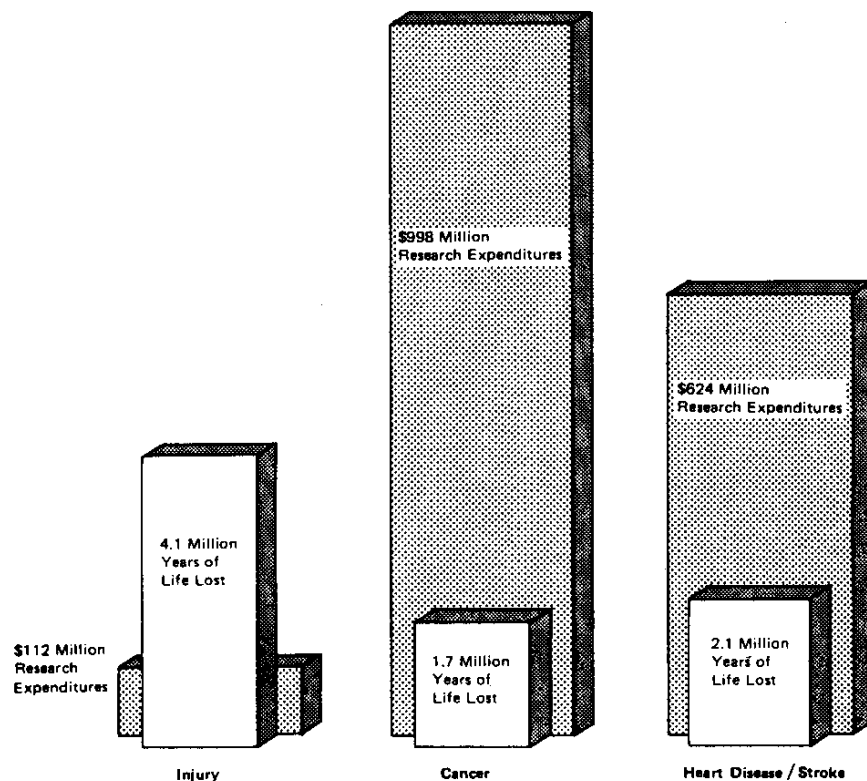


Figure 1. Estimated preretirement years of life lost annually and federal research expenditures for major causes of death in the United States. Years of life lost are derived from age-at-death distributions in the National Center for Health Statistics *Vital Statistics of the United States, Volume II. Mortality* (Hyattsville, Md.: U.S. Department of Health and Human Services, 1981). Estimate of the total federal expenditures for injury research, including prevention, is based on a review of relevant agencies' budgets by NRC Committee on Trauma Research, largest expenditures were those of Na-

tional Institutes of Health; National Highway Traffic Safety Administration; Consumer Product Safety Commission; and Alcohol, Drug Abuse, and Mental Health Administration. Expenditures for research on neoplasms and cardiovascular diseases are from the fiscal 1983 budgets of the National Cancer Institute and the National Heart, Lung, and Blood Institute from the Institute of Medicine's *Response to Health Needs and Scientific Opportunity: The Organizational Structure of the National Institutes of Health* (Washington, D.C.: National Academy Press, 1984).

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been possible, in large part, only for fatalities. There are many kinds of nonfatal injuries about which we know virtually nothing.

PROBLEMS WITH INJURY DATA

Currently, most of our information on injuries is about people who die as a result of an injury. The primary source of injury data is the computer file of death certificates maintained by each state. Death certificates have information on age, sex, race, residence, place of occurrence, and the cause of injury. Data are coded using the International Classification of Diseases for both the anatomic site of injury and external cause of event (E-code). This information has been crucial in looking at priorities, planning new interventions, evaluating strategies, and getting the attention of decision makers and the public itself.

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But we really do not know very much about the vast number of people who are injured but survive their injuries. Not only are 99 percent of injuries nonfatal, but fatal and nonfatal injuries differ with respect to cause, risk factors, and population groups affected.^{5,6} For example, eye injuries are the leading cause of monocular blindness, but since these injuries are rarely fatal, we do not know their leading cause.¹¹ If we do not know what causes most eye injuries, how can we determine how best to prevent them?

Many other questions with important policy implications cannot now be answered. Here are some that have arisen in our state recently:

- How many children sustain spinal cord injuries in car crashes?
- How many teenagers are hospitalized after suicide attempts? What means have they used?
- Which is a more important priority, a new poison control center or a new child-abuse prevention program?

To answer these questions now, we must rely on national or state estimates from studies that may have been conducted in other places. Wisconsin, a state with a large rural population, has to use data generated in places like San Diego or Philadelphia or make do with educated guesses.

Other existing data sources include poison control data maintained in poison control centers, trauma registries maintained regionally, and state motor vehicle departments. These have limited usefulness, due to their narrow scope. The lack of linkages among the various databases causes "data dissection," which restricts effective use of existing data.

There is growing recognition that all Americans have the potential to lose a life, or limb, or family member—and all of us deserve the best prevention, treatment, and rehabilitation programs possible. Around the country, as people are becoming aware of the extent of the injury problem, there is a mounting call for improved data and data management systems.

HOSPITAL DISCHARGE DATA

The increase in electronic billing systems, coupled with concern about rising health care costs, led many states to organize hospital discharge data systems. As of 1990, 28 states had set up systems or had legislation in place to start them.⁵ Many systems are based completely on data contained in the Uniform Bill (UB-82).

In Wisconsin, for example, we have a hospital discharge data system housed in the state government, the Office of Health Care Information. Starting in 1989, all acute care hospitals submit quarterly UB-82 billing information on each patient admitted. E-codes are used in about 25 percent of cases where we would expect them. A few hospitals appear to be using E-codes for all cases; some use E-codes only for medical misadventures; others use E-codes for only a selected set of patients (e.g., potential workers' compensation cases); and many use none at all. When we looked at cases of major trauma, we found that fewer than 10 percent of the 136 hospitals in the state are submitting E-codes on all their trauma cases.

NATIONAL ATTENTION ON E-CODES

E-codes are the part of the International Classification of Diseases (ICD) that "permit the classification of environmental events, circumstances, and conditions as the cause of injury, poisoning and other adverse effects."^{12(p.930)} These codes are to be used to supplement the clinical diagnoses from other chapters of the ICD. That these codes are not widely used is evidenced by their publication history. Although revisions in other chapters of the ICD-9-CM are distributed periodically to keep up with clinical practice changes, typographical errors in the E-codes index have not been corrected from one edition to another. Now, however, there is growing interest in E-codes for injury prevention, cost control, and reimbursement purposes.

Virtually every publication that addresses injury prevention suggests E-codes as a necessary and economical means to improve our knowledge. There have been articles in public health and medical journals calling for E-codes in hospital discharge datasets.^{2,3,5,6,9,13,14} The Centers for Disease Control have called for E-

codes in efforts to meet the health objectives for the year 2000. The American Health Information Management Association joined a growing list of national organizations endorsing the inclusion of E-codes for hospital discharge data through its *Position Statement on Mandatory Reporting of External Causes of Injuries and Poisonings*, October 1991. Six states have mandated E-codes in their hospital data systems: Washington, Rhode Island, California, New York, Vermont, and Maryland.¹⁵ Letter campaigns have been conducted to convince the National Center for Health Statistics Subcommittee on Hospital and Ambulatory Care Data to include E-codes in the minimum uniform hospital discharge data set (UHDDS). At least 40 health-related organizations have endorsed the use of E-codes. When the National Uniform Billing Committee met during the fall of 1991 to consider recommendations to revise the Uniform Billing Form (UB-82), they recommended that a separate labeled field be included for E-codes. The Health Care Financing Authority will review this recommendation, and although it has not yet been mandated, it seems likely that is only a matter of time before E-codes will be required for reimbursement of care in hospital settings.

WISCONSIN EXPERIENCE

In our state, Wisconsin, we have found that without federal or state mandate, it is hard to get hospitals to agree voluntarily to add E-codes to their records. This may be due to several misconceptions. Because it is likely that these are not unique to Wisconsin, we describe them and our responses in some detail.

No one wants this information. We have described how many people now do want this information and acknowledge that this has been a change over the last 10 years.

This will cost too much. In Wisconsin, we talked to many coding supervisors and determined that the costs would be quite small. The coding supervisors agreed that adding an E-code to a record would take an additional 1 to 3 minutes per record. If we assume an average salary of \$10/hour, each record would cost 17 cents to 42 cents to add E-codes. There are 100,000 trauma patients admitted yearly to the 136 Wisconsin hospitals; so, for the state as a whole, the cost would be \$17,000 to \$42,000, a few thousand dollars for each hospital. Estimates for Washington state were very similar.⁵

What if information on cause is not in the record? Some medical record staff are concerned that they would have to obtain additional information from physicians to assign an E-code. In our experience, there is almost always sufficient data in the history and physical of seriously injured patients to assign a three-digit E-code. Usually the information is more complete because the cause of injury is important for medical decision making. If such information is lacking, however, hospital and medical staff committees could assist in improving the documentation and in providing the necessary education to accomplish this.

What about E-codes for medical misadventures? Are these confidential data? Some states that have mandated E-codes have excluded those pertaining to medical misadventures from the reporting requirements.

In some categories, E-codes lack specificity—how can these be helpful? We recognize the inadequacies of the classification system on E-codes, for example, the restrictive nature of the indexing scheme and the lack of specificity for some types of injuries [e.g., skate boards and all-terrain vehicles (ATVs)]. Having consistent and uniform information available, however, is

better than having no information. With the involvement of health-information managers, these deficiencies can be addressed and corrected over time.

What will this do to our data processing costs? Computer programmers say that technically this is not a complicated issue. In computer terms, the amount of added information is small, even though it is enormously beneficial in public health terms. They estimate one-time programming costs to be under a thousand dollars. In Washington, vendors agreed to make necessary changes free of charge for their hospital data systems.⁵

There is no room on the UB-82 for an E-code. As stated, there will be a separate, labeled field for an E-code in UB-92.

Why do we need E-codes from more hospitals? Can we just use the ones we have? Some hospitals report E-codes only on drug overdose and poisoning patients. Some hospitals use only a selected set of E-codes. Some hospitals that report are tertiary care hospitals; others are small, rural hospitals. Because the reporting is so unsystematic, interpreting the data is virtually impossible. Imagine the result if hospitals reported length of stay or some other element in such a fashion.

How can these be useful for my institution? E-codes, in addition to being useful for the state and the nation, can be useful to institutions once E-coded data are routinely available. These data can be useful, for example, if a quality assurance/improvement committee elects to examine triage of patients injured in motor vehicle crashes, either those treated within the facility or those transferred to other health care institutions. Infection control might be interested in burn patients or those with crushing injuries from machines. Risk management and discharge planners might be interested in patients who have

fallen. Community relations departments might want to let their constituents know about the kinds of injuries they care for. Social work departments track victims of domestic abuse and child abuse. We have even heard of one billing firm that requires E-codes on emergency department physicians' bills because reimbursement from third-party payors is quicker.

We will not do it unless it is mandated. Because of limited staffing resources, cost cutting and heavy workloads, some hospital administrators and health information managers have stated that they will not use E-codes, despite the low cost and obvious use, until they are mandated. Although we recognize the need to balance the desire for additional data against other demands on time and resources, we believe this position is shortsighted. The nation's tragic record of injury-related mortality and morbidity can and should be improved. A key factor in this process is improved data based on complete and accurate coding. Although reimbursement has become the focus, it does not need to be the only outcome of the coding process. Health information managers must take the lead in improving data quality. The challenge and the responsibility for providing the information decision makers require for improving the public health is rightfully assigned to the professionals responsible for the management of health information.

The nation's tragic record of injury-related mortality and morbidity can and should be reduced.

ADDRESSING THE ISSUES IN WISCONSIN

In Wisconsin, the public health community enlisted the support of the health information community to promote the use of E-codes. We have written articles for the Wisconsin Medical Record Association (WMRA) newsletters and solicited speaking engagements at state and regional meetings. We have written to every department director in the state. Now we are seeking the endorsement of medical, public health, and government groups in an attempt to let them know about the injury problem and how E-codes might help. WMRA has established a task force on data quality to educate members about the quality of hospital discharge data that come from their departments, including the need for E-codes. We are also arranging for cost-free refresher courses in E-coding under the aegis of WMRA.

In the course of this work, we have discovered many health-information managers who were eager to help. Health-information managers are health professionals after all and understand the tragic nature of the injury problem. Most are relieved to hear that there are effective solutions to the seemingly endless carnage and are willing to do what is necessary. To improve national injury data, the involvement of health-information managers throughout the country will be necessary. As the nation's health information leaders, health-information managers are in a unique position to make a significant contribution by providing the data that can lead to progress in injury prevention. The need is clear and the benefits will be great—let us work together for a safer nation.

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