Cost Estimates for Statewide Reporting of Injuries by E Coding Hospital Discharge Abstract Data Base Systems

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Synopsis

A key element in the study of trauma problems is the design and development of adequate and affordable surveillance systems. One proposed method is the use of data available from hospital discharge abstract data base systems. However, surveillance systems based on existing data bases usually do not include codes that can identify the external causes of injuries, a critical limitation of the ability to determine the mechanisms of injuries.

One obstacle to adding external cause of injury codes, known as E codes under the International Classification of Diseases, to uniform hospital discharge abstract data base systems is the cost of such a change. This study provided an estimate of the type and size of the costs for one State, based upon a survey of hospitals, information system vendors, and medical records experts.

Two categories of the costs involved in adding E codes to hospital discharge abstract data base systems were identified. One-time implementation costs, which include modification of the computerized data base and the coding guidelines used by medical record personnel, average $600 per hospital. Annual costs resulting from increased operating expenses to include E codes average about $600 per hospital, because of the increased workload of coding and entry of the additional data.

Adding E codes to hospital discharge abstract data base systems appears to be financially feasible for statewide surveillance of serious injury.

Trauma remains one of the neglected diseases of our society (*1*). One reason for the continued magnitude of the problem is a lack of readily available sources of information on injuries.

As noted in the 1985 Institute of Medicine report, "Injury in America," "A prerequisite for the scientific study of injury is acquisition of data on which to base priorities and research (*1*)." Existing data bases cover only fatal injuries or injuries of a particular type (for example, motor vehicle traffic records). The development of more comprehensive injury surveillance systems is expensive as well as dependent on the cooperation of a large number of hospitals and medical providers (*2*).

An alternative to the development of new surveillance systems is the use of existing computerized hospital discharge abstract data base systems. Twenty-eight States have some form of hospital discharge abstract data system or have legislation requiring them to develop such a system (*3*). Information in such data bases could be useful in describing serious injuries, those requiring hospitalization (*4*). However, the data bases are of limited usefulness for injury control because the external cause of the injury resulting in the hospitalization is not coded.

Presently, hospitals code injuries by so-called N codes according to the nature of the injury, such as fracture, head injury, or ruptured spleen. External cause of injury codes (E codes) are a subset of the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) (*5*), and are used to specify the mechanism of the injury, such as motor vehicle crash, or fall. E codes are necessary in order to use the data base for epidemiological or prevention purposes.

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One of the major objections raised by hospitals and State organizations that are considering implementing E coding of hospital discharge abstract data base systems for trauma patients is the potential costs involved, particularly since hospitals presently have no financial incentive to use E codes under the Health Care Financing Administration prospective payment system.

This study was undertaken to identify the type and magnitude of the costs in one State, Washington, of adding E codes to hospital discharge abstract data base systems.

Methods

The Washington State Hospital Commission (WSHC) maintains a hospital discharge abstract data base, called the Comprehensive Hospital Abstract Reporting System (CHARS). Hospitals provide information to WSHC using a variation of the standard Medicaid claims format. Hospitals submit code data to CHARS on five diagnoses and three procedures.

Reporting E codes to CHARS would require hospitals to submit at least one additional code. Occasionally, two codes would be necessary, because E codes from E930 to E949 and from E880 to E888 require a second E code to denote the place where the incident occurred.

We conducted a survey to identify major issues and costs related to instituting E codes. Since cost constraints did not permit a complete survey of hospitals in the State, we made a representative, nonrandom sample of hospitals, information system vendors, and medical records experts. We selected hospitals to represent both urban and rural hospitals, hospitals that used onsite data processing capabilities, and those that used outside vendors. The vendors surveyed were managers of information systems shared by multiple hospitals, vendors of individual hospital software programs, and contractors who provide complete data entry and processing services.

In order to estimate the costs of E coding, the number of patients with injuries treated in hospitals was estimated using data from January and July 1986, weighted to obtain annual estimates. All patients were included who were admitted to a hospital and assigned a principal or secondary diagnosis ICD-9-CM code (N code) of 800 through 999.

Results

Two categories of the costs involved in adding E codes to hospital discharge abstract data bases systems were identified. One-time implementation costs included modification of the data base and the coding guidelines used by medical record personnel. Ongoing, annual costs were those resulting from the increased operating expenses involved in including E codes on hospital discharge abstracts and the entry of additional data.

Costs of implementation. The total costs and the components of the costs are shown in the table. The contractor who maintains the CHARS data base estimated the cost of modifying the CHARS system to accept E codes at $5,900. The costs of programming changes to enable individual hospitals to add E codes to their data bases were estimated by the type of hospital information system used. Officials of hospitals with inhouse computer system capability, and able to perform their own software modifications, estimated the task to require 1 to 10 days of programming time, with a mean of 3 days. At $25 per hour, the cost of programming changes would average about $600 per hospital.

Vendors who contract with hospitals for information system software or for data processing uniformly reported that they would modify their systems as needed to include E codes at no cost.

Medical records personnel are trained in ICD coding, including E coding. Hospital coders are familiar with codes E930 through E949 because use of one is required when the patient's condition results from an adverse effect from a drug. Although formal training would not be required in order to begin additional E coding on a statewide basis, clearly written guidelines for E coding would be necessary. The cost to develop and distribute such guidelines was estimated conservatively at $20,000.

Increased annual operating expenses. There is an additional cost to the WSHC to maintain the additional E code data on CHARS, estimated at $936 per year by the contractor who maintains the system.

The increased computer processing costs to the hospitals include costs for coding and entering the additional data field. The data tape without E codes consisted of 792 characters per record; adding an E code would increase this by 6 characters. On the basis

of current coding and data entry costs, the additional cost would average less than $200 per hospital per year.

Hospitals would incur a cost because of the additional workload of coding E codes on charts of trauma patients. In 1986 there were 560,000 discharges from approximately 100 Washington State hospitals, of which 16.67 percent, or 93,352, were patients admitted for injuries. In a survey performed by the WSHC in 1987, 25 percent of hospitals, which treat 35 percent of the injury victims in the State, presently enter E codes for all trauma cases. An additional 45 percent of hospitals, which treat about 45 percent of injury cases, E code about 25 percent of trauma admissions.

Thus, the number of discharges for injury that are currently not E coded, and that would represent an increased workload, is 50,177, or 54 percent of all injury discharges. Based on the coding standards of the Hospital Association of New York, the additional code would require an extra 3 minutes per chart, or a total of 2,509 person-hours for the 50,177 discharges. With reimbursement at $15 per hour, the additional costs for coding of E codes would average $376 per hospital per year.

As shown in the table, the implementation costs for modification of the system would be $25,900, and the average implementation cost per hospital would total $600. The annual additional operating expenses average a total of less than $600 per hospital.

Estimated cost of incorporating E codes in the hospital discharge abstract reporting system, Washington

Implementation	WSHC costs (dollars)	Average hospital costs (dollars)
Implementation		
Modification of CHARS database	5,900	...
Modification of hospital computer systems:		
Hospitals with inhouse systems	...	600
Hospitals with outside systems	...	0
Medical records coding guidelines	20,000	...
Annual operating expenses		
Maintenance of expanded database	936	...
Additional data entry costs	...	200
Additional coding costs	...	376

WSHC = Washington State Hospital Commission.
NOTE: Average hospital costs are the average costs to individual hospitals. See text for explanation of calculations.

Discussion

This study indicates that the costs of implementing E coding as part of hospital discharge abstract data base systems make these systems feasible and economically attractive alternatives for the surveillance of serious injuries. The major costs are changes in computer programming and the increased workload of medical records departments performing the coding.

Presently, hospital discharge abstract data bases include only information on inpatients in acute care hospitals. However, Guyer and coworkers have shown that the use of hospital discharge abstract data would increase the number of injuries available for analysis and study by 40-fold over data based on deaths (*6*). In addition, surveillance of hospitalized cases would capture the more serious types of injuries, particularly head, trunk, and internal injuries and the more important etiologies, particularly motor vehicle crashes and self-inflicted injuries (*6*). While the use of hospital discharge abstract data will not provide information on the large number of trauma patients treated in emergency rooms and physician offices, it will better address the data needs for injury control than are available at present and provide a model for possible future expansion to other categories of patients.

We believe that the cost estimates, although low, are accurate. The changes proposed to be made in hospital information systems are the addition of one or two fields to the systems, and would not require extensive programming changes in existing data sets. The fact that information system vendors at hospitals using those systems would make the changes at no cost tends to validate the projected low costs of the changes.

The costs for coding are lower than are commonly believed for a variety of reasons. Many of the hospitals caring for a large portion of the trauma cases in the State were already doing E coding. For those hospitals not E coding, medical records personnel nevertheless spend an average of 24 minutes per chart; the additional task of adding E codes thus is small.

Similarly, the added task of key punching the additional information is small. In the State of Washington, this amounts to less than an 0.8 percent increase in the number of characters entered.

A possible objection to implementing E-coding is the poor quality of the data on mechanisms of injury available in the medical records. This problem must be addressed by educating medical personnel on the need for accurate data on injury mechanisms, presently not required by most hospitals. There are no financial costs associated with ensuring that this information is included on emergency room and hospital records. E coding entails only documenting the history, which is a necessary part of providing quality care to a patient. Accurate assessment of the mechanism of injury is vital in evaluating a trauma patient and should be considered as usual a part of the medical record of trauma victims as the vital signs.

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A Study of the Deficiencies in the Condom-Use Skills of Gay Men

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The research reported in this paper was conducted at the Long Beach, CA, gay and lesbian community services center in its AIDS risk reduction program. A preliminary version of this study was presented as part of a larger presentation at the 11th National Lesbian and Gay Health Conference and 7th National AIDS Forum in San Francisco in April 1989.

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Synopsis

The use of condoms has been advocated as an important method of reducing the risk of AIDS for such people as gay men, prostitutes, IV drug users, adolescents, hemophiliacs, and others who may become infected with the human immunodeficiency virus (HIV) that causes AIDS. Although AIDS risk-reduction programs have provided information on condoms, none has assessed baseline or followup skills in their use. Because most condom failures have been attributed to errors in use, promoters of condom use should determine whether they are used correctly among those persons targeted for education.

A total of 219 gay men entering an AIDS risk-reduction program were asked to demonstrate the use of condoms on a model. All errors made during the demonstration were corrected, and participants were trained during the exercise in the proper use of condoms. More than 80 percent required correction in such things as opening the package, determining the outside of the condom, unrolling the condom to the base of the penis, and expressing air from the space at the tip of the penis.

Although proper use of condoms may seem obvious, this small study demonstrates that it must be taught. Since instructions found in condom packaging frequently are not easily understood by potential users, explicit instructions for condom use are needed.

The use of condoms has been advocated as one of the most important ways to reduce the risk of AIDS for people who may be in danger of infection with the human immunodeficiency virus (HIV) that causes AIDS. Since the early stages of the AIDS epidemic, programs targeted at the gay community have emphasized the need for the use of condoms in anal intercourse and in the avoidance of semen exchange between sex partners to reduce the risk of AIDS community-wide (*1–6*). Condom use also has been promoted for prostitutes (*7*), IV drug users (*8*), adolescents (*9*), hemophiliacs (*10*), and others. Although AIDS risk-reduction programs have provided information on condoms, none has assessed baseline or followup skills in their use.

It has been pointed out that condoms may fail as much as 10 percent of the time (*11*). Most condom failures, however, have been attributed to errors in use (*12*). In addition, lack of familiarity with condoms may interfere with the spontaneity of the sexual act and therefore diminish their consistent use. In promoting condoms, it is important to determine whether they are