Assessment of E-Coding Practices and Costs in Massachusetts Hospitals

VICTORIA VESPE OZONOFF, PhD
SUSAN TAN-TORRES, MD, MPH
CATHERINE W. BARBER, MPA

The authors are with the Massachusetts Department of Public Health, Sentinel Injury Surveillance System. Dr. Ozonoff is Director of Health Resources Statistics and is the Principal Investigator. Dr. Tan-Torres is a Research Associate. Ms. Barber is the Project Director. Assistance in developing the survey and measuring E-code rates in the Uniform Hospital Discharge Data Set was provided by the Statewide Comprehensive Injury Prevention Program.

Tearsheet requests to Victoria Ozonoff, PhD; State of Massachusetts, Department of Public Health, Health Statistics, 150 Tremont St., 5th floor, Boston, MA 02111; tel. (617) 727-8960; fax (617) 727-6584.

Synopsis

Hospital discharge data are a potentially useful information resource for documenting the epidemiology of nonfatal injuries. However, hospitals often do not include E-codes that identify external causes of injury in discharge abstracts. One barrier has been assumed to be the cost of assigning E-codes to medical records. Directors of medical records at hospitals in Massachusetts were surveyed to assess the validity of a cost-assessment study by Rivara and coworkers and to determine what resources they would need to E-code all injury discharges.

According to Rivara's estimates, injury coding an additional 500 hospital discharges would entail a continuing cost to each hospital of about $600 a year. More than half of the survey's 101 respondents believed that the estimates were accurate, 16 percent believed that the estimates were inaccurate, and 27 percent were unable to assess the potential costs. Among the resources needed to E-code all injury-related discharges, respondents most often cited training for those who assign the codes and the approval of the hospital administration. Only 20 percent of the respondents cited needs directly related to ongoing costs. The perception by hospitals of the cost of E-coding, frequently cited as a major barrier to the use of hospital discharge data as an injury surveillance source, did not emerge in this survey as an overriding concern.

THE DEVELOPMENT AND EVALUATION of injury prevention activities are restricted by a lack of data on nonfatal injuries (*1–3*). Hospital discharge data are a cost-effective and efficient source of data for conducting injury surveillance when data on both the nature of the patient's injury and the external cause of the injury are included (*4–6*).

However, in Massachusetts, only 30 percent or fewer of hospital discharges related to injury are coded for cause of injury by hospitals (*7*). Injury codes are defined by the International Classification of Diseases, 9th revision, Clinical Modification (ICD-9-CM) (*8*). The nature of the injury is indicated with ICD-9-CM morphology codes for diseases and injuries (referred to as N-codes). The external cause of injury is coded using ICD-9-CM E-codes. N-codes are reimbursable under the Health Care Financing Administration's prospective payment system and tend to be more strictly applied than the nonreimbursable E-codes, for which coding practices may vary.

One of the assumed barriers to E-coding has been the perception by hospital managers of the costs of additional coding. In 1990, Rivara and coworkers (*9*) investigated the additional cost to hospitals in the State of Washington for assigning E-codes to all injury discharges. At that time, hospitals assigned E-codes for less than 50 percent of injury discharges. The average per hospital additional costs were modest, amounting to roughly $600 annually in additional coding and data entry costs and a one-time investment of $600 in initial computer programming changes.

We surveyed hospitals in Massachusetts to determine the applicability of Rivara's estimates in a State with relatively high health care costs and to determine the incentives and barriers perceived by hospitals to assigning E-codes. We hypothesized

Table 1. Policies on E-coding of hospital discharge data reported by 101 acute care hospitals in Massachusetts, 1990

Policy	Number	Percent	Cumulative percent
Only adverse effects of drugs	8	7.9	7.9
Only poisoning and adverse effects of drugs.....	25	24.8	32.7
Only poisoning, adverse effects of drugs, and specific types of injury	11	10.9	43.6
All discharges with principal diagnosis of injury or poisoning.....	7	6.9	50.5
All discharges with principal or secondary diagnosis of injury or poisoning	40	39.6	90.1
Not using E-coding.....	10	9.9	100.0

NOTE: E-coding refers to external cause of injury under nomenclature of International Classification of Diseases (*8*).

Table 2. Policies on E-coding, by level of coding of hospital discharge data, reported by 90 acute care hospitals in Massachusetts, 1990

Policy	Level of coding			
	Low	Medium	High	Total
All injury discharges.....	21	8	15	44
Selected injury types	37	2	2	41
Not using E-coding.....	3	1	1	5
Total.....	61	11	18	90

NOTE: The rate of E-coding is the percent of a hospital's injury discharges that include an E-code in the 1989 Uniform Hospital Discharge Data Set (UHDDS). Rates are aggregated into three levels: low, 0–30 percent; medium, 31–60 percent; and high, 61–100 percent. UHDDS information was missing for 11 hospitals. E-coding refers to external cause of injury under nomenclature of International Classification of Diseases (*8*).

that the cost of E-coding would be cited as a primary obstacle.

Methods

The Massachusetts Department of Public Health routinely surveys all Massachusetts hospitals on an annual basis. The Annual Hospital Statistical Report (AHSR) survey collects basic utilization and discharge information from all acute, chronic, and psychiatric hospitals in the State. Completion of the survey is a licensure requirement, and response rates are correspondingly high.

For fiscal year 1990, a separate section on E-codes was added to AHSR. Medical records directors were instructed to complete the section, under the assumption that they were best qualified to describe the hospital's E-coding practices and to provide cost estimates. Although AHSR is sent to all Massachusetts hospitals, results presented in this paper include only acute care hospitals. Of the 113 acute care hospitals, 101 completed the surveys, for a response rate of 89 percent.

Results

Current E-code practices. Among the 101 respondents, 44 percent said that their hospital assigned E-codes only for poisoning, adverse drug effects, or for selected injury types (table 1). Forty-seven percent said that their practice was to assign E-codes for all cases with a primary diagnosis of injury or poisoning. That practice may or may not be based on an explicit policy, so compliance may vary. Ten percent said they did not assign E-coding to hospital discharges.

Using the fiscal year 1989 Massachusetts Uniform Hospital Discharge Data Set (UHDDS), we compared each hospital's stated E-code policy with the proportion of its injury discharges that actually were assigned an E-code (table 2). Of the hospitals that stated that their policy was to assign E-coding to all injury discharges, 48 percent actually E-coded a very low proportion of their injury discharges (30 percent or less). There is a time lag between the year when the survey was conducted and the fiscal year that was available for analysis, so that perception of E-coding practices may vary.

Assessment of cost estimates. Because high costs, real or perceived, have been cited as an obstacle to E-coding, Rivara's study was used as a benchmark for Massachusetts hospitals to evaluate their costs. Rivara's estimates assumed that assigning E-codes took an average of 3 minutes per chart (according to the coding protocols of the Hospital Association of New York), at a coder's rate of $15 per hour, and that average data entry costs were $200 annually per hospital. For a typical Massachusetts hospital with 500 injury discharges annually, assigning E-codes would cost $575.

We hypothesized that since Massachusetts health care costs were higher than average, the Rivara estimates would be perceived as too low. Surprisingly, respondents at only 16 hospitals (16 percent) believed that the estimates were inaccurate (table 3). More than half of the respondents believed that the estimates were accurate, and an additional 27 percent said that they were unable to assess costs accurately. Among respondents who believed that the estimate was inaccurate, 12 said that the costs cited were too low, and 2 stated they were too high. Seven respondents estimated that assigning E-codes would take 3 to 5 minutes per chart, six believed that would take 6 to 9 minutes, one

estimated more than 10 minutes, and two believed that would take less than 3 minutes.

Incentives and barriers to E-coding. The use of E-codes is not mandated in Massachusetts, nor is E-coding tied to reimbursement. Given that there are few, if any, external incentives for hospitals to E-code discharges, we were interested in learning why some hospitals do E-coding. The two reasons most commonly cited by respondents were research and tradition. The fact that many hospitals perform E-coding because of tradition suggests the importance placed by some hospital and medical record managers on sustaining an E-code initiative.

To determine existing barriers, we asked hospitals to indicate what additional resources, if any, they would need to adopt a policy of E-coding all injury discharges (table 4). Fifteen respondents said that their hospital would be willing to adopt such a policy with no additional resources. More than one-third of the hospitals indicated that training for coders would be required. Thirty percent indicated that the support of the hospital administration would be necessary. A space was provided for respondents to write in resources other than those listed. Only 20 percent cited needs directly related to ongoing costs: 17 percent stated that they would need additional staff, and 3 percent stated that direct financial compensation would be required.

Table 3. Assessments by managers of 101 acute care hospitals in Massachusetts of Rivara's cost estimates for E-coding hospital discharge abstracts, 1990 (9)

Comment	Number	Percent	Cumulative percent
Seems accurate	51	50.5	50.5
Inaccurate	16	15.8	66.3
Don't know	27	26.7	93.1
Missing data	7	6.9	100.0

NOTE: E-coding refers to external cause of injury under nomenclature of International Classification of Diseases (8).

Table 4. Perceptions reported by medical records managers in 101 acute care hospitals in Massachusetts of additional resources needed to implement a policy of full E-coding, 1990

Resource	Number	Percent
None, because hospital has full E-coding policy	28	27.7
Training in E-coding	36	35.6
Approval of hospital administration	30	29.7
None, because hospital is willing to adopt full E-coding policy without additional resources	15	14.9
Other:		
More staff	17	16.8
More documentation in the medical record	8	7.9
Uniform bill (UB-82) and E-code changes	5	5.0
Programming and computers	4	4.0
Financial compensation	3	3.0
Other	5	5.0

NOTE: The total percentage exceeds 100 because multiple responses were accepted. E-coding refers to external cause of injury under nomenclature of International Classification of Diseases (8).

Discussion

Medical records managers' perceptions of the cost of E-coding, which we had expected would be a major barrier to full E-coding, did not, in fact, emerge as an overriding concern in this survey. Note that respondents were medical records managers, who may be more favorably inclined toward coding, and not hospital administrators, whose interests may be more fiscally related.

There is a positive consensus among injury researchers regarding the importance of E-coding, and efforts are underway nationally to encourage or mandate full use of E-codes in hospital discharge data. The fact that respondents at 90 percent of the hospitals in Massachusetts said that they were at least superficially E-coding some of their hospital discharges indicates that improving E-coding would be an incremental process, unhampered by startup costs or institutional inexperience. However, when 1989 UHDDS data were reviewed, almost half of the hospitals whose managers said that their policy was to E-code all injury discharges had E-code levels of less than 30 percent, and only one-third had a high E-code level (61 to 100 percent). The disparity between stated practices and the actual track record in the UHDDS is problematic.

There are several explanations possible. One is that there is simply a difference between medical records managers' perceptions and the reality of their coding practices. If assignment of E-codes is done inconsistently, and if there is no policy on E-coding, there may be differences in practices, which may lead to inaccurate perceptions of a hospital's performance in E-coding. Alternatively, hospitals may be E-coding at the level indicated on the survey, but not submitting codes with their discharge data, because E-codes are not mandated or reimbursed. A report in 1985 by the Statewide Comprehensive Injury Surveillance System in Massachusetts indicated that abstracting services contracted by hospitals to maintain their discharge

'Hospital managers' perceptions of the cost of E-coding, which we had expected would be a major barrier to full E-coding, did not, in fact, emerge as an overriding concern in this survey.'

data did not always transfer E-codes from the medical record to the UHDDS.

Responses to the survey indicate that several relatively low-cost initiatives may respond to medical records managers' concerns regarding resources needed to improve E-coding. For example, free or low-cost training for coding personnel could be offered by injury control researchers. The support of hospital administrations might be gained by providing institution-specific data to hospitals, based on E-coded discharges. The data might be useful for hospital planning, marketing, or research, fostering a demand within the institution for improved data. A process to add a dedicated field for recording E-codes is currently underway both for the Uniform Bill used by hospitals nationally (UB-82) and for the Massachusetts UHDDS maintained by the State's Rate Setting Commission. These factors were cited as important by 5 percent of the hospitals and might narrow the gap between hospitals' stated policies and their actual E-coding record in the UHDDS.

Regardless of whether the use of E-codes is mandated or remains voluntary, injury researchers and health departments can capitalize on low-cost or budget neutral incentives to respond to medical records managers' concerns and thereby improve the quality of hospital discharge data for injury surveillance.

References

1. Committee on Trauma Research: Injury in America: a continuing public health problem. National Academy Press, Washington, DC, 1985.
2. Rice, D. P., et al.: Cost of injury in the United States: a report to Congress. Institute for Health and Aging, University of California and Injury Prevention Center, Johns Hopkins University, San Francisco, CA, 1989.
3. Public Health Service, Centers for Disease Control: Position papers from the Third National Injury Control Conference. U.S. Government Printing Office, Washington, DC, April 1992.
4. Sniezek, J. E., Finklea, J. F., and Graitcer, P. L.: Injury coding and hospital discharge data. JAMA 262: 2270–2272, Oct. 27, 1989.
5. Smith, S. M., Colwell, L. S., and Sniezek, J. E.: An evaluation of external cause-of-injury codes using hospital records from the Indian Health Service, 1985. Am J Public Health 80: 279–281 (1990).
6. MacKenzie, E. J.: Techniques of injury surveillance: use of uniform hospital-discharge data. *In* Emergency medical services for children: report of the 97th Ross Conference on Pediatric Research, edited by J.A. Haller, Jr. Columbus, OH, 1989, pp. 83–93.
7. Statewide Comprehensive Injury Prevention Program: Injuries in Massachusetts: a data source book. Department of Public Health, Bureau of Parent, Child and Adolescent Health, Boston, MA, 1990.
8. International classification of diseases: manual of the international statistical classification of diseases, injuries, and causes of death. 9th revision. Clinical modification. DHHS Publication No. (PHS) 91-1260. Centers for Disease Control, National Center for Health Statistics, and Health Care Financing Administration, Hyattsville, MD, 1992.
9. Rivara, F. P., Morgan, P., Bergman, A. B., and Maier, R. V.: Cost estimates for statewide reporting on injuries by E coding hospital discharge abstract data base systems. Public Health Rep 105: 635–638, November-December 1990.