Trauma Registry

A trauma registry is a disease-specific data collection composed of a file of uniform data elements that describe the injury event, demographics, prehospital information, diagnosis, care, outcomes, and costs of treatment of injured patients. The trauma registrar is a vital and integral part of the trauma team. It is important that the trauma registrar, trauma program manager, and trauma medical director work closely together on an ongoing basis.

Trauma registry data must be collected and analyzed by every trauma center (CD 15–1). The trauma registry is an important management tool that contains detailed, reliable, and readily accessible information needed to operate a trauma center. Data should be aggregated and analyzed by the agency that directs the trauma system at the city, county, or state level. Finally, these data must be collected in compliance with the National Trauma Data Standard (NTDS) and submitted to the National Trauma Data Bank® (NTDB®) every year in a timely fashion so that they can be aggregated and analyzed at the national level (CD 15–2). At a minimum, trauma centers and state agencies should collect the NTDS data set. Trauma centers and state agencies are encouraged to collect the full Abbreviated Injury Scale (AIS)© classification for each patient included in the registry. Beginning with 2015 admissions, participating centers will be required to collect and transmit data compliant with the AIS 05/08 update to the American College of Surgeons (ACS) as part of their NTDB/Trauma Quality Improvement Program® (TQIP®) data. The NTDB® has made an effort to work with trauma registry vendors to make sure that trauma registry programs are compatible with the NTDS, as well as to work with hospitals to provide support throughout the data submission process. In addition, the NTDB® is undergoing the process of becoming Health Level 7 (HL7) approved, which will establish the NTDS as the international standard for trauma data collection. Minor modifications that will occur in data elements during the HL7 process will be handled as part of the NTDS update process and will have little impact on individual trauma registries. Similarly, the NTDB® is equipped to handle the transition to International Classification of Disease v.10 Clinical Modification (ICD10-CM).

The relationship between the hospital's electronic medical records and the trauma registry continues to evolve. Clearly, efforts to limit redundant data entry should be explored. However, it is imperative that the data populating the trauma registry be as accurate, valid, and reliable as possible.

The exact inclusion and exclusion criteria used to select patients for entry into a trauma registry vary across hospitals. Some trauma centers, trauma systems, and state agencies modify the inclusion and exclusion criteria to address the specific needs of their patient populations. See *www.ntdsdictionary.org/dataelements/datasetdictionary.html* for specific criteria and data elements required by the NTDB®. Please note that compliance with the NTDS data collection requirement is defined as passing the data validation rule section as part of NTDB® data submission.

Uses of a Trauma Registry

A trauma registry contains the detailed, reliable, and readily accessible information needed to operate a trauma center. The data in a trauma registry can be used in a variety of ways. The following sections describe uses that improve the care of injured patients across the continuum from injury prevention to outcomes measurement. In addition, the need for all trauma centers to participate in data aggregation at the local, state, and national levels is addressed. This participation improves trauma systems, shapes public policy, and provides the opportunity for trauma centers to compare their outcomes with regional and national benchmarks.

Performance Improvement

Hospitals committed to serving patients with injuries are eager to provide the best care possible. The trauma registry is essential to the performance improvement and patient safety (PIPS) program and must be used to support the PIPS process (CD 15–3). Every trauma center should be able to show that the trauma registry is used to objectively review the care provided to individual patients and to identify variations in the processes and outcomes for groups of patients. The individual institution, regional trauma system, and national aggregate can monitor a variety of parameters, track variability, and document improvement. Examples of variables include prehospital response times; presence and timeliness of care; lengths of stay in the emergency department, intensive care unit, or hospital; incidence of complications such as nosocomial pneumonia; comparison of expected and observed deaths; and cost. These variables, in turn, can be compared with past performance or benchmarks developed from regional or national averages, such as those provided through TQIP (see Chapter 16, Performance Improvement and Patient Safety). Thus, the trauma registry is a tool to drive the performance improvement process for individual hospitals, emergency medical services systems, regional trauma systems, and the provision of injury care at the national level.

Public Health

The trauma registry is only one part of the comprehensive data system needed to describe the entire spectrum of injured patients. These data provide information about the incidence, care, cost, and outcome of injuries. These measures can be stratified further by age, sex, and ethnicity. The aggregation of trauma registry data for a specific geopolitical region to create a population-based depiction of injury as a disease process could be important information for departments of health. Many states already require submission of data to a state trauma registry. Registry data also may be used to inform public officials about trauma as a public health problem, thus serving as a basis for legislative and regulatory efforts.

It is important to acknowledge the variability of trauma system development across the United States. Many patients who sustain severe, life-threatening injuries are not treated in trauma centers. Some states require that data from all acute care facilities treating these patients be reported to a trauma registry, whereas others do not. This inconsistency makes the acquisition of accurate population-based data difficult. Ideally, all acute care facilities that treat injured patients should contribute to a trauma registry.

Injury Prevention

Trauma centers should use the trauma registry to characterize the frequency and patterns of injury in their communities (see Chapter 18, Prevention). This information will lead to the identification of high-risk groups who may benefit from injury prevention programs. Furthermore, these findings must be used to identify injury prevention priorities that are appropriate for local implementation (CD 15–4). The trauma registry should be used to monitor the impact of these interventions. This information can be used to effect changes in policy and behavior.

Trauma Systems

The needs of injured patients span the continuum of injury care, from prevention to outcomes measurement. Injured patients are present in urban, suburban, and rural environments. In addition, they can cross geographic and political boundaries. The trauma center provides only part of the overall care that injured patients require. Trauma systems are needed to implement an organized system of care that meets all the needs of injured patients. Such a system cannot exist without data collection and analysis. Individual trauma registries collect important information about the overall function of trauma systems. These data should be shared and aggregated at the local, state, and national levels to assess trauma system function. It is important that all acute care facilities treating injured patients submit data to a regional or statewide trauma registry.

Outcomes Measurement

Trauma is a major cause of death and disability in our society. Outcomes measurements describe the results of intervention and management. Positive patient outcomes result from effective and efficient systems of care. Outcomes measurement focuses on a wide variety of clinical results, including the quality of life and the level of function achieved by patients who survive trauma. The most effective use of outcomes measurement is through a rigorous process based on standardized data and risk adjustment. Such risk-adjusted benchmarking processes may occur at the regional, state, or national level. The ACS TQIP provides the opportunity for such outcomes measurement. All trauma centers must use a risk-adjusted benchmarking system to measure performance and outcomes (CD 15–5).

Resource Utilization and Cost Analysis

The trauma registry also may serve to document the resources required by a trauma program. It can facilitate reliable evaluation of treatments currently considered the standard of care, new strategies of care for injured patients, and the impact of innovative technologies. This information can be used to justify institutional and financial support of needed personnel and capital expenditures. Such analyses will become increasingly important as purchasers of health care scrutinize the costs and outcomes of individual practitioners, hospitals, and systems that provide trauma care.

Research

Research is used to advance our knowledge of injury. Valid questions can be answered only with reliable data. The trauma registry is a rich source of such data. Trauma centers are encouraged to use their trauma registry data for research. At the national level, the NTDB is the largest aggregation of trauma registry data ever assembled. These data have been provided to hundreds of researchers to answer important questions across the continuum of injury care. Many such analyses have been published in the peer-reviewed trauma literature.

Meeting Requirements for Verification and Designation

The process of trauma center verification and designation requires that trauma centers document their volume, performance, and outcomes over time. In addition, the process requires demonstration of an effective PIPS program (see Chapter 16, Performance Improvement and Patient Safety). A trauma registry is needed to demonstrate that these requirements are met. Trauma registries should be concurrent. At a minimum, 80 percent of cases must be entered within 60 days of discharge (CD 15–6).

Creating and Using a Trauma Registry

Developing a trauma registry requires significant commitment and hard work before the registry begins to approach its potential. Although some centers have designed their own computerized registries, these efforts are no longer necessary. Several effective trauma registry software packages are commercially available. These programs are designed to run on personal computers or hospital computer systems.

Through the intermittent addition of custom fields and the initiation of local performance improvement projects, a trauma registry has a tendency to grow in complexity over time, resulting in considerable expansion of the number of fields captured. To ensure that time is spent most efficiently, the fields within the registry should undergo annual review to determine which ones can be dropped and which ones should be added, as well as to ensure that definitions are consistent with the current NTDS (see *www.ntdsdictionary.org/dataelements/datasetdictionary.html*).

Trauma Registrar

It is important to acknowledge that high-quality data begin with high-quality data entry, and it is the trauma registrar who is responsible for performing this task. Most facilities have an on-site trauma registrar. The trauma registrar is a vital member of the trauma team. Trauma registrars come from diverse backgrounds such as nursing, medical records, computer science, and medical informatics, among others. Ideally, the trauma registrar works directly with the trauma team and reports to the trauma program manager. Trauma registrars should receive initial training when they start the job. They must attend or have previously attended two courses within 12 months of being hired: (1) the American Trauma Society's Trauma Registrar Course or equivalent provided by a state trauma program and (2) the Association of the Advancement of Automotive

Medicine's Injury Scaling Course (CD 15–7). A certifying examination is available through the sponsorship of the American Trauma Society's Registrar Certification Board, leading to the designation of certified specialist in trauma registries (CSTR) or equivalent. Registrars should complete a minimum of 8 hours of registry-specific continuing education per year.

The trauma registrar must demonstrate proficiency with the NTDS. Centers are encouraged to support trauma registrar training by providing educational offerings within the facility. For example, a lecture regarding organ injuries is appropriate training for registrars, because they are expected to code organ injuries, as well as the procedures performed to treat the injuries.

Off-site or contract management of the trauma registrar is not viewed by the ACS Committee on Trauma (ACS-COT) as optimal. However, if the trauma registry is managed at a remote location, the trauma program must have immediate access to those data and must be able to receive standard and custom reports in a timely fashion. If a hospital is relying on remote or contract registry staff, all recommendations and requirements with regard to the registry and registrars still must be met.

Confidentiality

Hospitals are responsible for ensuring patient and hospital confidentiality. The passage of the Health Insurance Portability and Accountability Act (HIPAA) by Congress in 1996 brought about major changes in the way internal and external data are handled at health institutions. The trauma program must ensure that appropriate measures are in place to meet the confidentiality requirements of the data (CD 15–8). All reasonable means should be used to protect against threats, hazards, and unauthorized uses or disclosures of these data. The responsible parties should ensure that all persons dealing with these data are trained in protecting the confidentiality of patients. Actions to protect confidentiality should be firmly integrated in the administration of the registry so that identifying information is available only to people who have a need to know. Facilities that submit data to the NTDB or TQIP or that are participating in trauma center verification must have a current and fully executed business associate agreement with the ACS.

Data Collection

In the planning stages of a registry, it is useful to consider the mechanisms for data collection and entry from medical records and the hospital information system. Data downloading from the hospital information system is expanding. The use of portable computers and handheld devices for data extraction and data entry is popular. It allows registrars to work concurrently from the medical record and interviews. Alternatively, a paper data form may be designed to record patient information for subsequent batch data entry. The least desirable method is postdischarge data extraction from the medical record. Once collected, these data are downloaded to the main registry. Provisions should be made to ensure timely and complete availability of prehospital care reports, operative notes, medical examiner reports, and other documents that may not always be present in the active medical record.

The amount of time and effort that will be necessary to maintain the registry should not be underestimated. A designated and well-trained trauma registrar is critical to the success of a registry. One full-time equivalent employee dedicated to the registry must be available to process the data capturing the NTDS data set for each 500–750 admitted patients annually (CD 15–9). This staffing need increases if additional data elements are collected.

Hospitals must also take into account the additional tasks, above the abstraction and entry of patient data, that are assigned to the registrar. Processes such as report generation, data analysis, research assistance, and meeting various submission requirements will decrease the time dedicated to the meticulous collection of patient data. Electronic downloads into the trauma registry also create additional tasks, as does ongoing data validation prior to data acceptance. Additional staff will be required to perform these tasks to ensure the integrity and quality of registry data that are used for prevention, PIPS, and other essential aspects of the trauma program.

Data Validation and Quality

The information provided by a trauma registry is only as valid as the data entered. Strategies for monitoring data validity are essential (CD 15–10). A scheme for internal validation helps to detect errors in data entry or coding. Many trauma registry software packages include mechanisms to ensure consistency. In addition, a plan for ensuring that the data entered are accurate and reflect the observations made on the patient should be established. One approach is to re-abstract 5 to 10 percent of patient records. The medical director, trauma program manager, and trauma registrar then can perform a systematic review of the differences to establish levels of inter-rater reliability. While the TQIP of the ACS is an extremely important process that involves extensive external data validation, TQIP participation alone does not necessarily ensure data validity across the entire spectrum of data contained in the hospital trauma registry. Ongoing review and evaluation are important to ensure the quality, reliability, and validity of local registry data.

Report Writing

A trauma registry can be valuable only if the data it contains can be transformed into useful information through the process of report writing. Trauma registry reports support decision making and guide the management of the trauma center. Most trauma registry software provides for the generation of several standard reports that summarize different ways to address specific questions or areas of concern. Most standard reports are oriented to anticipate the needs of a trauma center's PIPS program and provide the needed information. This capability should be built into the software itself or achieved by exporting the data to a separate spreadsheet, relational database, or statistical program.

The National Trauma Data Bank

The NTDB is the largest aggregation of trauma registry data ever assembled. It is committed to being the national repository for trauma center registry data. The NTDB® strives to collect data on every patient treated in every trauma center in the United States.

The goal of the NTDB is to inform the medical community, the public, and decision makers about a wide variety of issues that characterize the current state of care for injured persons in the United States. This goal has implications in many areas, including epidemiology, injury control, research, education, acute care, and resource allocation. This effort is in keeping with the mission of the ACS-COT to improve the care of injured patients through systematic efforts in prevention, care, and rehabilitation.

For details on NTDB data fields, see the NTDS data dictionary at *www.ntdsdictionary.org/dataelements/datasetdictionary.html.*

Supplemental Reading

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