



AOTR Trauma Registry Resource Manual

If referencing the AOTR Registry Resource Manual; The AOTR requests acknowledgement in any/all publications.

Dedication

The Alliance of Ohio Trauma Registrars wishes to dedicate this resource manual to Kathy Cookman. Due to Kathy's tireless efforts, overwhelming enthusiasm for trauma registry, and selfless dedication, she has created a voice for registrars in the trauma world. We are very grateful to her for her work in creating the Alliance, and maintaining a high level of professionalism and respect that is emulated amongst the trauma community.

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Preface

In Ohio during the late 1980's, the trauma nurse coordinators were the first to meet and officially organize. It was while attending several of those meetings, that a vision arose: gather those responsible for the collection of trauma information in a forum where we could share ideas on how to better accomplish the job responsibilities, ask questions, and learn from one another. During a conversation with the leaders of the trauma nurse coordinator's group, the idea was put forth and enthusiastically supported to establish a statewide registrar support group known as Alliance of Ohio Trauma Registrars (AOTR).

The founder of the Alliance of Ohio Trauma Registrars was Kathy (Jenkins) Cookman who at the time was the trauma registrar for Riverside Methodist Hospitals in Columbus, Ohio. Special recognition goes to Kathy Haley, Trauma Program Manager of Children's Hospital in Columbus, Ohio and Joyce Schmidt, Trauma Coordinator at Riverside Methodist Hospitals, for being supportive of the vision.

The AOTR (Alliance of Ohio Trauma Registrars), through collaboration with one another realized a need for a 'resource manual' to assist new registrars with understanding their objective in performing the job as a trauma registrar. Thus, the development of the manual was crafted to guide all those involved in the care of the trauma patient.

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Chapter One: History of Registries

Although a registry was originally a place (like Registry House in Edinburgh) where information was collected (in registers), the word registry has also come to mean the collection itself (Medicinenet, 2011). A registry is usually organized so that the data can be analyzed. For example, analysis of data in a tumor registry maintained at a hospital may show a rise in lung cancer among women. Per Free Dictionary (2011), a registrar is defined as an official keeper of records.

In the beginning of the 20th century, disease registries were established by public health officials to trend tuberculosis patients (Fairchild & Alkon, 2007). Since this time, there has been a growth of registries relating to cancer, rehabilitation, Emergency Medical Services, burn and trauma. In September 1966, the National Academy of Sciences' National Research Council released the, "Accidental Death and Disability: The Neglected Disease of American Society" report. Also, referred to as the "White Paper", the document initiated changes that have evolved into the modern system of trauma care that we see today. Recommendations set forth this document included:

1. Establishment of trauma registries in selected hospitals as a mechanism for the continuing description of the natural history of the various forms of injuries.
2. Subsequent consideration of establishment of a national computerized central registry.
3. Studies on the feasibility of designating selected injuries to be incorporated with reportable disease under Public Health Service control (American Trauma Society [ATS], para 2, 2011).

Historically the document was produced when The Digital Equipment Corporation introduced its PDP-8 computer. Often referred as the "Model-T of computers", it was the first of its kind to allow hospitals to collect data electronically (Iowa, n.d.).

David R. Boyd published the first detailed description of a computerized trauma registry in 1971. The system depicted used keypunch cards to enter data with each patient represented on a set of 16 cards. This system allowed for a thorough evaluation of all aspects of trauma care, including causes, clinical care, and administrative issues (Boyd, Lowe, Baker, & Nyhus, 1973).

In the 1980s, several technological companies created dedicated, powerful and flexible trauma registry software. Among these were Clinical Data Management (CDM), Cales and Associates, Tri-Analytics, and Lancet Technology. These new systems allowed the trauma program to more quickly gather, contain, and analyze patient data in one place.

In May 1989, *Trauma Quarterly*, the first comprehensive peer review publication on trauma registries, was published. Related topics such as data sets, reports, personnel, data management, and evaluation were included in the full spectrum of trauma registry.

In 1990, the American College of Surgeons Committee on Trauma (ACSCOT) published *Resources for Optimal Care of the Injured Patient*. This manual guides hospitals in their efforts to create a trauma service. Trauma registries are essential criteria for Level I, II and III trauma centers. The American College of Surgeons state that, documentation will be made of severity of injury (by trauma score, age, Injury Severity Score [ISS]) and outcome (survival, length of stay, ICU length of stay) with monthly review of statistics (American College of Surgeons

[ACS], 1999). In 1993 the second edition of the ACSCOT revised *Resources for Optimal Care of the Injured Patient* was published, validating the importance of the trauma registry. With each revision that is published, the ACSCOT continues to maintain that importance. The most current revision, in 2014, set requirements of staffing, education, and data validation. This includes the required attendance, within 12 months of hire, of the American Trauma Society's trauma registrar course, or state equivalent, and the Association for the Advancement of Automotive Medicine's abbreviated injury scaling course (ACSCOT, p112). They also set a staffing standard of one FTE per 500-750 admitted patients annually (ACSCOT, p112). Both, as well as other elements can be found in Chapter 15 of the most recent *Resources for Optimal Care of the Injured Patient*.

In many states, trauma regions have been developed, making for an organized regional registry. This enables regions to analyze trauma data and statistics from their own repository. Many states have an organized trauma system, providing trauma data and statistics for statewide injury prevention, legislation and promotion of optimal trauma patient care.

The National Trauma Data Bank (NTDB) is a data repository for any hospital to submit trauma data. In 2006, this submission became mandatory for all hospitals verified by the ACS as trauma centers (ACS, 1999).

Chapter 2: Trauma Registry Data Components

Data Sets

A dataset is a series of records, which were originally created or managed on a computer system. A dataset usually takes the form of fields and tables in which items of data are contained and structured (National archive of Datasets, n.d.). The trauma registry is an example of a dataset.

Datasets are made up of records; records are made up of fields (also known as data elements or variables); and fields are made up of characters. Sometimes there is a limit to the number of records that a dataset may contain. There may be limits to the number of fields allowed in a record, and the number of characters allowed in a field. As information technology continues to advance, limitations on the size of a dataset will cease to exist.

The number of fields in the trauma registry depends on the purpose of the registry, i.e., use of the registry for performance improvement, trending, benchmarking, research, etc. This will determine data elements that need to be collected. Participation in a national, state, regional system, and/or ACS trauma verification process will dictate, at a minimum, data elements to be collected.

The dataset consists of information related to patient demographics, clinical and outcome data. Depending on the purpose of the trauma dataset, it may also include information related to the patient post-discharge. Reporting capabilities are determined by the contents of the dataset.

To understand what each field in a dataset represents, it is important to define each field in a data dictionary. The data dictionary defines the meaning of a field, export qualities and information sources.

Types of Data Sets

National Trauma Data Bank

The NTDB is the largest aggregate of trauma registry data ever assembled (ACS, 2011). NTDB's goal is to collect data on every trauma patient in the United States to inform decision makers about epidemiology, care, and resource allocation in the trauma population (ACS, 2006). To accurately report and compare data submitted, a uniform dataset needs to be adhered to.

State Data

Most states have a data repository that requires data submission from acute care facilities. Depending on the state's alignment with the NTDB dataset, the state's data set may be comparable. It is imperative that the data submission is completed according to the state's timeline and required dataset. Refer to individual state guidelines for specific requirements.

Regional Data

Many facilities are a member of a regional system. Facilities may be required to participate in a regional trauma data submission and will have a data dictionary to guide this process. In some systems, a regional registrar may facilitate the process of state submission.

Facility Data

If the acute care facility is an ACS verified trauma center, data sets must be in line with the NTDB as well as meeting state and regional requirements. Trauma centers may also have additional datasets or fields to assist with research, trauma performance, and education, which may not be exported to any data repositories.

Chapter 3: Identifying Trauma Population and Trauma Types

Trauma population

The Ohio Trauma Registry defines the trauma population as injured patients who are admitted to a facility, transferred to a higher level of care, or died within the Emergency Department. Some variation in this definition will depend on inclusion criteria from the region, state or national dictionary.

The trauma population is identified with injury and external cause codes assigned based upon mechanism of injury and diagnosis. The two most common codes are:

International Classification of Diseases Volume 10 (ICD10) Injury Codes

Injury codes are identified in the S00 thru S99 codes in the ICD10 book. There may be some exclusion or inclusions beyond the 'Injury, Poisoning and Certain Other Consequences of External Causes' depending on the inclusion criteria used by the facility, region, state or national repositories.

External Cause Codes

External cause codes are also found in the ICD10 book. They are a group of codes identified in the ICD10 coding book as 'External Causes of Morbidity' and describe the external cause of the injury. The ranges for the external cause of injury are V00.xxxx thru Y38.9x2x. There are additional external causes of morbidity codes that can be used as supplemental codes to give more specific information of what type of activity the patient was involved in. These codes range from Y93 thru Y99. It is also noted that the external causes of morbidity codes used for location of the injury and not for the external cause of injury; beginning with Y90 thru Y92.9

Trauma Types

Blunt injuries (B)

Blunt trauma occurs from a force during acceleration, deceleration, compression, or shearing. The extent of injury that occurs during a blunt trauma type of mechanism of injury depends on the type of energy that is exerted. If the force is slow, then the energy that is released is also slow resulting in less tissue deformity. However, on the other side, if the force is rapid, then a greater amount of energy is released with the potential to cause more tissue deformity.

Examples include:

- Vehicular impact without impalement
- Blunt force trauma as in assault with a non-sharp object (e.g., fists, blunt object).
- Falls
- Blast injuries
- Extremities caught in machinery (not a saw); crush injuries, "belt" injuries
- Pinned between two objects
- Punch wall or glass surface NOT resulting in deep penetrating wound
- Struck by object made of glass (e.g., glass bottle, glass pitcher)

Penetrating injuries (P)

Penetrating injuries are caused by a sharp implement that results in penetrating the skin and then deeper in either a cavity or structures such as tendons, nerves, vascular or deep muscle beds. These injuries require more than one layer of suturing.

Examples include:

- Gunshot wounds
- Stab wounds
- Impalement
- Dog bites
- Nail guns
- Punch/fall through glass resulting in deep penetration
- Paint gun/high pressure liquid injection injuries

Thermal injuries (T)

Thermal injuries are caused by thermal or electrical mechanisms, such as thermal burns, frostbite, or lightning strikes.

Examples include:

- Thermal burns (e.g., fire, flames, scalds, hot liquids/grease)
- Chemical burns
- Hypothermia
- Electrocution
- Lightning strikes
- Taser injuries
- Burns to the airway

Not applicable (NA) or Other

These injuries do not fit into any of the above categories.

Examples include:

- Envenomation: snake bites, spider bites, etc.
- Cat bites, human bites
- Hangings, drowning, suffocations
- Smoke inhalation without burns to the airway
- Carbon monoxide poisoning

Combinations

There are incidents where more than one trauma type occurs during the injury. The trauma registrar decides which trauma type had the greatest impact on probability of survival. Remember, it is not always the most prevalent mechanism of injury that determines whether the blunt, penetrating or thermal had the greatest impact on the patient's outcome. An example would be a driver of a motor vehicle that crashed into a roadside post and part of the post impaled the driver's

heart. The impalement to the heart will most likely be the more serious injury, so “penetrating” would be the appropriate trauma type.

A good reference to aid in determining trauma type is the External Cause of Injury Matrix and Trauma Type map of Non-Poisoning Injuries located on the American College of Surgeons TQIP website.

Chapter 4: Trauma Members and Committees

The Trauma Department is comprised of different team members who are integrated into many different committees and organizations within the hospital, community, region and state. It is important to recognize and understand the minimum roles of each team member within the department. In a non-verified center, the duties of trauma collection and registry work may fall under the direction of the medical records or coding department.

Trauma Team Members

Medical Director

The Medical Director is typically a board certified surgeon who is responsible for medical administration, quality care, and effective integration of the trauma services. Within these responsibilities, the Medical Director also acts as a liaison with them medical staff, nursing, and pre-hospital providers. He or she is responsible for the trauma performance improvement activities and oversees the utilization review of all admitted trauma patients to ensure the smooth transition of care through the different hospital phases.

Trauma Program Manager or Nurse Coordinator

The trauma program manager (TPM) or nurse coordinator (TNC) is responsible for the management of the trauma program and function in administrative, clinical, education, and quality improvement roles to assure comprehensive care to meet the needs of trauma victims and their families. This person is responsible for assuring the implementation of day to day care of the Trauma Service patients. They also coordinate Trauma Performance Improvement (PI) and Multi-disciplinary meetings and assists the Director in reviewing the function and outcome of the Trauma program. The program manager/coordinator also works closely with pre-hospital Emergency Medical Services (EMS) to coordinate quality assurance, training and education. They oversee the trauma registry and in some facilities may perform the duties of the Trauma Registrar.

Trauma Registrar

The trauma registrar is responsible for abstracting chart data and entering it into the Trauma Registry, a computerized database providing detailed information on all trauma patients. Some registrars may be referred to as a Trauma Data Specialist or a Trauma Data Manager. The registrar provides oversight for the database processes and may fill all or some of the roles needed throughout the data process. The trauma data specialist or manager may also oversee others who fulfill the roles needed. The trauma registry role exists to analyze and utilize trauma patient data for performance improvement initiatives, research, injury surveillance, and trauma systems monitoring (Zougras, Ryan, & Esposito, 2000).

Trauma Registry Coordinator

The trauma registry coordinator is responsible for coordinating activities in the trauma registry. The coordinator may be the supervisor of the other registrars, responsible for maintaining integrity, running reports, and upholding deadlines. This position typically exists in verified trauma centers with large volumes and with more than three registrars on staff.

Injury Prevention Specialist

The injury prevention specialist is responsible for utilizing hospital, regional, state and/or national data to guide prevention activities to reduce injuries. An ACS verified level I and II trauma center must have a budgeted salary and job description for this position. Level I facilities must have a dedicated person other than the TPM/TNC performing these duties.

Outreach Coordinator

The outreach educator is responsible for providing trauma education to individuals and agencies with an outcome goal of improving the care of the trauma patient. This person may also be the coordinator of Advanced Trauma Life Support (ATLS) for physicians, Trauma Nurse Core Course (TNCC) for nurses and Pre-hospital Trauma Life Support (PTLS) for Pre-hospital providers. Depending on the facility and level of the trauma center, this may be a dedicated person or a specific job duty.

Emergency Medical Services Coordinator

The EMS coordinator is responsible for coordinating pre-hospital education, quality improvement, and assisting with the trauma program. Depending on the state or region, this person may or may not exist.

Other Team Members

Other team members include the medical and ancillary staff who respond to the incoming trauma patients in the emergency department. The type of staff who responds is determined by the activation criteria defined within the trauma centers. Typically centers have a two or three tier activation response system depending on mechanism of injury, injuries, and physiological status. Examples of ancillary members who respond include operating room staff, radiology, and chaplains.

Committees

Depending on the facility, region, and state affiliation, trauma center status and trauma designating body, the registrar may not be involved in committees, or may be known by another name. The registrar's involvement or membership in these committees is not universal to all registrars.

Trauma Performance Improvement and Patient Safety Program (TPIPSP)

The multidisciplinary peer review committee is one aspect of TPIPSP. This physician driven committee has representatives from neurosurgery, orthopedics, emergency medicine, anesthesia, and other specialties deemed appropriate for the review of the care of the trauma patient. Mortalities (deaths) and morbidities (the degree or state of the disease or injuries) are usually discussed at this meeting, along with complications and sentinel events.

Trauma Program Operational Process Performance Committee (TPOPPC)

The Trauma Program Operational Process Performance Committee (TPOPPC) is another aspect of TPIPSP. Committee members are a combination of medical and hospital providers. The focus of this committee is to address system issues of the trauma program (ACS, 2006).

Other Hospital Committees

A representative from the trauma program may be asked to sit on other hospital wide committees such as safety, disaster, transplant and research.

External Committees

The facility may be associated with a regional hospital alliance. This alliance may have dedicated committees for trauma. Regional trauma care, process improvement, and trauma education are the focus in these meetings. State committees are dependent on the degree of trauma involvement at state level. Some states may have a highly organized developed trauma system, whereas others are in the process of developing one.

Chapter 5: Data Collection Tools and Methods

Some facilities have the capability to import data from the hospital's mainframe and automatically download a portion of the data. This import can be time saving when data points such as demographics are imported into the trauma database. The hospital software and the vendor software must be compatible for an interface of data to be successful.

Whether a registrar chooses to use paper or electronic abstracts, or no abstract at all, it is more of a matter of personal choice than of proper process. An abstract includes all the fields from the registry software. The registrar then fills in these spaces with the pertinent information from the patient chart. Abstracts condense patient information to facilitate quick data entry into the trauma software program. Abstracts are tailor made to each facility, and sometimes to each region. Newer registrars tend to find the abstracts to be helpful as they learn their way around hospital medical records and the trauma software.

Paper Charts

Quickly becoming a relic of the past, paper charts are still in use at some medical centers. This chart type can be tedious to do real time abstraction on, as the registrar will have to travel to the patient's unit to collect current information. With paper charting, there can be a delay for parts of the patient's data to be assembled into a completed medical record.

Electronic

As federal law has dictated a move to EMRs for all hospitals by 2015 (US Department of Health Services, 2011), more and more hospitals are coming online with an electronic system. A benefit of an electronic medical record is the patient's data is stored in a centralized location, updating results, progress notes and dictation in real time. This tends to make chart abstraction easier for the registrar. A registrar may need to work closely with the electronic medical record implementation team to create the reports needed to abstract the data. There are facilities that have a "hybrid" electronic medical record. This means that the hospital medical record is a combination of scanned/electronic record and paper chart.

Methods of Abstraction

Concurrent Abstraction

Whether the facility decides on concurrent or retrospective abstraction, several factors should be taken into consideration. Concurrent abstraction provides a trauma department with synchronous data that allows for expeditious reporting and tracking. Concurrency allows for current trending, which provides for optimal process improvement. To achieve concurrency requires a committed, efficient effort on the part of the registrar, as the hospital chart must be revisited daily for any changes, and if any have been found, the registry must be updated accordingly.

Retrospective Abstraction

Retrospective abstraction allows the registrar to have a complete picture of the patient's care after the patient's discharge date. The registrar does not have to await procedures or diagnosis. Typically, a pre-determined time frame is set up for completion of the chart in the registry, for example, 30,

60, or 90 days' post discharge. Reporting is not concurrent, which can make deadlines of exporting data to the region and/or state hard to comply with. It is also important to note that keeping a retrospective database can make documents integral to patient care hard to locate, as paper documents do not always travel to the final destination with the chart. To be an ACS-verified trauma center, it is required to have 80% or more of the trauma patients entered into the registry within 60 days of discharge (ACS, 2006).

Equipment and Software

Some of the equipment required for data collection will include a computer, either a laptop or desktop. Certain facilities, depending on the level and degree of technology, may have handheld devices as well. Trauma software of choice for the reporting facility will need to be on a computer terminal. The brand of software used in the facility differs from location to location. Certain states use all the same software. The NTDS has a listing of software vendors available for trauma reporting. Whichever software is selected; it is recommended that the registrar establish a working relationship with the software vendor's support staff. This allows upgrades to be implemented smoothly and user issues handled in a prompt manner.

Methods of Patient Identification

The trauma patients for inclusion into the database can be found from a variety of hospital-generated reports. For example, Emergency Department (ED) logs, admission and discharge reports, trauma activation pagers and notification from team members.

Pre-Hospital Report

Every patient that EMS brings to the hospital, ground or air ambulance will have a pre-hospital patient report generated. Whether it is electronic or handwritten will be different from EMS department to department. From this report, all pre-hospital procedures, times, and vitals will be gleaned. The narrative portion of the report, where the scribe of the EMS providers notes their observations, may describe important patient injuries. Reviewing the EMS sheets daily may help the registrar determine possible trauma patients to be entered into the registry.

Other Reports

The operating report can provide information as to blood loss and provide a detailed description of the injury. Autopsy reports can be obtained from the coroner to identify additional injury. Patients meeting pre-defined state criteria will automatically be sent to the coroner post mortem for review. The coroner will then perform an autopsy and note their findings, including cause of death, in a very detailed report. This is an excellent place to confirm injuries on trauma patients, which may not have been identified at the hospital. These reports, depending on the reporting county, are typically available by six weeks' post-mortem.

Radiology reports are the findings and impressions from the radiologist for any imaging studies that the patient may have had during their visit. This is an excellent resource for finding very detailed descriptions of injuries. The radiologist will provide a description and/or sizing of injuries. It is important to note that a registrar must review the radiology report in its entirety. Doing so will create a clear picture of the injury, and the registrar will be able to collect important information that will help determine the appropriate ICD-10 and Abbreviated Injury Scoring Scale (AIS) coding.

Lab results from the laboratory will be used to determine ethanol levels and drugs of abuse. Some registries will also use them to determine complications during a patient's hospital course. Pathology reports are helpful in determining tissue type injuries that are obtained from a surgical procedure.

Evaluation of Tools

Periodically tools utilized for trauma collection will need to be evaluated and updated. Software vendors will alert and provide the registrar with system updates including coding updates and NTDB updates. As research and PI issues change within the facility, data sets may also need to be changed. As data needs change within the region, state and national data repositories, the registrars at each specific facility will need to perform the necessary maintenance to the system for consistency.

Chapter 6: Data Integrity and Validation

Data validity

Data validity means that the data entered into the Trauma Registry is a true representation of what the trauma registrar has abstracted and is claiming to measure. Data reliability is a state that exists when data is complete and error free. Collecting accurate and useful data is the most important aspect of data validity. Keeping the database valid and free from errors by running edits on a monthly basis can be invaluable, especially when data is released as information to other sources.

Methods of Data Validation

Data validation occurs at the beginning when data is being collected that will be included in the database. Collecting data from the hospital medical record is a valid and reliable information source. Records may be obtained from multiple sources, such as emergency medical services (EMS) records, medical records from transferring hospitals, emergency room records, radiology reports, and operating room records. Please be aware that emergency room physicians will occasionally write a preliminary diagnosis such as “pneumothorax” or “ankle fracture”. These are types of injuries that the physician is initially focusing on and will order more definitive tests to confirm the diagnosis. The Trauma Registrar is responsible for locating documented evidence of these injuries on radiologic reports before coding. To have valid data, the trauma registrar must record and code the diagnosis completely and accurately, using ICD and AIS codes. Finally, to avoid mistakes made when transcribing information from the chart into the data base, you must take care to enter data accurately.

Software Validation

Most trauma data software programs have validation checks built into the system. This means that the software used by the trauma registry will automatically check some of the data fields for the registrar’s accuracy and completeness. This measure protects some of the time and date fields. For example, it ensures that data entered as a patient’s discharge date is not a date prior to the admission date and that EMS arrival times are not listed prior to the injury time. Some of the software validation checks are pre-built by the software vendor, and depending on the software, other edit checks can be built by the registrar. Data validation is of critical importance at multiple levels.

Logic Validation

Another type of data validation is logic validation. To check or proof the registrar’s own work, a registrar must ask, “Does the data make sense?”. Key fields to check would be mechanism of injury against the trauma type. For example, gunshot wounds and stabbings should always be listed under penetrating injury, not blunt injury. Another example is if it is recorded that a patient arrived by private mode, but vitals are listed from a local EMS run sheet, then this would indicate that there is an error with one of these data points. Is the trauma registrar reporting a car accident as a mechanism of injury, but then using an E-Code for a fall? These types of validation can be performed by running specific reports for the facility on a regular basis. Again, running regular reports will help to keep data valid and clean of errors.

National Trauma Data Bank (NTDB)

The state and/or NTDB have a software validation check that occurs when data is downloaded to them. These states and/or NTDB required fields will be identified as an “edit”, if the appropriate fields are not correctly completed. Running these edits and correcting them before submission allows the Trauma Registrar to submit valid data to local, state and national organizations.

Method and Inter-rater Reliability

Inter-rater reliability is a process to determine the accuracy of chart abstraction and data entry into the registry. This can be achieved by looking at several data points that are known for inaccuracy. These data points are typically objective data elements such as respiratory assistance, gender, and/or date of birth. The key is that not all data points need validation. For example, the patient’s physical home address is typically not used in a hospital setting, and therefore does not demand validation. However, the patient’s home location, either city or county, is used and thus is a consideration. Data elements consistently used for reporting purposes, injury prevention, research, and/or process improvement should routinely be validated. To ensure maximum results, an alternate trained registrar will conduct the survey.

Another key area to validate includes the elements, which compose the probability of survival (POS). These elements are age, blunt versus penetrating injury, revised trauma score (RTS), and injury severity score (ISS). The RTS is a calculation based on the patient’s initial vital signs. This would include respiratory rate (breaths per minute), systolic blood pressure (mmHg), and the Glasgow Coma Score (GCS). The POS is a weighted formula, which calculates the individual hospital’s M and Z statistic, which represents the hospital’s trauma mortality and morbidity. The POS is a nationally recognized score. The M and Z statistic allows the individual hospital to compare their statistic to the national average to evaluate the care being delivered internally.

These are but several of the necessary data points to validate. Other data elements to consider but are not limited to are designated by (pre-hospital versus transfer hospital), trauma system activation, intensive care days, hospital length of stays, etc. Data validation elements should be discussed with the trauma coordinator or trauma program manager, and the trauma director to ensure that all elements pivotal to their efforts are being covered. Once the data elements are determined, the process becomes much simpler.

Process of Validation for Accuracy

The actual process for data validation ideally requires three individuals to perform the exercise: the original abstractor, re-abstractor and an unbiased individual to compare the data. The original person cannot re-abstract the determined data elements from the medical record for data validation purposes. To perform an inter-rated reliability audit, determine the number of fields to validate, and then re-abstract those elements. The next step is to compare the second answer with the original abstracted information.

To calculate the percent of accuracy, use the following formula.

$(\text{Number of elements agreed on}) \div (\text{number of elements validated}) \times 100$

Example:

Hospital A will validate 50 data elements, upon their first data validation they found that both data abstractors only agreed upon 30 of the data elements.

$$30 \div 50 = 0.6 \times 100 = 60\% \text{ accuracy}$$

Each hospital needs to determine an acceptable accuracy percentage to strive for. Placing focus and education on the data elements should increase the accuracy percentage each month. Data entry is just as important as data abstraction. The same process previously described is used to validate the elements that were originally entered into the trauma registry software.

Data Validation: A Simple Step to Great Success

The American College of Surgeons requires that each verified facility validate between five and ten percent of the total registry volume (ACS, 1999). This is a more extensive method of data validation and involves both the Trauma Registrar and the Trauma Program Manager/Coordinator. The Trauma Program Manager/Coordinator determines how often the validation of data occurs (monthly, quarterly, etc.). Once all data collection is completed, review random charts for discrepancies in abstraction and data edits. Once areas of deficiency are noted, discussion and review with the registrar are required to improve the quality of the data. If the same error or discrepancy is apparent in a majority of the patient data points, reviewing the charts more thoroughly will assist in correcting the identified issue.

Data collected in the Trauma Registry is a powerful tool. Hospital administrators utilize the data to plan budgets and staffing needs. Data can demonstrate peak times of trauma events, operating room usage. Researchers can use the data for benchmarking or trending. State representatives can use the data to help implement or change state laws. Having valid data can be a powerful instrument in proving data to make effective social change in each facility, region or state. The most important information that the trauma data can provide is to improve patient care for the facility.

Chapter 7: Complications

Definition and Identification

A complication is a disease, syndrome, condition, and/or event that can alter and/or hinder the treatment of the trauma patient (Mattox, 1994). It is important to note that collected conditions, related to the injury sustained, count as complications if contracted in the emergency room or occurred after admission to the hospital. These syndromes, diseases, and/or conditions will affect the patient's overall course in their attempt to heal from the trauma.

To identify complications review documentation by the treating physician's documentation. Diagnostic testing is responsible for much of the identification methods; however, depending upon the defined complications for registry collection, some of these may be more of a documented symptom. In either event, there needs to be documented evidence of the complication's existence after arrival. An example is a nursing home patient who presents with a pelvic fracture in the emergency department. During a patient's workup, a urinalysis (UA) revealed a urinary tract infection. This would not be a trauma complication. In the same patient, the UA was negative on admission but the patient had a positive UA five days later. This would be an example of a complication caused by either the care or in other cases the injury.

Location of Complications

Depending upon the hospital course of the patient, the registrar can find the complication documentation in a variety of places. Documentation of complications can be found recorded in the emergency department record, progress notes, consultations or discharge summary.

Complications/Deterioration

Several sources, depending upon whom all the institution reports to, can determine complications. If the facility reports to the National Trauma Data Bank (NTDB), a set of complications is required for submission. The state and the region may also have a set of required complications for submission, often mirroring each other. Furthermore, the facility itself may have a set of complications. Examples of complications include: pneumonia, urinary tract infection, pulmonary embolism, etc.

For further definition of the complications, it is advantageous to have a copy of the national, state and/or regional data dictionary. This will provide further guidance to the exact meaning of complication. Any further questions can be directed to the clinical staff in the trauma department for clarification.

Chapter 8: Coding, Scoring, Scales

ICD-10

ICD-10, is an international coding system, created by the World Health Organization, which uses certain numeric code combinations to represent diagnoses, procedures, and events (World Health Assembly, 2011). Typically, a registrar will have an ICD-10 coding book like the hospital coders and billers. There are also multiple online e-coding resources. External causes of morbidity coding describe the injury event and/or activity. There are also coding ranges that identify the location of the incident in question. The trauma patient may have more than one external cause code to describe their injury. An example would be a highway worker falling five feet from a piece of equipment onto a road then is strike by a car. The fall, and the vehicle strike, are two different groupings of external cause codes.

The next pieces of ICD-10 coding are the diagnoses. It is a seven-digit code that represents a diagnosis of injury. A trauma registrar will primarily concern themselves with the injurious diagnoses. Please check national, state or regional reporting criteria to know exactly which ICD-10 diagnosis codes are included and excluded. The state may require additional codes outside of the injurious diagnoses.

Lastly, are the procedure and intervention codes. These are seven digit codes with no decimal that represent any procedures or interventions that may be used to treat the trauma patient's injuries. Typically, only certain procedure codes are required by national, state or regional trauma reporting systems; for example, any surgical procedures and immobilization techniques. Each institution may have their own listing of procedures that they prefer to track for process improvement. The United States moved to ICD-10 coding in October 2015, though it was released for global usage in the early 1990s.

Abbreviated Injury Scoring

Abbreviated Injury Scoring (AIS) was developed in 1969 to assign a numeric code to help determine the severity of injuries sustained in a trauma (AAAM, 2005). The AIS is typically built from the ICD9 code designated for the injury, and goes more in depth with the location and degree of injury. This is an anatomical scoring system, rather than a physiological. In conjunction with health care provider description, intervention or procedure description, a registrar can use the AIS coding scale to define the severity of the injury further. Any code with a .9 ending is a code that does not have a score, and is not included in the ISS. These are vague codes to use when there is not enough information available to select an injury and/or diagnosis code. AIS codes also include Organ Injury Scale numbers to allow for confident injury scoring. It is important to familiarize oneself with the categorization of the AIS injuries, as some injuries are not classified in the commonly assumed body region, (ex. drowning is assigned to the chest whereas asphyxia is assigned to the head area). The AAAM (Association for the Advancement of Automotive Medicine) provides training and scoring books for the AIS system (AAAM, 2005).

Injury Severity Score

The Injury Severity Score (ISS) is the overall designation of the seriousness of the injuries sustained. The range is from 1-75, 75 is potentially non-survivable. The higher the ISS score, the lower the probability of survival. After determining the AIS components for a patient's injuries, the registrar will then take the most acute injuries in three different body areas, square the AIS numbers, and then compile them to determine the ISS (Injury Severity Score) of a patient. The exception to this is any AIS code that ends with .9. These placeholder codes do not tally into the final sum for ISS (AAAM, 2005).

Glasgow Coma Scale

The Glasgow Coma Scale (GCS) is a scoring system that determines the neurological function of an injured patient, with results from three being the lowest and least responsive to fifteen being alert and orientated (Wikipedia, 2011). There are both adult and a pediatric GCS scales. There are three components in measuring the total GCS: eye opening (1-4); verbal response (1-5); and motor response (1-6). The sum of these three categories results in the final GCS total. If documentation only includes a total, individual GCS components cannot be recorded. Only the totals of fifteen or three can be guesstimated at 4, 5, 6 or 1, 1, 1. The sum of zero does not exist for GCS; therefore, an unresponsive patient has a score of GCS of 3.

Eye Opening

Criterion	Observed	Rating	Score
Open before stimulus	✓	Spontaneous	4
After spoken or shouted request	✓	To Sound	3
After fingertip stimulus	✓	To Pressure	2
No opening at any time, no interfering factor	✓	None	1
Closed by local factor	✓	Non testable	NT

Verbal Response

Criterion	Observed	Rating	Score
Correctly gives name, place and date	✓	Orientated	5
Not orientated but communication coherently	✓	Confused	4
Intelligible single words	✓	Words	3
Only moans/groans	✓	Sounds	2
No audible response, no interfering factor	✓	None	1

Factor interfering with communication	✓	Non testable	NT
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Best Motor Response

Criterion	Observed	Rating	Score
Obey 2-part request	✓	Obeys Commands	6
Brings hand above clavicle to stimulus on head neck	✓	Localizing	5
Bends arm at elbow rapidly but features not predominantly abnormal	✓	Normal flexion	4
Bend arm at elbow, features clearly predominantly abnormal	✓	Abnormal flexion	3
Extends arm at elbow	✓	Sounds	2
No movement in arms/leg, no interfering factor	✓	None	1
Paralyzed or other limiting factor	✓	Non testable	NT

Glasgow Coma Scale: <http://www.glasgowcomascale.org/>

Revised Trauma Score

To determine the Revised Trauma Score (RTS), three different vital signs components are used: GCS, Systolic Blood Pressure, and Respiratory Rate. The RTS is used, primarily, in two different places. The first is pre-hospital Emergency Medical Services (EMS) assessment to determine the best level of health care center to transport the patient. The other is mainly used by the hospital to determine outcome prediction. Any patient with a score < 4 should be taken to a trauma center (Pohlman, Bjerke, & Offner, 2010).

Table 2

Example of the Revised Trauma Score			
Glasgow Coma Scale	Systolic Blood Pressure	Respiratory Rate	Coded Value
13-15	>89	10-29	4
9-12	76-89	>29	3
6-8	50-75	6-9	2
4-5	1-49	1-5	1
3	0	0	0

Revised Trauma Score: www.trauma.org

Trauma and Injury Severity Score (TRISS)

TRISS is a scoring system that determines the probability of survival. To determine this, an algorithm using both the RTS and ISS is used.

TRISS calculators can be found in trauma software and online through such websites as www.Trauma.org.

Z and M Statistics

The Z- statistic quantifies the difference in the actual number of deaths (or survivors) in the test subset and the predicted number of deaths (or survivors) based on the baseline. The M-statistic is an injury severity match of the populations under comparison (Boyd, Tolson, & Copes, 1987).

Organ Injury Scale

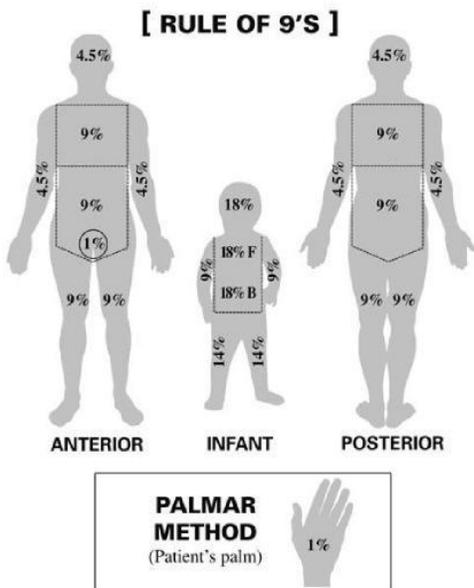
The Organ Injury Scale (OIS) is a grading system, developed in 1987 by the American Association for the Surgery of Trauma, which determines the level of injury to bodily organs.

More than likely, a registrar will only focus on the grading of solid organ injuries. It is a universal language used by both radiologists and surgeons to determine severity of injury. The number given, which can vary between I and VI with I being least severe correlates directly to a corresponding AIS designation for organ injury (Tinkoff et al., 2008).

Functional Independence Measure FIM©

FIM© is a rehabilitation based scoring system that determines the starting point, continuing program, and ending results from a rehabilitation standpoint. Measurement of scoring takes place in the rehabilitation or skilled nursing facility, as it is a long-term measurement related to the functional status post the cease of the acute care side. This way, rehabilitation professionals can adjust their goal outcomes and expectations for the trauma patient (Uniform Data System for Medical Rehabilitation, 1999).

Rule of 9's



To have a uniformed measuring system for body surface area affected in a burn injury, given the disparity between body mass in the populace, the Rule of 9's grading scale was developed. The human body is divided up into eleven sections. By assigning each section a number related to 9, as each section was guaranteed to be covered by about 9% of flesh, a grand sum of Total Body Surface Area (TBSA) affected can be reached, with the severity of degree of burn measured in another method. This way, regardless of an individual's size, an estimate of the burned damage can be reached. There is a different rule set for adults versus pediatrics. The Rule of 9's is only applied when the degree of burn is at least 2nd degree, and is designated more for field triage than inside a sophisticated burn center (Oliver, 2009). Rule of 9's: http://www.njburncenter.com/ruleof9s_lq.html

Chapter 9: Data Requests and Reporting

Collaboration

There will be times that the registrar will be asked to participate in a joint research project. This may be with other institutions, state, local, national registries or researchers. Collaboration with others and establishment of data facilitates evidence-based care, as well as provides data to be researched with the end goal of improving patient's outcomes and development of prevention programs (ACS, 2006).

A few registry related items that require collaboration or a repository of data include:

- Grant funds often require joint data collection
- Researchers/grants from within your own institution may require collaboration of data collection
- Injury Prevention studies
Public Health Surveillance

Utilizing repositories of data such as National Trauma Data Bank or state registries can be very helpful when a study requires many patients, which are not available within a single institution's registry/database. A study could include looking at different regions, age groups, or other factors not found at one institution.

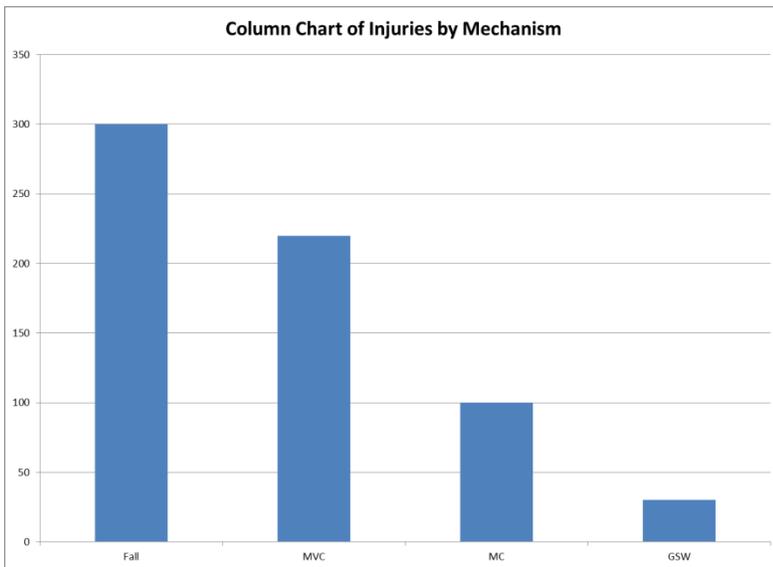
Participating in a joint research project, running reports for a survey, using data to support ideas, providing information on a state, local or national level are all forms of collaboration. It is important to remember that all data released must comply with the Health Insurance Portability and Accountability Act (HIPAA) policies and guidelines. Clearance for release of data may need to be obtained from the Internal Review Board (IRB). Most institutions promote research and collaboration with others to promote the exchange of information.

Representation of Data

An Excel chart serves as a graphic or visual representation of data in your registry. There are four types of charts that a registrar may routinely use in representing data in reports.

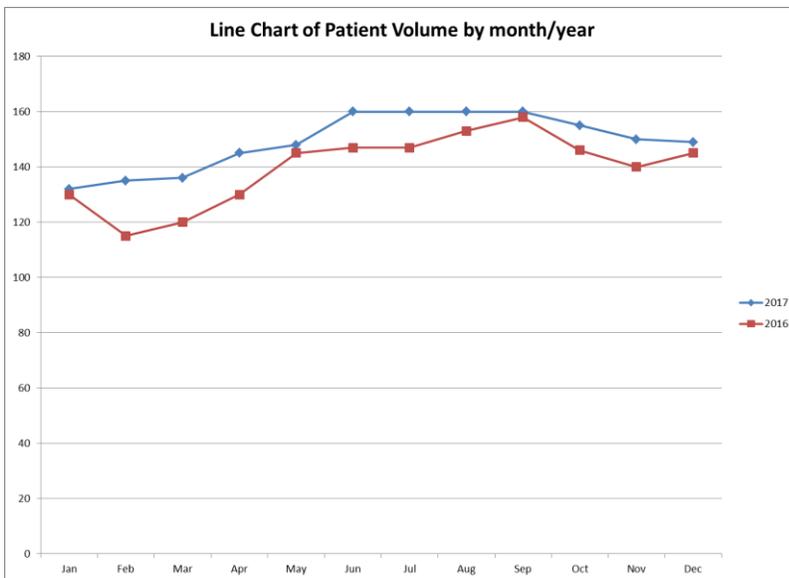
Column Chart

A column chart uses vertical bars of differing heights to illustrate the relationships between groups of data. It is useful for showing trends over time.



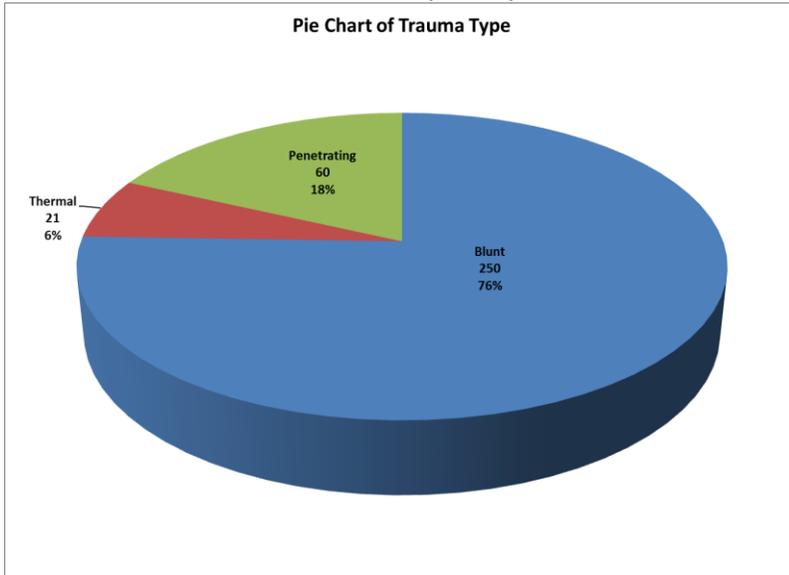
Line Chart

A line chart is similar to a column chart for showing trends over time; however, it uses lines, instead of bars, to connect a series of data points.



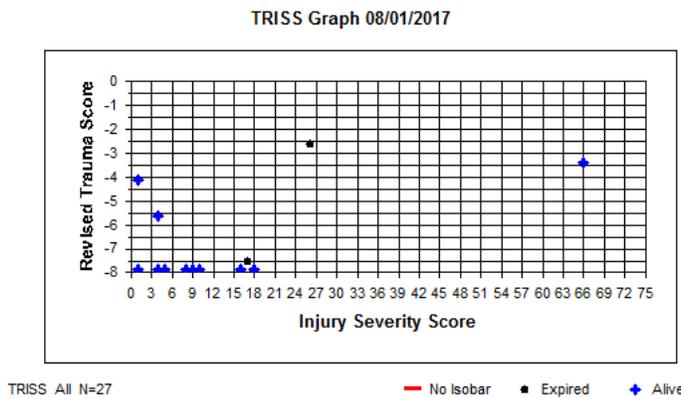
Pie Chart

A Pie chart shows the relationship of a part to a whole. Each part is shown as a “slice” of the pie.



Scatter Chart

A scatter chart, or XY chart, shows the relationship between two categories of data. One category is represented on the vertical (Y) axis and the other category is represented on the horizontal (X) axis. The points in the chart are not connected with a line, since the two categories do not relate to one another (Microsoft, 2009).



Statistical Presentation of Data

Many times, data is reported out as a mean, mode, ratio or median. Presentation of data is a method to report data about a population, occurrence or outcomes. Below is an example of them.

Mean

The mean (or average) of a set of data values is the sum all the data values divided by the number of data values.

Sum of all data values/ number of data values = mean

Ex. $10+15+20+18+12+17 / 6 = 15.3$

Median

The median of a set of data values is the middle value of the data set when it has been arranged in ascending order. That is, from the smallest value to the highest value.

Ex. The ages of nine trauma patients with a stabbing injury last week are listed below

17 20 27 32 18 39 36 14 25

Find the median of this set of data values.

Solution:

Arrange the data values in order from the lowest value to the highest value:

14 17 18 20 27 25 32 36 39

The fifth data value, 27, is the middle value in this arrangement, making the median 27.

Chapter 10: Performance Improvement

Performance Improvement (PI) is the concept of measuring the output as of process or procedure, then modifying the process or procedure to increase the output, increase efficiency, or increase effectiveness of process or procedure (ACS, 2006). Trauma PI is essential the monitoring and improvement of care. The major objective of PI is to reduce inappropriate variations of care by measuring and improving the process of care and outcomes. Reliable data collection is a key component in supporting an effective PI program.

All trauma centers must participate in the American College of Surgeons' TQIP (Trauma Quality Improvement Program) service. TQIP collects data on a quarterly basis from trauma centers, and then provides feedback on identified areas of quality improvement in benchmarking reports. The goal is to improve patient outcomes. The TQIP committee provides your hospital with risk-adjusted benchmarking reports, along with comparisons of like-hospitals that participate on a national level. Also TQIP provides monthly question and answer webinars regarding the data dictionary fields and monthly educational quizzes on data dictionary fields.

As you familiarize yourself with the PI program already at the facility or in the process of being developed, keep the following in mind:

1. No two programs are the same.
2. The trauma medical director must lead the PI.
3. Adverse outcomes do not always indicate a bad program; instead look at how the information is handled. Adverse outcomes should guide the program to evaluate and change current policies, procedures and suggest the thought "Is there a better way?"
4. Trauma PI should be integrated within the hospital PI program.
5. Loop closure is a required outcome for the PI process.
6. The registrar is an integral part of the PI process since the registrar is gathering and reporting the data. The registrar may be the first person to recognize an issue or see a trend in the data.

Developing a PI program

A well-established program may have audit filters already in place. If not, plan a meeting with the trauma medical director and program manager to discuss the filters required to track data. Filters are usually tracked monthly, and reported (either monthly or quarterly) until a desired outcome is achieved. Once a filter has reached the desired outcome, it most likely will continue to be tracked for a few months to be sure the desired outcome is maintained. Once a filter is dropped, it is usually placed on a schedule to be periodically rechecked.

The following example is a simple PI project. The registrar has noticed that there is an increase in the number of charts missing the first GCS. The registrar runs a report from the last few months to confirm his/her suspicions. Data shows that for the last three months; GCS is missing on 35% of the charts. The information is shared with the trauma program manager. An educational program is designed and implemented for the nurses. The registrar will then set up a filter to run the data each month until the desired outcome is met. The data is reported during the trauma PI meeting. After several months of an acceptable outcome (95% or better), the committee may elect to drop

the filter from regular reporting and ask it be reported every six months. Depending on the PI issues being monitored, a registrar may have several audit filters each month to report on.

Examples of PI filters:

- Trauma surgeon response time for trauma resuscitation
- Attendance of surgeons at monthly PI meetings
- Mortality, morbidity and complications
- Time to CT scanner
- Delay in diagnosis or missed diagnosis
- EMS scene time
- Length of stay in the emergency room
- Over/Under Triage

Chapter 11: Reviews and Verification

Designating Bodies

Each state affiliation guides the designating body that is responsible for a facility's trauma verification status. Many states defer the process to the American College of Surgeons (ACS). There may be state foundations, health departments or another designating body that is utilized in place of the ACS. It is important to be aware of the trauma governing bodies and laws that are in place to guide the trauma verification process. The information in this section is based on an ACS visit. If a facility is verified from another entity, please review their website for information pertaining to a non- ACS visit.

If a state is verified by the ACS, become familiar with the "Resources for Optimal Care of the Injured Patient, 2014". This resource document can be purchased through the ACS website. Other documents related to trauma care and the verification process can be found on their website. If a state is verified by another designating body, reference their office and web page for guidance.

Prior Verification Report

Depending on the verification body, reports will need to be submitted four to eight weeks prior to the verification date. The following are a few examples of the report names that may be required:

1. ACS Application Submission
2. Pre-Review Questionnaire (PRQ)- American College of Surgeons

The PRQ are a set of questions developed by the ACS to elicit a comprehensive description of a trauma program. The answers represent the framework of the trauma program, which guide that the reviewers during the facility's consultation or verification visit. The registrar's role in preparing the document is to provide the required statistical and registry data from patients in a pre-determined 12-month period. Consistency of data, processes and care are the keys to a successful visit.

The Trauma Center Verification Process

A hospital may elect to become a verified trauma center. Hospitals completing the process for the first time or who have gone through major leadership changes since the last visit may have a consultation visit. The consultation visit is much like the verification visit and identifies any weaknesses or deficiencies that must be corrected prior to a verification visit. In either the consultation or verification visit, the PRQ is completed and sent to the ACS. Dates are set for the visit. Prior to the visit, this can be a stressful time, but with organization, clear-reasonable timelines, and clearly defined roles, the program can be successful. It takes a team to develop a trauma program. Successfully verified trauma centers will repeat the verification process every 3 years. During each sequential visit, the reviewers will be looking for continuous growth of the program.

The team of reviewers for a verification visit consists of two trauma surgeons; one will be from the same level trauma center as level being reviewed. In some cases, a nurse reviewer or another surgeon from Neurosurgery or Orthopedics may attend as well.

The reviewers start the first day with chart review. The registrar may have the responsibility of sitting with a reviewer to assist with navigation through a hard copy or electronic chart. The reviewers typically ask the registrar to run a few reports to test the ability to retrieve data from the trauma data software program, determine his/her understanding of communication and/or obtain additional information to a topic/issue identified during the chart review. The first day will also consist of a pre-review dinner. The reviewers will go through the PRQ with the surgeons, administrators and other pertinent services i.e. radiology, disaster coordinator, EMS, etc. The trauma registrar may be invited to attend.

The next day will include a tour of the facility, completion of the chart review, evaluation of the PI process, and final assessment of the overall status of the trauma program. This is the typical format, but can be changed per reviewer discretion. There is an exit interview to disclose the reviewers' preliminary findings. The reviewers then prepare their findings which are presented to the Verification Review Committee (VRC) of the ACS who make the final determination of trauma center status. A letter of determination with supporting documentation is then sent back to the facility within six to ten weeks.

Chapter 12: Education & Credentialing

Qualifications

Currently, there are no “set” criteria for trauma registrars. What is desirable is a previous medical background of some kind; proficiency with Microsoft Office® programs especially Excel®, data entry skills, medical terminology and anatomy proficiency. Some trauma programs prefer registrars with a medical coding background, as coding is a required part of the job. Other programs require a Certified Specialist in Trauma Registry (CSTR) certification or a Certified Abbreviated Injury Scoring Specialist (CAISS) at some point during employment. Examples of common credentials amongst trauma registrars include, but are certainly not limited to: EMT, RHIT, RHIA, RN, CSTR, and CAISS. Registrars may have regular interaction with medical staff, making interpersonal and networking skills mandatory.

Registry Requirements

The American Trauma Society (ATS) is the only organization to offer a complete Trauma Registrar Course recognized by the ACS as an avenue for comprehensive trauma registry training. This course combines basic and advanced registrar levels. It is a good starting point for new registrars to learn the basics of the job. Further skills will be acquired at the registrar's own facility and through continuing education offerings. The Registrar course is offered at least twice throughout the year. Registration information is available through the ATS website (www.amtrauma.org).

The American College of Surgeons (ACS) requires each new registrar to attend two courses within 12 months of hire. (1) The Association for the Advancement of Automotive Medicine's (AAAM) Abbreviated Injury Scaling Course (AIS), which teaches the registrar how to appropriately utilize AIS in their registry. Information about this course is available on their website (www.aaam.org). (2) The American Trauma Society (ATS) Registrar Course or state equivalent provided by a state trauma program. The ATS Registrar Course is offered several times throughout the year, more information is available at their website (www.amtrauma.org). Also, the ACS requires each registrar to complete a minimum of 8 hours registry-specific continuing education per year.

Ohio's Alliance of Ohio Trauma Registrars (AOTR) Education Subcommittee created a state equivalent to the ATS course. This course is approved by the Ohio Committee on Trauma (OCOT) and the Ohio Emergency Medical Services Board (OEMS) to meet the requirements of the ACS *Resources for Optimal Care of the Injured Patient* 2014 Revision. The course is backed and supported by Ohio Society of Trauma Nurse Leaders (OSTNL) and AOTR. The class is offered free of charge to Ohio trauma registrars twice a year in the spring and fall.

Often, the vendor for the software that a registrar uses will offer at least a yearly training conference to learn or refresh skills, and to see the latest features. Check with your vendor's support department to see what options are available. In addition, vendor specific software that the registrar uses will offer a yearly training conference, for both novice and experienced users. Check with your specific vendor for details.

Certification

Certified Specialist in Trauma Registry

The CSTR certification is offered through the American Trauma Society (www.amtrauma.org). Certification focuses specifically on the registrar and indicates formal recognition of basic trauma registry knowledge. This certification is highly valued and eligibility requirements include a minimum of 2 years' full time experience in the trauma registry practice and successful completion of the certification. The comprehensive examination is offered through multiple regional testing centers as an online test.

CAISS

The CAISS, or Certified Abbreviated Injury Scoring Specialist, certification verifies the trauma registrar in Abbreviated Injury Scoring. The examination is administered through the Professional Testing Corporation (www.ptcny.com) at various locations through the United States. The requirements to sit for the test include registration and a fee. Typically, a registrar has attended one or more classes offered by the AAAM on AIS scoring. More information is available on AIS through the Association for the Advancement of Automotive Medicine website (www.aaam.org).

Chapter 13: Resources

There are many resources available, both in hard copy and online, to help the registrar process quality data. It is recommended that the registrar equip his/herself with an arsenal of readily available materials. The following is a list to get you started!

Websites

- Alliance of Ohio Trauma Registrars: www.ohiotraumaregistrars.org
- American College of Surgeons: www.facs.org
- Association for the Advancement of Automotive Medicine Website: www.carcrash.org
- American Association for Surgery of Trauma (AAST): www.aast.org/traumaresources.html
- Health Resources and Services Administration: www.hrsa.gov
- UK based Orthopedic Education Resource: www.orthoteers.co.uk
- Trauma databank with useful clinical and radiological images: www.trauma.org
- Injury Prevention Website: www.injurycontrol.com
- The American Association for the Surgery of Trauma: www.aast.org
- Ohio Department of Public Safety: <http://www.ohiopublicsafety.com>
- USPS Zip Code Finder: www.usps.com
- The Center for Disease Control and Prevention: www.cdc.gov
- Injury Prevention Website: www.injurypreventionweb.org
- National Highway Traffic Safety Administration: www.nhtsa.dot.gov
- American Trauma Society: www.amtrauma.org
- NTDS: www.ntdbdatacenter.com
- Yahoo Registry Club: <http://groups.yahoo.com>
- American Health Information Management Assoc: www.ahima.org
- Society of Trauma Nurses: www.traumanurses.org

Anatomy:

- Wheelless Textbook of Orthopaedics: www.wheelessonline.com
- Gray's Anatomy: www.bartleby.com/107/
- Inner Body: www.innerbody.net
- 3-D interactive tool of the human body: www.visiblehuman.epfl.ch

Conversion Sites:

- www.calculateme.com
- www.onlineconversion.com
- www.trauma.org/archive/scores/triss.html
- www.convert-me.com

Hard Print Materials

Medical Dictionary- to assist with unfamiliar medical terminology and any eponymous diagnostic terms that may be used by the physician.

Abbreviated Injury Scale Coding Dictionary- published by the Association for the Advancement of Automotive Medicine, available through one of their training classes or through order online. The AIS dictionary has a listing of specific injurious diagnosis which correlates to a numeric code that then determines an Injury Severity Score.

ICD-10 Coding Books- consist of two books, which are utilized in the trauma registry. The first book includes all diagnosis codes and external causes of morbidity. Depending on state reporting requirements, there may be some additional ICD10 codes from earlier in the book (ex. Pneumocephalus, cerebral edema). The second book contains the codes for procedures. ICD-10 is updated annually in October.

Anatomy Books- *Grey's Anatomy* is one example. Many hospital libraries may have this one or a current version. Anatomy books can found purchased online or locally at a collegiate bookstore or medical supply store.

Software Vendor- trauma registry application will also have many resources to help. Some of these will be in the form of a manual, hard print or electronic, telephone support. The vendor will have support staff on hand to assist with programming, reporting, data entry, exporting or updates.

Resources for the optimal Care of the Injured Patient- American College of Surgeons

Data Dictionaries- National, Station, Regional, Facility

Peer Support

Regional committees

Many hospitals are affiliated with a regional trauma system, which may have a subcommittee of registrars that meet monthly or quarterly to discuss coding and data entry concerns, and for educational conferences.

State committee

Many states have a formal trauma registry meeting. These committees offer experience and camaraderie as a resource for the new registrar. By joining these types of committees, the registrar can network and find assistance.

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Appendix

Trauma Registry Data Request Form **ALL requests for data must have this form completed**

<div style="border: 1px solid black; padding: 2px;"> Trauma Registry Data Request Form </div>	Date Received: _____
<p>Date Request Initiated: ___ / ___ / ___ Request Due Date: ___ / ___ / ___ <small>(Due to the volume of requests, a minimum of 1-week is required)</small></p> <p>Trauma Staff Receiving Request: _____</p> <p>Requestor: _____ Department/Affiliation: _____</p> <p>Phone Number: _____ Pager: _____ Email: _____</p> <p>Define Reason For Data Request:</p> <p>_____</p> <p>_____</p> <p>_____</p>	
<p>Will the data be used in publication(s)? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If YES, please list: _____</p>	
<p>Will the data be used in research? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If YES, you must list the IRB approval number: _____</p>	
<p><u>The Trauma Registry will receive written credit within any/all publications utilizing information within the database.</u> <i>Initials</i></p>	
<p>Final Format: <input type="checkbox"/> Detail Report (Giving individual patient information in columns/rows – no calculations)</p> <p style="padding-left: 20px;"><input type="checkbox"/> Crosstab Report (Calculations, averages, outcome measures, comparisons, percentages, etc.)</p> <p style="padding-left: 20px;"><input type="checkbox"/> Excel Spreadsheet</p> <p style="padding-left: 20px;"><input type="checkbox"/> Excel Spreadsheet with graphs</p> <p style="padding-left: 20px;"><input type="checkbox"/> Graphs only</p>	

Output: ↑ Paper ↑ Email ↑ Diskette (Requestor must supply the diskettes)	
<i>Confidentiality Notice: This form and recipient(s) and may contain confidential information responsible for maintaining the confidentiality information ONLY for the authorized HIPAA policies.</i>	<i>any attachments, is for the sole use of the intended and privileged information. The recipient is of this information and is to use the purposes pursuant to hospital confidentiality and</i>

I hereby agree to the above statements.

	_____ (Signature)
	_____ (Printed Name)
	/ ____ / (Date)

Please place a check mark next to the data element applicable to your request. The Registry personnel will go over this list Trauma with you to clarify your request.

DATA ELEMENT	DATA ELEMENT
↑ Tracking Number (Unique Trauma Registry Number)	↑ Trauma Surgeon Arrival Time
↑ Medical Record Number	↑ Trauma Surgeon Arrival Date
↑ Patient Account Number	↑ ICD-10-CM Codes (Injury only or ALL codes)
↑ Patient Name	↑ AIS Body Region
↑ County of Residence	↑ AIS Code
↑ City of Residence	↑ ISS
↑ State of Residence	↑ ETOH Level
↑ Zip Code of Residence	↑ Toxicology (Amphetamine, Benzodiazepine, Cannabis, Cocaine, Opiate, PCP)
↑ Race	↑ In-house Procedures
↑ Gender	↑ Operative Procedures (Craniotomy, Exploratory Laparotomy, ORIF, STSG, OTHER:
↑ Date of Birth	↑ Procedure ICD-10
↑ Age	↑ Vent Days
↑ Cause of Injury	↑ Payment Source (Medicaid, Medicare, Prison, Private Insurance, Self-Pay, Workman's Compensation)
↑ Cause E-Code	↑ Discharge Disposition (Home, Jail, Nursing Home, Rehab Hospital, Morgue)
↑ Injury Time	
↑ Injury Date	
↑ Injury Location Code	
↑ County of Injury	

† Protective Devices (Airbag, Safety Belt, Helmet, etc.)	† <u>Discharge/Death Time</u>
† Trauma Type (Blunt, Penetrating, Thermal, Asphyxia)	† <u>Discharge/Death Date</u>
† Trauma Alert Category (1, 2, Not Called)	† Outcome (Alive/Dead)
† Work Related (Yes, No)	† Length of Stay
† Transport Mode (AS, AR, HS, HR, POV, Walk)	† Revised Trauma Score ED
† <u>Transport Agency Scene</u>	† GCS Total ED
† <u>Transport Agency Referring Hospital</u>	† Revised Probability of Survival ED
† Scene Initial Vitals (B/P, Pulse, Resp, GCS)	† Place of Death
† Scene Procedures (Intubation, Immobilization, CPR, Cric, Fluids) †	† <u>Organ Donation</u>
Referring Facility	† <u>Complications</u>
† <u>Referring Facility Arrival Time</u> †	† <u>Other – Please define below:</u>
† <u>Referring Facility Arrival Date</u> †	_____
Referring Facility Initial Vitals (B/P, Pulse, Resp, GCS)	_____
† Referring Facility Procedures (Intubation, Immobilization, CPR, Cric, Fluids, HeadCT, AbdCT, ChestCT, CT, Ultrasound, Chest Tube, DPL)	_____
† Admitting MD	_____
† Admit Type (Emergency, Direct) †	_____
ED MD	_____
† <u>ED Arrival Time</u>	_____
† <u>ED Arrival Date</u>	_____
† ED Initial Vitals (B/P, Pulse, Resp, GCS)	_____
† ED Procedures (Intubation, Immobilization, CPR, Cric, Fluids, HeadCT, AbdCT, ChestCT, CT, Ultrasound, Chest Tube, DPL, Sutures)	_____

Elements that are underlined are components of the HIPAA defined Protected Health Information (PHI) and may NOT be provided for use outside of the facility. Re-identification, which constitutes the assignment of a random code to each individual may be used to allow traceability of the data as long as the code key is kept securely by the investigator and the

identity of the study subjects is not disclosed to the user(s) of the data. The code may NOT be derived from information about the individual and may NOT be otherwise capable of being translated so as to identify the individual.

For Office Use Only:

Lists/Queries:

Reports:

Communication/Clarification:

Trauma Program Manager Approval: ↑

Request Denied: ↑

Trauma Medical Director Approval: ↑

Reason:

Job Description

Those responsible for the identification, collection, analysis and reporting of trauma carry several titles, have a varied level of background and educational expectations. This chapter hopes to provide a few example job descriptions which are currently in place within the United States. The hospital-specific identifiers have been removed as well as salary/hourly rates of pay.

I. Trauma Registrar

Required Skills/Work Experience

Demonstrates excellent verbal, written and interpersonal communication skills. Demonstrates experience in using Microsoft Access, Word, Excel and Power Point. In-depth knowledge of medical terminology, anatomy, medical records procedures, ICD-10 coding, and Abbreviated Injury Scale (AIS) assignment. Demonstrate an independent work initiative, sound judgment, diplomacy and professional demeanor. Must be detail-oriented and goal-oriented with the ability to work independently all awhile meeting deadlines.

Recommended Credentials, Licensure or Certification

Associate Degree in Health Information Management, Registered Health Information Technician (RHIT/RHIA) and Certified Specialist in Trauma Registry (CSTR), Certified Abbreviated Injury Scoring Specialist (CAISS), preferred. EMT certification or a registered nurse.

Responsibilities

- 1) Develop, design, implement and maintain computer-based systems for trauma injury data.
- 2) System administrator for the trauma registry database, install and update software.
- 3) Provides first-level computer support within the trauma department.
- 4) Responsible for case identification, data abstraction, ICD-10 coding, input, retrieval, analysis and validation of trauma data.
- 5) Assigns AIS based on knowledge of rules established by the American Association for the Advancement of Automotive Medicine (AAAM).
- 6) Sets standards for data entry, implementation of procedures, writes/develops manuals for all registry-related functions.
- 7) Creates and implements exports of registry data consistent with data requests and compliance with national, state or regional repositories.
- 8) Participates in injury-related research studies.
- 9) Statistical analysis of data for reporting, performance improvement as well as continual preparation and maintenance of trauma verification status.
- 10) Develop training objectives and other written materials for registry-related presentations.

- 11) Represent the healthcare system at various local, state and national registry meetings.
- 12) Responsible for data quality of all variables required and reported to the state and national repositories. Maintains collaborative relationship with the trauma registry vendor to ensure current technology in data collection.
- 13) Obtain trauma patient autopsy reports from the coroner and enter data into registry.
- 14) Assists in the interviewing and training of new registry personnel.
- 15) Assists and participates in the planning and implementation of injury prevention activities.
- 16) Respects patient rights for informed consent and the handling of confidential information as defined by the healthcare system's mission and applicable state/federal laws and regulations.
- 17) Review timeliness, accuracy, availability and security of information.

Minimum Knowledge, Skills and abilities may include:

- 1) Knowledge of medical records procedures to obtain patient information.
- 2) Ability to type in order to enter data into the computerized database.
- 3) Interpersonal skills necessary in order to communicate, understand, interact and respond effectively with all levels of hospital and medical staff, patients and outside agency personnel when gathering and exchanging medical information.
- 4) Ability to read and write in order to understand and follow written instructions, analytical skills and knowledge of medical terminology and anatomy necessary to interpret, evaluate and classify medical record information.
- 5) Ability to concentrate and pay close attention to detail (up to 90% of working hours) for performing trauma data analysis.