PA TRAUMA SYSTEMS FOUNDATION

Performance Improvement Primer

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HISTORICAL OVERVIEW & PRIMER PURPOSE

Performance improvement (PI) is the *systematic evaluation of care* for each trauma patient.

The terms and focus of this process have undergone numerous changes—beginning with the term *quality assurance*. This evolved into *total quality management*, and later *continuous quality improvement*. Currently, trauma programs refer to the PI process as performance improvement and patient safety (PIPS). Most important, the focus has shifted away from individual provider errors to a system-wide perspective. This more sophisticated model has two fundamental concepts—"systems measures" and "human measures" that both impact patient outcome. This broader understanding of performance and quality review requires awareness that the system also contributes to error. In fact, the overall goal of building strong, resilient systems supports the delivery of safe, quality care. This foundation prevents errors from occurring and favorably impacts patient outcomes.

Just as the term has evolved, so has the trauma system's adoption, expectation and utilization of the PIPS process. Performance improvement for the care of the injured patient remains the central core element of Pennsylvania's trauma system.

Historically, PI has been conducted at the local, trauma facility level. As a result of health facilities merging into larger systems, the PI process has grown into a more regional process. Pennsylvania's statewide PIPS process continues to mature and evolve with the addition of quarterly benchmark reporting, a central POPIMS repository of state deaths, PIPS and Outcomes committees and the newly formed Pennsylvania State TQIP Collaborative (PA-TQIP) initiative.

This PI Primer is designed to support basic, trauma facility PI that is conducted and documented by the core trauma team. The PI process should be meaningful, methodical—and most important—beneficial to the maturation of a developing trauma program. This foundation is paramount in creating a sustainable PIPS process that fosters system-wide excellence in patient care and outcome.

Contents of this PI Primer is possible through the generous sharing and publication of PIPS tools and references from within Pennsylvania's trauma system, as well as the national trauma community.

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WHAT IS TRAUMA PERFORMANCE IMPROVEMENT?

Trauma performance improvement (PI) is a confidential, systematic review and discussion of trauma care with ongoing surveillance of processes, systems and their impact on outcomes. PI is both time and data intensive and includes multiple processes.

IT IS VITAL TO THE EXISTENCE OF YOUR TRAUMA PROGRAM

A high-functioning PI program must document the quality and timeliness of trauma care. The program must use metrics to provide the direction to improve trauma care. These metrics will guide patient care outcomes, provider performance—both response and actions—as well as system performance.

WHAT WILL PERFORMANCE IMPROVEMENT DO FOR YOUR TRAUMA PROGRAM?

A performance improvement and patient safety (PIPS) program is required by the Pennsylvania Trauma Systems Foundation (PTSF) Standards of Accreditation in order to be accredited as a trauma center. Additionally, as the core of a trauma center's development and maturation, performance improvement will:

- Improve patient care at the bedside
- Foster a culture of competency, accountability and patient safety
- Classify events which focus on *opportunities for improvement*
- Evaluate cost of care, while enhancing fiscal performance
- Build a system that supports safe, quality care by preventing error

COMPONENTS OF THE PERFORMANCE IMPROVEMENT PROCESS

The identified components of the PI process occur in phases.

These phase are:

- Issue/Event Identification
- Validation
- Discussion
- Development of Corrective Actions to Address Issue(s)
- Implementation
- Evaluation of Effect
- Loop Closure

See Appendix A: PI Process Diagram

PERFORMANCE IMPROVEMENT TOOLS

Concurrent PI is a cornerstone to success. Use every opportunity to walk the talk of concurrent performance improvement.

Examples of current PI best practice includes:

- Identification of opportunities in care during patient rounds to prevent or reduce harm
- Identification and resolution conducted during daily patient report
- The use of standardized order sets: Evidence based interventions built in to the electronic medical record that supports Management Guideline initiatives such as:
    - Geriatric Rib Fracture Management Guideline
    - Massive Transfusion Management Guideline
- Standardized Check List: Prompts and reminders of standards of practice, such as a SICU VAP Bundle
- The use of acronym reminders: An abbreviation formed from the initial letters of other words and pronounced as a word- can be useful prompts

  Example:

  - FASTHUGS BID (feeding, analgesia, sedation, thromboembolic prophylaxis, head of bed, ulcer prevention, glucose control, spontaneous breathing trial, bowel function, indwelling catheters, de-escalation of antibiotics/medications)

PERFORMANCE IMPROVEMENT & PATIENT SAFEFY PLAN

A performance improvement and patient safety (PIPS) Plan is required by the PTSF Standards of Accreditation. The PIPS Plan must outline the structure for how the trauma program's PI process functions. This plan should establish roles, accountability and credibility. Furthermore, it should demonstrate the linkage to the hospital's facility-wide PIPS process.

COMPONENTS OF THE PIPS PLAN

The following list outlines the required components of the PIPS Plan:

- Philosophy, Mission & Vision
- Authority/Scope
- Indicators/Audit Filters
- Event Identification
- Data Management
- Committee Structure
- Team Members
- Roles & Responsibilities
- Levels of Review
- Peer Determinations
- Corrective Action Plan(s) & Implementation
- Event Resolution & Re-Evaluation
- Confidentiality
- Integration into Hospital PIPS Process

PIPS PLAN EXAMPLES

The following links are examples of PIPS plans:

http://www.ptsf.org/upload/Level_III_PI_Plan.pdf

http://www.ptsf.org/upload/Level_II_2014_RPH_Trauma_PI_Plan_LLL.pdf

http://www.ptsf.org/upload/Level_I_PI_plan_GMC_PI_Plan_2016.pdf

COMMITTEES AND COMMITTEE STRUCUTRE

Committee structure is one component of the PIPS Plan. This section will highlight several of those committees, their purpose and membership. Some accreditation levels have different requirements; those differences will be noted.

PEER REVIEW COMMITTEE

The goal of the Peer Review Committee is to have robust case discussion among multidisciplinary peers. In this forum, discussions should include clinical dialogs at the patient level, as well as and provider-related events.

Committee discussions should be addressed, trended and documented. Examples of those discussion topics include: deaths, transfers and morbidities. Events related to systems and clinical management guidelines should also be discussed. Sentinel events, great saves, challenging cases and provider-specific events—including specific morbidities and mortalities—can be reviewed in detail.

MEETING STRUCTURE AND LOGISTICS

The meetings must be scheduled at regular times and frequency to assure prompt review of the cases. Attendance must be monitored. Meeting minutes must be maintained. Teleconferencing is acceptable, but should be minimal and must allow for active participation.

The TPMD—in collaboration with the Trauma Program Manager (TPM) and the Trauma Performance Improvement (PI) Coordinator will have the leadership role. The Trauma Program Medical Director (TPMD) must chair this committee

Specific attendees are required, including a liaison for subspecialties. It is the responsibility of the liaison to communicate critical information to their subspecialty group. If individual subspecialty services/departments have department and/or hospital-based peer or case review meetings in addition to the required PIPS peer-review meeting, those meeting minutes or outcomes must be made available to the trauma PIPS program.

PARTICIPATION REQUIREMENTS for Level I, II and III Trauma Centers:

- The TPMD, TPM and PI Coordinator must maintain 75% attendance.
- All general surgeons participating in trauma care must participate
    - General surgeons must maintain 50% attendance
- All advanced practitioners (AP) supporting the general surgical team and having a defined role in trauma care must participate
    - AP's must maintain 50% attendance
- Subspecialty liaisons must participate and maintain 50% attendance
    - Anesthesia
    - Emergency Medicine
    - Critical Care – If critical care unit is not independently directed by a surgeons (Level I/II)
    - Neurosurgery (Level I/II and as applicable for Level III)
    - Orthopedics
    - Radiology
    - Additional subspecialists as defined by the PIPS plan

PARTICIPATION REQUIREMENTS for Level IV Trauma Centers:

- Required for all Level IV centers:
    - Trauma Program Medical Director
    - Emergency Medicine (if the TPMD is not from the ED)
    - Radiology
    - Trauma Program Manager
- Required if participating in care of the injured patient:
    - Orthopedics
    - Anesthesia
    - Surgeons
    - Advanced Practitioners
    - Trauma PI Coordinator
    - Additional subspecialists as defined by the PIPS plan

MULTIDISCIPLINARY TRAUMA SYSTEMS / OPERATIONS COMMITTEE

This is a multidisciplinary committee that addresses process, system and operational events that impact trauma care. Individual patient cases typically are not presented in this venue, but the events identified from patient case review requiring operational and/or system input to resolve are brought to the committee. This committee should be separate from the peer-review (case review focused) committee for Level I, II and III trauma centers. Level IV trauma centers may choose to combine this meeting with the peer-review committee.

MEETING STRUCTURE AND LOGISTICS

The meetings must be scheduled at regular times and frequency to assure prompt discussion of events. Meeting minutes and attendance must be maintained.

The TPMD and TPM co-chair this committee.

PARTICIPATION REQUIREMENTS:

Attendees should include representatives from all phases of care provided to injured patients, including any ancillary personnel as defined by the PIPS plan.

- Trauma Program Medical Director, Trauma Program Manager, Trauma PI Coordinator
- Other potential attendees:
    - Administration
    - Emergency Department
    - Information Management (IT)
    - Lab/Blood Bank
    - Nursing
    - Nutrition
    - Pediatrics Representative
    - Pharmacy
    - Pre-hospital/EMS
    - Quality Management
    - Registrars
    - Rehabilitation
    - Respiratory
    - Social Services
    - Subspecialty Liaisons
    - Trauma Surgeons

TRAUMA STANDARDS OF CARE, AUDIT FILTERS & CORE MEASURES

Trauma standards establish care delivery and are evidenced-based. They are established from national, regional and local standard of care.

GUIDELINE AND PROTOCOL DEVELOPMENT

Trauma programs should seek to reduce unnecessary variation in the care they provide. To achieve this goal, a trauma program must use clinical practice guidelines, protocols, and algorithms derived from evidenced-based validated resources.

In areas where there is an absence of such resources, consensus-based institutional guidelines should be established according to the most current available peer-reviewed literature and clinical experience and acumen.

Once implemented, trauma programs should track compliance with their clinical practice guidelines, protocols, and/or algorithms and ultimately monitor them for effects on outcome.

Examples of such activities include the following:

- The use of massive transfusion protocols in patients with exsanguinating hemorrhage
- Assessment and clearance of the cervical spine
- The management of severe traumatic brain injury
- The reversal of oral anticoagulants, the timing of antibiotic administration, and time to the operating room for open fracture management
- The use of venous thromboembolism prophylaxis

The following practice management guidelines are required per PA Standards:

- Cervical spine clearance
- Geriatric trauma management
- Massive Transfusion Protocol
- Open fracture management
- Trauma Patient Transfer guideline
- Trauma Resuscitation management guideline
- Trauma Triage Activation guideline

- Unstable pelvic fracture management

GUIDELINE AND PROTOCOL DEVELOPMENT TIPS

The following are a list of guideline and protocol development tips:

- Elicit input and feedback from stakeholders
- Focus on evidence-based foundations
- Utilize resources (Do not reinvent the wheel). There is a good possibility that your guideline may already exist
    - Contact TPMs from other trauma centers
    - Contact other hospitals within your health system
    - Refer to professional organizations – where best practices are frequently available on the web page
- Creating, approving and implementing a guideline does NOT mean you have achieved loop closure

    - Level III center example:
      Over the past 6 months your PI process identified an increase in poor outcomes for major trauma patients transferred from your hospital to the Level 1 trauma center. Internal review, as well as referral feedback, attributed this to variation in resuscitation practice, which included late blood administration. As part of your action plan a guideline for Initial Management of Major Trauma was developed to include early blood administration. Monitoring would include:

        - Outcomes → rate of poor outcomes decreases, decrease in time from identification of shock to blood administration
        - Processes → 100% compliance with ED education regarding PMG

See Appendix B: MANGAGEMENT GUIDELINE TEMPLATE

MONITORING AND REPORTING OF MANAGEMENT GUIDELINES

Practice Management Guidelines must be monitored for compliance. The results are then shared with the specific providers and the TPMD at a minimum. Compliance tracking is incorporated into the credentialing process. In order to track compliance accurately, astute data collection is imperative.

Data collection: A mechanism of data capture must be established. Concurrently reviewing care: making rounds, correcting and noting deficiencies, or note the justifications for the variance. The data to be captured should be defined core measures of compliance within the clinical practice guideline. Focus on a drill down of key specific compliance metrics to meet the intent of the guideline (typically no more than 5).

Ways to accomplish data capture:
Customize trauma registry elements or use other simplified databases such as Midas or Excel spreadsheets which can calculate percentage compliance.

Example: Massive Transfusion Protocol (MTP) Guideline Metrics

- Was MTP activated according to policy?
- Time/type/ratio of blood products
- Was TXA administered according to policy?
- Was MTP deactivated per policy?
- Number of returned/wasted blood component

AUDIT FILTERS (PI INDICTORS)

Audit Filters are:

- Tools that assist with monitoring the process of care relative to standards of care.
- Prompts the PI Team to review an issue, but does not necessarily equal "bad" care.
- Is a wide net – for surveillance of events.
- Should not be used as a benchmark.

Mandatory: (Required for verification or accreditation purposes)
Audit Filter Examples
Process Measures – Required

- Response times of CT/MRI when on-call
- Transfers to higher level of care within the institution
- Organ donation rate
- Registry abstraction – 80% within 2 months

Institution Specific Audit Filters (At Discretion of program)
Clinical

- Failed non-operative management - Splenic injury that is embolized that progresses to require splenectomy.
- Operative management not warranted – Negative laparotomy in setting of questionable indications

Performance

- Missed injuries
- Delayed diagnosis
- Screening and brief intervention
- Documentation completeness

Utilization of audit filters:

Rate based audit filters: (can be captured by abstraction with specific defined elements in registry or Outcomes software)

- Frequency of specific events (example: how often Trauma Tertiary exam completed/number of admissions)
- Occurrence/total number of trauma cases (example: number of VAP/number of intubated Trauma patients)
-

Case reviews: (can be set up to trigger a case review to determine if care was timely)

- Review of specific cases where an audit filter was triggered (example: Deaths/Delay to Laparotomy with BP<90)

Concurrent Review: (best if done concurrently, gain access to un-documented variables and activities)

- Review of specific populations, close to the event as possible (example: all upgrades to ICU, massive transfusion, code in CT)

CORE MEASURES:

Core Measures utilize data to improve the healthcare delivery process. Core measures are either process or outcome focused.

Process measures:

- System operations/Not clinical in nature
- Qualitative filters (e.g. Satisfaction survey)
- Institutional filters (e.g. Time to CT)

Outcome measures:

- Clinical/Patient focused
- Quantitative/benchmarks (e.g. VTE/VAP rates)

See Appendix C: ACS REQUIRED CORE MEASURES

DATA MANAGEMENT: COLLECT, MONITOR AND REPORT

Fundamental to the performance improvement process is monitoring and measurement of the outcome of specific processes or procedures related to trauma care to improve efficiency, increase effectiveness, or reduce real or potential harm, as well as to improve future outcomes.

Process and outcomes measures, referred to as audit filters, require defined criteria and metrics. They can be derived by monitoring trauma-related institutional clinical practice guidelines. In addition, mandatory core measures are required. All process and outcome measures must be documented within the trauma PIPS program's written plan and reviewed and updated at least annually.

These measures should be subjected to routine multidisciplinary trauma peer review and variances identified and further analyzed for causative factors and opportunities for improvement.

COLLECTING:

- Audit filters, (indicators) ideally are collected concurrently (with team identification, and/or de-escalating undesirable outcomes)

MONITORING:

- Use trauma registry
- Use dashboards
- Use calendars for reporting data: establish a calendar for a review/reporting rotation

REPORTING:

- Monthly performance case reviews
- Quarterly reports to Trauma Committee
- Annual report to hospital leadership

TRACKING PI ACTIVITIES

It is essential to have a consistent method of tracking PI activities from the time of the event identification through loop closure. All activities should be recorded in the POPIMS/OUTCOMES software.

Tracking tools that have been utilized as adjuncts in trauma PI are included in the Resource section of the PTSF web page. (Examples: AM report forms, PI Coordinator activities, peer review forms)

Sufficient mechanisms must be in place to identify events both concurrently and retrospectively for review by the trauma PIPS program.

IDENTIFICATION OF PI EVENTS (EVENTS) FOR REVIEW

The identification and reporting of PI events may come from various resources. Potential sources may include but are not limited to:

- Emergency Medical Services (EMS) documentation
- Registry abstraction/surveillance
- Hospital EMR/medical record
- Video/audio recordings – prehospital (medical command, transfer center), resuscitation
    - Compare care delivered to established best standards of practice
    - Did care follow established practice management guidelines
- Provider feedback: email, verbal
- Established Patient Report forums (AM report)/Huddles
- Daily rounds: for admitted patients
- Tertiary phases of care feedback: rehab, long term care, other trauma centers
- Autopsies
    - Potential identification of missed injuries
    - Confirmation of appropriate lifesaving interventions and critical thinking skills
    - Assist injury identification in the trauma registry
    - Feedback for providers
- Reports and metrics from external agencies – PTOS, TQIP, NTDB,
- Audit filters – identified metric to trigger a review of an event, useful as a focus tool
- Variance analysis: established standards of care indicators that must be evident on patient care review
- Patient/family advocates/ Risk Management

FOUR LEVELS OF PERFORMANCE REVIEW

The PI Process includes four levels of review. These levels are:

- Primary – verification and validation of the event by the TPM or designee.
- Secondary – review of the event by the TMD or designee.
- Tertiary – review of the event by the Trauma Committee/multidisciplinary forum
- Quaternary – when the event is taken to a forum outside the trauma center (such as region, state, or external reviewer

Achievement of loop closure (event resolution) may occur at any level depending on the issue.

The PI issue must be documented in POPIMS. Entries should be made for every level of review required to address an event.

See Appendix D: PIPS LEVEL OF REVIEW DIAGRAM SCALES

PRIMARY REVIEW

The goal of primary review is to identify and validate events.

- Validation is a methodical review of information that is essential to confirm and collate data to make a determination for the event.
- The responsibility is dependent upon resources, level of accreditation and structure of the PI program. Typically this level is completed by the trauma program manager/trauma coordinator/PI Coordinator.
- There are several courses of actions that may follow the primary review:
    - Resolution of the event/loop closed
        - Example: patient falls out for audit filter review "non-surgical admit". Chart review reveals an elderly patient with a humerus fracture, normally treated as outpatient injury, with documented plan of care for admission required for social/safety care factors; living independent at home, no assistance available. Findings and conclusion: Appropriate non-surgical admit as patient does not require acute care admission for the injury. No events identified, loop closed.
    - Refer the issue for TMD/Trauma medical director review (Secondary Review)
        - TMD reviews the case and makes a determination or refers to committee.

- Continue to trend an issue
  - Example: Reviewing resuscitations on trauma team activations, there are no temperatures documented for 3 patients in arriving in rapid succession. Atypical, this is investigated with the ED nurses involved and get their feedback. They report that all temperature measuring devices were absent from the trauma resuscitation areas and after investigating, they were undergoing quality testing, as they had been reported as providing questionable low readings. They had been returned, after replacement software installed. Concerned about the accuracy of temperatures you decide to trend temperature readings for the next week to provide input on any further actions.

SECONDARY REVIEW

The goal of secondary review is further investigation & triage of events.

- This level is the responsibility of TMD or PI delegated person (assigned physician on core panel, nurse manager, department manager) – to gain further insight from a leader's perspective; combining complementary expertise and depth of review
- There are several courses of actions that may follow the secondary review:
  - Resolution of issue/loop closed by the TPMD or Delegate.
    - Example: A TPM chart review raises a concern because the ED length of stay (LOS) was > 60 minutes prior to transfer to definitive care of patient with spleen injury. Chart review findings; trauma activation based on mechanism of intrusion into passenger compartment > 18 inches, VSS. Patient was stable for CT scan due to stable vital signs and physical exam. Spleen laceration found on CT necessitated transfer. Care appropriate, no events, no further action required.

  - Referral for further review to specialty group or committee
    - Example: Case of readmission for infected hardware in tib/fib ORIF, refer to subspecialist for further review and give summation of findings to larger (tertiary) multidisciplinary peer review committee (PI committee).

TERTIARY REVIEW

The goal of the tertiary review is to reach consensus of determinations and course of action to provide loop closure (event resolution). The TMD (or physician designee) must lead peer review discussions and moderate peer review determination and judgements

- This is a structured review by a group; usually multi-disciplinary
- Can include Regional PI Committee if applicable for hospital system
- Cases appropriate for committee review
    - Deaths
    - All transfers out of specialty populations
    - Unexpected outcomes
    - Review requested by trauma stakeholder
    - Sentinel events
    - System Events
    - Policy/protocol non-compliance
    - Low volume populations such as pediatrics, pregnant women, burns

- There are several courses of action that may follow the tertiary review:
    - Mortality determination/judgment
        - Mortality *with* opportunities for improvement: Provides a gross measure of individual or system errors that were evident in individual and aggregate cases.
        - Mortality *without* opportunities for improvement: Provides a gross measure of in which no individual or system errors identified in individual or aggregate cases.
    - Corrective action plan is initiated – this will be explained in detail under Action Plan section.

QUATERNARY REVIEW

The goal of the quaternary review is to complete an external review of the event.

- Can include Regional PI Committee if applicable for hospital system
- Event is taken to a forum outside the trauma center (such as region, state, or external reviewer)

ACTION PLAN DEVELOPMENT

When an opportunity for improvement is identified, appropriate corrective actions to mitigate or prevent similar future adverse events must be developed, implemented, and clearly documented by the trauma PIPS program.

Examples of corrective actions include the following:

- Additional and/or enhancement of resources facilities, equipment, communication
- Guideline, protocol, or pathway development or revision.
- PI team project
- Targeted education (for example, rounds, conferences, or journal clubs)
- Additional and/or enhanced resources
- Remediation/counseling
- External review (Quaternary review)
- Peer review presentation
- External review or consultation
- Ongoing professional practice evaluation
- Change in provider privileges

ACTION PLAN: PI TEAM PROJECT

A PI Team Project may be appropriate to address an event. This includes:

- Workgroup of stakeholders to work on specific issue, usually less urgent but still important
- Must have oversight by trauma center leadership. TMD/TPM must act as champion.
- Use available data to determine effectiveness of suggested changes

For example: ED Trauma flow sheet is missing temperature documentation, and there is a lack of consistent warming measure utilization. A workgroup of interested trauma ED nurses is formed to try to improve this problem. They use chart review to look at documentation of temperatures, use of warming measures and temperature of the patient at first destination from the ED. After solutions are implemented the same metrics will be used to determine success.

ACTION PLAN: EDUCATION

When education is the identified action plan:

- Invite a speaker to present on area of identified knowledge deficit
- Address need at nursing competencies
    - For example case review demonstrated a knowledge/comfort deficit with pediatric medication dosing. Pediatric Drug calculations and dosing was added to the annual ED nurse competencies
- Ensure communication regarding new PMG's
- On-line education
- Newsletters
- Conferences

ACTION PLAN: SYSTEM ENHANCEMENTS

For system enhancement action plans:

- The TMD must actively participate.
- Resources (staff, support staff, equipment, drugs)
    - For example: a mock survey team noted and identified that the trauma coordinator needs more dedicated time for trauma
    - Delay in care is identified due to unavailability of mannitol in the ED (which is located in pharmacy) – develop a system to ensure needed drugs are available for the team
    - Equipment example is implementation of StO2 monitoring regionally
    - Poor outcome related to lack of pediatric ETT in the ED – implement dedicated draw resuscitation based on Broslow system or equivalent
- Facilities
    - For example a safety concern related to transferring emergency vehicles having no direct access to the defined trauma resuscitation area has been identified by prehospital crews. Create a process by to accommodate direct flow to critical resuscitation areas to mitigate the safety concern
- Communication: Any change to improve all forms of communication

ACTION PLAN: REMEDIATION AND COUNSELING

When remediation and counseling is indicated:

- Usually most effective for behavior related events which are rare
- Difficult but necessary and should be done as soon as possible to the event
- Does not belong in an email – should be done face to face
- Delivered by Trauma Medical Director or Nurse Manager depending on who is involved following hospital/Human Resources policies and guidelines.
- Especially difficult in trauma centers with small number of providers.
- Must be documented
    - The TMD has a one on one conversation with his colleague regarding his poor documentation for trauma activations. He/she then sends a memo to the trauma coordinator outlining the conversation and action items that came from the meeting. This is documented in the PI database
- Look for trends and changes in behavior
- Mitigation plan may include involving administration and removing provider from trauma panel

ACTION PLAN: EXTERNAL REVIEW

This process is especially helpful with smaller staff resources, ensuring objectivity.

- Level I and II trauma center resources can be offer assistance setting up this review process for level III and IV centers.
- Helpful when several surgeons or TMD is involved in difficult case, or cases that cannot reach a satisfactory consensus of internal peer group.
- Mock trauma site visits and consultative visits can also provide an external review of care and processes.

LOOP CLOSURE (EVENT RESOLUTION)

Effective performance improvement demonstrates that a corrective action has had the desired effect by continuous monitoring and evaluation, this process is referred to as "closing the loop" or event resolution.

An effective performance improvement program demonstrates clear documentation that identified opportunities for improvement, lead to specific interventions altering systems or care processes preventing or reducing the likelihood of further similar conditions from reoccurring.

The effectiveness of these interventions should be continuously reevaluated to determine if these revisions improved the process or outcomes in care. Demonstration of consistent systematic use of a defined PIPS process is clear evidence of a commitment to the continuous pursuit of improving the care of the trauma patient.

Example of how loop closure might look in your trauma center:

A 4 year old presents after being thrown from an ATV
Found to have significant head injury and abdominal injury
Transferred to an adult only level 2 trauma center
Transferred from ED of level 2 center to pediatric level 1 trauma center after 60 minutes for pediatric neurosurgery unavailable at level 2 center

Issue identification: Double transfer leading to delay to definitive care

Action plan: TMD to TMD phone call to discuss transfer, development of guideline outlining injuries that should be triaged directly to a pediatric trauma center, provider conference with speaker from pediatric trauma center to present cases

Monitoring: Secure documentation of phone call discussion points, record attendance of providers at education, review next pediatric trauma activations for compliance with new guideline

Loop Closure: On-going monitoring of transfers revealed the next severely injured children that present following implementation of guideline are transferred directly to pediatric trauma center.

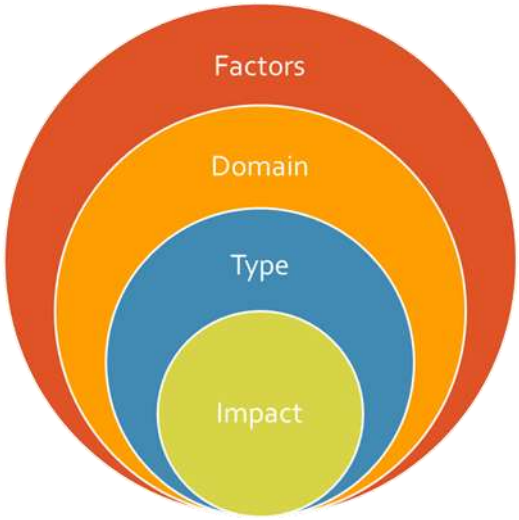
Event is now resolved but monitoring should be on-going

DETERMINATION AND CLASSIFICATION

Classification of events: This includes determination of the effects of events based on an institutional defined system such as but not limited to: POPIMS Judgment status, JCAHO taxonomy, expected/unexpected, severity levels or other grading system.

CLASSIFICATION OF CARE EVENTS WITH TAXONOMY

The use of the JCAHO taxonomy must be utilized in the classifications of all deaths at a minimum; see following definitions:



- Impact: The level of harm to the patient. Can be Medical (physical and/or psychological) or Non-Medical (Legal and/or Financial)
- Type: The implied or visible processes that were faulty or failed (diagnosis, treatment, communication failures, etc.)
- Domain: Characteristics of the setting in which an incident occurred (ED, OR, ICU). Also includes what phase of care and who was involved with care
- Factors (formerly called Cause): Factors and agents that lead to an incident (Human and/or System)

Adverse event: "An injury that is caused by medical management rather than the underlying disease and that prolongs hospitalization, produces a disability at discharge, or both." (Institute of Medicine, 2001a)
Error: "Failure of a planned action to be completed as intended or use of a wrong plan to achieve an aim" (Institute of Medicine, 1999)
Sentinel event: A subtype of adverse event with a particularly high potential for harm. "An unexpected occurrence resulting in death or serious physical or psychological injury, or the risk thereof." (JCAHO, 2005)

Complication: Unexpected, unplanned and unwanted outcomes such as a wound infection or a deep venous thrombosis. Can be secondary to natural disease processes or an adverse event

See Appendix E: AHRQ DEGREES OF RESULTING HARM

DETERMINATION AND CLASSIFICATION: POPIMS AND THE ACS

Classification of events: This includes determination of the effects of events based on an institutional defined system such as but not limited to: POPIMS Judgment status, JCAHO taxonomy, expected/unexpected, severity levels or other grading system.

The multidisciplinary trauma peer review committee must systematically review mortalities, significant complications, and process variances associated with unanticipated outcomes and determine opportunities for improvement.

Mutually agreed upon nomenclature to allow for integration with the institution-wide PIPS process should be used.

Based on this review process, both the appropriateness and timeliness of care should be reviewed, and opportunities for improvement (for example, errors in judgment, technique, treatment, or communication, along with delays in assessment, diagnosis, technique, or treatment) should be determined and documented.

See Appendix F: MORBITIY AND MORTALITY JUDGEMENT CLASSIFICAITONS

REQUIRED FOLLOW-UP MEASURES

The PIPS program will provide feedback to referring facilities including:

- Anatomical diagnosis, including ISS.
- Outcomes (LOS, discharge destination)
- Opportunities for improvement:
    - Utilizing the Level of Review process: primary: issue identification and investigation of an issue occurring at transferring facility would potentially lead to call and discussion of the reported or perceived event, if verified, discuss possible actions and resolutions as appropriate
    - Document all activities in POPIMS and this follow up notification should be a review of those activities that occurred.
    - Take advantage of the POPIMS templates that will auto populate this information for convenience, still enabling concise PI issue detail editing as needed.

  Example: Radiology issue for rescanning/re-imaging due to inability to view films.

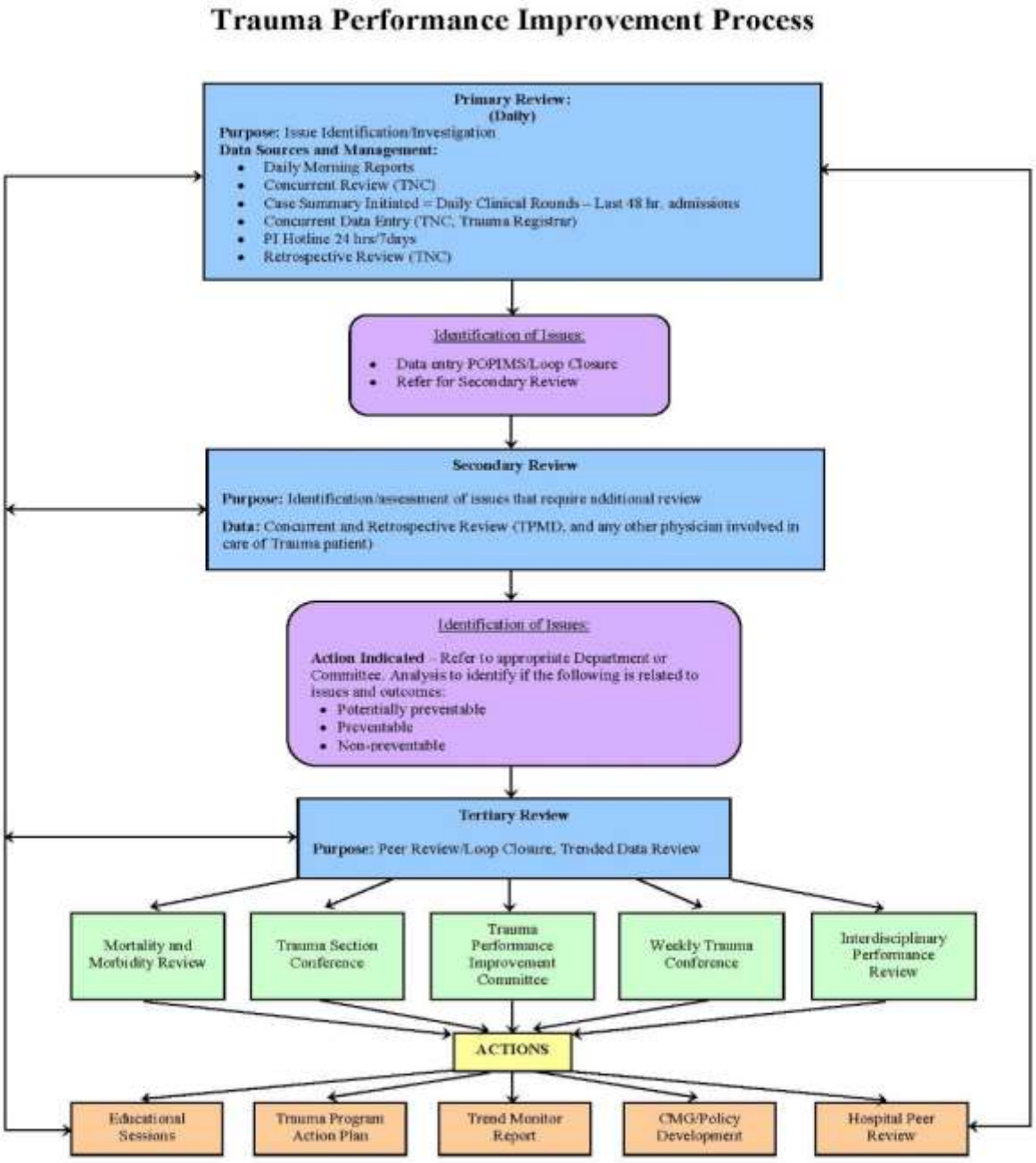
See Appendix G: EXAMPLE OF POPIMS TEMPLATE FOR TRANFER FOLLOW-UP COMMUNICATION

PUBLICATIONS AND RESOURCES

Appendix H contains links and resources to multiple PI references.

See Appendix H: PUBLICATIONS AND RESOURCES

APPENDIX A: PI PROCESS DIAGRAM



APPENDIX B: PRACTICE MANAGEMENT GUIDELINE TEMPLATE

Your Hospital Logo

Your Hospital Name

Regional Practice Management Guideline

Title	
Adult **Practice Management Guideline**	**Effective: 11/2011**
Contact: Trauma Coordinator	**Last Reviewed:**

Purpose
Definition of purpose: " something set up as an object or end to be attained"

Example: To describe the airway management for patients presenting with an emergency airway

Definitions
Definition of definition: "a statement expressing the essential nature of something"

Example: Emergency Airway: a device placed to support respiratory function that is **not** considered a definitive airway (i.e., Combitube, King LTS-D)

1. Adult trauma patient – any patient age fifteen (15) or older suffering an injury. For the purposes of this guideline the definition is any injured patient who may be at risk for a spine injury.

Policy Statements
May be one or multiple statements

Example: All trauma patients arriving with an emergency airway for respiratory support meet criterial for highest level of trauma activation

Procedure Statements
Definition of statement: "a particular way of doing things; a set of steps that must be followed to achieve the desired results"

Example: The trauma team leader should view patient arriving with an emergency airway has a potential airway management risk and be prepared to utilize alternate advanced airway modalities with the assistance of Anesthesia.

Resources/Links
Definition of resource: "a source of information or expertise:

Example: literature review; existing guideline

Prepared by: Hospital **leadership**
Approvals: ?? **Subcommittee;** ?? **12/15/2011** Identify who provides final approval for implementation

Disclaimer: This is a general guideline and is not intended as a substitute for clinical judgment or as a protocol for the management of all trauma patients. Can place any disclaimer here according to your leadership team or none at all.

Suggestion made 2014—identify audit filters that will apply to this PMG

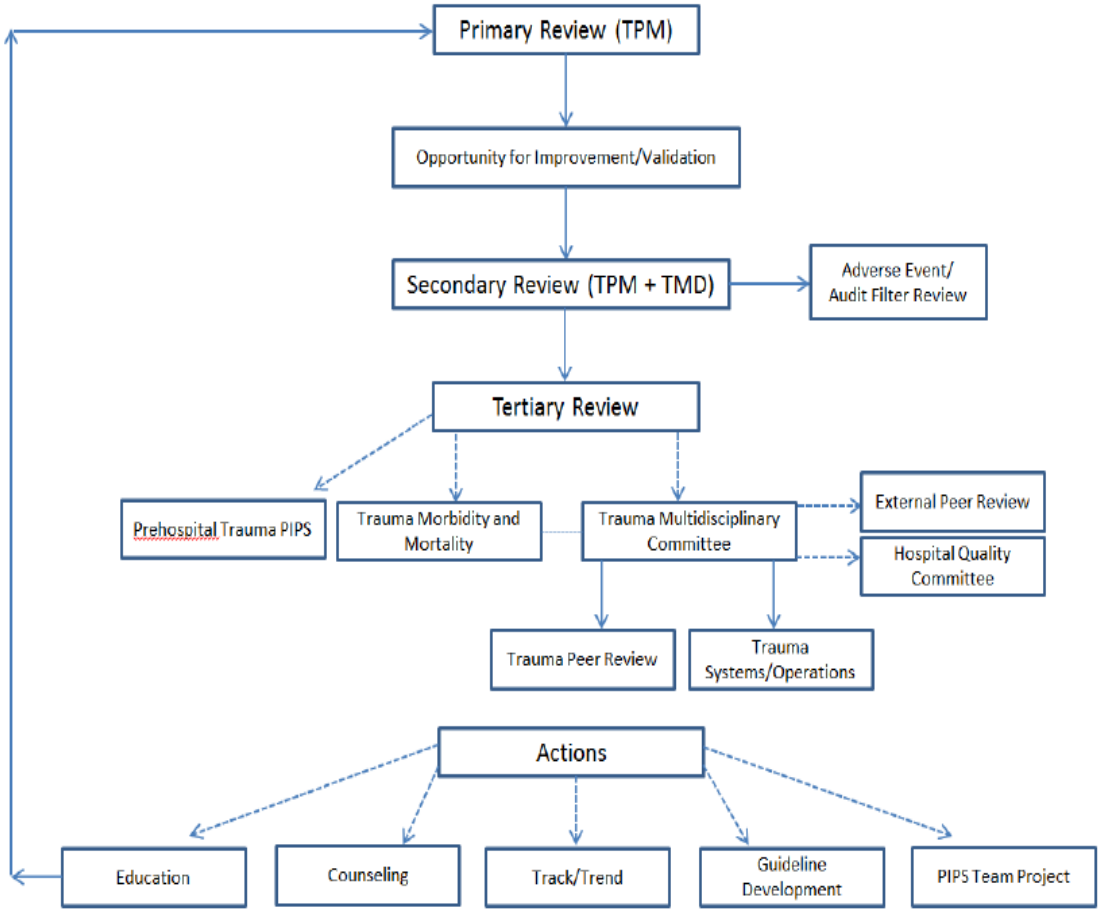
APPENDIX C: ACS REQUIRED CORE MEASURES

- Admission to Non-Surgical Service *10% threshold
- Diversion Report
    - General Surgical provision of care to ensure that it does not interfere with the care of injured patients
- Timeliness of laboratory testing/blood availabilities
- Turnaround time for MTP
- Turnaround time for goal-directed component therapy
- Center volumes
- Organ donation rates
- Payer Mix
- Mortality:
    - Dead on Arrival: no resuscitation efforts in ED
    - Death by ISS subgroups
    - Died in ED despite resuscitation efforts
    - Died in-hospital
    - Total Mortality Rate
        - Pediatric Rate <15
        - Geriatric >64
- Radiology: Timeliness of team response for: (if responding from outside center)
    - CT – 30 min
    - General Radiology -30 min
    - Interventional Radiology – 30 min
    - MRI – 60 min
- Radiology variance trending: Rate of change of read interpretation
- Timeliness of Care:
    - Response time for critical injury management for example, epidural hematoma, open fractures and hemodynamically unstable pelvic fractures)
    - Emergency Medicine In-House coverage
    - L3: ED covering in-house emergencies
- Operating Room availability
- Operating Room/PACU: Back-Up Team response time and utilization

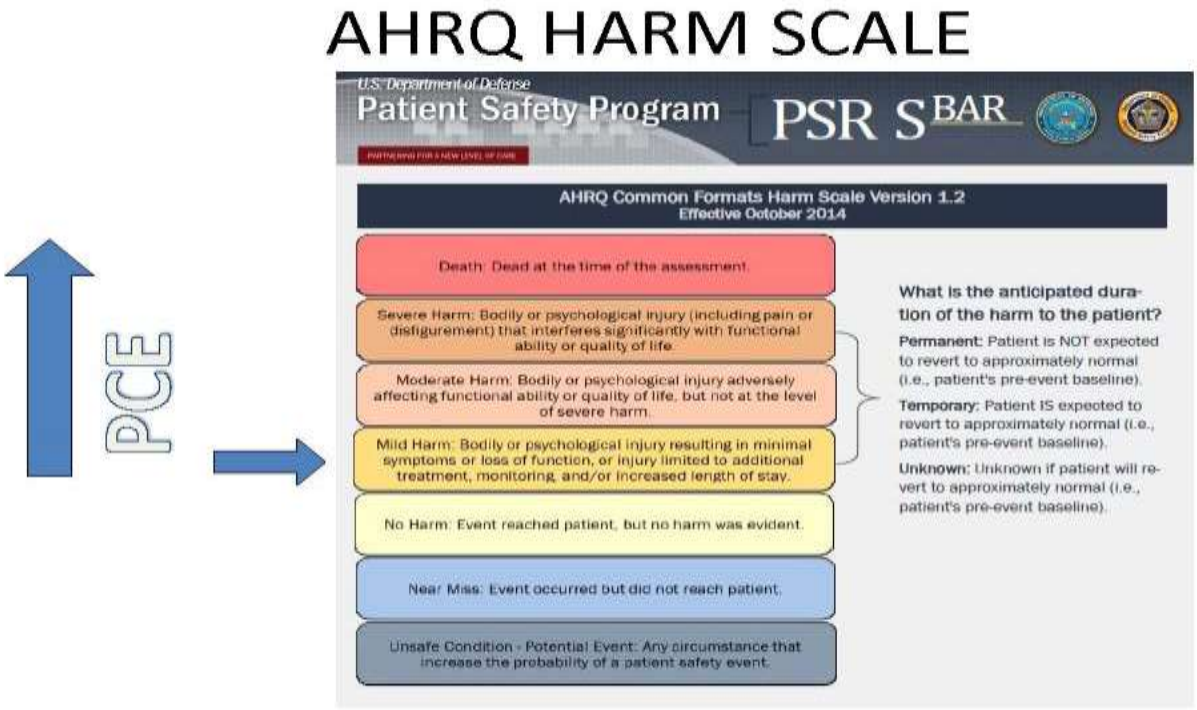
APPENDIX C: ACS REQUIRED CORE MEASURES ~ CONTINUED

- Response time to consultation
  - Trauma Surgery
  - Neurosurgery
  - Orthopedic Surgery
  - Anesthesiology: to in-house and to Operating Room
- Response time to trauma activations: Trauma Surgeons
  - Timeliness of back-up call responsiveness
- Upgrades in Care
- Triage:
  - Categorization of level of activation
  - Compliance with Activation Criteria *annually
  - By level of response
  - Over/Under triage trended rate *quarterly
- PIPS Meeting Attendance:
  - TPM
  - TPMD
  - Trauma physicians
  - Liaisons
  - Advanced Practice clinical staff

APPENDIX D: PIPS LEVELS OF REVIEW DIAGRAM



APPENDIX E: AHRQ DEGREES OF RESULTING HARM



APPENDIX F: MORBITIY AND MORTALITY JUDGEMENT CLASSIFICATIONS

MORTALITY JUDMENT STATUS

- **Unanticipated Event *with* Opportunity for Improvement**
  - Anatomic injury or combination of injuries considered survivable
  - Standard protocols not followed with unfavorable consequence
  - Inappropriate provider care with unfavorable consequences
  - P(s) > 0.5 by TRISS methodology

- **Anticipated Event *with* Opportunity for Improvement**
  - Anatomic injury or combination of injuries considered severe but survivable under optimal conditions
  - Standard protocols not followed, possibly resulting in unfavorable consequence
  - Provider related care considered sub-optimal, possibly resulting in unfavorable consequence
  - P(s) 0.25 - 0.5 by TRISS methodology

- **Mortality Event *without* Opportunity for Improvement**
  - Anatomic injury or combination of injuries considered non-survivable with optimal care
  - Standard protocols followed or if not followed, did not result in unfavorable consequence
  - Provider related care appropriate or if sub-optimal, did not result in unfavorable consequences
  - P(s) < 0.25 by TRISS methodology

MORBITIY JUDMENT STATUS

- **Unanticipated Event *with* Opportunity for Improvement**
  - Complication related to deviation from standard protocol
  - Complication result of provider error
  - Complication related to error in judgment
  - Complication related to equipment malfunction

- **Anticipated Event *with* Opportunity for Improvement**
  - Complication indirectly related to deviation from standard protocol, operator error or error in judgment
  - Provider related care considered suboptimal indirectly resulting in unfavorable outcome

- **Event *without* Opportunity for Improvement**
  - Complication occurred despite adherence to a reasonable standard protocol
  - Complication occurred despite appropriate care and good judgment

APPENDIX G: EXAMPLE OF POPIMS TEMPLATE FOR TRANSFER FOLLOW-UP COMMUNICATION

July 8, 2016

NOTE: All information in this letter is considered CONFIDENTIAL. It is intended for quality and review purposes only.

Dear 1089-99,Regional Medical Center (General Hospital)

Thank you for referring the following patient: John Doe (05/10/1973), a 42 year old Male to our facility. This patient was admitted on 03/26/2016 at 03:45 for further evaluation and care of injuries sustained from the following mechanism: Fall (on) (from) other stairs and steps, initial encounter. Injuries diagnosed included:

BILATERAL FRONTAL SAH

LT FRONTOPARIETAL SKULL FX

LT SDH MEASURING 0.6 CM THICKNESS WITH SHIFT

LT TEMPORAL HEMORRHAGIC CEREBRAL CONTUSIONS

LT SAH

Transporting EMS Service: LifeFlight

Admitting Service: Trauma Service (General Surgery)

Post ED Destination: ICU/Critical Care Unit

Injury Severity Score: 20 (Scores $\geq$ 16 considered major trauma)

This patient was at our facility for 5 days including 4 days in the ICU and 1 days on ventilator. The overall outcome of this patient was: Alive - Home on 03/31/2016.

If you have any questions, please contact: Matthew Mowry at 412.359.5022 or mmowry@wpahs.org.

Sincerely,

Matthew Mowry, MSN, RN, CEN

Trauma Performance Improvement Coordinator

APPENDIX H: PUBLICATIONS AND RESOURCES

American College of Surgeons Trauma Publications
https://web2.facs.org/timssnet464/acspub/frontpage.cfm?product_class=trauma

American Trauma Society
http://www.amtrauma.org/

Eastern Association for the Surgery of Trauma, Trauma Practice Management Guidelines
http://www.east.org/tpg.html

Minnesota Department of Health
http://www.health.state.mn.us/traumasystem/education/index.html

Minnesota CALS Program
https://calsprogram.org/

National Trauma Data Bank
http://www.facs.org/trauma/ntdb.html

Society of Trauma Nurses
http://www.traumanursesoc.org/

Trauma.org
http://www.trauma.org/

Trauma Center Association of America
http://www.traumacenters.org/

Western Trauma Association, Algorithms
http://westerntrauma.org/algorithms/algorithms.html

APPENDIX H: PUBLICATIONS AND RESOURCES CONTINUED

Source	Contact
American College of Emergency Physicians	www.acep.org
American College of Surgeons	www.fasc.org
American Association for the Surgeon of Trauma	www.aast.org
Brain Trauma Foundation	www.braintrauma.org
The Eastern Association for the Surgery of Trauma	www.east.org
Emergency Nurses Association	www.ena.org
Pediatric Trauma Society	www.pediatricsociety.org
Regional Practice Management Guidelines	Southern Minnesota Regional Trauma Advisory Committee www.smrtac.org
Society of Trauma Nurses	www.traumanurse.org
Trauma Quality Improvement	https://www.facs.org/quality-programs/trauma/tqip
Western Trauma Association	www.westerntraumaassocation.org