

**Performance Improvement Guidelines for the  
North Carolina Trauma System**

**Property of North Carolina Committee on Trauma  
Performance Improvement / Outcomes Sub-committee  
of the American College of Surgeons**

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## ***I. Purpose***

The purpose of this manual is to outline for North Carolina trauma centers, site team reviewers and those establishing trauma centers, guidelines for the development and maintenance of a performance improvement/patient safety program in North Carolina.

This document identifies definitions, tools and models as examples for such a program. Some variation between centers will be noted due to issues/problems that are specific for those institutions. The trauma centers are responsible for identifying their specific performance program and demonstrating evidence of ongoing review of the trauma Performance Improvement/Patient Safety (PIPS) plan. The program should be reviewed on an annual basis and updated as needed based on the evolving needs of a center's program.

## ***II. Mission Statement***

The mission of the Performance Improvement / Outcomes Sub-committee is to develop and monitor a trauma system-based, statewide performance improvement patient safety (PIPS) program in an effort to assure quality outcomes. Moreover, this group will develop performance benchmarks for the trauma centers, as well as for the trauma system, including both systems-based and clinical-based filters.

## ***III. Performance Improvement/Patient Safety***

Performance Improvement (PI) is a term recommended by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) to describe the continuous evaluation of a trauma system and trauma providers through structured review of the process of care as well as the outcome. Key elements of the PI process include:

- a process of care
- a system that evaluates and makes changes or improvements in the care process
- a monitor to see if the changes made in the care process had the desired effect, ie, loop closure.

When a defined threshold is met, closure is addressed and documented as such.

Patient Safety is defined by the National Patient Safety Foundation as "The avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the processes of health care. These events include "errors," "deviations," and "accidents." Safety emerges from the interaction of the components of the system; it does not reside in a person, device or department. Improving safety depends on learning how safety emerges from the interactions of the components. Patient safety is a subset of healthcare quality.  
(Cooper, et al)

#### **IV. Acknowledgements**

This plan was developed by the following members of the PI subcommittee of the North Carolina Committee on Trauma:

Steve Vaslef, MD (Chair)  
Betsy Tesseneer, RN, BSN  
Jamie Walker, RN, MSN  
Jeanette Wilson, RN, MSN  
Mark Johnson, RN, EMTP  
Jennifer Sarafin, RN, MSN  
Sylvia Scholl, RN MSN

Bonnie Snyder, RN, BSN  
Carolyn Foley, RN  
Greg Fleming, RRT, EMTP  
Cheryl Workman, RN, MSN  
Kelli Moore, RN, BSN  
Sharon Schiro, PhD  
Kathy Mohr, RN BSN

Sources for the information included: Resources for Optimal Care of the Injured Patient:1999 (American College of Surgeons Committee on Trauma-ACS-COT); The Trauma Performance Improvement- a How To Handbook (PI Subcommittee on the ACS-COT); the JCAHO; and other trauma centers' plans. This guide is a supplement to the ACS Trauma Performance Handbook. Therefore, new centers should utilize the two guides together.

#### **V. Responsibility/Authority**

##### **A. State**

The State Trauma Advisory Committee (STAC) has the responsibility for the state PI program under the authority of the North Carolina Committee on Trauma (NC COT).

##### **B. Regional**

The lead hospital(s) in each Regional Advisory Committee (RAC) in North Carolina has the responsibility for the performance improvement program for its respective region.

##### **C. Local (Trauma Center)**

The trauma medical director has the responsibility for the performance improvement program. The authority for the trauma PI program must come from existing quality and PI structures within the hospital. The location of the trauma program in the organizational structure of the hospital must be such that it can interact with at least equal authority with other departments. The trauma medical director must be empowered to address issues that involve multiple departments, so that program development and performance improvement can occur expeditiously.

Adequate administrative support, as well as defined lines of authority, must be in place to guarantee the comprehensive evaluation of all aspects of trauma care.

## VI. Definitions

1. **Brief Review:** A brief review of patient care/record must include, at a minimum, collection of data and input into the registry, and review of that information by either the Trauma Registrar, Trauma Program Manager (TPM) and/or Trauma Medical Director (TMD). Patients that may need only brief review include patients admitted to trauma and non-trauma services that have no delays in care, no unexpected complications, no errors in care and/or do not die; transfers that occur within 6 hours of injury, and /or patients admitted for 24 hours or less and are discharged alive.
2. **Clinical Management Guidelines:** Systematically developed, evidence-based approaches designed to assist in clinical management decision-making that reflects the continuum of care.
3. **Complication:** Any event that deviates from an anticipated recovery from illness or surgery. (ref. American College of Surgeons Committee on Trauma: *Resources for Optimal Care of the Injured Patient:1999*. American College of Surgeons, Chicago, IL, 1998.)
4. **Corrective Action Plan:** A structured effort to improve performance or process that has been identified through the PI process as sub-optimal.
5. **Credentialing:** Approval of a physician (credentialed provider) as a member of the trauma team, based on a review of the individual's training and experience by the trauma service director and the appropriate service chief. Physician Extenders are also considered credentialed providers through the hospital medical staff and are subject to review by the Trauma Peer Review Committee.
6. **Disease Related:** An event or complication that is an expected sequela of a disease, injury, or illness.
7. **Discretionary Filters:** Audit criteria that may be used to evaluate trauma programs and/or patient care issues (See Appendix B).
8. **Full Review:** A full review of a patient record/care includes evaluation of care provided from the pre-hospital period at least through patient discharge. The review must include any complications, either expected or unexpected, delays in care and patient outcomes. If the patient dies, a determination must be made as to whether the death was preventable, potentially preventable or non-preventable. This review must be documented in writing and submitted to the Trauma Medical Director for final evaluation. All deaths must have a full review. If the patient has been cared for exclusively by a non-trauma service physician, that death review may be conducted by the off-service PI committee, to include the same death judgment and appropriateness of care. Patients who must also undergo a full review include the following: those that are transferred greater than 6 hours after injury; patients that are re-admitted for the same injury or missed injury; and patients with unexpected outcome.
9. **Loop Closure:** Measurement of a process or outcome after implementation of the corrective action plan. Monitoring must be demonstrated and documented.
10. **Morbidity:** Any deviation from normal health that may be a result of a complication or may be pre-existing.

11. **Non-discretionary filters:** Audit criteria that are state mandated and utilized to evaluate the trauma program/patient care and that must be demonstrated at each site visit. (See Appendix A)
12. **Non-preventable:** An event or complication that is sequela of a procedure, disease, illness, or injury for which reasonable and appropriate preventable steps have been taken.
13. **North Carolina Committee on Trauma (NC COT):** Committee consisting of the trauma medical directors of the centers within the state of NC whose mission is to develop and implement meaningful programs for trauma care in local, regional, national, and international arenas. These programs must include standards of care, assessment of outcome, and financial accountability. The NC COT will serve as a resource to the North Carolina Office of Emergency Medical Services for trauma-related matters.
14. **NTRACS** - National Trauma Registry of the American College of Surgeons (ACS). A commercial software package for collection, storage, analysis and reporting of trauma patient information on an individual hospital level. These data must be sent to the state quarterly. (NOTE: all designated trauma centers or those applying for designation must use the state approved software program that, at this time, is NTRACS.)
15. **Outcome:** Results of patient care from the patient, provider and/or society perspective.
16. **Potentially Preventable:** An event or complication that is sequela of a procedure, disease, illness, or injury that likely would not have occurred had the identified errors been avoided.
17. **Preventable:** An event or complication would not have occurred to a reasonable degree of medical certainty had the identified errors been avoided.
18. **Process:** Elements of care that relate to the system or structure in which the care is delivered.
19. **Provider-Related:** An event or complication resulting from care provided by pre-hospital personnel, technicians, nurses or physicians that leads to delays or errors in technique, treatment or communication.
20. **Regional Advisory Committee (RAC):** Group comprised of at least one Level I or II trauma center (lead agency) and a representatives of trauma care providers and the community, for the purpose of regional trauma planning, establishing, and maintaining a coordinated trauma system.
21. **State Trauma Advisory Committee (STAC):** Committee comprised of representatives from trauma centers across the state, the purpose of which is to provide a forum to facilitate trauma system development and coordination of trauma activities, to provide a manageable meeting format while keeping the system inclusive and to ensure input from all groups. (Each group will report activities/issues to the STAC through designated representatives. STAC membership is defined in the personnel section below).

22. **System-Related:** An event or complication not specifically related to a provider or disease but to a system
23. **Tiered Activation System:** A system that determines the level of resources mandated upon the patient's arrival and is determined by anatomic, physiologic or mechanistic criteria. Exact definitions may be institutional specific.
24. **Trauma patient:** Any patient with an ICD-9-CM discharge diagnosis 800.00-959.9 excluding 905-909 (late effects of injury), 910.0-924 (blisters, contusions, abrasions, and insect bites), and 930-939 (foreign bodies).
25. **Trauma Registry:** North Carolina computerized data collection system utilizing the ACS NTRACS database. Data points and their definitions are standardized by the Trauma Datapoint Committee to ensure that data are collected uniformly throughout the state. Each institution may use custom data points.

## ***VII. Personnel***

### **HOSPITAL** (Disclaimer: Some titles are institution-specific)

1. **Clinical Nurse Specialist/Nurse Practitioner/Trauma Case Manager:** An RN with expert trauma experience, frequently Masters prepared, that facilitates the patient/family continuum. Assists the manager, director and registrar in identifying problems and trends.
2. **Physician Extender/Physician Assistant:** Assists in the care of the trauma/injury patient under the direct supervision of a physician.
3. **Trauma Coordinator/ Program Manager:** Shares responsibility for the PI program with the director. Administers the daily operations of the program: handles problems/issues; identifies trends; and maintains documentation of the PI process.
4. **Trauma Medical Director:** Responsible for the leadership of a trauma Performance Improvement/Patient Safety (PIPS) program at the individual institution. Directs the PI process and the multidisciplinary review process. May delegate this or part of this to other trauma team members.
5. **Trauma Registrar:** Responsible for abstracting and entering data into the registry. May be involved in studies. May complete monthly PI reports alone or in conjunction with the director and or manager.

### **STATE**

1. **North Carolina Trauma Registry Director:** Collects, maintains, trends, and reports state trauma registry data. These data are assembled from all designated North Carolina trauma centers and many North Carolina community hospitals. This person is responsible for maintaining confidentiality in data and reporting.

2. **Hospital and Trauma Specialist:** Member of the staff of the North Carolina Office of Emergency Medical Services who serves as the liaison with the trauma centers in North Carolina. Guides in the interpretation of rules and regulations for the trauma centers. Directs the NC trauma designation process.
  
3. **EMS Medical Director:** Under contract to the North Carolina Office of Emergency Medical Services, serves as a consultant with the Hospital and Trauma Specialist for the North Carolina trauma system.
  
4. **STAC:** STAC membership consists of:
  - Trauma Medical Directors - one representative from each designated trauma center (including one designee as NCCOT representative)
  - Trauma Program Managers – one representative from each designated trauma center (including one designee as TPM committee representative)
  - Trauma Registrars – one representative
  - NCCEP - one representative
  - EMS Administrators - one representative
  - ATS – one representative
  - ISSAC – one hospital representative
  - RAC Coordinators – one representative
  - OEMS Hospital and Trauma Specialist
  - NCTR Director from the Central Data Collection Agency
  - NCCOT Chair, Vice Chair, and Immediate Past Chair
  - Air Medical - one representative
  - EMS Provider - one representative

## REGIONAL (RAC)

1. **RAC membership:** The RAC membership shall include, at a minimum, the trauma medical director(s) and the trauma nurse coordinator(s) or program manager(s) from the lead RAC agency; outreach coordinator(s) or designee(s) from the lead RAC agency; RAC registrar or designee from the lead RAC agency; a senior level hospital administrator; an emergency physician; an Emergency Medical Services representative; a representative of each hospital participating in the RAC; community representatives; and, an EMS System physician involved in medical oversight.
  
2. **RAC Coordinator:** The RAC Coordinator is responsible for the oversight of the development and operations of the Regional Advisory Committee for Trauma to include but is not limited to:
  - Planning and coordination of RAC meetings;
  - Enhancing communication and information sharing among trauma providers;
  - Facilitating regional trauma registry development and quality improvement activities;
  - Conducting or facilitating organizational, trauma provider, and community education.
  - Conducting or facilitating community based injury prevention activities.

## **LOCAL**

1. **EMS Director:** Director of a local EMS agency. May facilitate addressing problems/issues that arise in the pre-hospital environment. Attends PI meetings.
2. **EMS Medical Director:** Medical Director of an EMS agency. Responsible for approving pre-hospital policies, procedures and protocols. Attends PI meetings.

## ***VIII. Data Collection***

### **A. NC Trauma Registry**

1. **Quality:** It is important that collected data is:
  - a. Obtained in a timely manner, monitored, stored and transmitted to protect patient confidentiality.
  - b. Collected as per the NC Trauma Registry definitions
2. **Selection:** The population to be monitored meets the NC Trauma Registry Inclusion Criteria (800-959.9) and trauma patients that meet observation criteria, (24-hour hospital stay) excluding 905-909 (late effects of injury), 910-924 (blisters, contusions, abrasions, and insect bites) and 930-939 (foreign bodies). The “trauma patient” is defined as a person who has sustained acute injury and by means of a standardized field triage criteria (anatomic, physiologic and mechanism of injury) is judged to be at significant risk of mortality or major morbidity.

The data sources listed below will be used to develop a profile of care provided by the Trauma Center.

### **B. Other Sources of Information**

1. Patient record
2. Patient rounds
3. Conferences
4. E Mail communications
5. Problem sheet communications
6. Verbal communication
7. Patient complaints
8. Risk management reports
9. Hospital Information Systems
10. Pre-hospital reporting
11. Referral hospital feedback

### **3. Participation**

- a. Trauma centers are required to submit data to the NC State Trauma registry on a quarterly basis.
- b. Non-trauma centers may voluntarily submit data to the NC State Trauma Registry.

#### 4. Data Validation

- a. Data validation must be performed by each trauma center using information from the Central Data Collection Agency and the validation guidelines developed by the Data Validation Sub-Committee of the Trauma Registrars.

### *IX. Review*

#### 1. Types of Review:

- a. **Retrospective** - implies abstraction from charts, conferences or registry information often analyzed following patient discharge. Example - mortality review
- b. **Concurrent** - implies that data is recorded and care analyzed in real time. Example: patient rounds
- c. **Trend Analysis:** When issues/problems are identified as happening in greater frequency than expected or complications are occurring that are unexpected; a review of these trends must occur, to include an action plan and evaluation of action plan. Example: Aspiration pneumonia is occurring with more frequency in the ED and appears to be associated with aspiration of contrast material. A focused review and analysis of the issues leading to the problem needs to occur, a plan of action needs to be put in place and a follow up audit needs to demonstrate improvement of the problem.
- d. **Periodic Audits:** Audits that occur in a time frame defined by the trauma program administrators which may or may not be initiated due to problems identified. These may be just "checks" in the system. Example: Trauma Surgeon response time is a mandatory filter that must be reported at the site visit. In order to ensure compliance and document that response time is at 80% or better, a periodic audit through NTRACS should be run. If a trend is identified regarding response times then a more focused review and action plan will be developed.
- e. **Focused Audits:** a review of a filter or problem that has been identified as an issue. Example: Trauma Surgeon response time is run periodically. If it was discovered that the times were greater than 20 minutes or that the problem was lack of documentation of times; a more focused review and action plan would be completed.
- f. **Process monitors:** a review that looks at the process in which care is provided.

Examples include:

- 1) Compliance with guidelines, protocols, and pathways
- 2) Appropriateness of pre-hospital and ED triage
- 3) Delay in assessment diagnosis, technique, or treatment
- 4) Error in judgment, communication, or treatment
- 5) Appropriateness and legibility of documentation
- 6) Timeliness and availability of x-ray reports
- 7) Timely participation of subspecialties
- 8) Availability of operating suite, acute and subacute

- 9) Timeliness of rehabilitation
- 10) Availability of family services
- 11) Insurance carrier denials
- 12) Consistency of outpatient follow up

g. **Outcome monitors:** Evaluation of patient care from an outcome perspective

Examples include:

- 1) Mortality
- 2) Morbidity
- 3) Length of stay
- 4) Cost
- 5) Quality of life
- 6) Patient satisfaction

h. Refer to Appendix C for PI process flow sheet.

## 2. RAC Meetings

The PI Sub-Committee must meet no less than 2 times per year. At a minimum, multidisciplinary trauma providers and others as deemed appropriate should attend. This includes for example, RNs, MDs, EMS providers.

## 3. Trauma Center Performance Improvement Committee Meetings

Purpose: To complete reviews/issues.

- a. **Trauma program performance committee** - a meeting held at least quarterly to address global trauma system issues including prehospital, interdepartmental issues, and inter-hospital issues that affect patient care. The committee addresses system process issues, keeps minutes, attendance (to include department affiliation) and works to correct overall program deficiencies to optimize patient care. (See Table 1 for additional information, p 13.)
- b. **Multidisciplinary peer review** - a meeting that is held at least quarterly to discuss and resolve patient management issues including preventable or possibly preventable morbidities and/or mortalities; to develop and approve clinical management guidelines; and to address complex system issues not resolved in other forums. The core panel that must attend this meeting includes the surgeons taking trauma call (as selected by the trauma medical director) that may be representatives of the group of trauma surgeons or may be all trauma surgeons; physician representatives from Orthopaedics, Neurosurgery, Emergency Medicine, Anesthesiology; and the Trauma Nurse Coordinator/Trauma Program Manager. The Trauma Medical Director may add others to this core group as deemed appropriate/needed for review. Information from this meeting, while confidential and protected by peer review, must be shared with other medical care providers involved in the specific case in an effort to improve patient care, prevent future delays or complications and/or provide education for the improvement of trauma care. Examples of relevant peer review include appropriateness and timeliness of care and evaluation of care priorities among specialists. This performance review must be done by those with similar credentials. When the trauma surgeon is the primary physician on a case, he/she should have his/her peer review completed by another physician. Credentialed provider related issues, which are potentially preventable or preventable, should be integrated into the hospital-wide peer review process. Minutes should be taken, as well as attendance, to include department affiliation. (See meeting list for additional information.)

- c. **Quality Indicators/Monitors:** Non-discretionary (ND) data must be collected and a review performed. Discretionary (D) data to be collected will be selected by the trauma center; however review performed only if indicated by trending information. There may be valid reasons why an event occurs differently from the ideal expectation. Quality indicators/monitors are statements of an ideal expectation. This fact should be documented in the medical record by the physicians involved in the patient's care and then noted during the PI review. (Outcome quality indicator) Example: open fracture to the OR within 8 hours. If the patient has a severe brain injury and the neurosurgeon does not feel this to be in the patient's best interest, a delay may be made in operative intervention and documented as such in the patient record.

#### 4. Steps in the Review Process:

- a. Identify the injury/trauma patient utilizing the ICD-9 codes (See the definition of a trauma/injury patient.)
- b. Data is collected by the trauma registrar on ALL patients within this ICD-9 code. The patient and the record are reviewed by the Trauma Registrar and/or TPM and/or Clinical Nurse Specialist.
- c. Issues/problems revolving around the care of the patient from prehospital through the discharge process are identified. Trauma performance improvement issues are identified in a number of different ways, through case management of the patient by the TPM and CNS; through referral from other sources including the management teams in the ED, ICU or floor; individual nurses; technicians or other staff members; physicians; pre-hospital team members; and/or risk managers. The TPM or TR may screen the patient records on a daily basis. They assess for any issues that may prompt review.
- d. Complications are identified throughout the patient's stay and documented in the registry. Trends of complications may be run periodically as dictated by the trauma center PI plan.
- e. The TPM reviews the issue/problem/complaint and attempts to resolve the issue if appropriate. The Trauma Program Medical Director is kept apprised of issues. Issues that are trends, cross departments, personnel/staffing issues, or system issues need to be addressed in the Trauma Program Performance meeting.
- f. Any problem/issue that is identified as a sentinel event (see JCAHO definition) must be referred, per hospital policy, to risk management and administration for evaluation.
- g. Problems/issues that are identified as credentialed provider-related are referred to the department chair or designee of the specific department or the multi-disciplinary peer review committee for discussion and resolution with documentation of closure. Problems/issues that are referred to other departments must have clear written documentation back to the trauma program of resolution/closure of the issues.
- h. All admitted injury patients will go through some level of review which may be as brief as the data collection and brief case review by the TPM/TR to the full PI process. The following are examples:

Brief Review	Full Review
Non-trauma service admits to be reviewed by admitting service. If admitting service does not have a PI process in place, PI must be done by the Trauma Service.	Deaths – Deaths of patients that are cared for by non-trauma surgeons must have a full review and written report back to the trauma program.
All other admitted trauma not included in the full review process	Transfers from initial institution > 6 hours.
Transfer from initial institution < 6 hours	Re-admit for same injury problems or missed injury
24 hour observation patients with no complications	Unexpected outcomes (as defined by the institution)

- i. In addition to the review of specific patients, the PI plan should include periodic audits, focused audits and trend analysis. These are institution specific and are normally based on evaluation of the program by the Trauma Medical Director and Trauma Program Manager/Coordinator.
- j. Complications, as identified by review of the trauma registry, can be monitored through trend analysis. If it is noted that a certain complication is occurring more frequently than expected, then an audit and full review are warranted.
- k. Evaluation of patients that are called a trauma should be reviewed for appropriateness of “call”.
- l. Mortality should be evaluated utilizing Injury Severity Score (ISS). An example would be review of deaths with ISS scores < 15 compared to deaths of patients with ISS > 15.
- m. Documentation and review of times and reasons for trauma-related diversion of patients from the scene or referring hospital.

**X. Meetings**

A. RAC Meetings

RAC PI sub-committee meeting to occur no less than two times per year.

B. Trauma Center Meetings

<b>Trauma Program Performance Committee</b>	<b>Multidisciplinary Peer Review</b>
Purpose: To address system and educational issues and to serve as the conduit for policy / procedure approval.	Purpose: To discuss multi-disciplinary cases not resolved in other forums, quality of care clinical decisions and patient management
Independent from, but coordinated with, hospital PI	Independent from, but coordinated with department PI
Administratively driven	MD driven
Members usually include those such as ED, ICU and trauma floor(s) nurse managers or their designees; trauma physicians; reps from EMS, radiology, flight team. PT, OT, Speech; ED Medical Director or designee; OR director; hospital department head (administrative level superior to the Trauma Program Manager and Trauma Program Medical Director) above Trauma Program Manager for the trauma service; registrars, and trauma team members.	Members: Physicians taking trauma call, representatives from Orthopedics, Neurosurgery, Emergency Medicine, Radiology, Anesthesiology, as well as the TNC or TPM and other physicians as the particular case(s) require.
Facilitated by: TNC, TPM	Facilitated by: Trauma Medical Director or designee within Trauma Service
Meetings: No less than quarterly	Meetings: No less than quarterly
Attendance: 50% at a minimum by service / department	Attendance: 50% at a minimum by service / department
Minutes: to hospital PI with clear documentation of problem resolution and / or plan	Minutes: Reported to Hospital PI Documentation of resolution and/or plan. It may be helpful to grade morbidities and determine the preventability of morbidities and mortalities. Credentialed provider-related issues, which are potentially preventable or preventable, should be integrated into the hospital-wide peer review process.
Issues addressed: Trended issues Global trauma system issues	Issues addressed: Preventable and possibly preventable morbidity and mortality; Inter-service system issues, sentinel events

**Level III trauma centers may combine these two meetings**

## ***XI. Initial Trauma Center Designation - PI Plan***

1. During a site review, trauma centers applying for initial designation must demonstrate that all the non-discretionary areas are monitored.
2. Outcomes of those monitors/indicators must be documented with a clear plan of action including re-evaluation of the action plan.
3. Identified discretionary filters (see Appendix B) must have been evaluated during the 6 months preceding the site visit. Identification of chosen filters will be based on assessment by the Trauma Medical Director, Trauma Program Manager and trauma team utilizing the registry and identified risk areas for the individual center. This evaluation may be as simple as a registry review of complications and trends of these. If problems have been identified, an action plan must be demonstrated with re-evaluation of that plan.

Examples: Time to transfer, ED to OR times, missing ACR (Ambulance Call Report), triage criteria compliance, GCS < 8 with no intubation. Refer to Appendices A and B) for lists of discretionary and non-discretionary filters.

## ***XII. Renewal of a Trauma Center - PI Plan***

1. During the site review, trauma centers applying for re-designation must demonstrate that all non-discretionary filters are monitored.
2. Outcomes of those monitors/indicators must be documented with a clear plan of action including re-evaluation of the action plan.
3. Discretionary filters/indicators will be selected by the individual trauma center based on the history of the trauma program (to include concerns identified in earlier state site visits) and on problems/issues identified during the PI process.
4. During the site review process, indicators may be found indicating the need for a focused review.

## APPENDIX A

### Monitor / Indicator Filters for Trauma Performance Improvement

All thresholds set by the institution are at a **minimum of 80%** unless otherwise specified. The following filters are **non-discretionary** filters that must be monitored by all trauma centers.

#### A. Non-Discretionary (MANDATORY) filters:

- All deaths (100%) regardless of where they occurred
- Trauma surgeon response times (PGY IV or higher)
  - $\geq 20$  minutes for highest tier of activation (Level I and II trauma centers)
  - $\geq 30$  minutes for highest tier of activation (Level III trauma centers)
  - Monitor response times for other tiers of activation for timeliness and appropriateness
- Neurosurgeon response  $> 60$  minutes (may be less as defined by the institution) for life threatening neurosurgical injuries
- Orthopedic Surgeon response  $> 60$  minutes (may be less as defined by the institution) for life threatening or limb threatening injuries
- Airway Manager – Physician responsible for the trauma patient’s airway must be present on patient arrival, may be the Emergency Department physician, Anesthesiologist, or Trauma surgeon.
- Monitor Over / Under triage rate (definition is institution specific)
- Nursing Documentation (Choose one phase to monitor documentation). The phase chosen is at the discretion of the Trauma Medical Director and Trauma Program Manager.

Phases: Resuscitation Phase  
Operative Phase  
Critical Care Phase  
Step Down / Floor Phase

- Admissions by Non-Surgeon
- Delay in Disposition
- Delay in Consultation
- Delay in Trauma Team Activation
- Minimum of one filter that addresses timeliness and appropriateness of care (this can come from the Discretionary List) for each of the following areas of care:

Trauma / Surgical Care  
Neurosurgical Care  
Orthopedic Care

#### B. Discretionary (Not Mandatory) filters:

When reviewing Discretionary filters, as compliance improves in areas of review, the trauma center will identify other areas to review. Discretionary filters are listed in Appendix B.

## APPENDIX B

### ***Examples of Discretionary (Not Mandatory) Filters***

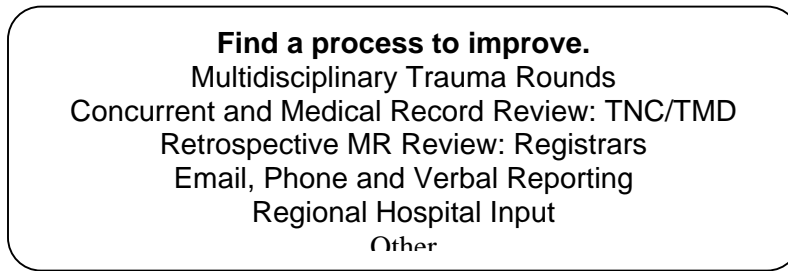
PREHOSPITAL AIRWAY	HEPATIC/PANCREATIC/BILIARY	MISCELLANEOUS
1001 Aspiration	4501 Acalculous Cholecystitis	8501 Anesthetic Complication
1002 Esophageal Intubation	4502 Hepatitis	8502 Drug Complication
1003 Extubation Unintentional	4503 Liver Failure	8503 Fluid & Electrolyte Complications
1004 Mainstem Intubation	4504 Pancreatic Fistula	8504 Hypothermia (<95°F or 35°C) Mg'd?
1005 Unable to Intubate	4505 Pancreatitis	8505 Monitoring
1009 Other Airway	4506 Splenic Injury (iatrogenic)	8507 Readmission
	4599 Other Hepatic / Biliary	8508 Post-Op Hemorrhage
PREHOSPITAL FLUIDS	HEMATOLOGIC	PROVIDER ERRORS/DELAYS
1501 Inappropriate Fluid Management	5001 Coagulopathy (intra-operative)	9001 Delay in Disposition - LOS
1502 Unable to Start IV	5002 Coagulopathy (other)	9002 Delay in Trauma Code Activation
1599 Other Prehospital fluid	5003 Disseminated Intravascular Coag	9003 Delay to OR
PREHOSPITAL MISCELLANEOUS	5005 Transfusion Complication	9004 Delay in MD Response
2001 No EMS Form	5099 Other Hematologic	9005 Delay in Obtaining Consult
2002 Incomplete EMS Form	INFECTION	9006 Delay in Diagnosis
2003 Prehospital Delay	5501 Cellulitis / Traumatic Injury	9007 Error in Diagnosis (& x-ray reads)
2099 Other Prehospital	5502 Fungal Sepsis	9008 Error in Judgments
AIRWAY	5503 Intra-abdominal Abscess	9009 Error in Technique
2501 Esophageal Intubation	5504 Line Infection	9010 Incomplete Hospital Record
2502 Extubation Unintentional	5505 Necrotizing Fascitis	RENAL
2503 Mainstem Intubation	5506 Sepsis-like Syndrome	6001 Renal failure
2599 Other Airway	5507 Septicemia	6002 Ureteral Injury (Iatrogenic)
PULMONARY	5508 Sinusitis	6003 UTI - Early (< 72 hrs)
3001 Abscess (excludes empyema)	5509 Wound Infection	6004 UTI - Late (> 72 hrs)
3002 ARDS	5510 Yeast Infection	6099 Other Renal / GU
3003 Aspiration / Pneumonia	5599 Other Infection	VASCULAR
3004 Atelectasis Required Treatment	MUSCULOSKELETAL/INTEGUMENTARY	7501 Anastomotic Hemorrhage
3005 Empyema	6501 Compartment Syndrome	7502 DVT - Lower Extremity
3006 Fat Embolus	6502 Decubitus (minor)	7503 DVT - Upper Extremity
3007 Hemothorax	6503 Decubitus (blister)	7504 Embolus (non-pulmonary)
3008 Pneumonia	6504 Decubitus (open sore)	7505 Gangrene
3009 Pneumothorax (barotrauma)	6505 Decubitus (deep)	7506 Graft Infection
3010 Pneumothorax (iatrogenic)	6506 Loss of Reduction / Fixation	7507 Thrombosis
3011 Pneumothorax (recurrent or other)	6507 Nonunion	7599 Other Vascular
3012 Pneumothorax (tension)	6508 Osteomyelitis	PSYCHIATRIC
3013 Pulmonary Edema	6509 Ortho Wound Infection	8001 Psychiatric - result of present injury
3014 Pulmonary Embolus	6599 Other Musculoskeletal / Integumentary	ACS AUDIT FILTERS
3015 Respiratory Failure / Distress	NEUROLOGIC	Abd injury and low BP laparotomy > 1 hour
3016 Upper Airway Obstruction	7001 Alcohol Withdrawal	GCS < 14, No head CT
3017 Pleural Effusion	7002 Anoxic Encephalopathy	GCS ≤ 8 No ETT or surgical airway
3099 Other Pulmonary	7003 Brain Death (unexpected)	No Lap ≤ 1 hr abd injury and SBP < 90
CARDIOVASCULAR	7004 Diabetes Insipidus	Laparotomy > 4 hours
3501 Arrhythmia	7005 Meningitis	Craniotomy > 4 hours EDH / SDH
3502 Cardiac Arrest (unexpected)	7006 Neuropraxia (iatrogenic)	Abd, Thoracic, Vasc or Cranial Surg > 24 hr
3503 Cardiogenic Shock	7007 Non-op SDH / EDH	Nonfixation of Femoral Diaphyseal in Adult
3504 CHF		

3505 MI	7008 Progression of original neuro Insult unexpected	Ambulance scene > 20 minutes
3506 Pericarditis	7009 Seizure in Hospital	No hourly vital signs in ED
3507 Pericardial Effusion / Tamponade	7010 SIADH	Transfer > 6 hrs in initial hospital
3508 Shock	7011 Stroke / CVA secondary to original injury	Reintubation within 48 hrs
3599 Other Cardiovascular	7012 Ventriculitis - (post-op)	Delay in Care
<b>GASTROINTESTINAL</b>	7099 Other Neurologic	GCS < 8 with no ICP monitor
4001 Anastomotic Leak		Failed non-operative management of GSW to abd
4002 Bowel Injury (iatrogenic)		Failed non-operative management of blunt injuries
4003 Dehiscence / evisceration		Initial treatment of open fracture > 8hrs from admit
4004 Enterotomy (iatrogenic)		
4005 Fistula		
4006 Hemorrhage - Lower GI		
4007 Hemorrhage - Upper GI		
4008 Ileus		
4009 Peritonitis		
4010 Small Bowel Obstruction		
4011 Ulcer-Duodenal / Gastric		
4099 Other GI		

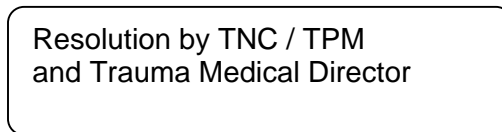
# APPENDIX C

## Trauma Surgery Service Issue Identification Process

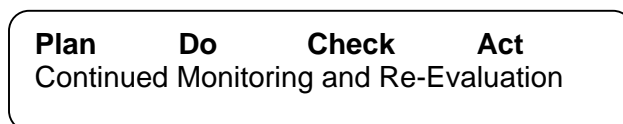
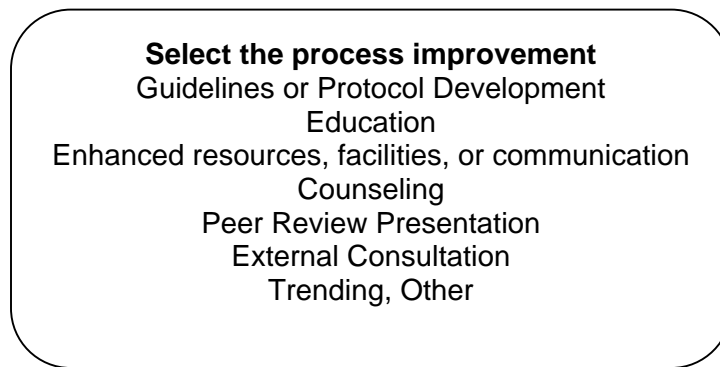
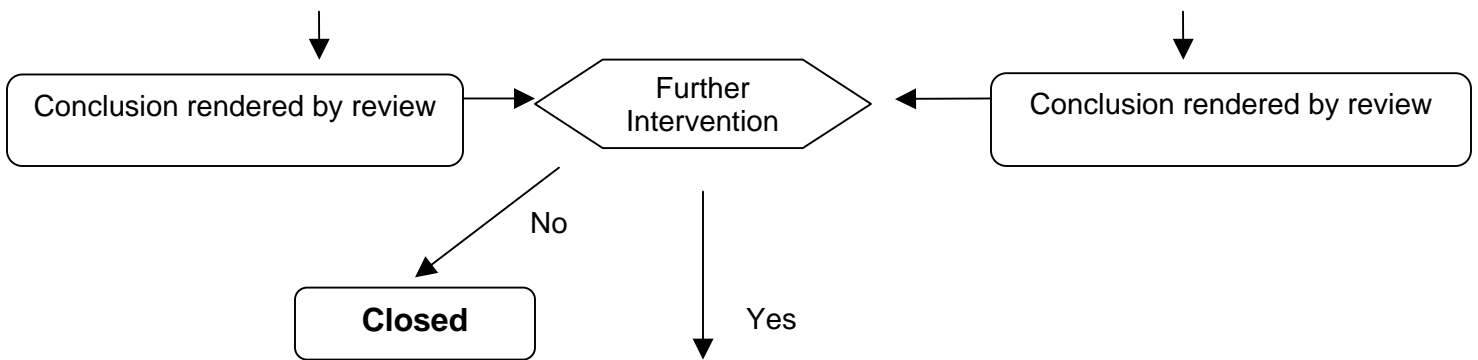
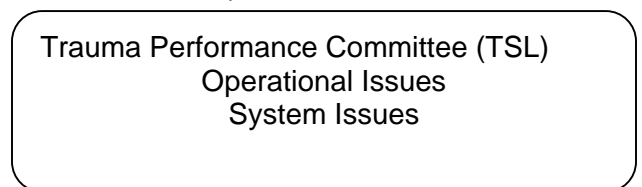
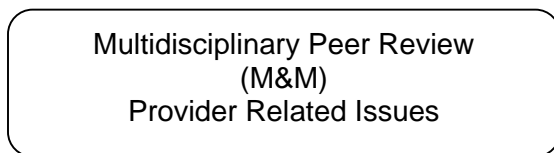
### Tier Review



### Second Tier Review



### Third Tier Review



## **APPENDIX D**

### **(RAC) Regional Improvement Process**

#### **I. Purpose**

The purpose of these guidelines is to aid in developing trauma performance improvement standards for the community facility and the Emergency Medical Service.

#### **II. Rationale**

Prior to delivery of definitive care Emergency Medical Services and community hospitals often assume vital roles in acute management of trauma patients. The goal of standardization of treatment processes suggests that mechanisms for surveillance of medical management should be incorporated into regional trauma care. Appendix D represents performance improvement processes directed towards assuring regional standards of care.

The following areas describe projected benefits in developing and maintaining a regional trauma performance improvement strategy.

- Reduction in variations of care through standardization of processes.
- Improvement in efficacy, access and timeliness to definitive care.
- Ensuring competent & current providers
- Ensuring effective and appropriate utilization of trauma systems and associated resources
- Identifying consistent mechanisms for reporting issues
- Identifying areas for improvement and effective process management

#### **III. P/I Process - Methodology**

Regional Facilities and EMS agencies shall establish a trauma performance improvement process. The process should include the selection of a committee lead by a chairperson for committee oversight. The committee should be comprised of members typically involved in trauma care and representative of involved parties.

##### **Examples:**

Regional Facility PI Committee

**ED Medical Director**

**ED Director**

**Nursing Personnel**

**EMS representative**

Emergency Medical Services PI Committee

**EMS Medical Director**

**Emergency Nurse Liaison**

**EMS Director or Appointee**

**EMS Training Officer or Appointee**

#### **IV. Discretionary Audit Filters**

**Hospital  
Filter**

Monitored Purpose

Traumatic Deaths	Care Appropriateness
ED LOS > 4 hours prior to transfer	Care Appropriateness <ul style="list-style-type: none"> <li>▪ Timeliness of transfer</li> </ul>
Non Trauma Center ICU admission	Triage Appropriateness
Blood product administration	Resuscitative Appropriateness <ul style="list-style-type: none"> <li>▪ Meets ATLS Guidelines</li> </ul>

### Emergency Medical Service

Filter	Monitored Purpose
Traumatic Deaths	Care Appropriateness (occurring during EMS care)
Air Medical Utilization	Appropriateness <ul style="list-style-type: none"> <li>▪ Meeting Air Medical Triage Criteria</li> </ul>
Attempted Intubations	Care Appropriateness <ul style="list-style-type: none"> <li>▪ RSI – Utilize Audit tool for monitoring</li> </ul>
Triage	Appropriateness

### V. Process Improvement Steps

Step 1. Audit Filter Identified?

Step 2. Chart/ACR (Ambulance Call Report) Review  
Identify Filter Deviations

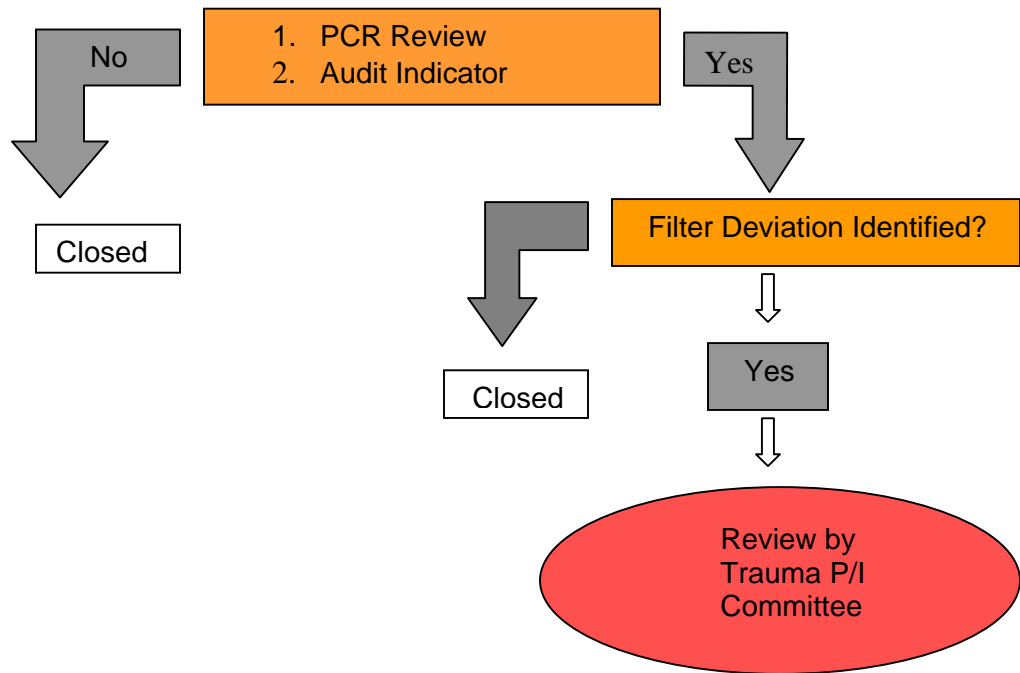
Step 3. Determine degree of review

- Single Review
- Committee Review

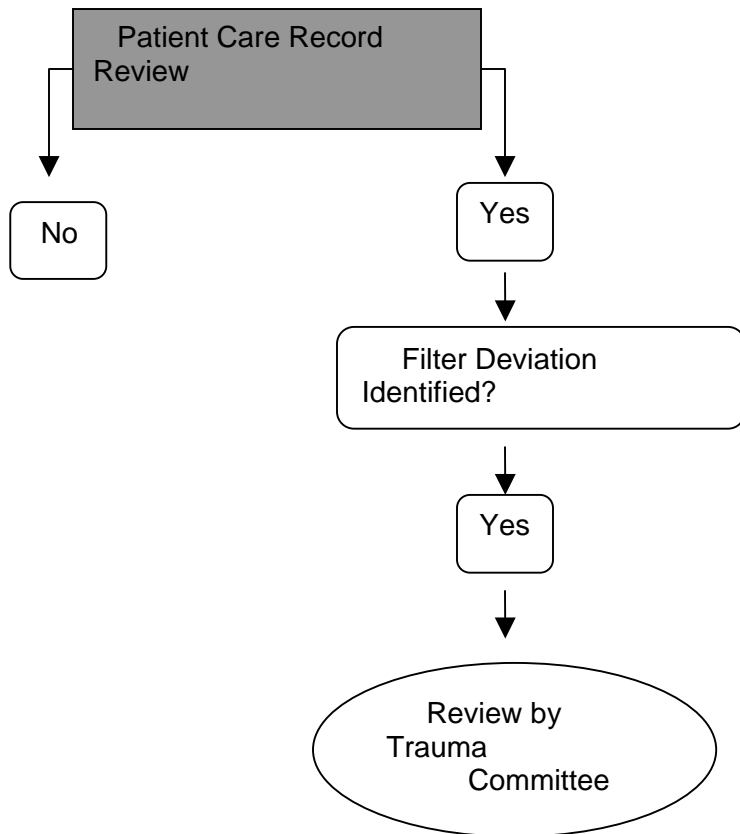
Step 4. PI Committee Review

Step 5. Select method of process improvement

**Example 1.**



**Example 2.**



## REFERENCES

1. American College of Surgeons, Committee on Trauma Resources for Optimal Care of the Injured Patient, Chicago, ACS 1993, 1999.
2. Cooper JB, Gaba DM, Liang B, Woods D, Blum LN. National Patient Safety Foundation agenda for research and development in patient safety. *Medscape Gen Med [series online]*. 2000;2(3): 9 pgs.
3. The Performance Improvement Manual: 2001. The American College of Surgeons, Committee on Trauma – see [www.facs.org](http://www.facs.org) (can download from the web)