Performance Improvement Guideline for the North Carolina Trauma System

Property of North Carolina Committee on Trauma

Performance Improvement / Outcomes Sub-committee

of the American College of Surgeons

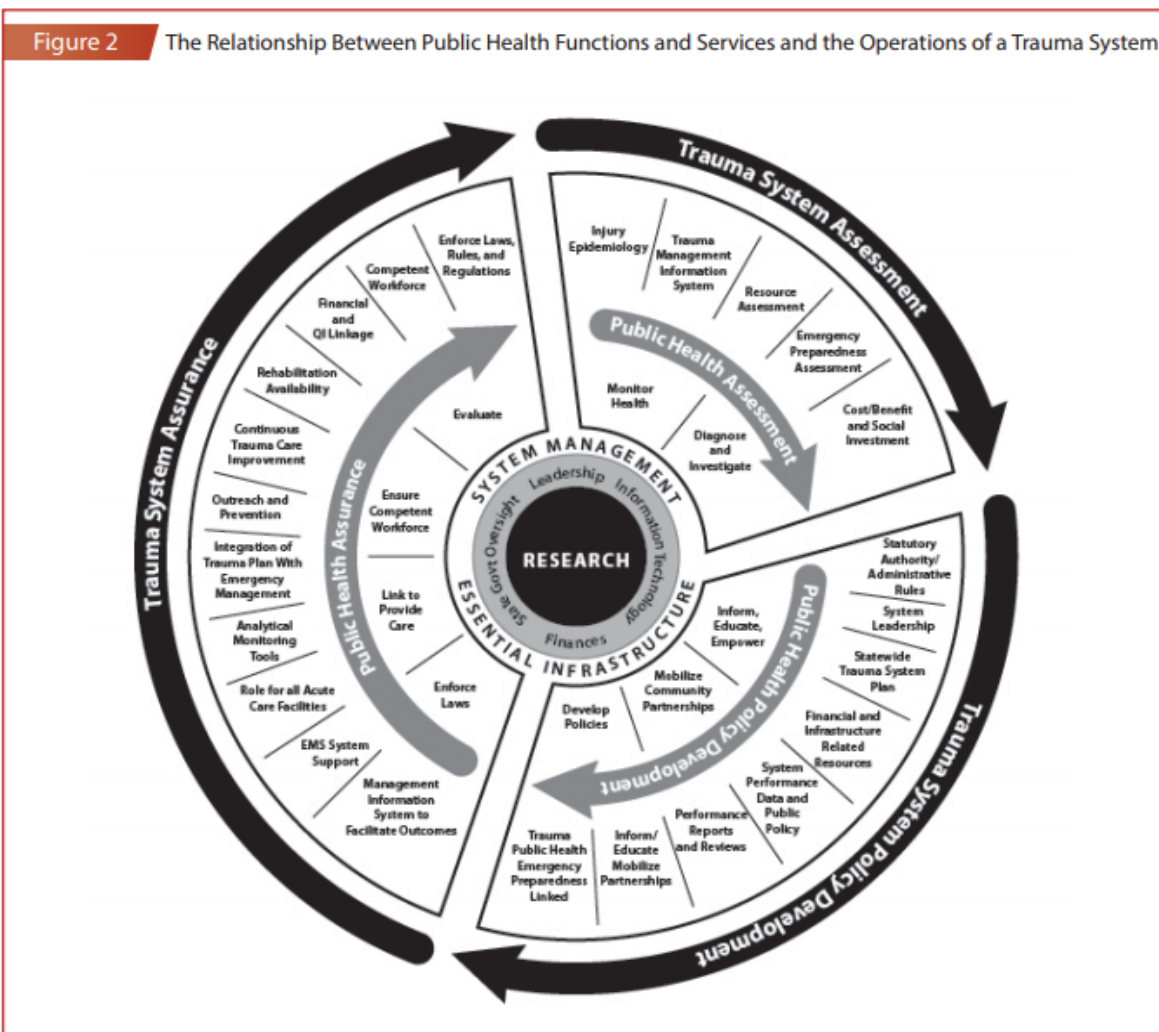June 2017 Revision

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I. Purpose

The purpose of this manual is to serve as a PI resource and supplement to the Resources for Optimal Care of the Injured Patient 2014 document for North Carolina trauma centers.

II. Mission Statement

The mission of the Performance Improvement / Outcomes Sub-committee is to provide and monitor a trauma system-based, statewide Performance Improvement Patient Safety (PIPS) program to assure quality outcomes.

III. Performance Improvement/Patient Safety

Trauma PI and patient safety are the result of designed and coordinated care across the continuum of injury care (prevention to rehabilitation). Refer to Figures 2 & 3 located in the Regional Trauma Systems Chapter for   detail.

Figure 2 — The Relationship Between Public Health Functions and Services and the Operations of a Trauma System

Source: U.S. Department of Health and Human Services, Health Resources and Services Administration. *Model Trauma System Planning and Evaluation.* Rockville, MD: U.S. Department of Health and Human Services; 2006. Available at: www.facs.org/quality-programs/trauma/tsepc/resource. Accessed September 24, 2013.

Figure 3 A Preplanned Trauma Care Continuum
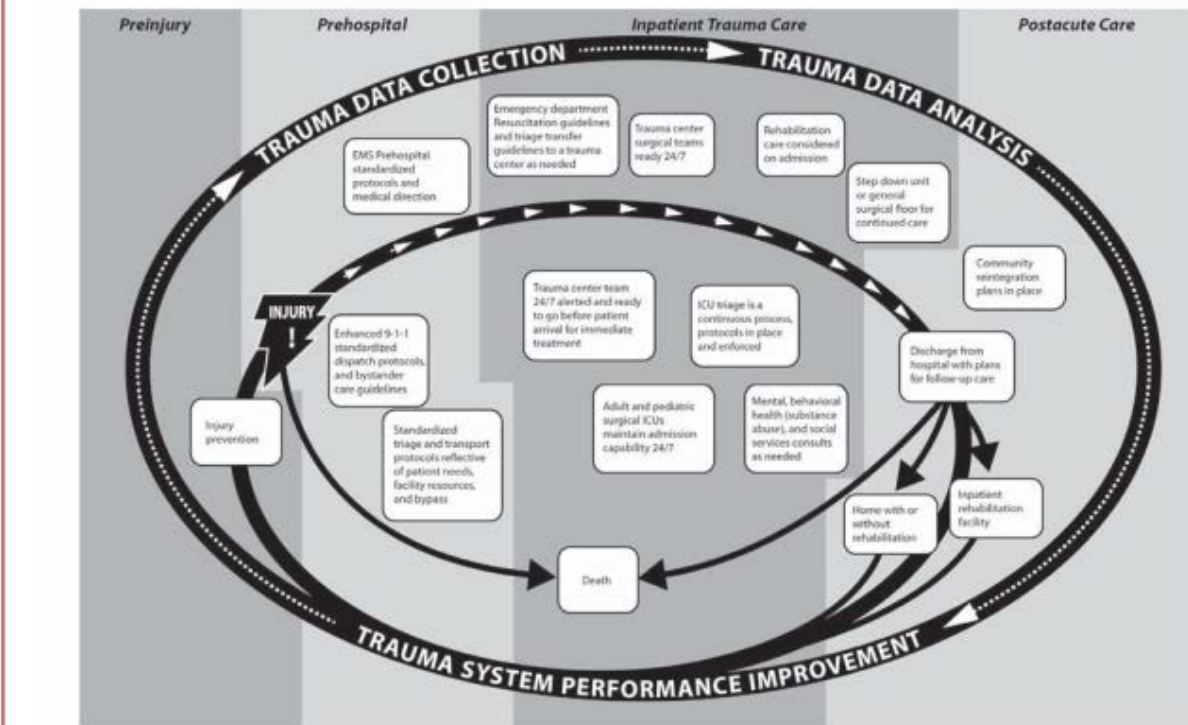
Source: U.S. Department of Health and Human Services, Health Resources and Services Administration. *Model Trauma System Planning and Evaluation.* Rockville, MD: U.S. Department of Health and Human Services; 2006. Available at: www.facs.org/quality-programs/trauma/tsepc/resources Accessed September 24, 2013.

(Rotundo, M. F., Cribari, C., & Smith, R. S. (2014). *Resources for Optimal Care of the Injured Patient American College of Surgeons 2014* (figures 2 & 3). American College of Surgeons, 11-13. Chicago: IL)

IV. Acknowledgements

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

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Sources for the information included Resources for Optimal Care of the Injured Patient: 2014 (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, all 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) in conjunction with the American College of Surgeons Committee on Trauma guidelines and regulations.

B. Regional

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

C. Local (Trauma Center)

The trauma medical director has the responsibility for the performance improvement program. Refer to Performance Improvement and Patient Safety Chapter 16 for further information.

(Rotundo, M. F., Cribari, C., & Smith, R. S. (2014). *Resources for Optimal Care of the Injured Patient American College of Surgeons 2014*. American College of Surgeons, **115**. Chicago: IL)

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), Trauma Nurse Coordinator PI (TNC) 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 less than 4 hours from time of arrival at referring hospital, and/or patients admitted to trauma centers for 24 hours or less excluding deaths.

 2. **Clinical Practice Guidelines:** Refer to American College of Surgeons - Committee on Trauma. (2014): *Resources for Optimal Care of the Injured Patient*, **118**. Chicago, IL

3. **Complication**: Refer to American College of Surgeons - Committee on Trauma. (2014): *Resources for Optimal Care of the Injured Patient*. Chicago, IL./TOPIC/NTDB definitions **A3.5-A3.27**.

4. **Corrective Action Plan**: Refer to Refer to American College of Surgeons - Committee on Trauma. (2014): *Resources for Optimal Care of the Injured Patient*, **131**. Chicago, IL /TOPIC/NTDB definitions.

6. **Determination: the** definition and classification of trauma peer review cases discussed in a manner consistent with the trauma center's institution-wide performance improvement program.

Refer to American College of Surgeons - Committee on Trauma. (2014): *Resources for Optimal Care of the Injured Patient*, **131**. Chicago, IL

7. **Disease Related**: An event or complication that is an expected sequela of a disease, injury, or illness.

8. **Discretionary Filters**: Audit criteria that may be used to evaluate trauma programs and/or patient care issues (See Appendix B).

9.   **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.

- Complication:
  - expected or unexpected
  - delays in care
  - patient outcomes

- All deaths.

- Death determinations:
  - anticipated mortality with opportunity for improvement
  - mortality without opportunity for improvement
  - unanticipated mortality with opportunity for improvement

- An off-service PI committee may review utilizing the same death judgement appropriateness of care when exclusively cared for by a non-trauma physician.

- Other patient case examples requiring full review include:
  - Outside hospital transfers greater than 4 hours ED length of stay
  - Readmissions within 30 days for the same injury or missed injury
  - Patients with unexpected outcome.

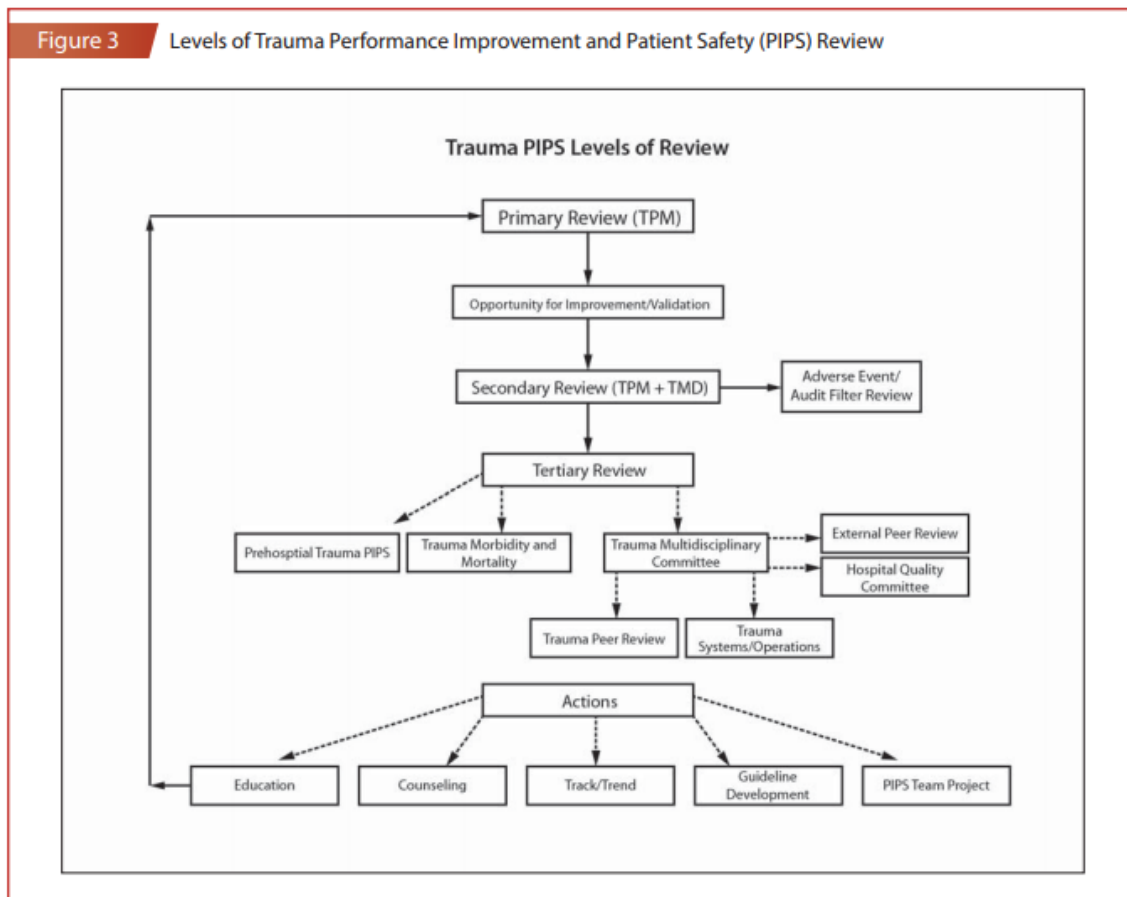10. **Loop Closure**: Measurement of a process or outcome after implementation of the corrective action plan. Monitoring must be demonstrated and documented. Refer to American College of Surgeons - Committee on Trauma. (2014): *Resources for Optimal Care of the Injured Patient*, **132**. Chicago, IL:

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11. **Morbidity**: Any deviation from normal health that may be a result of a complication or may be pre-existing NTDB co-morbidity Refer to American College of Surgeons - Committee on Trauma. (2014): *Resources for Optimal Care of the Injured Patient*. Chicago, IL./TOPIC/NTDB definitions **A3.1-A3.4**.

12. **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)

13. **North Carolina Committee on Trauma (NC COT):** Committee consisting of the trauma medical directors of the trauma 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. In addition, the NC COT will serve as a resource to the North Carolina Office of Emergency Medical Services for trauma-related matters.

14. **North Carolina Data Dictionary**: Data points and definitions that are standardized to the NTDB Data Dictionary in addition to N.C. State specific data reviewed by the Trauma Data Dictionary Committee to ensure that data are collected uniformly throughout the state. Each institution may use custom data points.

15. Process: Elements of care that relate to the system or structure in which the care is delivered.

    Refer to **Figures 2&3 located in** American College of Surgeons - Committee on Trauma 2014: *Resources for Optimal Care of the Injured Patient*, **11-13**. Chicago, IL

16. **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.

17. **Regional Advisory Committee (RAC):** Group comprised of at least one Level I or II trauma center (lead agency) and representatives of trauma care providers and the community, for the purpose of regional trauma planning, establishing, and maintaining a coordinated trauma system.

18. **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).

19. **System-Related**: An event or complication not specifically related to a provider or disease but to a system

20. **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.

Refer to **Figures 2&3 located in Chapter 5,** American College of Surgeons - Committee on Trauma 2014: *Resources for Optimal Care of the Injured Patient*, **38-39**. Chicago, IL.

| Figure 3 | Levels of Trauma Performance Improvement and Patient Safety (PIPS) Review |

Trauma PIPS Levels of Review

(TMD) indicates Trauma Medical Director, and (TPM) indicates Trauma Program Manager.

Refer to **Figure 3 located in Chapter 16,** American College of Surgeons - Committee on Trauma 2014: *Resources for Optimal Care of the Injured Patient*, **129**. Chicago, IL.

21. **Trauma patient**: ICD-10-CM Code Ranges: S00-S99, T07, T14, T20-T28, T30-T32 and T79.A1-

T79.A9

NTDB Data Dictionary 2018.Retrieved from https://www.facs.org/quality-programs/trauma/ntdb/ntds/data-dictionary

22. **Trauma Registry**: A computerized data collection system utilizing a state approved database consisting of a commercial software package for collection, storage, analysis and reporting of trauma patient information on an individual hospital level.   This data is downloaded to the state registry weekly. (NOTE: all designated trauma centers or those applying for designation must use a software program that will download required registry data elements to the North Carolina state trauma registry.)

VII. Personnel

HOSPITAL (Disclaimer: Some titles are institution-specific)

1. **Clinical Nurse Specialist/ Trauma Case Manager/ Advanced Practitioners**: An RN or other with expert trauma experience, frequently Masters prepared, that facilitates the patient/family continuum:

    o   Assists the TNC, TPM, TMD and registrar in identifying PI opportunities and trends
    o   Renders trauma care under physician supervision.

    Refer to American College of Surgeons - Committee on Trauma. (2014): *Resources for Optimal Care of the Injured Patient*, **85**. Chicago, IL.

2. Hospital Personnel

    o   **Trauma Coordinator/ Program Manager**: Shares responsibility for the PI program with the TMD. Administers the daily operations of the program: handles problems/issues; identifies trends; and maintains documentation of the PI process.

    o   **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.

    o   **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 TNC, TPM and or TMD.

    Refer to American College of Surgeons - Committee on Trauma. (2014): *Resources for Optimal Care of the Injured Patient*, **36-43**. Chicago, IL.

STATE

1. **North Carolina Trauma Registry and Disaster Data Analyst**: Extracts, assist with data maintenance, analyzes, and provides scheduled state trauma registry data reports. 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. **Trauma Systems Manager:** 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. Facilitates development of NC Trauma System as directed in the NC Statute. 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 Trauma Systems Manager 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 level of designated trauma centers (including one designee as TPM committee representative)
- Trauma Registrars – one representative (and the **North Carolina Trauma Registry and Disaster Data Analyst**)
- NCCEP - one representative
- EMS Administrators - one representative
- ATS – one representative
- RAC Coordinators – one representative
- North Carolina State **Trauma Systems Manager**
- NCCOT Chair, Vice Chair, and Immediate Past Chair
- Air Medical - one representative
- EMS Provider - one representative
- Trauma Nurse Coordinator PI – one representative
- Injury Prevention – one representative
- Research Committee Member – one representative
- Chief of NC OEMS

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

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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:
- PIPS activities in coordination with the Trauma Nurse PI Program Coordinator;
- Conducting or facilitating organizational, trauma provider, and community education.
- Conducting or facilitating community based injury prevention activities in coordination with the Injury Prevention Program Coordinator or designee.

LOCAL

1. **EMS Director**: Director of a local EMS agency. May facilitate addressing problems/issues that arise in the pre-hospital environment. Attends facility PI meetings.

2. **EMS Medical Director**: Medical Director of an EMS agency. Responsible for approving pre-hospital policies, procedures and protocols. Attends facility PI meetings.

Refer to American College of Surgeons - Committee on Trauma. (2014): *Resources for Optimal Care of the Injured Patient*, **23**. Chicago, IL.

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 NTDB data definitions and specific NC Trauma Registry definitions

2. **Selection**: The population to be monitored includes:

- Any patient with an ICD-10- CM diagnosis S00-S99, T07, T14, T20-T28,T30-T32, T71,T79.A1-T79.A. (exclusions S00,S10, S20, S30, S40, S50, S60, S70, S80, S90)
- Or trauma patients that meet admission criteria (24-hour hospital stay), transfer via EMS
- Or drowning, asphyxiation, unplanned readmission related to initial injury within 30 days of last discharge.
(Refer to: NTDS Data Dictionary 2017 Admissions. Committee on Trauma, **V**. North Carolina Trauma Registry Data Dictionary 2017. NCOEMS, **3**.)

The "trauma patient" is defined as a person who has sustained acute injury and by means of a standardized activation criteria (anatomic, physiologic and mechanism of injury) is

judged to be at significant risk of mortality or major morbidity. Suggested data sources listed below will be used to develop a profile of care provided by the Trauma Center:

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 weekly 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.

Refer to American College of Surgeons - Committee on Trauma. (2014): *Resources for Optimal Care of the Injured Patient*, **112**. Chicago, IL.

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; a review of these trends must occur, to include an action plan, evaluation of action plan, and audits to verify improvement. (Example: Aspiration pneumonia is occurring with more frequency in the ED and appears to be associated with aspiration of contrast material.)

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. If an unfavorable trend is identified, then a more focused review and action plan will be developed in order to ensure compliance and document that response time is at 80% or better.

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) Timeliness and availability of x-ray reports
   6) Timely participation of subspecialties
   7) Availability of operating suite, acute and subacute
   8) Timeliness of rehabilitation

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

   1) Mortality
   2) Morbidity
   3) Length of stay
   4) Cost/Financial
   5) Patient satisfaction
   6) Palliative Care Guidelines
   7) Patient Satisfaction

a. All admitted injured patients will go through some level of review which may be as brief as the data collection and brief case review by the TNC/TPM/TR to the full PI process. The following are examples:

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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 immediate transferring institution > 4 hours.
Transfer from initial institution < 4 hours	Re-admit for same injury problems or missed injury
24 hour observation patients with no complications	Unexpected outcomes (as defined by the institution)

PI process flow sheet example:

Figure 3 — Levels of Trauma Performance Improvement and Patient Safety (PIPS) Review
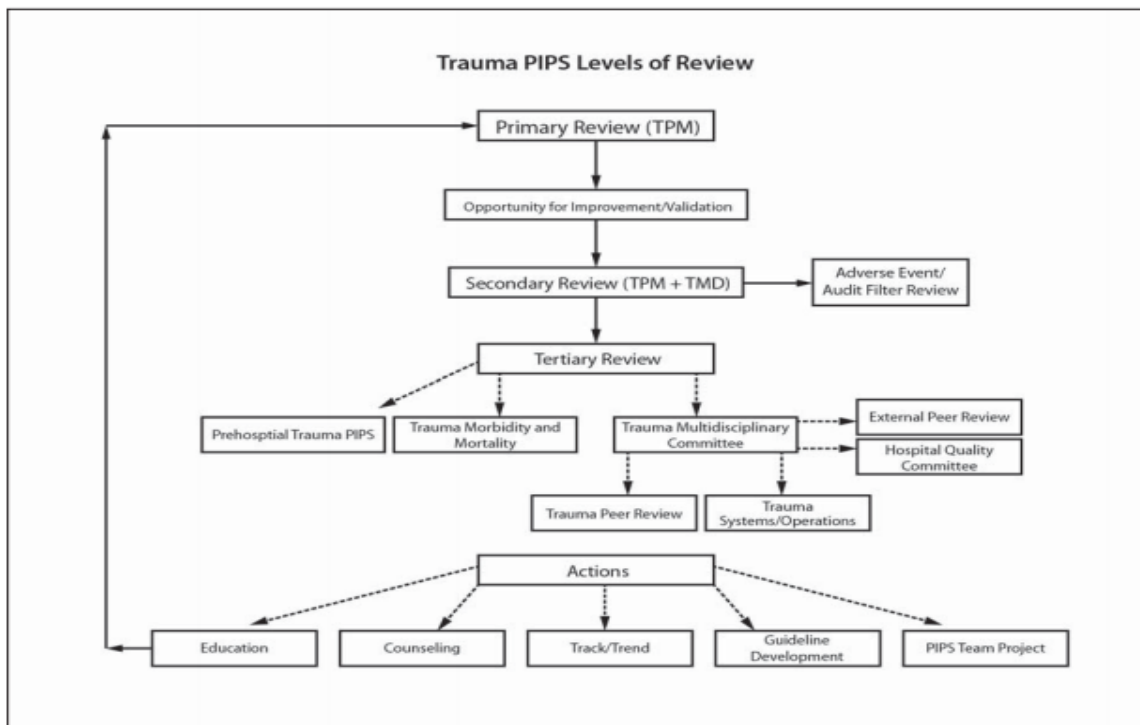
Refer to **Figure 3 located in Chapter 16,** American College of Surgeons - Committee on Trauma 2014: *Resources for Optimal Care of the Injured Patient*, **129**. Chicago, IL.

2. Forums for Trauma Center Performance Improvement Review – Purpose to present opportunities

      a. RAC Meetings (refer to Meeting Section)

      b. Trauma Program Performance Committee (refer to Meeting Section)

      c. Multidisciplinary Peer Review (refer to Meeting Section)

Refer to **Figure 3 located in Chapter 16,** American College of Surgeons - Committee on Trauma 2014: *Resources for Optimal Care of the Injured Patient*, **130**. Chicago, IL.

3. Steps in the Review Process:

a. Identify the patients utilizing the ICD-10 codes (See the definition of a trauma/injury patient.)

b. Data is collected by the trauma registrar on ALL patients within ICD-10 code range. The patient and the record are reviewed by the Trauma Registrar and/or TNC/TPM and/or Clinical Nurse Specialist.

c. Issues/problems revolving around the care of the patient from prehospital through the discharge process are identified. The TNC/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 TNC/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. 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.

g. 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).

Figure 2   The Matrix Method for the Calculation of Triage Rates

	Not Major Trauma	Major Trauma	Total	Overtriage
Highest Level TTA	A	B	C	A/C x 100
Midlevel TTA	D	E	F	Undertriage =
No TTA	G	H	I	(E+H) / (F+I) x 100

    h.   Evaluation of patient Under/Over Triage.

Refer to **Figure 2 located in Chapter 16,** American College of Surgeons - Committee on Trauma 2014: *Resources for Optimal Care of the Injured Patient*, **121**. Chicago, IL.

    i.   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.

    j.   Documentation and review of times and reasons for trauma-related diversion of patients from the scene or referring hospital.

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.

X. Meetings
1. **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.

Refer to American College of Surgeons - Committee on Trauma 2014: *Resources for Optimal Care of the Injured Patient*, **137-138**. Chicago, IL.

2. **Trauma Program Performance Committee**: Minimum of Quarterly Meeting.

Refer to American College of Surgeons - Committee on Trauma 2014: *Resources for Optimal Care of the Injured Patient*, **130**. Chicago, IL.

3. **Multidisciplinary Peer Review:** Preferred monthly meeting

Refer to American College of Surgeons - Committee on Trauma 2014: *Resources for Optimal Care of the Injured Patient*, **130**. Chicago, IL.

Trauma Center Meeting Table (Level III trauma centers may combine these two meetings)

Systems/Operations	Patient Care/Peer Review
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, OR and trauma floor(s) nurse managers or their designees; trauma physicians, EMS, radiology and other ancillary departments; ED Medical Director or designee; Trauma Program Administration, registrars, and trauma team members.	Members: Physicians taking trauma call, trauma liaison from Orthopedics, Neurosurgery, Emergency Medicine, Radiology, Anesthesiology, Medicine/Hospitalist, as well as the TNC or TPM and other physicians as specific case(s) require.

Facilitated by: TNC, TPM, Trauma Medical Director or designees	Facilitated by: Trauma Medical Director or designees within Trauma Service
Meetings: Monthly	Meetings: Monthly
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
Issues addressed: Trended issues, Global trauma system issues	Issues addressed: Morbidity and Mortality; Inter-service system issues, sentinel events, complications,

XI. Initial Trauma Center Designation - PI Plan / XII. Renewal of a Trauma Center - PI Plan

During a site review, trauma centers applying for initial designation and re-designation/verification must assess and demonstrate performance metric compliance within the following areas. Additional discretionary and non-discretionary filters may be monitored according to the direction of the trauma medical director and trauma program manager/trauma nurse coordinator.

- Clinical Practice Guidelines (Examples)
  - 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.
  - Deep vein thrombosis or pulmonary embolism event

- Core Process Measures and Outcomes (Examples)
  - Mortality Review
  - Trauma Team Activation Criteria
  - Trauma Surgeon Response to the ED
  - Over/Under Triage
  - Acute Transfers Out
  - Delay in OR availability

- Pre Review Programatic Core Measures (Examples)
  - Trauma Center Volume
  - Trauma Center Payor Mix
  - Geriatric TraumaVolume
  - Blood Bank TAT
  - Vertebral Column Injuries

- Other Filter Examples
  - Time to transfer
  - ED to OR times
  - Missing ACR (Ambulance Call Report)
  - Triage criteria compliance
  - GCS < 8 with no intubation

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)
    - > 20 minutes for highest tier of activation (Level I and II trauma centers)
    - > 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/Trauma Nurse Coordinator.

    Phases: Resuscitation Phase
    Operative Phase
    Critical Care Phase
    Step Down / Floor Phase
  - Admissions by Non-Surgeon
  - Delay in Disposition (during any phase)
  - Delay in Consultation (consult indicated: delay or omission)
  - 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

A. Discretionary **(Non Mandatory)** filters: When reviewing Discretionary filters, as compliance improves in areas of review, the trauma center will identify other areas to review.

<u>Examples of Discretionary (Not Mandatory) Filters</u>

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^{0}F or 35^{0}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 Pre-hospital fluid	5003 Disseminated Intravascular Coag	9003 Delay to OR
	5005 Transfusion Complication	9004 Delay in MD Response
	5099 Other Hematologic	9005 Delay in Obtaining Consult
PREHOSPITAL MISCELLANEOUS	**INFECTION**	9006 Delay in Diagnosis
2001 No EMS Form	5501 Cellulitis / Traumatic Injury	9007 Error in Diagnosis (& x-ray reads)
2002 Incomplete EMS Form	5502 Fungal Sepsis	9008 Error in Judgments
2003 Pre-hospital Delay	5503 Intra-abdominal Abscess	9009 Error in Technique
2099 Other Pre-hospital	5504 Line Infection	9010 Incomplete Hospital Record
AIRWAY	5505 Necrotizing Fasciitis	**RENAL**
2501 Esophageal Intubation	5506 Sepsis-like Syndrome	6001 Renal failure
2502 Extubation Unintentional	5507 Septicemia	6002 Ureteral Injury (Iatrogenic)

2503 Mainstem Intubation	5508 Sinusitis	6003 UTI - Early (< 72 hrs)
2599 Other Airway	5509 Wound Infection	6004 UTI - Late (> 72 hrs)
	5510 Yeast Infection	6099 Other Renal / GU
	5599 Other Infection	
PULMONARY	**MUSCULOSKELETAL/INTEGUMENTARY**	**VASCULAR**
3001 Abscess (excludes empyema)	6501 Compartment Syndrome	7501 Anastomotic Hemorrhage
3002 ARDS	6502 Decubitus (minor)	7502 DVT - Lower Extremity
3003 Aspiration / Pneumonia	6503 Decubitus (blister)	7503 DVT - Upper Extremity
3004 Atelectasis Required Treatment	6504 Decubitus (open sore)	7504 Embolus (non-pulmonary)
3005 Empyema	6505 Decubitus (deep)	7505 Gangrene
3006 Fat Embolus	6506 Loss of Reduction / Fixation	7506 Graft Infection
3007 Hemothorax	6507 Nonunion	7507 Thrombosis
3008 Pneumonia	6508 Osteomyelitis	7599 Other Vascular
3009 Pneumothorax (barotrauma)	6509 Ortho Wound Infection	
3010 Pneumothorax (iatrogenic)	6599 Other Musculoskeletal / Integumentary	
3011 Pneumothorax (recurrent or other)	**NEUROLOGIC**	**ACS AUDIT FILTERS**
3012 Pneumothorax (tension)	7001 Alcohol Withdrawal	Abd injury and low BP laparotomy > 1 hour
3013 Pulmonary Edema	7002 Anoxic Encephalopathy	GCS < 14, No head CT
3014 Pulmonary Embolus	7003 Brain Death (unexpected)	GCS $\leq$ 8 No ETT or surgical airway
3015 Respiratory Failure / Distress	7004 Diabetes Insipidus	No Lap $\leq$ 1 hr abd injury and SBP < 90
3016 Upper Airway Obstruction	7005 Meningitis	Laparotomy > 4 hours
3017 Pleural Effusion	7006 Neuropraxia (iatrogenic)	Craniotomy > 4 hours EDH / SDH
3099 Other Pulmonary	7007 Non-op SDH / EDH	Abd, Thoracic, Vasc or Cranial Surg > 24 hr

GASTROINTESTINAL	7008 Progression of original neuro Insult unexpected	Nonfixation of Femoral Diaphyseal in Adult
4001 Anastomotic Leak	7009 Seizure in Hospital	Ambulance scene > 20 minutes
4002 Bowel Injury (iatrogenic)	7010 SIADH	No hourly vital signs in ED
4003 Dehiscence / evisceration	7011 Stroke / CVA secondary to original injury	Transfer > 6 hrs in initial hospital
4004 Enterotomy (iatrogenic)	7012 Ventriculitis - (post-op)	Reintubation within 48 hrs
4005 Fistula	7099 Other Neurologic	Delay in Care
4006 Hemorrhage - Lower GI	CARDIOVASCULAR	GCS < 8 with no ICP monitor
4007 Hemorrhage - Upper GI	3501 Arrhythmia	Failed non-operative management of GSW to abd
4008 Ileus	3502 Cardiac Arrest (unexpected)	Failed non-operative management of blunt injuries
4009 Peritonitis	3503 Cardiogenic Shock	Initial treatment of open fracture > 8hrs from admit
4010 Small Bowel Obstruction	3504 CHF	PSYCHIATRIC
4011 Ulcer-Duodenal / Gastric	3505 MI	8001 Psychiatric - result of present injury
4099 Other GI	3506 Pericarditis	
	3507 Pericardial Effusion / Tamponade	
	3508 Shock	
	3599 Other Cardiovascular	

Plan	Do	Check	Act
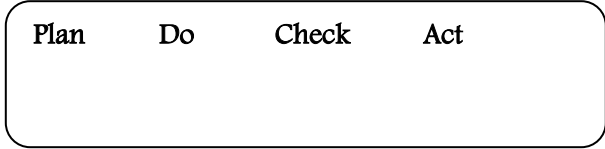
APPENDIX D

(RAC) Regional Performance 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.   PI Process - Methodology

Regional Facilities and EMS agencies shall establish a trauma performance improvement process in collaboration with the Trauma Center PI. 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:

A. Regional Facility PI Committee
ED Medical Director

ED Director

Nursing Personnel

EMS representative

B. **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   Monitor Purpose

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Traumatic Deaths	Care Appropriateness

ED LOS > 4 hours prior to transfer	Care Appropriateness
	   ▪ Timeliness of transfer
	   ▪

Non Trauma Center ICU admission	Triage Appropriateness

Blood product administration	Resuscitative Appropriateness
	   ▪ Meets ATLS Guidelines
	   ▪

Emergency Medical Service Filter	**Monitor Purpose**
Traumatic Deaths	Care Appropriateness (occurring during EMS care)

Air Medical Utilization	Appropriateness
	   ▪ Meeting Air Medical Triage Criteria??
	   ▪

Attempted Intubations	Care Appropriateness
	   ▪ RSI – Utilize Audit tool for monitoring???
	   ▪

Triage	Appropriateness

V.

Process Improvement Steps

Step 1. Audit Filter Identified

Step 2. Chart/ACR (Ambulance Call Report) Review
Identify Filter Deviations
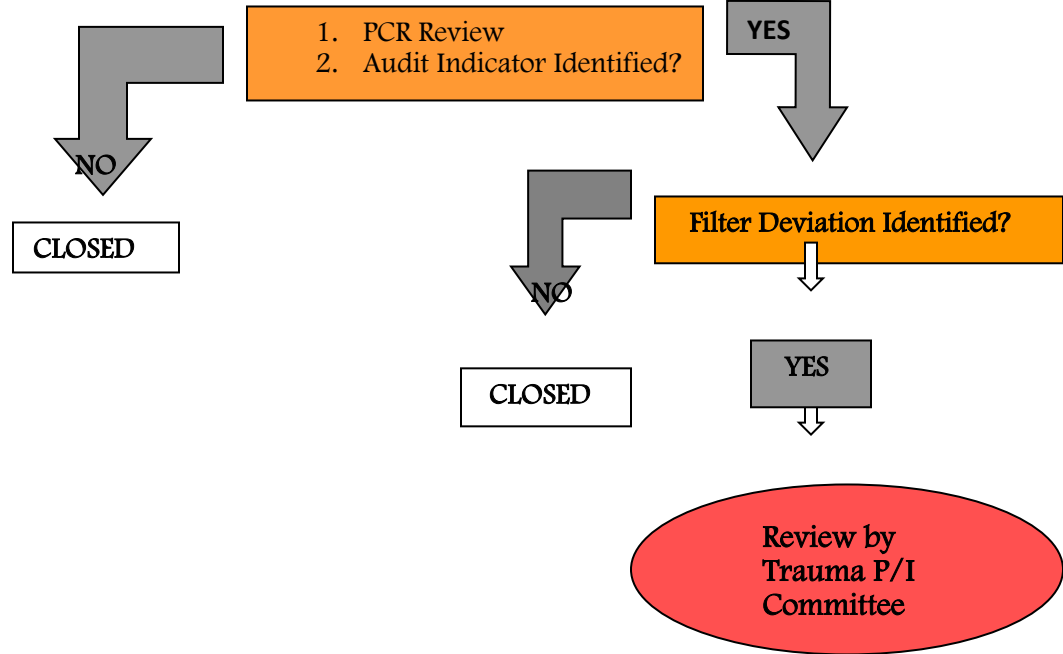
Step 3. Determine degree of review
- Single Review
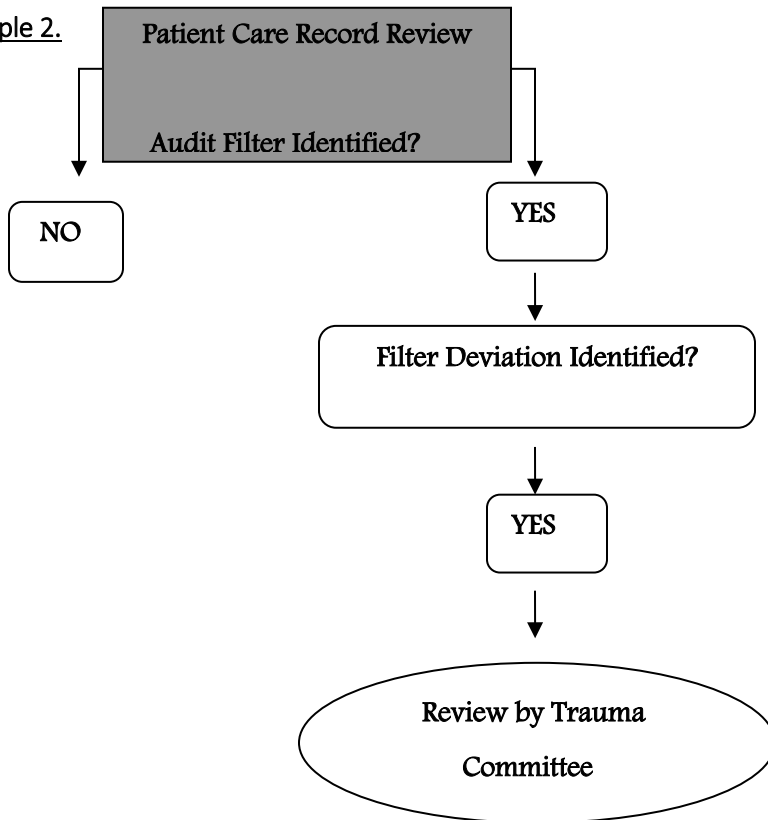- Committee Review

Step 4. PI Committee Review
Step 5. Select method of process improvement

PRE-HOSPITAL/OUTSIDE AGENCY PERFORMANCE IMPROVEMENT PROCESS MODELS

Example 1.

```
                    ┌─────────────────────────────────┐
                    │  1.  PCR Review                 │        YES
  ┌──────┐          │  2.  Audit Indicator Identified?│         │
  │      │          └─────────────────────────────────┘         │
  NO                                                            ▼
  │                                              ┌──────────────────────────────┐
  ▼                                    NO ───────│  Filter Deviation Identified? │
┌──────────┐                          │          └──────────────────────────────┘
│  CLOSED  │                          ▼                         │
└──────────┘                    ┌──────────┐                   YES
                                │  CLOSED  │                    │
                                └──────────┘                    ▼
                                                    ╭──────────────────────╮
                                                    │   Review by          │
                                                    │   Trauma P/I         │
                                                    │   Committee          │
                                                    ╰──────────────────────╯
```

Example 2.

```
              ┌─────────────────────────────────┐
              │   Patient Care Record Review    │
    ┌─────────┤                                 ├─────────┐
    │         │   Audit Filter Identified?      │         │
    ▼         └─────────────────────────────────┘         ▼
┌──────┐                                              ┌──────┐
│  NO  │                                              │ YES  │
└──────┘                                              └──────┘
                                                          │
                                                          ▼
                                    ┌──────────────────────────────┐
                                    │  Filter Deviation Identified? │
                                    └──────────────────────────────┘
                                                          │
                                                          ▼
                                                     ┌──────┐
                                                     │ YES  │
                                                     └──────┘
                                                          │
                                                          ▼
                                            ╭──────────────────────╮
                                            │   Review by Trauma   │
                                            │     Committee        │
                                            ╰──────────────────────╯
```

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