Trauma Outcomes & Performance Improvement Course

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To successfully complete this course you must be present for the entire session and submit an evaluation of the presentation.
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Introduction
Course Objectives
Trauma Outcomes Performance and Improvement Course

- TOPIC offers practical application for all levels of trauma centers, from entry level to mature phase of program development.
- A self-paced, modular didactic content is combined with breakout sessions with application of materials to vignettes.
- The course is customized to meet the needs of multidisciplinary providers with varying levels of trauma performance improvement and patient safety experience.
- Operational definitions, sample tools and case vignettes are incorporated to facilitate learning.

Evolution of TOPIC

- Initial goal was to provide Trauma Program Managers with Trauma PI structure and processes
- 2003 1st course at STN Annual Conference
- 2004-5 HRSA grant to teach TOPIC in 50 states
- 2006 collaborate with ACS to regionalize TOPIC
- 2010 STN/ACS MOU: collaborate teaching TOPIC
- 2012 STN/ACS collaborate to reengineer TOPIC

National TOPIC Courses

- 43 states in USA
- 15 ACS/STN Regions

International TOPIC Courses

- International rollout
  - Canada, Europe, South America, Europe, Middle East, Australia

Today’s Participants

- What is your Role?
  - Physician, Nurses, Registrar, PI Coordinator, Data Analyst, State Trauma/EMS, Pre-hospital, Administration, Other
- Trauma Center Level: I, II, III, IV, V+
  - In process verification/accreditation
  - Pediatric, Burns, Other
  - Urban or Rural
- Experience in current role: >10, ~5, <1
- Taken TOPIC before?
Successful Completion

• To successfully complete this course, all participants must attend the entire event and submit a completed evaluation at the end of the session.

• CME - Accessed on-line
• CNE – Certificate given at end of course
• Attendance must be verified by signature on the sign-in sheets

Continuing Nurse Education

Society of Trauma Nurses is accredited as a provider of continuing nursing education by the American Nurses Credentialing Center’s Commission on Accreditation.

This event has been awarded 8.25 contact hours.
Certificates distributed at the course ending

Continuing Medical Education

• This activity has been planned and implemented in accordance with the Essential Areas and policies of the Accreditation Council for Continuing Medical Education through the joint provider-ship of the University of Kentucky College of Medicine and Society of Trauma Nurses. The University of Kentucky College of Medicine is accredited by the ACCME to provide continuing medical education for physicians.

• The University of Kentucky College of Medicine designates this live activity for a maximum of 8.25 AMA PRA Category 1 Credit(s)™. Physicians should only claim credit commensurate with the extent of their participation in the activity.

• The University of Kentucky College of Medicine presents this activity for educational purposes only. Participants are expected to utilize their own expertise and judgment while engaged in the practice of medicine. The content of the presentations is provided solely by presenters who have been selected for presentations because of recognized expertise in their field.

Financial Disclosure

Faculty/Presenters/Authors/Content Reviewers/Planners disclose no conflict of interest relative to this educational activity

Make STN your professional home, and make ATCN available to nurses around the world.
Join today at traumanurses.org/membership
First time members use discount code TOPIC-10 and save $10!

Why Does STN Exist?

To ensure optimal trauma care to all people.
To advocate for the highest level of quality trauma care across the continuum
To be the premiere global nursing organization across the trauma continuum
COURSE OBJECTIVES

1. Enhance the understanding of the performance improvement process as it relates to trauma care via interactive sessions, sample tools and didactic sessions.

2. Review the performance improvement process from issue identification through loop closure/event resolution.

3. Discuss trauma performance improvement multidisciplinary structures and related interfaces within a facility.

4. Define the peer and system performance improvement components of the PI plan through tools and review of case examples.

5. Discuss the components of a PI plan.

6. List examples of meaningful indicators and audit filters.

7. Review the Practice Management Guideline development and implementation process.

8. List specific sources to identify trauma care issues and discuss strategies to enhance PI issue identification.

9. Define the process flow for issues from identification to resolution.

10. Discuss levels of peer review judgment in trauma and the professional standards review process.

11. Identify features of various levels of trauma performance review.

12. Review roles and responsibilities of PI team members and options for team member configuration.

13. Review the trauma registry role and integration in the trauma PI process.

14. List the considerations that guide peer review judgment determination.

15. Discuss issues of authority in peer review judgment determinations.

16. Discuss requirements for corrective action plans.

17. Describe the components of corrective action plans.

18. List practical measures to ensure integrity of PI data.

19. Review methods of event resolution and strategies to report and document event resolution.

20. Describe methods to integrate or link trauma PI with hospital or system PI.

21. Describe components of a trauma system at the regional and state level.
Module 1: Performance Improvement Patient Safety (PIPS) Model and Conceptual Plan

- Discuss the importance and various components of the trauma PIPS plan.
- Describe an effective Trauma PIPS program.
Module 1: Performance Improvement
Patient Safety (PIPS) Model and Conceptual Plan

Why PIPS in Trauma?
• Evaluate
  – Patient care outcome
  – Provider response
  – System performance
• Improves patient care at bedside level
• Fosters competent and accountable providers

Why PIPS in Trauma?
• Classifies events which focus opportunities for improvement
• Essence of trauma center development and maturation
• Evaluates cost of care
• Enhances the fiscal aspect of a trauma program

PIPS Outcomes
• PIPS is the concept of
  -- Process
    • Monitoring
    • Evaluating
    • Analyzing
    • Classifying
    • Recommending
    • Implementing
  -- Outcome
    • Improves the care given from the perspective of system, patient, provider

Culture of Safety

Blame
• Eliminates certain language that places blame
  ➢ "preventable"
  ➢ "cause"
  ➢ "unanticipated"

Safety
• Identifies strategies to reduce the risk of
  ➢ "near misses"
  ➢ "adverse events"

Opportunities for Improvement

Culture of Safety: Inherent Risks

System Risks
• Technologically complex
• Constantly changing medications and equipment technology
• Competing Priorities
• Variable individual competence
• Every patient is different

Human Error
• At point of care
• Involves human issues
• Fatigue
• Knowledge
• Reliability on personal perfection
• Humans are not perfect
Culture of Safety: Promotion

- Promote a common patient safety vocabulary
- Critical for sharing and aggregating data to support patient safety
- Taxonomy combines terminology and the science of classification

Culture of Safety: Promotion

- Identify safe practices
- Apply optimal principles in trauma care
- The patient **ALWAYS** comes first
- Staff communication focused on safety
- Hierarchy never trumps safety
- All staff are appropriately assertive when necessary

Culture of Safety: Promotion

- Tools which promote teamwork and safety
  - Checklists
  - Example - FAST-HUGS-BID
  - Standard order sets
  - Standardized documentation tools
- Concurrent PI during patient rounds
  - Engages entire trauma team

Trauma PIPS Process Development

- Where are you in your trauma program development phase?
- How do you integrate PIPS with your hospital?
- How do you integrate PIPS in your trauma system?
- Other Considerations
  - Annual volume
  - Trauma Center size/level
  - Academic/Community/Rural
  - Human and physical resources
  - Environmental/Geographic Changes

Trauma PIPS is...

- Dynamic yet Prescriptive
- Multidisciplinary and system oriented
- Integrated into the hospital PIPS system
- Individualized to your program
- Outlined in your PIPS Plan
- Facilitated by Trauma Medical Director and the Trauma Program Manager
- Everything you do is performance improvement and patient safety

Basis for a Trauma Program PIPS Plan

- Established structure/prescriptive for how PIPS program is operationalized
- Assures continuity and expectations of all groups related to the process
- Educational tool for new staff (distribute to all)
- Linked to hospital PIPS plan
- Foundation of pre-site-survey questionnaire

*Do you have a written PIPS plan?*
*Refer to PIPS plan preceding the appendix*
Trauma PIPS Plan Components

- 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 and Implementation
- Event Resolution and Re-evaluation
- Confidentiality
- Integration into Hospital PIPS process

Goal: Improving Processes and Patient Outcomes

Event identification: complication, adverse outcomes, process issues
Validation, analysis, multi-disciplinary peer review and determination
Team work to correct adverse event, develop evidence based guidelines for care, provide consistent education
Feedback to providers, referring facility(s) transport team(s) and communication of outcome

Taxonomy

(Ivatury et al. JT, Feb 2008)

- **Impact**: Outcome or effect of event
- **Type**: Processes that were faulty
- **Domain**: Setting where incident occurred or phase of care
- **Cause/Factors**: Factors and agents that led to incident (system and human)
- **Prevention and mitigation**: Universal, selected or indicated, an action plan

Taxonomy

- **Scope**
  - Building blocks
  - Common definitions and classifications
  - Unambiguous and translatable terminology
- **Scope**
  - Comprehensive classification tool
  - Applicable to all health care delivery settings
  - Includes multiple levels of patient harm
  - Addresses sentinel or serious events, adverse events, no-harm events, near misses or close calls, and potential events
Key Aspects of Module

- Trauma PIPS covers a broad scope of performance improvement processes and must be defined by your program
- All aspects of the PIPS program must be defined in the Trauma PIPS Plan
- Culture of safety principles are transitioning from blame to opportunity
- Components of PI Plan are constant & prescriptive in all trauma program levels but operationalizing may vary
PI Roadmap

Establishing Authority for PI Program

PI Team Members: Roles/Responsibilities

Links to Institutional PI

Issue Identification

Investigation/Validation/Analysis

Options for Performance Review/Critique
  * Tools
  * Levels of Review

Process for Judgment/Consensus

Determining/Implementing an Action Plan

Loop Closure

Sources Monitoring Reports * Tools

Information and Data Management
  * Tools
  * Documentation
  * TReg
  * Reports
  * Confidentiality
  * Storage
RESOLUTION OF THE
BOARD OF TRUSTEES OF

WHEREAS, is regional providers of emergency care in the great metropolitan area: and

WHEREAS, has established a high quality, nationally recognized trauma services at its which is integral to its mission; and

WHEREAS, the and has earned the designation of Level I Trauma Centers; and

WHEREAS, the Board of Trustees ("Board") desires to confirm its continued commitment to the Level I Trauma Centers as describes herein;

NOW, THEREFORE, BE IT:

RESOLVED, the Board supports and is committed to the continuance of trauma services at ;

RESOLVED, the Board supports and is committed to providing resources and personnel for the continuance of designation as Level I Trauma Centers, as awarded by the American College of Surgeons.

IN WITNESS THEREOF, the undersigned has signed this certificate this _____ day of __________________, in his capacity as Secretary of the Board of Trustees of and attests that the resolutions were approved at a duly called meeting of the Board on this ___ day of __________________.
Sample Medical Staff Resolution

The medical staff of ______________________________ supports the Trauma Program. The following resolution has been presented to and approved by the Medical Executive Committee on ____________________________.

Be it resolved that the medical staff at ______________________________ supports the Trauma Program. This includes: Clinical Care, Performance Improvement, Quality Improvement/Peer Review, Community Outreach, Community Education, Professional Education, Trauma and Trauma Related Research.

The medical staff recognizes the importance of assuring superior care to all trauma patients. The medical staff supports the trauma surgeons, all other physician providers on the trauma call panel, and those involved in care of the trauma patient in their commitment to maintain and exceed the standard of trauma care.

Sincerely,

Chief of Staff
Module 2: Trauma Committee Structure

- Explain trauma committee structure and the roles and responsibilities of team members.
- List required and discretionary members of Trauma Committee.
- Discuss methods of maintaining privacy of PIPS data.
Module 2: Trauma Committee Structure

Module Goals
• Explain trauma committee structure and the roles and responsibilities of team members.
• Describe the committee structures
• Review roles and responsibilities of members
• Discuss required and discretionary members
• Review committee planning and coordination
• Discuss committee reporting structure
• Relate impact of HIPAA on trauma PIPS & integration into PIPS plan

Trauma Committee Structure

Required or Discretionary
• Committee structure
• Members
• Data presented
• Options

Trauma Committee Goals
• Develop a culture that promotes both system and patient care improvements and aligns with the national standards
• Review performance and patient safety of the trauma center
• Present factual/objective data and processes to facilitate decision making by committee

Trauma Committee Structure

Required
• Multidisciplinary Trauma Peer Review
  – Clinical concerns at the patient level
  – Provider related events
• Multidisciplinary Trauma Systems/Operations
  – Process and System focused
  – Operational events

Discretionary
• Pre-Hospital Trauma PIPS Committee
• Morbidity and Mortality Review

Must be defined in the Trauma PIPS Plan
LINE OF AUTHORITY FOR TRAUMA PIPS PROCESS

Board of Trustees Joint Conference
Medical Executive Committee
PIPS Coordinating Council
Surgery PIPS Committee
Weekly Review Trauma Review and Trauma Program Manager

Trauma Multidisciplinary Peer Review Committee

- Goal: Review the efficacy, efficiency and safety of the trauma patient care
- ACS requires Trauma Medical Director chair (Level I and II)
- Awareness of state laws governing peer review structure and attendance
- Limited access forum defined by bylaws
- Frequency of meetings should be volume driven and ensure concurrent review

Trauma Multidisciplinary Peer Review Committee Function

- Review mortalities, adverse events, selected cases
- Chronicle a candid discussion of the events
- Classify Type, Factors, Opportunities
- Make Determinations (judgments)
- Develop action plans (mitigation/prevention)
- Record discreet minutes and determinations
- Document action items/prevention initiatives
- Refer system events to Trauma Systems Committee

Trauma Multidisciplinary Peer Review Committee Cases

- All or Select deaths
- Select occurrences
- Sentinel events
- Problem trends
- Unusual or uncommon cases
- Unexpected outcomes
- Great saves

Trauma Multidisciplinary Peer Review Committee Members (L I/II)

- Trauma Medical Director *
- Trauma/General Surgeons *
- Orthopedics *
- Neurosurgery *
- Emergency Medicine *
- Anesthesia *
- Critical Care *
- Radiology / Interventional Radiology
- Pediatrics
- Thoracic
- plastics
- Medical Examiner
- Rehab Medicine
- Trauma Program Manager
- Trauma Registrar
- Invited Sub-Specialist Involved with Case

* Minimum 50% attendance

Trauma Multidisciplinary Peer Review Committee Members (L III/IV)

- Trauma Medical Director *
- Orthopedics *
- Emergency Medicine *
- Anesthesia *
- Radiology *
- Medical Examiner
- Trauma Program Manager
- Trauma Registrar

* Minimum 50% attendance
Multidisciplinary Trauma Peer Review Committee Options

• Level III Trauma Centers
  – Planned in conjunction with Trauma Operations Committee
  • Two separate agendas / minutes
  • Separate attendance
  • Held back to back for time management and physician utilization
  – Follow discoverability regulations
  – Must be led by Trauma Medical Director

Multidisciplinary Trauma Peer Review Committee Options

• Level IV Trauma Centers
  – May be held at time of Medical Staff Peer Review with separate agenda, minutes
  – Define physician disciplines
  • Trauma Medical Director
  • Emergency Physicians
  • Specialty surgeons if patient admitted or operative intervention
  • Radiologist

Multidisciplinary Trauma Systems/Operations Committee

• Separate committee from Peer Review (Can be held back to back)
• System and operations focused
• Pre-hospital processes
• Transfers/Diversions
• Data driven
• Process focused
• Systems events referred by Peer Review
• Not a forum to discuss individual cases

Multidisciplinary Trauma System/Operations Committee Members

• Trauma Surgeons
• Anesthesia
• Specialty liaisons
• Radiology
• Critical Care
• Pediatrics
• Rehabilitation
• Administration
• Trauma Program Manager
• Trauma Registrar
• Pre-hospital/EMS
• Nursing
• Respiratory therapy
• Lab/Blood Bank
• Quality Management
• Pharmacy
• Nutrition
• Info Management

Multidisciplinary Trauma System/Operations Committee Function

• Chaired by Trauma Medical Director and/or Trauma Program Manager
• Address operational events / infrastructure events
  – Verification / Designation readiness
• Process-focused
  – Regional/System focused
  – Global system issues
  – Link with hospital systems
• System issues tracked until resolved

Trauma Morbidity & Mortality

• Discretionary
• Trauma M&M Review filters cases which need additional examination and intervention
• Feeds cases to Trauma Multidisciplinary Peer Review
• Trauma deaths, unexpected outcomes should be examined
• Separate from Multidisciplinary Trauma Peer Review
• Trauma Medical Director/Manager responsible to document organization, meeting minutes and follow up of all defined actions or prevention initiatives
Prehospital Trauma PIPS Committee

- Interface with prehospital agencies that routinely transport or transfer patients to their facility
- Open dialogue between prehospital agencies and the trauma center
- Review prehospital care, handoff procedures (time out), radio/cell communication, track trauma activation appropriateness, joint planning and personnel issues

PIPS Committee Individual Roles

Trauma Medical Director Roles and Responsibilities

- Authority to direct the PIPS plan
- Directs development of evidence-based practice guidelines
- Selects cases for PIPS committees and referrals
- Performs case reviews
- Analyzes PIPS trends/physician profiles
- Directs PIPS correspondence
- Leads peer review discussions
- Moderates peer review determinations/judgments
- 2nd Level of review prior to Peer Review
- Mitigation/Prevention Plan Input
- Follow up with absent Trauma Surgeons and Liaisons
- Elevate to Medical Staff Peer Review
- Process to disseminate key information to absent members with documentation
- Follow up provider related counseling
- Follow up with trauma privilege issues

Trauma Program Manager Roles and Responsibilities

- Directs implementation of PIPS plan, defined tools & processes
- Identifies, monitors trends, tracks, analyzes, PIPS data
- Coordinates various PIPS committee meetings
- Participates in peer review discussions & meeting
- Responsible for the meeting minutes
- PI through the Trauma Continuum
- Ensures validation of registry data
- Participates in operationalizing practice guidelines
- Facilitates Resolution/Loop Closure
- Represents trauma program on hospital and system committees
- Manages follow-up on PIPS system issues & peer review issues
- Structured orientation to PIPS plan and process
- Awareness of defined event reviews, complications definitions, and defined judgment or review determination language
- Report identified events and occurrence to trauma team
- Shared responsibility: extensive review for cases going to PIPS meeting
- Participate in peer review discussion and determinations
- Participate in developing corrective action plans
- Routine feedback (weekly, monthly, annually)
Facilitating a Trauma Committee Meeting

**Trauma Systems**
- Admission
- Transfers (In & Out)
- Events
- Occurrences
- Mortality
- Outcomes: LOS, ICU LOS, Vent Days
- Trauma Activations

**Peer Review**
- Physician’s review
- Diagnostic reports
- Autopsy
- Trended reports
- Correspondence
- Medical record
  - Pre hospital
  - Inpatient
  - Referral facility
  - Rehab if indicated

Use of Information Technology in Trauma PIPS Meetings

- Email notifications and agendas
  - Follow institutional rules for patient confidentiality
- LCD screen/computer with link to
  - Electronic medical record
  - Radiographic images and lab results
- Teleconferencing or video teleconferencing
  - Referring facilities
  - Rehabilitation facilities
  - Out of town physicians/key personnel
  - Invited specialists/subject matter experts

Use of Information Technology in Trauma PIPS Meetings

- Graphic representation of data with denominator
  - Current timeframe
  - Tended year to date/rolling 13 months
- Minutes should be recorded during the committee meeting to ensure capture of critical discussion
- Various formats for minutes
  - Entire meeting with all patients discussed
  - Electronic PI database under specific patient information
  - See variations of minutes in back of module appendix
- Project recorded PI database tracking screens with determinations and minutes
- Electronic approval of minutes

PIPS Data Storage and Protection of Confidentiality

- Trauma PIPS Plan Outlines
  - Template/parameters of minutes
    - Establish with hospital performance improvement / risk department
    - Files to protect the provider/patient/hospital
    - How PIPS data/PI file is documented & data secured in PIPS plan
  - Plan for “archiving”/storing data
  - Consistent with hospital plan/quality department
  - Trauma registry data security policy

PIPS ‘File’ Components

- PIPS electronic or paper "file" components
  - Case summary
  - Registry data
  - Correspondence regarding event or care
  - Email Encryption
  - Meeting minutes

  - Issue identification
  - Analysis
  - Corrective actions
  - Supporting PIPS documents
  - Occurrence tracking
  - Follow-up
  - Loop closure (resolution)
  - Confidentiality statements

Health Insurance Portability and Accountability Act (HIPAA)

- May effect traditional hospital and trauma performance improvement activities
- Review with your hospital risk/legal/quality management with interpretation and implications HIPAA has on all Trauma PIPS in respect to documentation and correspondence
- Disclosure Needed - Check with Legal Department
Key Aspects of Module

- Trauma PIPS covers a broad scope of processes and must be defined in PIPS plan
- Components are constant/prescriptive in all levels of trauma care but operationalizing may vary
- Committee structure must be defined in PIPS plan
- Committee membership defined by institution and level of verification / designation
- Must have trauma peer review and systems review
- Clear confidentiality guidelines must be stated in Trauma PIPS plan
Trauma Program Operational Process
Performance Committee

Sample Agenda Topics

- Call to Order
- Attendance
- Minutes
- Statistical Review
- Dashboard Review
- Trauma Center Criteria Compliance
- Action Plan Follow Up
- Policy/Procedure Revisions
- Old Business
  - Action Log
- New Business
  - Departmental Updates
  - Trauma Strategic Plan
  - Administrative
  - Clinical
  - Systems
Case Review Discussion

Date and Attendance

Dr. ________________ reviewed this ___ year old M/F that was involved in a ______________________ on _________________. The pre-hospital management (______________) and the clinical presentation to the ED were reviewed. Trauma activation was ___________. The response was _________________. Dr. ___________ was the _________ in charge of the evaluation. The patient’s ABC’s were presented. Interventions (___________) were reviewed. V/S were _______________. The secondary survey define _______________. The priorities of management were _______________. Radiographs of _______________ were performed and reviewed. Initial diagnostic evaluation included _______________. Findings were _________________. The patient was moved to the ________ with ___________. The patient was admitted/transfered at _______________. Operative intervention was initiated at ____:____. OR findings were _________________. (Clearly document all key elements of discussion, timeliness of care, appropriateness of care, compliance to standards, and discussed alternate measures to managing the patient. Controversies of management need to be clearly summarized and documented.)

• Event Impact
• Domain
• Determination
• Outcome: Complications/Variances
• Prevention Initiative
• Expiration: MWOO, MWTCO, MWTRSO
• Reviewed by: ______________________, ______________________, ______________________
• Recorder: ___________________________________________
Trauma Program Operational Process
Performance Committee

Sample Elements to Record for Minutes

- Date
- Time
- Location
- Attendance
- Items for Discussion
- Discussion Conclusion
- Corrective Action Plan
- Responsible Individual
- Status of Corrective Action
- Targeted Completion Date: Open, Closed, Pending
- Signatures
- Document Minutes moved through hospital organizational flow
Module 3: Audit Filters, Core Measures and Variance in Care

- Evaluate trauma center performance and care using audit filters, core measures, practice management guidelines, and trauma taxonomy.
- Describe three methods of measuring trauma center performance outcomes.
Module 3
Audit Filters, Core Measures, and Variances in Care

Module Goals
• Evaluate trauma center performance and care using audit filters, core measures, practice management guidelines, and trauma taxonomy.
  • Discuss audit filter use in process and outcome measurement and evaluation
  • Discuss the core measures, mandatory and discretionary in PIPS programs
  • Discuss practice management guidelines and their use in evaluating trauma center performance while minimizing variances in care
  • Introduce taxonomy classifications to monitor care events

Are You a “Good” Trauma Center?
“A trauma center should provide safe, efficient, and effective care to the injured patient.”

Resources for Optimal Care of the Injured Patient- Chapter 16
How is this Measured?

Trauma Standards of Care
• Trauma standards are evidence-based and built on national, regional and local standards of care
• Audit Filters are tools that assist with monitoring the process of care relative to standards of care

Core Measures
• Core Measures focus efforts which utilize data to improve the healthcare delivery process
  – 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 rates)

Adverse Events
National Quality Forum Definition of Adverse Event - An event that results in unintended harm to the patient by an act of commission or omission rather than by the underlying disease or condition of the patient

TJC Sentinel Event Definition - An unexpected occurrence involving death, serious physical or psychological injury, or risk thereof.
Adverse Events
- Adverse event/outcome
- Unintended consequence
- Unplanned clinical occurrence
- Therapeutic misadventure
- Peri-therapeutic accident
- Hospital-acquired complication
- Medical mishap
- Unexpected occurrence
- Untoward incident
- Iatrogenic complication/injury

Trauma Audit Filters Purpose
- Audit filters prompt a review
- Triggering an audit filter does not imply “bad” care
- Not all rise to a need for deep review
- Surveillance of care is a netting system

Trauma Audit Filters
- Audit filters need to be clearly defined
  - Definitions based on accepted standards of care/practice
- Should be valuable - relevant
- Need to be incorporated into the trauma PIPS written plan and reviewed at least annually

Trauma Audit Filter Review
- Rate based
  - Frequency of specific events
  - Occurrence/total number of trauma cases
- Case reviews
  - Review of specific cases where an audit filter was triggered
- Concurrent Review
  - Review of specific populations (e.g. admit to nonsurgical service, massive transfusion)

Trauma Audit Filters
- Non-discretionary (Mandatory)
  - American College of Surgeons COT
  - State required
  - Regional
  - TJC and/or other regulatory agencies
- Discretionary
  - As defined by your trauma program
  - May vary with changes in population or volume

Audit Filters in your Program
- Non-Discretionary “Mandatory”
- Discretionary
Non Discretionary (Mandatory) Audit Filter Examples

Process Measures - Required
- Surgeon response to ED – highest level trauma plus all other required responses
- Trauma team activation criteria
- Response of specialists to time-sensitive procedures
- Over and under triage
- Admissions to nonsurgical service
- Transfers out
- Times trauma center is on diversion
- ED physicians covering other hospital units – response times to ED

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
- Multidisciplinary Trauma Committee Attendance

System Process Core Measures
- Appropriateness of neurosurgical care at Level III center
- Use of neurosurgical back-up
- Protocol compliance
- ED dwell time for trauma level I activation
- In-house emergent/urgent intubations
- Delay in OR availability
- OR staff response & PACU staff if on-call
- Radiology misread rate

Analysis of Process Measure Overtriage / Undertriage

<table>
<thead>
<tr>
<th>ISS &lt; 15</th>
<th>ISS &gt; 15</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest Activation</td>
<td>A</td>
<td>B</td>
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<tr>
<td>Second Tier Activation</td>
<td>D</td>
<td>E</td>
</tr>
<tr>
<td>No Activation</td>
<td>G</td>
<td>H</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Overtriage</th>
<th>Undertriage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A / C</td>
<td>(E + H) / (F + I)</td>
</tr>
</tbody>
</table>

Triage Case Review - Example
A patient is brought to the ED following what is thought to be a medical seizure. Evaluation includes head CT which shows traumatic subdural. Further history reveals patient hit head earlier that morning. ISS = 16
Audit Filter Flagged is Under-triage
Case Review - Questions

• Did EMS report reflect any history of injury?
• Was time to OR increased due to lack of trauma team activation?
  – Did patient suffer any adverse outcomes from delays?
• Is there anything that can be done differently if this occurs again in the future?

Outcome Measures

• Mortality
  – Rates
  – Autopsy Rate
• Complication rates
  – Trauma Service
  – Trauma Center
• Length of Stay
• Ventilator days

• Patient/Family Satisfaction
• Hospital charges and cost (RVU’s)
• Quality of life metrics

Pediatric Measures

• Process
  – > 100 Pediatric patients per year – must have pediatric specific PIPS
  – < 100 Pediatric patients per year – each case needs to be reviewed for appropriateness of care
• Core Measures
  – Solid Organ Injury Mgmt
  – Head Injury Outcomes
  – Resuscitation (Fluid)
  – DVT Prophylaxis
  – Non Accidental Trauma
  – Radiation Exposure
  – Pain Management

Discretionary (Non-Mandatory) Audit Filter Examples

• Performance
  – Missed injuries
  – Delayed diagnosis
  – Screening and brief intervention
  – Documentation completeness

Institution Specific Audit Filters

• Clinical
  – Failed non-operative management
  – Operative management not warranted
  – Patient leaves ED with GCS < 8 and no definitive airway
  – Was massive transfusion protocol used in hemorrhaging patient

Institution Specific Audit Filters
**Institution Specific Audit Filters**

- Pediatric
  - Delays in obtaining vascular access
  - Screening and brief intervention
  - Physician coverage in the PICU
  - CT scans – over-scanning
  - Delays in transfer

- Resource/Financial
  - Delay in discharge disposition
  - Hospital readmission within 72 hours
  - Transfer to another facility due to lack of inpatient beds
  - Reimbursement of trauma activation fees
  - Reimbursement for Screening and Brief Interventions
  - Physician billing and reimbursement

**System Audit Filters**

- Absence of pre-hospital or referring hospital records
- Transfers and Follow-up
- Trauma patients taken to non-trauma centers
- Lack of community resources for patients (transfers out)

**Collecting, Monitoring, Reporting**

- Collecting
  - Audit filters ideally are collected concurrently
- Monitoring
  - Use your trauma registry
  - Use of calendars for reporting data
- Reporting
  - Monthly performance case reviews
  - Quarterly reports to Trauma Committee
  - Annual report to hospital leadership

**Using the Trauma Registry**

- Daily reporting of specific audit filters
- Monthly reporting of rates
- Repository for all PIPS activities
  - Patient specific
  - Trauma Program specific
- Annual report
- Research
Clinical Practice Guidelines

- Evidenced based practice guidelines reduce variance in care
- Road map for clinical decisions
- Effect outcomes
- Trauma Centers must
  - Track compliance
  - Monitor effect on outcomes

Examples of Clinical Practice Guidelines

- Massive Blood Transfusion
- C-spine clearance guidelines
- Severe TBI (ICP monitors, time to OR, etc.)
- Reversal of oral anti-coagulation
- VTE prophylaxis
- Open fracture (antibiotic timing and time to OR)
- CT in pediatric patients/radiation dosage

Monitoring Clinical Practice Guidelines

- Data collection
  - Rotate Tracking with “Guideline of the month”
  - Customize trauma registry elements
- Provider-specific profiles
  - Scorecards – compliance
  - Provider specific analysis
- Variance reporting to Trauma Program Operation Process Performance Committee, Patient Safety Committee & Trauma Multidisciplinary Peer Review Committee
  - Non-compliance
  - Over-compliance
  - Under-compliance

Monitoring Clinical Practice Guidelines

- Define the Core Measures of compliance with CPG
- Drill down to define 1-5 CPG specific compliance metrics
- Example: VTE Prophylaxis (yes/no/not applicable)
  1. Was patient stratified into low-moderate-high risk
  2. Were pneumatic compression devices ordered
  3. Was chemoprophylaxis ordered appropriately
  4. Was chemoprophylaxis administered timely
  5. Was duplex scan done within 24 hours of admission

Clinical Practice Guidelines Enhancing Compliance

- Compliance Tools:
  - Standard trauma admission orders
  - Pocket cards
  - Unit/Department binders or posters
  - Electronic intranet or hospital network

Classification of Care Events Taxonomy
### Framework of the Taxonomy

- I. Impact
- II. Type
- III. Domain
- IV. Factors

#### Differentiating Levels of Harm

- **None** – patient outcome is not symptomatic or no symptoms detected and no treatment is required
- **Minimal** – patient outcome is symptomatic, symptoms are mild, loss of function or harm is minimal or intermediate but short term, and no or minimal intervention (e.g., extra observation, investigation, review or minor treatment) is required
- **Moderate** – patient outcome is symptomatic, requiring intervention (e.g., additional operative procedure; additional therapeutic treatment), an increased length of stay, or causing permanent or long term harm or loss of function
- **Severe** – patient outcome is symptomatic, requiring life-saving intervention or major surgical/medical intervention, shortening life expectancy or causing major permanent or long term harm or loss of function
- **Death** – on balance of probabilities, death was caused or brought forward in the short term by the incident

### Taxonomy: Impact (Harm)

- **Medical**
  - Physical
  - Psychological
- **Non-Medical**
  - Legal
  - Social
  - Economic

### Degrees of harm

- No detectable harm
- Minimal permanent or temporary harm
- Moderate permanent or temporary harm
- Severe harm
- Death

### Key Points of Module

- Audit filters capture variances in all levels of centers that need to be reviewed
- The ACS Resources for Optimal Care of the Injured Patient criterion reflects the required audit filter and measures for verification
- Institutions should choose discretionary filters relevant to their patient population
- A plan for monitoring and reporting the PIPS activities of the trauma center is a vital component of the overall trauma program
- Taxonomy classification aids in events analysis and tracking
Examples of Standard Indicators/Audit Filters

Traumatic Deaths
Trauma Surgeon Response – all levels of trauma care
Consultant Response time for time-critical injuries (e.g. epidural hematoma, open fractures, hemodynamically unstable pelvic fractures)

Undertriage/Overtriage

Non-Surgical Admissions
Availability of anesthesia service
Delay in operating room availability
EMS Scene Time

Emergency Department Length of Stay
Time to transfer to tertiary care facility
Timeliness of preliminary and final radiology reports

Complication rates
Time to administration of antibiotics for open fractures
Time to reversal of anticoagulation

Adherence to Practice Management Guidelines such as Cervical Spine Clearance, VTE Prophylaxis, and Massive Blood Transfusion in exsanguinating hemorrhage

Pediatric Specific
- Management of solid organ injury
- Fluid resuscitation in children
- Management of non-accidental trauma
- Appropriate imaging
- Pain management

Trauma center diversion-bypass hours

Missed injuries
Burn patients with inhalation injuries who are not intubated
Fluid resuscitation in burn patients
TRAUMA PROGRAM

Trauma Alpha Audit Performance Improvement Tool

□ Alpha Criteria Met: ____________________________________________________________

□ Did not meet alpha criteria

Complete Trauma PI Tracking Form for indicators not met:

<table>
<thead>
<tr>
<th>INDICATOR</th>
<th>MET</th>
<th>NOT MET</th>
<th>N/A</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room set up with appropriate equipment as per EMS report</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDP in room on patient arrival</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radiology tech present on patient arrival</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT tech present on patient arrival</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgeon arrival within 30 minutes of notification</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial ABC assessment performed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initial V/S &amp; GCS performed</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperature taken with initial V/S</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 large bore IV’s in place</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lab drawn within 15 minutes of patient arrival</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Warming measures initiated (If patient not hypothermic, warmed blanked acceptable)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CXR, Pelvis, &amp; CS x-rays performed within 30 minutes of arrival</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT performed within 30 minutes of arrival</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radiology films available in viewing system timely</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lab results available within 60 minutes of patient arrival</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPE utilized by all staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments: __________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

Audit completed by: _________________________________________________________________

PRIVELEGED & CONFIDENTIAL: This report is a review function and as such is confidential and shall be used only for the purpose provided by law and shall not be public record and shall not be available for course subpoena.
Clinical Practice Guidelines Resources

ACS web based interactive PIPS - www.socialtext.net/acsdemo-wiki/

Agency for Healthcare Research and Quality
- Publishing Agency for Health Care Policy and Research (AHCPR) clinical practice guidelines - www.ahrq.gov

American Association for the Surgery of Trauma - www.aast.org

Eastern Association for the Surgery of Trauma (EAST) - www.east.org

Pediatric Trauma Society - www.pediatrictraumasociety.org

Society of Trauma Nurses - www.traumanurses.org
MODULE 4:
Event Identification and Levels of Review

Describe the review process of an event from identification through resolution in the PIPS plan.
Module Goals

- Describe the review process of an event from identification through resolution in the PIPS plan.
  - Provides systematic approach to event identification
  - Describe the process for events' flow to resolution
  - Select levels of review and their criteria
  - Methods of integration into trauma PIPS plan

Event Identification and Levels of Review

- Requires
  - Ability to cross multiple disciplines
  - Endorsement by the hospital
  - Administrative support for resources

Sources of Event Identification

- EMS (ground/air)
- Medical Control
- Medical Record
- Referrals (written/verbal)
- Transfer Center
- Daily rounds/case management
- Conferences (peer review quality conference, education conferences)
- Risk management reports
- Autopsies
- Hospital Quality Management Department
- Patient/Family Feedback
- Registry data
- Department reports
- Region/state forums
- Designating authority
- Benchmark reports

Domain: Setting

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Non-hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resuscitation</td>
<td>Pre-hospital</td>
</tr>
<tr>
<td>Radiology</td>
<td>Transferring Facility</td>
</tr>
<tr>
<td>Blood bank/Lab</td>
<td>Transferring Agency</td>
</tr>
<tr>
<td>OR</td>
<td>Rehab</td>
</tr>
<tr>
<td>PACU</td>
<td>Outpatient</td>
</tr>
<tr>
<td>ICU</td>
<td>Patient/Family</td>
</tr>
<tr>
<td>Step down unit</td>
<td>Other...</td>
</tr>
<tr>
<td>General care</td>
<td></td>
</tr>
</tbody>
</table>

Event Identification: Concurrent Process

Advantages

- Affects patient care at point of service
- Increased staff/patient/family satisfaction
- Less reliance on medical records department
- Improved prospective reporting

Disadvantages

- Personnel intense
- Management of data input and concurrent reporting

*Must be defined in the Trauma PIPS Plan*
Event Identification: Retrospective

**Advantages**
- Done all at once
- May be easier if resources are limited

**Disadvantages**
- Reliance on Medical Record only
- Not timely
- Less effective feedback
- PIPS process delay
- Data backlog/late reporting of compliance violations

Elements of PIPS Management

- Process & tools for tracking identified events
  - Strongly recommend electronic tracking
  - Standardized reporting formats
  - Ability to interface with Hospital Quality, Medical Staff, etc.

- Tracking to confirm loop closure (event resolution)

Framework of the Taxonomy

I. Impact
II. Type
III. Domain
IV. Factors

Type of individual involved (physician, nurse, etc.) and type of setting (hospital, pre-hospital, clinic, etc.)

Domain

<table>
<thead>
<tr>
<th>Time</th>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>Physicians</td>
</tr>
<tr>
<td>Day (holiday/weekend)</td>
<td>Nurses</td>
</tr>
<tr>
<td>Shift work</td>
<td>Therapists</td>
</tr>
<tr>
<td>Shift change</td>
<td>Others</td>
</tr>
<tr>
<td>Mass Casualty</td>
<td></td>
</tr>
</tbody>
</table>

Levels of Review

- Defined steps to address relevant level in order to reach event resolution
  - Primary/Level I
  - Secondary/Level II
  - Tertiary/Level III
  - Quaternary/Level IV

- Achievement of loop closure may occur at any level depending on the issue
Levels of Performance Review

- Primary Review - finding the events
  - Concurrent/retrospective event identification
  - Confirmation of actual event
  - Immediate resolution and feedback
  - Events may be closed or trended at this level
  - Establish electronic PIPS tracking system to show event addressed/action/closure
  - Determination if it needs further review

- Secondary Review - triaging events
  - May require referral to:
    - Multidisciplinary Trauma Peer Review Committee
    - Multidisciplinary Trauma Systems/Operations Committee
    - Trauma M & M
    - Liaisons
    - Department heads
  - Establish electronic PIPS tracking system to show event addressed/action/closure

- Tertiary Review - structured review by group
  - Efficacy, efficiency and safety of care
  - Provide focused education
  - Provide peer review
  - System vs. Provider error
  - Team performance
  - Contributing factors
  - Corrective recommendations/actions
  - Close loop and document to Trauma PIPS

Levels of Performance Review

- Secondary Review - triaging events
  - Review electronic medical record
  - Confirmation of all involved
  - Development of timeline
  - Review any additional information
  - Review by TMD and/or TPM
  - Event may be closed at this level
  - Feedback

Levels of Performance Review

- Tertiary Review - structured review by group
  - Review at a formal committee
    - Trauma Multidisciplinary Peer Review Committee
    - Trauma Operational Process Performance Committee
    - Trauma M & M Conference
    - Hospital PIPS Committee
    - Regional and Systems PIPS Meetings
    - Prehospital Trauma PIPS
Levels of Performance Review

- Quaternary/Level IV
  - Examine extraordinary care
  - External Review
  - Forums
    - Hospital Quality
    - External peer review
      - Regional
      - State
      - Expert

Which Cases are Forwarded to a PIPS Meeting?

- Select Audit Filters
- Select based on clinical significance
- All indicators?
- All complications?
- All deaths?
- Unexpected outcomes?
- Systems issues?
- Sentinel events?
- PMG non-compliance
- Policy/protocol non-compliance
- Special populations
  - Pediatrics
  - Geriatric
  - Pregnant
  - Burns
  - Spinal Cord Injuries
  - Morbidly obese

Key Aspects of Module

- Multiple ways exist to identify PIPS events
- Concurrent monitoring is recommended
- Tracking system tools are required for event analysis
- Systematic classification for PIPS events will aid in process improvement
- Incorporate standards/parameters/thresholds for review decision level
TRIUMA PI PROCESS: LEVELS OF REVIEW

PRIMARY REVIEW: Daily

Phase of Care
- Prehospital
- Resuscitation
- Inpatient Care Review
- Outpatient Care Review

Purpose: Issue Identification/Validation
- Concurrent review: PIC and Registrar's
- Concurrent data entry: PI/Registry interface
- Case Summary Initiated - Daily Clinical Rounds - Last 24° admissions
  Issue determination, discussion, delineation, decisions, do (actions)
- PI Issue ID forms: off-shifts/weekends & outpatient settings
- PI Hotline 24 hrs./7days
- Resuscitation Video Review

SECONDARY REVIEW: Weekly

TPD/TPC-M/PIC

Potentially Preventable/Preventable Issues (and Non-Preventable w/educational value)

TERTIARY REVIEW: Monthly

Purpose: Peer Review/Accountability Determination, Loop Closure Plan, Trended Data Review
Team (TPD, TPC-M, PIC, Registry Staff, Attending Staff - in various combinations)

Monthly:
- Morbidity & Mortality
- Trauma Surgeon Performance Improvement Conference
- Trauma Surgeon/Medical Examiner DEATH Review
  may be done at Trauma Surgeon PI Conference
- Interdisciplinary Performance
  ED, Anesthesia, Rehab, Radiology,
  Critical Care, Neurosurgery, Ortho

Actions
- Educational Session
- Trauma Center Strategic Plan
- TREND Monitor Report
- CMG/Policy Development
- Hospital/System PI Project

Legend
PIC: Performance Improvement Coordinator
TPD: Trauma Program Director
TPC-M: Trauma Program Coordinator/Manager
Inclusion dates: ________________________________________________________________

Reason for review: □ Quarterly Review □ PI issue: ________________________________

Findings:

□ All diversions appropriate/no further action
□ Questionable diversion: ___________________________ (date/time)
□ Inappropriate diversion: ___________________________ (date/time)

<table>
<thead>
<tr>
<th>Issue</th>
<th>Action Plan</th>
<th>Responsible Party</th>
<th>Status</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Unnecessary</td>
<td></td>
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<tr>
<td>□ Trend</td>
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<tr>
<td>□ Education</td>
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<tr>
<td>□ Counseling</td>
<td></td>
<td></td>
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<tr>
<td>□ Peer Review</td>
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<tr>
<td>□ Other</td>
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</table>

Determination: □ System-Related
□ Provider-Related

Preventability: □ Non-Preventable
□ Potentially Preventable
□ Preventable

Comments:

______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________
______________________________________________________________________________

__________________________________________  _________________________________
Trauma Medical Director/Date                  Trauma Program Manager/Date
MODULE 5:
Data Management:
Supporting the Trauma PIPS Process

Evaluate effectiveness, validity and reliability of data collection processes.
Module 5
Data Management: Supporting the Trauma PIPS Process

Module Goals
Evaluate effectiveness, validity and reliability of data collection processes.
- Review the trauma registry core functions in supporting the trauma PIPS process
- Discuss implementation and sustainment of an optimal trauma registry and trauma data process
- Identify optimal data processes
- Discuss trauma data validation processes

Definition of Trauma Registry
“…uniform data elements that describe the injury event, demographics, pre-hospital information, diagnoses, care, outcomes, and costs of treatment for injured patients.”
- Resources for Optimal Care of the Injured Patient

The Trauma Registry
- The Trauma Registry is the foundation for the trauma program
- Provides data to support:
  • Trauma PIPS
  • Research
  • Finance
  • Special projects
  • All aspects of the trauma program

Trauma Registry Functions
- Tool to assess and evaluate clinical care
  - Vital to the PIPS process
- Public health and injury prevention
  - Characterize frequency and patterns of injury to target community education
- Contributes to trauma cost analysis and resource utilization
- Data repository for clinical and systems research
- Supports trauma center verification process

The Data Dictionary
- Adherence to the National Trauma Data Bank (NTDB) data definitions is fundamental
- Failure to use the data dictionary compromises the integrity of the data
- State specific data elements also require a data dictionary
Implementing a Trauma Registry

The basic components needed:
• Institutional financial commitment and continued support for an optimal trauma data process
• Trauma Registrar(s)
• Appropriate hardware (PC, LAN, virtual storage capacities etc.)
• Software Database
• Efficient data collection process
• Data validation process
• Good technical support from the vendor
• Data security policy
• Secure office area

Trauma Registry Software

Optimal trauma registry databases:
— Provide valid and reliable data
— Produces PI reports
— Are able to be customized
— Have capability for PI tracking and trending
— Have Robust report writing capabilities
— Future
  — Configured for trauma taxonomy
  — Structured to collect PI data related to: Impact, Type, Domain and Cause

Trauma Registrar

Background
— Health Information
— Nursing
— Informatics

Training*
— ATS Registrar Course
— AAAM Scaling course

*Within 12 months of hire

Trauma Registrar Staffing

• ACS recommends one full time trauma registrar for every 500 to 750 trauma admissions annually
• Level III and IV trauma centers may have a hybrid staffing model
  • Example: the responsibilities may be combined

Trauma Registrar Job Description

• Must include:
  — Trauma Registry duties (all inclusive)
  — Close interface with TPM and TMD
  — PIPS Data Support
  — Report writing and generation for research, injury prevention activities, hospital trauma activity
  — Administrative requirements
  — Regulatory requirements
  — Interface (State, Regional, NTDB, TQIP)

Trauma Registry

• Data must be collected and analyzed by all ACS verified centers
• Data collection should be concurrent
• 80% of cases must be entered within 60 days of discharge
• Should support documentation of emerging trauma patient safety taxonomy
Trauma Registrar Interface

- Trauma Registrars need to be fully integrated into:
  - Trauma PIPS Processes
  - Event/Issue identification
  - Data element, data field updates
  - Data validation processes
  - Data reporting
  - Patient Safety Taxonomy

- Trauma hospital staff, and PI representatives need to understand:
  - Roles and responsibilities of the trauma registrars
  - Inclusion criteria
  - Audit filters
  - Committee reports
  - Patient Safety Taxonomy

Trauma Registry Support of Trauma PIPS

Accurate, validated, concurrent data is the foundation for trauma PI

- The trauma registrar supports the trauma PIPS process by:
  - Concurrent event identification of complications, audit filter fallouts, deaths, etc.
  - Tracking and trending of PI issues through routine collated reports (weekly, monthly, annually)
  - Analysis and report generation of classifications using the taxonomy
  - Meeting the risk adjusted benchmarking requirements
  - Meeting the trauma system PI requirements

Trauma Registrar: The Team Approach

- Include the trauma registrar(s) in:
  - Trauma bedside rounds / weekly case conferences
  - Daily communication and information sharing on clinical and PI issues
  - System operations committee meeting
  - Multidisciplinary peer review committee meeting as appropriate
  - Educational opportunities
  - This inclusion, and integration leads to improved trauma data

Protection of the Trauma Data

- Ensure data is secure at all times
- Develop and maintain a trauma data security policy consistent with the hospital’s data security policies
- Develop and maintain a data request and release policy
- Limit access to the trauma registry to protect patient privacy and ensure integrity of the data
  Recommend TPM, TMD, and PI Coordinator, and Trauma Registrars only

Data Validation is..

- A process to ensure a program operates on clean, correct and useful data, to prove or disprove accuracy:
  - A review of data for completeness and appropriateness with the elimination of erroneous values
  - The identification of suspicious or invalid cases, variables, and data values.

Registry Data Validation: “Inter-rater Reliability”

- Strategies for monitoring data validity are essential
  - Audit of the registrar and data processes
  - Productivity reports: number of cases completed, and time to complete each case
  - Re-abstraction of patient records (5-10% per month)
  - Ascertain adherence to the NTDB data definitions
  - Comparative data point analysis
  - Report on missing data elements
  - The registry staff and TPM should discuss the findings, and corrective actions
Why Validate Your Trauma Data?

• The process of developing, implementing, and refining a registry data validation system is integral to optimal trauma registry operations
• Goal: significant reduction / complete elimination of avoidable errors


Hospital St. Elsewhere

Trauma Performance Improvement Committee
Performance Measure Dashboard

State and National Trauma Registries

• Valuable component of an effective and efficient trauma system
• NTDB submission required
• Aggregate of registry data from participating trauma centers and hospitals
• State registry used for trauma system PIPS
  – Needs assessment
  – Epidemiologic purposes
  – State wide research projects

How to Maintain a Concurrent Data Process

• Ensure the TPM and TMD advocate for appropriate trauma registrar staffing ratios
• Revitalize outdated trauma data work flow processes
• Plan carefully and aggressively for an appropriate trauma data model
• TPM to monitor, and provide careful oversight to the trauma registrars to support their roles and responsibilities

Optimize Work Processes

• Paperless, concurrent data model
• Laptops, Tablets, Dual Monitors
• Efficient PI process
• Interfacing with the electronic medical record
• Interfacing with the pre-hospital electronic medical record
• Lean methodology
• Learn about working smart
Key Aspects of Module

- The trauma registry is the foundation of the trauma program
- Appropriate staffing levels, training, continuing education and institutional support is crucial
- Implement and maintain a concurrent data model, and ensure work processes are optimized
- Integrate the trauma registry staff into the various aspects of the trauma program such as rounds, education, case conferences
- Ensure patient privacy laws are maintained, and protect the integrity of the data by limiting access to the registry
National Registrar Education and Network

• AAAM AIS injury scoring course http://www.carcrash.org
• ATS Registrar Network* http://www.amtrauma.org
  *National registrar certification oversight
• State registrars network
• Local registrar network
MODULE 6: 
Trauma PIPS Reports

Describe the fundamental principles of creating meaningful reports.
Module 6: Trauma PIPS Reports

Objectives

- Describe the fundamental principles of creating meaningful reports
- Review options for reporting trauma PI data
- Discuss the importance of benchmarking, comparison, and trend over time reports
- Discuss various examples of trauma PIPS reports

Getting Started

Ask Yourself:
- Do you have accurate data?
- Do you have timely and meaningful data?
- Who is your target audience?
- What do you want your audience to get from your data?
- What message do you want to convey?
- What is the goal of the report?

Tips for Creating Meaningful Reports

- Spend time thinking, creating, and perfecting your report template
- Display the data so it is easy to read (within a few seconds)
- Determine what type of graph best displays a particular data set
- Comparisons over time are important
- Indicate thresholds when appropriate
- Avoid presenting raw data

Report Tips

- Show everything in context
- When in doubt, annotate
- Place labels in close proximity to the actual data

Report Tips

- When presenting the data, get to the point fast
- Data slides are not about the data, they are about the meaning of the data
- Focus the audiences attention on the message behind the data, and not the data

(Kapell, 2007)
(Duarte, 2013)
Creating Reports: Some Basic Caveats

- When creating charts for PIPS keep words to a minimum
- Chart: a way to present data that would alternatively be shown as a table.
- Table: presents data that otherwise would need to be displayed as text.
- Goal: your report should convey the main idea(s) of your data, that might not be apparent if the display was in a table or text.

Presenting the Trauma Data

- Who is the best, and most appropriate person to present the information?
- Practice
- Anticipate questions

Types of Trauma PIPS Reports

Basic Trauma Hospital Reports:
- Census by month with comparison to the previous year
- ED Disposition
- Hospital disposition
- Hospital and ICU length of stay
- Mechanism of injury
- Demographics
- Trauma team activations

Trauma PIPS Reports
- Audit filters
- Brief summary analysis on a dashboard report
- Complication dashboard control charts (by month or quarter)
- Deaths using trauma taxonomy

Types of Trauma PIPS Reports

- Complications
  - Depending on the trauma patient volume, may report this monthly or quarterly
  - Control charts show trends over time
  - Include individual provider-specific complication rates in the annual credentialing process (proceed with caution as many cannot be attributed to one physician)

Customized PIPS Reports

- Consultant response times
- Timeliness to OR
- Compliance with documentation of vital signs protocols
- Timeliness of interventions and diagnostics
- Special populations:
  - Geriatric
  - Pediatric
  - Pregnant
  - Burn

Benchmark Comparison with NTDB

Compare your trauma hospital data with national data

Examples:
- Patient Demographics
- Hospital demographics
- Survivors vs. non-survivors:
  - LOS
  - mean ISS & ICU days
  - Age

Examples:
- Blunt vs. penetrating percentages
- ISS by age group
- Mortality rates
- Mortality by ISS
- ED disposition
- Hospital disposition
- ISS and hospital charge
- Mechanism of injury and restraint usage
- ISS with LOS
Benchmarks and Measurements:
Outcome Data
Report Examples:
• Functional status on discharge (FIM Scores)
• Results of patient satisfaction surveys
• Complication rates
• Compliance with practice management guidelines
• Mortality and morbidity
• Severity-adjusted mortality and morbidity
• Unplanned return to OR
• Unplanned upgrade to an intensive care unit
• Unplanned hospital readmission
• Surgical wound infections
• Organ donation activity

Risk Adjusted Benchmarking
• Required at Level I, II, and III centers
• Methodology for evaluating risk adjusted performance and benchmarking
• Reduce variability in trauma process/outcomes/cost
• Goals
  – Develop data elements to measure processes of care
  – Standardize care management via trauma centers nationally
  – Implement uniform defined audit filters and universally accepted data definitions

Trauma Quality Improvement Project [TQIP]
• Project software program for enhanced PI
• A trauma PIPS program for evaluating risk adjusted performance and benchmarking
• Goals:
  • Reduce variability in trauma care thus improving outcomes and decreasing costs
  • Develop data elements to measure processes of care
  • Standardize care management via trauma centers nationally
  • Implement uniform defined audit filters and universally accepted data definitions

TQIP Measurable Processes of Care
TQIP reports include:
• Mortality and complication benchmarking
• Select national audit filters
TQIP Best Practice Guidelines
• Geriatric
• Massive Transfusion
• Management of Traumatic Brain Injury

Trauma PIPS Report Examples
Surgeon Response to Highest Trauma Activation Level
Quarterly Report

Matrix Method for Under/Over Triage

<table>
<thead>
<tr>
<th>Year</th>
<th>UT/OT MATRIX</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CRITERIA MET</td>
</tr>
<tr>
<td></td>
<td>HIGHEST LEVEL TTA</td>
</tr>
<tr>
<td></td>
<td>MIDLEVEL TTA</td>
</tr>
<tr>
<td></td>
<td>NO TTA</td>
</tr>
</tbody>
</table>

Complete Chart Abstraction within 60 days of Discharge
ACS Requirement

TQIP Injury Severity Comparison

<table>
<thead>
<tr>
<th>Year Hospital (9 Patients)</th>
<th>All Other TQIP Hospitals (6 Patients)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-Hospital Cardiac Arrest</td>
<td>1.2 %</td>
</tr>
<tr>
<td>Shock</td>
<td>3.6%</td>
</tr>
<tr>
<td>Mean ISS</td>
<td>16.8</td>
</tr>
<tr>
<td>Mean SBP</td>
<td>136.4</td>
</tr>
<tr>
<td>Mean Pulse</td>
<td>86.5</td>
</tr>
<tr>
<td>ED GCS Motor 4 or less</td>
<td>10.4%</td>
</tr>
<tr>
<td>ED GCS Total 8 or less</td>
<td>10.4%</td>
</tr>
</tbody>
</table>
### Key Aspects

- Plan carefully when creating a report
- Understand your target audience
- Ensure your data is accurate
- Use clear labeling, and appropriate types of graphs to display the data
- Consider comparison reports, and outcomes reports
- Practice presenting the reports
## Analysis of Process Measure
### Overtriage / Undertriage

<table>
<thead>
<tr>
<th></th>
<th>ISS &lt; 15</th>
<th>ISS &gt; 15</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest Activation</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Second Tier Activation</td>
<td>D</td>
<td>E</td>
<td>F</td>
</tr>
<tr>
<td>No Activation</td>
<td>G</td>
<td>H</td>
<td>I</td>
</tr>
</tbody>
</table>

**Overtriage**

\[
\frac{A}{C}
\]

**Undertriage**

\[
\frac{(E + H)}{(F + I)}
\]
Adult Trauma Service Admissions

Solid Organ Grading Documentation Audit
January 1 to March 31
SPLEEN Lacerations

Total 16 Cases reviewed

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Grade Documented</th>
<th>Documentation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CT Radiology Report</td>
<td>11 cases</td>
<td>69%</td>
</tr>
<tr>
<td>And / OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Progress Notes</td>
<td>15 cases</td>
<td>94%</td>
</tr>
<tr>
<td>And / OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Operative Reports</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>(0 cases had Operative Intervention)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

16 Cases or 100% of the population with a SPLEEN laceration did have the Grade of the laceration documented in the patient record.
## Adult Trauma Service Admissions
### Solid Organ Grading Documentation Audit
January 1 to March 31
### LIVER Lacerations

Total 6 Cases reviewed

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Grade Documented</th>
<th>Documentation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. CT Radiology Report</td>
<td>4 cases</td>
<td>67%</td>
</tr>
<tr>
<td>And / OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Progress Notes</td>
<td>5 cases</td>
<td>83%</td>
</tr>
<tr>
<td>And / OR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Operative Reports (0 cases had Operative Intervention)</td>
<td>N/A</td>
<td>N/A</td>
</tr>
</tbody>
</table>

6 Case or 100% of the population with a LIVER laceration did have the Grade of the laceration documented in the patient record.
MODULE 7: Peer Review Determination and Confidentiality

Explain the function and process of peer review in the PIPS plan.
Module 7: Peer Review Determination and Confidentiality

Objectives
Peer Review Determination
Explain the function and process of peer review in the PIPS plan.
- Understand “peer review protection” scope
- List considerations which guide peer review
- Define peer review determination in the Trauma PIPS plan
- Discuss need for established authority in peer review determinations
- Discuss accepted determination criteria tools for system, clinical, provider events

When to Utilize Determination
- “Multidisciplinary trauma peer review committee must systematically review mortalities, significant complications, and process variances associated with unanticipated outcomes and determine opportunities for improvement”
- The definition and classification of events must be consistent with institution-wide PIPS program
- Mutually agreed upon nomenclature allows for integration with the institution-wide PIPS
- 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

Obstacles and Essentials
Obstacles:
- Absence of required surgeons/liaisons
- Imperfect probability of survival scoring
- Incomplete data for case discussion
- Absence of autopsy information
- Inadequate minutes reflecting the critical discussion of the events

Essentials:
- Attendance
- Framework for outcome (Type, Factors) selection
- Minutes that reflect critical aspects of discussion of selected events and outcomes
- Feedback to PIPS Committee

Peer Review Authority
- Hospital bylaw directive
  - Empowerment to the trauma PIPS program
  - Provider credentialing criteria
- Integrate into hospital peer review
- Trauma system/state standards/ regulations
- Understand state statutes regulating discoverability

Determination Options
- Classification tools
  - Institutionally developed classification guidelines
  - Region or National developed tools
- Should interface with hospital peer review classification
- Goal is to be comparable to other trauma centers in the region / state /nationally
- Objective is to be able to standardize the classification of events for reporting, tracking, and narrow down focus of corrective action planning
Determination Type

- Communication
- Patient Management
- Clinical Performance
  - Pre-intervention
  - Intervention
  - Post-intervention

Determination Contributing Factors

- System (Process) Related: not specifically related to provider or disease
- Patient (Disease) Related: an expected sequela of a disease or injury
- Provider Related: an untoward event that results from the care provided

Determination Methodology

- Philosophical change in problem analysis
- Focuses on opportunities for improvement
- Provides structure for event assessment
- Culture of Safety recognizes that human error and imperfect choices occur and that these should be dealt with in a non-punitive manner

Determination Mortality Peer Review

- Mortality without opportunity for improvement (OFI)
- Mortality with opportunity for improvement (OFI)
- Unanticipated mortality with opportunity for improvement (OFI)

(ACS is moving away ‘anticipated’ mortality and focused on OFI)

Opportunity for Improvement (OFI)

A realization that conditions exist in structures and/or processes of care where modification could reduce the incidence of real or potential adverse events or, ideally, improve outcome

If the same patient were to walk through the door today, would we do anything differently?

Patient Safety + Taxonomy

- Patient Safety is freedom from injury or illness resulting from the processes of health care
- Taxonomy is the science, laws, or principles of classification
- Patient Safety Taxonomy is the identification and classification of things that go wrong in health care, the reasons why they occur, and preventive strategies which can minimize future occurrence.
Taxonomy is International

Towards an International Classification for Patient Safety: key concepts and terms

Frameworks of the Taxonomy

I. Impact
II. Type
III. Domain
IV. Factors

Type of health care service or intervention provided
System Human

Taxonomy: Type

- Communication
- Patient Management
- Clinical Performance
  - Pre-intervention
  - Intervention
  - Post-intervention

Taxonomy: Type

- Communication
  - Inaccurate and incomplete information
  - Questionable advice or interpretation
  - Questionable consent process
  - Questionable disclosure process
  - Questionable documentation

Taxonomy: Type

- Patient Management
  - Questionable delegation
  - Questionable tracking or follow up
  - Questionable referral or consultation
  - Questionable use of resources

Taxonomy: Type

Pre-intervention
  - Correct diagnosis, questionable intervention
  - Inaccurate diagnosis
  - Incomplete diagnosis
  - Questionable diagnosis

Intervention
  - Correct procedure with complication
  - Correct procedure incorrectly performed
  - Correct procedure but untimely
  - Omission of essential procedure
  - Procedure contraindicated
  - Procedure not indicated
  - Wrong Patient

Post-intervention
  - Correct Prognosis
  - Inaccurate prognosis
  - Incomplete prognosis
  - Questionable prognosis
 Contributing Factors

- System (Process) Related: not specifically related to provider or disease
- Patient (Disease) Related: an expected sequela of a disease or injury
- Provider Related: an untoward event that results from the care provided

 Contributing Factors

- Systems
  - Organizational
  - Technical
  - External

- Human
  - Provider
  - Patient
  - External

- Other
  - Negligence
  - Recklessness
  - Intentional Rule Violation

 Contributing Factors

- Analysis of events show that contributing factors could be classified into two groups
  - System failures (actual and near misses)
    - Orientation, training, staffing, environment, alarms system which lead to operator errors
  - Human failures (actual and near misses)
    - Communication, patient assessment, delays in diagnosis

 Contributing Factors

- Management
  - Maintain Organizational Resources
  - Staffing, training, budget
- Organizational Culture
  - Chain of Command
  - Delegation of Authority
  - Communication Channels
  - Formal Accountability
- Protocols/Processes
  - Processes
    - Time Pressures, Schedules
  - Procedures (Organizational)
    - Standards, documentation
    - Oversight
  - Risk Management, Safety Programs
  - Transfer of Knowledge
    - Supervision, Training
  - External

 Contributing Factors

- Provider/Hospital based
  - Skill based: failure to execute stored task instructions
  - Rule based: failure in retrieve stored CPG instructions
  - Knowledge based: failure due to insufficient knowledge
  - Chain of command or failure to notify supervisor
  - Behavior

 Contributing Factors

- Facilities
  - Equipment/Materials
    - Design
    - Construction
    - Malfunction
    - Obsolescence
    - Availability
- External
  - Technical failures that are beyond the control and responsibility of the organization
    - Care prior to arrival
Contributing Factors
HUMAN-PROVIDER (examples)

- Skill
  - Technique
  - Surgical priorities
- Rule based
  - Protocol compliance
  - Regulatory compliance
  - Credentialing compliance
- Knowledge base
  - Judgment / decision-making
  - Diagnosis

Contributing Factors
HUMAN-PATIENT

- Patient: failures related to patient characteristics or beyond control of provider
  - Patient non compliant or refusal
  - Survival Probability
  - DOA
  - Injury Severity
  - Co-morbidities
  - DNR/withdrawal of life support

Contributing Factors
OTHER

- Negligence
  - Failure to perform at the level of competence consistent with professional norms of practice and operation
- Recklessness
  - Intentional deviation from professional norms of good practice and operation with cause
- Intentional Rule Violations
  - Knowingly violates a rule or procedure

Determination Confidentiality

- Peer Review Process
- Confidentiality defined in bylaws
- Collective open decision
- Discussion of event
- Strive to achieve consensus
- Voting can be raised hand or private ballot
- Minutes MUST reflect the essence of discussions

Case Review Evaluation

- What was the outcome?
- Were standards of care followed?
- Was supervision adequate?
- What were the pre-existing conditions?
- Were trauma practice management guidelines and protocols followed?
- What were the circumstances (multiple, simultaneous patients) surrounding the event?
- Who was involved and what safety goals were related?
- Were system failures present?
- Were there knowledge and skill variations?
- Were there associated performance or behavioral events?
Case Review Example

- Geriatric male struck by car – sustained bilateral open lower extremity fractures
- Cervical spine cleared in ED
  – Cervical collar removed
- Day 10 post ICU transfer to acute care unit patient complained of neck pain
- Post film review found C-spine fracture
  – Cervical collar replaced for 6 weeks.

Case Review Example

- Type [Communication/Clinical]
- Domain [ICU & Acute care]
- Factors [Human]
- Opportunity for Improvement: System improvements to prevent this from reoccurring
- Identified Event: Category - System related OFI

Case Review Example

- 36 year old male - Mechanism of fall
  Diagnosis lower open extremity fracture
- Awake, alert and oriented, stable vital signs
- Receives IV Paralytic agent instead of IV Antibiotic – Develops respiratory arrest
- Ventilated with Bag Valve Mask & responded with no sequelae.
- Category of sentinel event

Case Review Example

- Type [Communication-Patient management - Clinical performance]
- Domain [Emergency Department]
- Factors [Human - System]
- Identified Event - System and Provider OFI

What steps can be taken to prevent this from reoccurring?

Key Aspects of Module

- Effective peer review can be done at any level trauma center
- Authority of committee must be well-defined in the PIPS plan
- Committee authority will differ in PIPS plans and hospital bylaws
- Taxonomy classification is designed to provide a comprehensive review process that fosters issue identification leading to mitigation
- Identifying the contributing factors that led to the event is not loop closure (event resolution)
Case Review Example

- Geriatric male struck by car – sustained bilateral open lower extremity fractures
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- Type [Communication-Patient management - Clinical performance]
- Domain [Emergency Department]
- Factors [Human - System]
- Identified Event - System and Provider OFI
  
  *What steps can be taken to prevent this from reoccurring?*

Key Aspects of Module

- Effective peer review can be done at any level trauma center
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- Committee authority will differ in PIPS plans and hospital bylaws
- Taxonomy classification is designed to provide a comprehensive review process that fosters issue identification leading to mitigation
  - Identifying the contributing factors that led to the event is not loop closure (event resolution)
The Conceptual Framework for the International Classification for Patient Safety

The solid lines represent the semantic relationships between the classes. The dotted lines represent the flow of information.
INCIDENT TYPE AND PATIENT OUTCOME

The class, *incident type*, is a descriptive term for a category made up of incidents of a common nature grouped because of shared, agreed features, such as “clinical process/procedure” or “medication/IV fluid” incident. Although each incident type concept is distinct, a patient safety incident can be classified as more than one incident type.

The class, *patient outcomes*, contains the concepts that relate to the impact upon a patient which is wholly or partially attributable to an incident. Patient outcomes can be classified according to the type of harm, the degree of harm, and any social and/or economic impact.

Together, the classes *incident type* and *patient outcomes* are intended to group patient safety incidents into clinically meaningful categories.
Pertinent descriptive information that provides context for the incident is captured by four classes: patient characteristics, incident characteristics, contributing factors/hazards, and organizational outcomes.

**Patient characteristics** categorize patient demographics, the original reason for seeking care and the primary diagnosis.

**Incident characteristics** classify the information about the circumstances surrounding the incident such as where and when, in the patient's journey through the healthcare system, the incident occurred, who was involved, and who reported.

**Contributing Factors/Hazards** are the circumstances, actions or influences which are thought to have played a part in the origin or development of an incident or to increase the risk of an incident. Examples
are human factors such as behavior, performance or communication; system factors such as work environment; and external factors beyond the control of the organization, such as the natural environment or legislative policy. More than one contributing factor and/or hazard is typically involved in a single patient safety incident.

Organizational outcomes refer to the impact upon an organization which is wholly or partially attributable to an incident. Organizational outcomes indicate the consequences directly to the organization such as an increased use of resources to care for the patient, media attention or legal ramifications as opposed to clinical or therapeutic consequences, which are considered patient outcomes.

A complex relationship exists between incident type and contributing factors. The same incident or circumstance may be perceived as an incident or a contributing factor, depending on the context, circumstance or outcome.

An incident always has a set of contributing factors. Although an incident can be a contributing factor to the origin or development of another incident, some contributing factors can not be incidents in their own right. An incident can therefore be designated as a principal incident type depending on context specific business rules (e.g., the incident most proximal to the identified patient outcome), design of an information system or type of data analysis.

For example, if a patient with atrial fibrillation on warfarin got up at night to go to the bathroom, and slipped and fell resulting in no discernable harm, the patient safety incident would be considered a no harm incident and the incident type would be categorized as a “patient accident - fall”. If this patient had been found the following morning unrousable on the floor, then it is likely that the patient safety incident would be considered a harmful incident (adverse event) and the incident type would be regarded as “clinical management”. The fall would be considered a contributing factor involving “staff factors”, “work environment factors”, and “organizational/service factors”.


The classes detection, mitigating factors, ameliorating actions and actions taken to reduce risk capture information relevant prevention, incident recovery, and system resilience.

Detection and mitigating factors together represent incident recovery (i.e., secondary prevention). Ameliorating actions are those used in the rescue phase of incident recovery (i.e., tertiary prevention).

Actions taken to reduce risk represent the collective learning from the information classified in all 10 classes necessary to result in system improvement, reduction of risk and improvement in patient care.
The concept of incident recovery,\textsuperscript{17} derived from industrial science and error theory, is particularly important if learning from patient safety incidents is to occur.\textsuperscript{18,19} It is the process by which a contributing factor and/or hazard is identified, understood and addressed thus stopping the contributing factor or hazard from developing into a patient safety incident. Incident recovery and resilience \textit{(in the context of the ICPS resilience)} is “the degree to which a system continuously prevents, detects, mitigates or ameliorates hazards or incidents” so that an organization can “bounce back” to its original ability to provide core functions) provide the context for discussion of detection, mitigation, amelioration and reduction of risk.

\textit{Detection} is defined as an action or circumstance that results in the discovery of an incident. For example, an incident could be detected by a change in the patient’s status, or via a monitor, alarm, audit, review, or risk assessment. Detection mechanisms may be built into the system as official barriers or informally developed.

\textit{Mitigating factors} are actions or circumstances which prevent or moderate the progression of an incident toward harming the patient. Mitigating factors are designed to minimize the harm to the patient after the error has occurred and triggered damage control mechanisms. Together, detection plus mitigation can impede the progression of an incident from reaching and/or harming a patient. If the incident does result in harm, ameliorating actions can be introduced.

\textit{Ameliorating actions} are those actions taken or circumstances altered to make better or compensate any harm after an incident. Ameliorating actions apply to the patient (clinical management of an injury, apologizing) and to the organization (staff debriefing, culture change, claims management).

\textit{Actions taken to reduce risk} concentrate on steps taken to prevent the reoccurrence of the same or similar patient safety incident and on improving system resilience. Actions taken to reduce risk are those actions taken to reduce, manage or control the harm, or probability of harm associated with an incident. These actions may be directed toward the patient (provision of adequate care, decision support), toward staff (training, availability of policies/protocols), toward the organization (improved leadership/guidance, proactive risk assessment), and toward therapeutic agents and equipment (regular audits, forcing functions). Detection, mitigating factors and ameliorating actions both influence and inform the actions taken to reduce risk.

\textsuperscript{17} Also referred to as “error recovery” or “recovery”


Which variables assist in making determination?

<table>
<thead>
<tr>
<th>Determinants of Judgments</th>
<th>Responses</th>
<th>Discussion</th>
<th>Determination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Were accepted policies/procedures followed?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Were clinical management guidelines adhered to?</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Was management done as per ATLS guidelines?</td>
<td></td>
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</tr>
<tr>
<td>If complication involves a resident/student, was there evidence of adequate supervision?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Was the system response optimal?</td>
<td></td>
<td></td>
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<tr>
<td>Did the patient have pre-existing medical conditions that contributed to the occurrence?</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Was the occurrence/complication evident prior to hospitalization?</td>
<td></td>
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</tr>
</tbody>
</table>

**DETERMINATION**
Framework of the Taxonomy

I. Impact

II. Type

III. Domain

IV. Factors

Severity of harm (AHRQ degrees of resulting harm)

Type of health care service or intervention provided

Type of individual involved (physician, nurse, etc.) and type of setting (hospital, pre-hospital, clinic, etc.)

- System
- Human
Classification: Prevention (P) & Mitigation (M)

Indicated
- Improve the safety of using high-alert medications (P)
- Improve the safety of using infusion pumps (P)

Selective
- Eliminate wrong-side, wrong-site, wrong-procedure surgery (M)

Universal
- Improve the effectiveness of communication among caregivers (P)
- Reduce the risk of healthcare-acquired infections (M)
- Improve the accuracy of patient identification (P)
- Improve the effectiveness of clinical alarm systems (P)
Develop an action plan as part of the trauma PIPS program.
Module 8: Action Plan/Prevention: Development and Implementation

Module Goals

- Develop an action plan as part of the trauma PIPS program.
- Define patient safety events which require Prevention and Mitigation
- Identify various corrective action strategies based on event identification
- Discuss corrective action plan components and integration into Trauma PIPS program

Mitigation and Prevention

- A Mitigation corrective action is a reaction to a problem that has already occurred
  - Mitigation recognizes an event may/will occur again and seeks to lessen the consequences (example – mass casualty event)
- A Preventive action is initiated to stop a potential problem from occurring
  - Prevention seeks to truly eliminate future events (example – UTI prevention)

The process used for corrective actions and preventive actions is very similar

Action Plan

- Identify Opportunity for Improvement
- Analyze supporting data
- Develop corrective action(s)
- Implement prevention/mitigation action
- Ensure event resolution as evidenced by data to demonstrate change in practice after prevention/mitigation

S.M.A.R.T. Action Plans

- Action plans need to have clear goals that are
  - Specific
  - Measurable
  - Attainable
  - Realistic
  - Timely

Prevention and Mitigation Corrective Action Examples

- Guideline/Protocols development or revision
- Education
- System Enhancements (resources)
- Counseling
- Peer Review
- External Review
- Focused Workgroup
- Ongoing Profession Practice Evaluation
- Change in Provider Privileges
Guideline/Protocol Development
- Evidence-based practice
- Multiple agencies make recommendations
  - EAST (Eastern Association for the Surgery of Trauma)
  - TQIP
  - WTA (Western Trauma Association)
  - AAST (American Association for the Surgery of Trauma)
- Decrease variation in practice/outcomes

Focused Workgroup
- Focus Specific
- Time Limited
- Workgroup champion
- Key Stakeholders
- Data Analysis
- Utilize evidence-based information
- Develop plan & accountability
- Report plan to committees

Education
- Patient teaching rounds
- Conferences
- Visiting professors/nurses
- Trauma Grand Rounds
- Journal clubs
- Case presentation
- Hospital newsletters
- Social Media
- Unit posters/storyboards
- Video options
- Internal Online Education
- Focused readings

Peer Review Presentations
- Focus on:
  - Constructive
  - Educational
  - Not punitive
  - Non-accusatory environment

  Goal is to assure quality care!

System Enhancements
- Multifactorial
  - Resources, facilities, communication
- Based on evidence based guidelines
- Requires collaboration
- Utilize resources
  - Internal
  - External

System Enhancements Example Case
Discharge Delays
- Resources
  - Staff - weekend
  - Support staff
  - Equipment/drugs
- Facilities
  - Bed utilization
  - Rehab
  - Long term care
  - Diversion/transfer

Communication
- Verbal/written
  - Planning
- Checklists
- Human factors
  - Hand-offs
  - Family understanding
External Review

- ACS/State
- State-wide trauma group members
- Specialty group from another hospital
- Confirmed subject matter expert
- Lead hospital in a health care system

External Review Examples

- TJC
- ACS COT
  - Site surveys
  - Systems surveys
  - Consultative visits
- Specialty Focused
  - Neurosurgery
  - Orthopedics
  - Trauma surgery
  - Pediatrics/Others...
- Consultations from outside experts
  - Clinical
  - Fiscal
  - Administrative
  - Vendor consultations
- Mock Surveys

Counseling

- Difficult
- Necessary
- Limited effectiveness
- As soon as possible
- Face to face
- Most events are systems related not behavioral
- Behavior events
- Delivered by:
  - Trauma Director
  - Section Chief
  - Administrator
- Must be documented
- Focus is behavior not person

Privileges/Credentials Review

- Critical Step
  - Tended events
  - Medical staff bylaws
- Hospital policy for staff remediation
- Integration into hospital PIPS program
- Mitigation plan
  - May step down voluntarily
  - Education
  - Focused area of study
  - External courses
  - Mentoring

Taxonomy

Classifying Corrective Actions

- Classified as either Prevention or Mitigation
  - Prevention - the prospective identification of potential risk factors and devising potential strategies
  - Mitigation – minimizing the impact of future events

Corrective Action Scope

- Universal: actions designed for all patients
  - Communication: Handoffs, Time Out, Trauma Activation Protocol
- Selective: actions designed for patients with specific risks of adverse event
  - Checklist, Coumadin Reversal, Geriatric CPG
- Indicated: action designed for high risk patients with minimal risks of adverse events
  - Developing protocol for trauma OB patients, Severe TBI Protocols, Massive Hemorrhage Protocols
Key Aspects of Module

- Action plans are structured and written (formalized)
- Action plans will influence change
- Multiple models
  - Choose the correct event
  - Choose the correct people
  - Choose the correct action
- Identify specific solutions, timeframes and assign accountability
- Re-evaluate and assure resolution

Must be defined in the Trauma PIPS Plan
1. Problem identification and desired outcome.

2. Identify most likely cause through data.

3. Identify potential solutions and data needed for evaluation.

4. Implement solutions and collect data needed for evaluation.

5. Analyze data and develop conclusions.

6. Recommend further study and/or improvements and take action.

Action Methodology

Plan

Check

Act

Do
TOPIC Medical Center

Trauma Center Performance Improvement Patient Safety (PIPS) Master Plan

Goal
Sample - The goal of this plan is to provide a framework for the planning and implementation of performance improvement activities for the TOPIC Level XXX Trauma Center. The plan objective is to assure the proper support is in place to achieve the goals as outlined in the Trauma Program Purpose and Organization Structure Policy. The goal of that policy is to ensure the delivery of appropriate and optimal care to all injured patients coming to TOPIC Hospital Level XXX Trauma Center.

Mission and Vision of the Trauma PIPS Program
Purpose of this section – To state how to integrate the mission and vision of the medical center and/or facility’s quality department with the mission and vision of the Trauma PIPS program. The mission statement is a general statement regarding the role of the trauma program and quality improvement as a service to the patients, community, and region.

Authority/Scope
Purpose of this section – This section should include information on the designated authority for operating the trauma PIPS program as well as the extent of authority in patient care review. This could be a bylaw statement which grants authority from a medical staff level. Include all of the people and/or groups that grant authority to the Trauma Center for their PIPS program activities. Include the role that person/entity has in the medical facility that gives them the authority to approve the trauma program’s authority. It is helpful to specify the reporting structure of the trauma PIPS activities (example would be organizational chart).

Credentialing
Purpose of this section – The credentialing statement for physicians on the trauma call panel should include criteria to be met for initial and regular review of trauma team privileges as well as who is responsible for the process. Language needs to include the authority of the Trauma Medical Director to credential surgeons for trauma call and the authority to remove providers from call if someone is deemed unable to provide safe care. (See Resources for Optimal Care – Chapter 5) If trauma program providers include Advanced Practitioners include language on how they will be credentialed for trauma patient care. (See Resources for Optimal Care – Chapter 11.)

Trauma Patient Population Criteria
Purpose of this section – The trauma patient population criteria should be a concise statement describing those patients that will be monitored under the trauma performance improvement. It may include a defined age group, range of ICD 10 diagnosis codes, and regional or state descriptors.

Data Collection and Analysis
Purpose of this section – Data collection and analysis should include a statement regarding all of the data sources that support the trauma performance improvement process. Also to be included is how patients and events are identified, data is collected, and where the data is entered and stored. State methods used for data analysis.

Process for Monitoring Compliance
Purpose of this section – The process for monitoring compliance should include the spectrum of activities involved in operating the PIPS program. This will include the processes used to ensure compliance with policies, practice guidelines, standards of care, and current practice.

Review Process
Purpose of this section – State the process the trauma center uses for event review. Include language on Primary, Secondary, Tertiary, and Quaternary reviews.
Determination

*Purpose of this section* - Include a list or descriptors of the rating or judgment determination tool which will be used with identified events including deaths. The minimum number of categories for mortality reviews is mortality with opportunity for improvement and mortality without opportunity for improvement. (Resources for Optimal Care Chapter 16)

Documentation of Analysis and Evaluation

*Purpose of this section* - The process of analysis and evaluation should be documented in some format; the description should be inclusive of the evaluation of the trauma PIPS data and the staff involved in the process. The statement also should describe the documentation method for tracking event resolution.

Referral Process for Investigation or Review

*Purpose of this section* - Describe the process for referring trauma cases to a hospital department, appointed liaison, clinical division/service, or committee for further investigation or review. This would include physician peer review.

Trauma PIPS Committee Structure

*Purpose of this section* - Describe the goal/charge and membership and the structure of the Trauma PIPS committee. List the departments/divisions represented. Identify attendance requirements. Describe the approval process for non-committee staff attendance. Describe the committee's reporting process and how it interfaces with the hospital. Include both the Multidisciplinary Trauma Systems/Operations Committee and the Multidisciplinary Trauma Peer Review Committee.

Operational Staff Responsible for the Trauma PIPS Program

*Purpose of this section* - Describe the staff support responsible for operational support and maintaining the trauma performance improvement program; list responsibilities of key staff.

Action Planning

*Purpose of this section* - Describe the goal of action planning and who is ultimately responsible for a PIPS action plan. Include how the success/effectiveness of the plan will be monitored. List categories of options for action plans. (See Resources for Optimal Care page 129) Some or all of the categories may require a description and explanation that is specific to an individual hospital and trauma program.

Confidentiality Protection

*Purpose of this section* - A statement should include information about protection of confidentiality that is specific to hospital policies while adhering to all local, state and federal laws regarding patient and provider confidentiality.

Integration into Hospital Performance Improvement Process

*Purpose of this section* - Describe how the trauma PI program is integrated into the hospital's PI process.

Addendum

Include all of the process and outcome measures included in the Trauma Center's PIPS program. These are required to be reviewed annually at a minimum. Placing in an addendum allows for an efficient way to update PIPS measures and events as determined by the trauma program for review without changing the entire PIPS plan.

*Assure PIPS Plan is signed by all Responsible Parties – Minimum of Trauma Medical Director and Trauma Program Manager*
Review the process, methods and report for event resolution.
Module 9: Event Resolution (Loop Closure), Institutional Links and Outcome Improvements

**Module Goals**

- Review the process, methods and report for event resolution.
  - Discuss the benefits of institutional links to the trauma PIPS program
  - Discuss outcomes improvements
  - Discuss event resolution (loop closure)
  - Review the process, methods and reporting for event resolution (loop closure)

**Benefits of Linking Trauma PIPS with Hospital PIPS**

- Common language
- Classifications
- Nomenclature
- Event awareness across departments and disciplines
  - Avoids “silos”
- Trauma Program integrated into overall institutional reports
  - Events

**Examples of Institutional Links**

- Hospital quality improvement model
- Referrals to other PIPS/peer review committees
- Trauma committee reports presented to surgery PIPS
- PI minutes to department chairs
- Event reports
- General statistical reports
- Annual trauma program report

**Examples of Outcomes Improvements**

- Improved response times following implementation of new paging process
- Improved survival rates, fewer complications, and shortened length of stay after development of a geriatric practice guideline
- Reduced imaging in pediatric patients after development of order set
- < ED length of stay at referring centers following regional system development

---

**Hospital PIPS Organizational Chart:** Showing linkages to the hospital quality management program
Event Resolution Process

- Event resolution includes multiple processes:
  - Name those responsible to spearhead the PIPS processes
  - Include measures that will prevent and mitigate future occurrences
  - Determine time frames for completion of assignments
  - Benchmark with appropriate sources
  - Monitor for repeated events, track and trend data
  - Monitor compliance rates

Event Resolution and Monitoring

- After desired impact reached determine when continuous monitoring stops
- Monitoring includes:
  - Ensuring the contributing factors that led to the event have been appropriately corrected
  - Ensuring the corrective measures taken to prevent and mitigate adverse events are effective
- Realistic time frames for monitoring
  - Re-analyze PIPS data periodically to ensure mitigation/corrective actions are sustainable

Event Resolution (Loop Closure)

- Loop refers to the cycle of monitoring findings, fixing and monitoring again
  - Loop closure may also be termed event resolution
- Some loops require ongoing monitoring
  - Example – mandated audit filters
    - For documentation purposes, close the loop if desired outcome achieved for specific case
    - Continue to monitor for future occurrences

Event Resolution (Loop Closure)

Discussion points:
- When is the event resolved?
- What barriers have been encountered?
- What is an appropriate timeframe to reach the desired goal?
- What is appropriate reporting of event resolution:
  - How is this documented?
  - How is this reported?
  - Who is this reported to?
- Who determines if the event is resolved?

Unsuccessful Event Resolution

Possible reasons include
- Provider performance does not change
- No improvement in system issue(s)
- No improvement in patient outcomes
- Stagnant action plans
- Inappropriate action plan for identified issue
- Failure to involve appropriate departments in action plan
- Lack of authority and accountability for staff involved in corrective actions
- Competing priorities

Event Resolution Reporting

Use institutional links
- Trauma PIPS committee
- Hospital PIPS/Quality committees
- Agency/Provider
- Other hospital committees as appropriate
- Historical tracking for trauma verification survey
Event Resolution

Summary of the total Trauma PIPS process reaching event resolution

Key Aspects of Module

- Linking trauma program PIPS to hospital quality
  PIPS is beneficial
- Overall goal of PIPS is to demonstrate improved
  trauma patient outcomes
- Event resolution is the sum of the process of
  trauma PIPS
- Event resolution (loop closure) refers to the cycle
  of monitoring, findings, actions, and re-monitoring
Event Resolution

Summary of the total Trauma PIPS process reaching event resolution

- Authority for Review & Action
- Define Items for Review
- Event Identification
- Investigation / Validation
- Committee Review
- Determination
- Action Plan
- Data Analysis
- Outcome of Action Plan Interventions
- Measured Impact (Evaluation)
- Resolution (Loop Closure)
VIGNETTES

Critique trauma cases using the principals of performance improvement application.
Vignettes

- Actual practice of the PIPS process in a small group format
- Fictitious cases based on ACS/VRC list of top PIPS events found deficient during site visits

Practice Application

Case Scenario
- BLS service with 25 year old male in motorcycle crash
- Report to local trauma center (Level III) states “bike laid down”
- Scalp laceration - dressing applied
- VS will be given on arrival
- No reported loss of consciousness

Practice Application

Arrival at Level III Hospital
- Airway patent (loud talking)
- Breath sounds equal
- Circulation – Blood oozing through dressing
- GCS 14 (minus one verbal – confusion)
- Exposure - road rash
- VS BP 98/70 Pulse 145 Respirations 28

Practice Application

- IV NS 1 Liter bolus
- Medicated for pain
- Scalp wound 14 cm full thickness laceration to bone – freely bleeding
  – Pressure applied while work-up continues
- Chest and C-spine x-rays ordered

Practice Application

- One hour after arrival
  – In X-ray to complete C-spine series
  – VS 104/82 Pulse 136 Respirations 28
  – GCS 12 after Fentanyl – “Resting”
    - Minus 1 Verbal
    - Minus 1 Motor
    - Minus 1 Eye
Practice Application

• Ninety minutes after arrival
  – Wound care begins
  – VS BP 88/68 Pulse 142 Respirations 28
  – GCS 10
• Physician concerned with GCS
  – CT obtained

Practice Application

• Epidural hematoma on CT
• GCS now 8
• Helicopter transport ordered
• Patient intubated to protect airway
• Transfer to Tertiary Trauma Care 2.5 hours after arrival

Practice Application

Tertiary Trauma Care
  – Trauma Team Activated
  – ABCDE
    • Airway – Intubated
    • Breathing – Bilateral breath sounds
    • Circulation – Scalp wound stapled. No bleeding
    • Disability – GCS 3T Pupils reactive
    • Expose – Left tib/fib area swollen – road rash

Practice Application

Tertiary Trauma Care
  – CT from referring facility viewed
  – Left Epidural Hematoma identified
  – Patient to OR in 15 minutes
  – Hematoma successfully evacuated
  – ICU for 3 days + Acute care 3 days.
  – Discharged home on day six.
    • Tib/Fib fracture - non-surgical fixation

PI Reviews – Level III Center

Transfer out audit filter triggered
  – Primary review
    • Trauma Coordinator pulls record and prepares summary report for trauma medical director
  – Secondary review
    • Trauma medical director reviews care
    • Has note from receiving hospital that patient had good outcome
    • Determines no issues

PI Reviews

What audit filters should be triggered for review at the Level III facility?
Classifying the Issues

• **Impact:**
  • Physical: No detectable harm
  • Non-Medical: Potential legal consequences

• **Type:**
  • Communication: Inaccurate or incomplete information
  • Patient Management: Resuscitation
  • Clinical Management (Intervention): Questionable procedure

• **Domain:**
  • Hospital: Emergency Department
  • Non-Hospital: EMS Ground
  • Phase: Resuscitation

• **System Factors:**
  • Performance Standards
  • Training

TOPIC Course Summary

• Questions
• Comments
• Recommendations
• Networking
• Course Evaluation
• Thank You
Vignettes

Objectives – During these skills session’s participants will be expected to

1. Identify and state the issues that are present in the given fictitious case scenarios.
2. Describe the steps in the primary review of selected issues.
3. Determine the appropriate level of review that would be needed for the issues identified.
4. Generate an action plan that is appropriate for the identified issue
5. Describe event resolution for the identified issue.
6. Apply the Culture of Safety taxonomy to the given issue and state how it would be entered into the patients overall PI record

Instructions

TOPIC course participants will be assigned into groups of no more than 10. Each group should function as a performance improvement committee reviewing a case to determine if there are any events (issues) that need to be taken through the PI process. Each group should assign a recorder for their activities and a spokesperson to present to the entire group the issues and PI activities for their particular vignette. Expect each case review to need a minimum of thirty minutes from identification of the issues to generating event resolution.

After being given the case scenario groups should complete the following steps:

1. Read the entire case scenario
2. Identify all of the issues found in the specific case. These vignettes may contain system issues, provider issues, or both. List all issues on the form provided.
3. As a group chose one issue to take through the entire PI process (primary, secondary, and tertiary review) ending with event resolution
4. Determine the category of the event (adverse event, complication, death, missed injury, non-compliance to protocols or guidelines, system, etc.
5. Determine the impact to the patient (what was the level of harm)
6. Determine the type of the event (communication, patient management, etc.)
7. Determine where and when it occurred and who was involved.
8. Describe the issues (factors) that led to the event
9. Describe what the minutes should reflect in each of the levels of review. Describe how to document event resolution (loop closure) for the case
10. Be prepared to share with the entire class the following:
   a. Brief summary of case
   b. Events (issues) identified
   c. One event chosen for PI activities
   d. An appropriate primary, secondary and tertiary review of the chosen issue
   e. What prevention and mitigation strategy was chosen for event resolution
   f. What reports might be asked from the trauma registry to support the PI activities for the case
   g. When the issue would be considered resolved (the loop closed)

Each group will be expected to conduct two different case reviews taking an issue from each through the entire PI process
Vignette – Worksheet

<table>
<thead>
<tr>
<th>List all of the events (issues) found in the given case</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ____________________</td>
</tr>
<tr>
<td>2. ____________________</td>
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<tr>
<td>3. ____________________</td>
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<td>4. ____________________</td>
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<td>5. ____________________</td>
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<td>6. ____________________</td>
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<tr>
<td>7. ____________________</td>
</tr>
<tr>
<td>8. ____________________</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Summarize the content of an appropriate review at each level</th>
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<tbody>
<tr>
<td>Primary</td>
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<td></td>
</tr>
<tr>
<td>Secondary</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Tertiary</td>
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<tr>
<td></td>
</tr>
<tr>
<td>Quaternary</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Create an action plan for event resolution (prevention and mitigation)</th>
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</table>

<table>
<thead>
<tr>
<th>Describe when the event can be considered resolved</th>
</tr>
</thead>
</table>
## Trauma Event Tracking Form

<table>
<thead>
<tr>
<th>Date of report:</th>
<th>Medical record No:</th>
<th>Admit Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Name:</td>
<td>Age:</td>
<td>Gender:</td>
</tr>
<tr>
<td>Nature of event:</td>
<td>Date:</td>
<td>Time:</td>
</tr>
<tr>
<td>Diagnosis:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of Activation:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Pertinent Information:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Impact (✓)

#### Physical
- No harm
- Potential for harm
- Minimal temporary harm
- Minimal permanent harm
- Moderate temporary harm
- Moderate permanent harm
- Severe temporary harm
- Severe permanent harm
- Death

#### Psychological
- No harm
- Minimal temporary harm
- Minimal permanent harm
- Moderate temporary harm
- Moderate permanent harm
- Severe temporary harm
- Severe permanent harm
- Profound mental harm

#### Legal
- Legal department contacted
- Complaint registered w/ Patient Affairs
- Potential legal risk
- Delayed disposition
- Unnecessary hospital admission
- Unnecessary EMS/Air transport
- Unnecessary procedure
- Unnecessary treatment
- Behavioral issue

### Type (✓)

#### Communication
- Inaccurate or incomplete information
- Questionable advice or interpretation
- Questionable consent process
- Questionable disclosure process
- Questionable documentation

#### Patient Management
- Delegation of care or tasks
- Patient follow-up
- Consultation or referral
- Resource utilization

#### Clinical Performance

**Pre-Interventional:**
- Correct diagnosis, questionable intervention
- Inaccurate diagnosis
- Incomplete diagnosis

**Interventional:**
- Correct procedure with complications
- Correct procedure, incorrectly performed
- Correct procedure but untimely
- Omission of essential procedure
- Procedure contraindicated
- Procedure not indicated

**Post-Interventional:**
- Unexpected outcome
- Inadequate post-procedural instructions
- Inadequate home-going instructions

### Domain (✓)

#### Setting
- Scene
- Transport
- Transferring facility
- ED
- Radiology
- IR
- OR
- PACU
- ICU
- Step Down
- Floor
- Clinic

#### Phase
- Evaluation
- Resuscitation
- Acute Care
- Post discharge

#### Time
- Weekday
- Weekend/Holiday
- Day
- Night
- Shift change
- Mass Casualty

### Domain (✓) - continued

#### Staff

**Providers:**
- Trauma surgeon
- Fellow
- Resident
- PA /NP
- EM physician
- ICU physician
- Anesthesia
- Neurosurgery
- Radiology

**Nurses:**
- Nursing assistant
- LPN
- Registered nurse
- Float Staff

**Therapists:**
- Physical therapist
- Occupational therapist
- Respiratory Therapist
- Speech Therapist

**Others:**
- Pharmacist
- X-ray technician
- Lab
- Transfusion
## Trauma Event Tracking Form

### System Factors (✓)
- Electronic Medical Record
- Registration
- Schedules
- Resource availability
- Equipment issue
- Hand-off
- Multiple casualty incident
- Inadequate/absent policy or practice management guideline
- Diversion

### Human Factors (✓)

#### Practitioner factors
- Practitioner skill-based
- Practitioner rule-based
- Practitioner knowledge-based
- Practitioner fatigue
- Practitioner unclassifiable
- Intentional rule violations
- Negligence
- Recklessness

#### Patient Factors
- Uncooperative/Non-compliance
- Left against medical advice
- Left without being seen
- Left before treatment completed
- Family issues

### Determination
- Mortality with Opportunity for Improvement
- Mortality without Opportunity for Improvement
- Missed injury
- Delay in Diagnosis
- Incorrect Diagnosis
- Technique issue
- System Issue
- Inadequate Protocol
- Communication Issue
- Other Identified Component—Specify ____________
- Patient Disease
- No Error

### Action Plan
- Periodic Reporting
- Develop Practice Management Guideline/policy
- Education
- Counseling
- PIPS Team Project
- Hospital/System PI
- Other

### Event Resolution

**Date** ________________

Signature: 

Date: 
A trauma coordinator is reviewing the chart of a trauma patient admitted the evening before. He records the following timeline –

**2035** - A 17 year old male arrives via EMS at the emergency department (ED) with multiple stab wounds to the abdomen. Primary and secondary exams were completed by the ED staff which revealed three sites of apparent stabbings on the left lower side of the abdomen. Two large bore IV’s were started and warmed crystalloid fluid was given at a controlled rate. The patient was tachycardic with pulses ranging 110 – 118 but other vital signs were within normal limits.

**2045** - The trauma team arrives and assumes care.

**2110** - A portable chest x-ray was obtained. The patient was then sent for CT for imaging of the abdomen and pelvis.

**2140** - The patient returned to the trauma bay with a call from the Radiologist at the same time stating the CT was negative for abdominal/pelvic/vascular injures.

**2215** - A member of the trauma team called the ED physician saying the patient would be admitted for overnight observation. They would be coming to write orders.

**2330 & 0005 & 0035** – The ED nurse calls the trauma resident to come and write admission orders. No response to pages.

**0050** – The ED nurse pages the supervising trauma resident. She calls back and indicates she will contact the junior resident

**0150** – The trauma junior resident arrives and writes orders for admission

**0240** – The patient is transferred to the floor.

The trauma coordinator notes that the patient received the appropriate care in the emergency department including regular charting of vital signs and appropriate pain management. The case triggers the following audit filter – Prolonged ED length of stay.
The PI coordinator at a designated trauma center is reviewing the chart of a trauma patient admitted the previous afternoon. She records the following timeline –

1300 - An 88 year old male is brought to the ED via EMS following a fall down three steps. He is complaining of mild abdominal pain (3 out of 10). The ED nurse triaged the patient to the acute care area of the ED. The trauma team was not activated as the patient did not meet institutional criteria. BP 105/60 P 105

1320 – The ED physician examines the patient and orders a CBC, Basic Metabolic Panel, U/A, and chest x-ray. An IV is placed and NS is ordered at a controlled rate.

1400 - A portable chest x-ray is obtained. BP 108/64 P 98

1450 – CBC results returned and a Hgb of 7.9 is noted. Review of the record shows patients last Hgb during his previous primary care visit two weeks ago was 11.9. The ED physician orders a CT abdomen/pelvis

1530 – The CT is completed and patient returned to the ED. BP 102/58 P 104

1700 – The Radiologist calls the ED physician to inform the imaging revealed a grade IV splenic laceration. The trauma team is now paged.

1710 – The trauma team arrives and is apprised of the situation. Repeat Hgb obtained along with a type and cross-match. BP 95/50 P 112. The surgeon states he will make arrangements for an operating room.

1800 – Repeat Hgb is 7. BP 80/60 P 120. Type and cross match completed and 1st unit of packed cells hung. The ED is told the surgeon is waiting for the OR.

1830 – First unit of blood continues to infuse at a controlled rate due to patient’s age and a history of heart disease. BP 85/65 Pulse 120 Anesthesia comes to assess the patient for surgery.

1920 – Second unit of packed cells hung to infuse. BP 80/60 P 122. OR now available and patient take for laparotomy

The PI coordinator notes that the patient met criteria to trigger the following event – Delay in operating room availability.
Vignette – Case 3

The Trauma Program Manager at a designated trauma center is reviewing the chart of a trauma patient admitted the previous afternoon. He records the following timeline –

1400 - A fifty-five year old male is brought to the ED via EMS following a rollover Motor Vehicle Crash. A trauma activation was called prior to patient arrival with an ETA of five minutes

1405 – The full trauma team arrives including the surgeon. Primary and secondary exams are completed. It is noted that the patient has no sensation to light touch or pain in his lower extremities. Extensive contusions, abrasions, and swelling noted on right lower extremity. Portable chest and pelvis x-rays are obtained.

1430 – Patient taken for CT of the head, C-spine, chest, abdomen, and pelvis.

1515 – The patient returns to the trauma bay with scans positive for multiple spine fractures. Neurosurgery (NS) is called for consult.

1600 – Plain films of right leg are obtained while the patient waited for NS evaluation. No fractures identified.

1620 – The neurosurgical resident evaluates the patient and informs the team that the patient will be going directly to the OR from the ED for management of an unstable C-spine fracture.

1730 - To OR with Neurosurgery

2145 - Admitted to the ICU directly from the OR

2205 – The ICU nurse notes a bruised, swollen, cold, mottled right leg and foot (eight hours after initial notation of injury to the leg) and notifies the trauma team

2230 - Trauma resident arrives to evaluate the patient. Orthopedics called in consult.

2355 – The orthopedic resident is concerned for compartment syndrome. Right leg anterior compartment pressures measured at 55 mmHg. One hour later the patient is taken to the OR for fasciotomy of the affected compartment.

The next morning moderate myonecrosis of right leg is noted on dressing change. Patient undergoes debridement of the affected area and a wound vac is applied.

Two days later the patient is taken to the OR for evaluation and wound vac change. Extensive worsening of the right leg myonecrosis is noted. The leg is determined not to be salvageable and patient undergoes right above knee amputation

The Trauma Program Manager notes that the patient met criteria to trigger the following events

– Missed injury
– Compartment Syndrome
– Unexpected Post-interventional outcome
Vignette – Case 4

The Trauma Program Manager at a designated trauma center is reviewing the chart of a trauma patient who arrived by EMS the preceding day. He begins the primary review on this patient death and notes the following timeline –

1537 – EMS is dispatched lights and siren to a report of a pedestrian struck by a vehicle

1545 – EMS arrives on scene to find a male patient lying on the ground moaning. Bystanders relate the patient was walking his dog when a car came around the corner too fast and hit the man. He was thrown 20 feet.

1550 – EMS trauma protocol followed which included manual stabilization of c-spine and placing patient on long board. Patient became uncooperative and attempted to hit the medics when they attempted cervical collar placement so this was deferred. Neck did not appear tender to palpation. Oxygen via nasal cannula was applied but patient again became agitated so was deferred. Initial vital signs – BP 200/100 P 100 R 14 GCS 12

1600 – Physical exam was documented as no obvious injuries. IV attempted X 2. One successful with #20 G in right hand. IV infusion of crystalloid started at a controlled rate. Cardiac monitor placed which was recorded as normal sinus rhythm.

1615 – Ambulance departs the scene. Patient GCS noted to be 10. Enroute to the hospital the patient was noted to have generalized seizure activity then became apneic. Bag-valve mask ventilations initiated. Patient then became pulseless. The trauma center was called notifying of a code in progress at 1625.

1645 – Patient arrives at trauma center with CPR in progress. The trauma team had been activated. The patient is intubated, has bilateral needle decompressions, and two IO catheters inserted in preparations for massive blood transfusion. A rapid trauma evaluation notes an injury to the occipital region of the head injury with probable depressed skull fracture. Ecchymosis is noted on the firm abdomen. The pelvis appears unstable.

1650 – FAST exam revealed no cardiac motion. It was noted that CPR had been in progress for over twenty minutes in a patient with blunt traumatic arrest. Measures halted and patient pronounced dead.

When the case was presented at Trauma Multidisciplinary Peer Review Committee an autopsy was available. It described the cause of death as multisystem blunt trauma including subdural hematoma, pelvic fracture, splenic injury grade V, rib fractures, and pulmonary contusions. The committee felt the cause was likely due to exsanguination from the splenic injury with the patient having such a rapid decline.
The Trauma PI Coordinator at a designated trauma center is reviewing the chart of a trauma patient who arrived by EMS the preceding day. He begins the primary review on this patient death and notes the following timeline –

**1234** – EMS is dispatched to the scene where a woman was reportedly shot. Police are on scene and have determined the scene is safe for EMS to tend to the patient.

**1245** – EMS arrived on scene to find a 32 year old woman in distress screaming that she has been shot. Rapid trauma assessment reveals a large wound to the left upper quadrant that is actively bleeding. Skin is cool and pale.

**1248** – Initial VS are documented as BP 110/palpation Pulse 126 and weak Respirations 26. Attempts made for pulse oximetry but the patient refused.

**1250** – The patient was fully immobilized on a spine board with cervical collar.

**1300** – Patient placed into the ambulance for further treatment. A 22g IV was initiated in left hand – 1 liter normal saline hung and opened wide. Oxygen via non-rebreather mask attempted but patient agitation interfered with its use. Dressing applied to abdominal wound.

**1315** – The ambulance departs the scene. The tertiary care trauma hospital is called and report given that they are bringing a patient who meets top tier trauma team activation criteria. ETA is 10 minutes.

**1325** – Arrival at the trauma center. The trauma team is present. The patient is V on AVPU scale moaning that someone shot her in the stomach. Primary exam reveals decreased breath sounds on the left with tracheal deviation evident. There is an actively bleeding abdominal wound in the left upper quadrant. The skin is cool, moist, and pale. Initial BP is 60 with a pulse of 146.

**1330** – Needle chest decompression accomplished on left followed by left chest tube. 600cc blood returned immediately. Soon after the patient became unresponsive and lost pulses. Central access immediately obtained and massive transfusion initiated. Patient taken immediately to the OR where she died two hours later.
The Trauma Program Manager at a designated trauma center prepares a primary level review summary on a patient death. The review is as follows –

A 48-year-old male was involved in a high-speed motor vehicle crash and brought to the trauma center by EMS. The paramedics reported that the patient was amnesic to the event but there was no witnessed loss of consciousness. Glasgow Coma Score was 15 during transport. The paramedics also identified a deformity of the right femur and tenderness over the right lateral chest. During transport the patient's blood pressure was 115/74 with a heart rate of 96 and respiratory rate 18.

There is no indication on the trauma flow sheet as to what time the trauma center was notified about the patient, what time the patient arrived, nor what time the team members arrived. There is also no record of the patients Glasgow Coma Score or temperature during his entire stay in the emergency room.

Upon arrival at the trauma center the patient was assessed by the emergency medicine physician who documented the following findings:

- Tenderness over the right anterolateral thoracic cage
- Contusion of the abdomen with a seatbelt pattern
- Mild abdominal tenderness
- Deformity of the right femur with intact distal pulses

The recorded vital signs indicated blood pressure 112/76, heart rate 98 and respiratory rate 18.

The emergency physician obtained plain radiographs of the chest and right femur in addition to CBC, electrolytes, coagulation studies, and urinalysis. Laboratory results were remarkable only for a hemoglobin of 11.

The initial reports from radiology identified a midshaft femur fracture on the right and no evidence of acute findings on the chest radiograph. Orthopedic surgery was consulted and they applied a traction splint to the right leg then admitted the patient to the hospital three hours after arrival in the ED. Their plan was for operative reduction and internal fixation of the femur fracture in 24 hours.

Later that afternoon a consultation was placed to the internal medicine service to evaluate the patient’s condition for the OR. During this evaluation the internist discovered that the original report of the chest radiograph had been amended which noted a widened mediastinum, fractures of the 1st and 2nd rib on the right and a small pleural effusion in the left hemithorax.

A stat repeat chest radiograph was obtained which showed an increase in size of the mediastinal hematoma and concern for aortic disruption. Interventional radiology was immediately consulted and agreed to perform arteriography but during transport to the radiology suite the patient suddenly became hypotensive, arrested, and could not be resuscitated.
Vignette – Case 7

The Hospital Quality Reviewer at a designated trauma center prepared an event review summary on a patient death. The review is as follows –

A 75-year-old female was brought to the trauma center by EMS after sustaining a fall from standing height at her home. The patient's daughter accompanied her to the hospital and provided a patient history of coronary artery disease with a stent placed approximately 2 years ago. She had been managed on Plavix and had been doing very well according to her cardiologist whom she saw on a regular basis. Her daughter also mentioned that the family had recently become aware that her mother has been drinking wine in the evenings and they are concerned this may have contributed to her fall. The patient experienced a fall approximately 2 years ago suffering a hip fracture. EMS reported that the patient experienced a brief loss of consciousness on scene with mild confusion noted during transport. Her blood pressure was 174/90 with a heart rate 84 and respiratory rate of 18. On arrival in the emergency department the patient was awake but drowsy with the following vital signs:

BP 172/86, Pulse 86 Temperature 96.8 and Respiratory Rate 18.

She was evaluated by the emergency medicine physician who identified the following injuries:

- Hematoma above the left orbit and extending beneath the scalp to the mid left temporal-parietal area
- Pain in the left hip/proximal femur without obvious deformity

Pupils were noted to be symmetric and reactive with no focal neurologic deficits. A cervical collar had been placed by EMS which, after physical exam and review of history by the emergency physician, was removed.

After completion of her physical exam the emergency room physician obtained CBC, coagulation studies, electrolytes, blood-alcohol level, urinalysis, chest radiograph and plain radiographs of the pelvis and left femur. Pertinent findings from these studies include hemoglobin 13, INR 1.1, blood-alcohol .06, normal chest radiograph, and fracture of the left femur proximal to a previous left hemiarthroplasty.

The patient was seen in consultation by orthopedic surgery who determined that she required operative reduction and internal fixation of the fracture. Because of her history of cardiac disease they requested she should be admitted to internal medicine. Subsequently the patient was evaluated by the Hospitalist Service and admitted to the general medical ward.

In consideration of her operative plan for the next morning Lovenox was held and no heparin was administered. Because of the pain associated with her fracture sequential compression devices were also not applied.

During the evening the patient complained of pain in her left hip which was managed by increasing doses of morphine. Later in the night the nursing staff noted that the morphine made the patient increasingly "groggy" and she was found to have a drop of her O2 saturation to 90%. This was managed by supplemental oxygen however the patient was agitated and somewhat confused and kept removing the nasal cannula.

Early the following morning the transportation team brought the patient to the preoperative area where the CRNA assessed the patient and determined that she was experiencing significant hypoxia with oxygen saturation 88%. She was difficult to arouse and her left pupil was significantly dilated compared to the right. The planned surgical procedure was immediately canceled and the patient was transferred to the intensive care unit where her hypoxia continued to worsen. She experienced hypotension and became unresponsive. Several hours later the family elected to withdraw care and the patient expired. Autopsy was refused by family.
**Vignette – Case 8**

The Trauma Medical Director at a designated trauma center reviews the timeline of events for a case reported to him by the Trauma Program Manager. The case had been called into the Trauma Center’s Complications Hotline for the following event - Greater than 2 hours to the operating room for laparotomy

**A 75 year old male fell at home striking his left side on the coffee table.**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0915</td>
<td>Trauma Team paged</td>
</tr>
<tr>
<td>0925</td>
<td>Trauma surgeon arrives</td>
</tr>
<tr>
<td>0930</td>
<td>Patient arrives in the ED trauma room via medics.</td>
</tr>
<tr>
<td>0945</td>
<td>After the initial primary and secondary survey were performed, a CT ABD/Pelvis was ordered and the patient was transported to the CT scanner. The CT was read by the radiologist as positive for a grade IV splenic laceration with blush and fluid in pelvis.</td>
</tr>
<tr>
<td>1045</td>
<td>The patient was then transported with trauma nurse to the angiography suite. An angiogram was performed by the radiologist and reported as negative for extravasation.</td>
</tr>
<tr>
<td>1230</td>
<td>Admitted to the ICU with orders for Hemoglobin and Hematocrit every 6 hours</td>
</tr>
<tr>
<td>1900</td>
<td>The ICU nurse contacted the attending trauma surgeon with lab results of Hemoglobin 8.5 /Hematocrit (H/H) 25 which were down from the initial 13/38 on arrival. Urine output was 25ml/hour. The Trauma Surgeon gave orders to infuse 2 units packed red cells (PRCs)</td>
</tr>
<tr>
<td>2200</td>
<td>The ICU nurse contacted the attending trauma surgeon to report a BP 95/60 after the 2 units PRC were infused and a repeat H/H of 9/27. The Trauma Surgeon gave orders for 2 additional units of PRCs</td>
</tr>
<tr>
<td>0100</td>
<td>The ICU nurse called the trauma surgeon to report the patient had a BP 89/54, urine output of 20ml/hour and the repeat H/H 9.5/28. The trauma surgeon again orders 2 units PRCs</td>
</tr>
<tr>
<td>0400</td>
<td>The ICU nurse calls to report H/H 9.7 /29 and states concern that the abdomen is slightly more distended. She reported a BP 100/60 and that urine output remains at 25ml/hour. The trauma surgeon orders repeat H/H for 0700</td>
</tr>
<tr>
<td>0800</td>
<td>The ICU nurse calls with the most recent H/H of 7.8 /23. At about the same time the ICU service is on rounds and the rounding MD calls the attending trauma surgeon regarding the clinical situation.</td>
</tr>
<tr>
<td>0830</td>
<td>The patient is taken to the OR and undergoes a splenectomy.</td>
</tr>
<tr>
<td>1000</td>
<td>The patient returns to the SICU and is recovered there</td>
</tr>
<tr>
<td>Day 7</td>
<td>The patient is discharged to a skilled nursing facility for PT/OT with gait strengthening goals</td>
</tr>
</tbody>
</table>
Burn Vignette – Case 1

A coordinator from a regional burn center is reviewing the chart of a patient transferred to their facility the previous weekend. The following summary of the case is created –

A 23 y/o male was involved in a house fire and sustained partial and full thickness burns to his neck, arms, chest and abdomen. The patient was carried from the house by firefighters. Time of injury/burn was estimated to be 21:45. Scene treatment consisted of 100% oxygen via non-rebreather mask. EMS report notes that no IV attempts were made due to burns on both arms. Scene vital signs are recorded as HR 119, BP 109/78, RR 28, SaO2 92%, GCS 14. 10 mg of Morphine was given IM for pain. The arrival time to the closest hospital was 22:50, following a 12 minute EMS transport.

At the initial hospital, the patient was estimated burns to be 65% Total Burn Surface Area (TBSA) which included arms, chest, abdomen, and neck. Weight was determined to be 210 lbs. (95 kg). A subclavian central line was placed and a second IV was established via Interosseous in the left leg. Fluid resuscitation was initiated with 0.9% NaCl. Initial ED vital signs were HR 124, BP 102/84, RR28, SaO2 92% Temp 35.5 C. GCS 13. The ED physician notes state suspicion for inhalation is low as the patient was still awake and had no complaints of shortness of breath. With O2 saturations greater than 90% it is decided there is no need to intubate. IV Morphine was ordered to be given PRN pain, with 2 doses of 15mg each given within 15 minutes of arrival. The patient became hypotensive and low dose vasopressors were started to augment the fluid resuscitation. The burns were cleaned and dressed with silver sulfadiazine dressings. While this was occurring transfer to the regional burn center was arranged via ground ambulance. The patient was left the initial hospital at 03:10.

Fluid resuscitation continued during transport with additional IM morphine given to control pain for the 45 minute trip.

At the receiving Burn Center initial vital signs were recorded as HR 128, BP 100/86, RR 12, SaO2 – 86%, Temp 35 C GCS 12. 0.9% NaCl IV fluid was infusing via 2 peripheral IV's (it was noted that the bags were labeled #10 and #11). The patient was intubated shortly after arrival for decreasing level of consciousness and dropping oxygen saturations. Rapid admission to the Burn ICU occurred where the dressings applied by the referral facility were removed. Reassessment of the burns revealed partial thickness burns to the anterior arms bilaterally, mixed partial /full thickness burns to the anterior neck, abdomen and chest. TBSA 30%

The coordinator was reviewing the record as part of the trauma center's performance improvement and patient safety process (PIPS) and considering what feedback should be provided to the transferring center.
The Pediatric Trauma Coordinator at a designated trauma center reviews the following case of a patient admitted to their facility:

12 year old female (estimated weight 35 kg) driving an ATV without a helmet ran into a tree at 40 mph. EMS was dispatched to the scene. On their arrival they found the patient to be awake but confused with GCS of 14 (minus one point for Verbal)

Vitals obtained were as follows: HR 130, R 28

Interventions taken included C-spine stabilization and placement of a 20g IV followed by a 20 ml/kg normal saline bolus

EMS provided the following information to the medical command center for patient report:
12 year old (estimated weight 35 kg) was involved in an ATV crash. The patient is awake. Her color is pink and a fluid bolus of 20ml/kg is infusing.

After hearing EMS report the trauma center determines the patient does not meet trauma activation criteria.

On arrival to the trauma center patient is found to be confused and pale.
Vitals obtained showed the following: HR 138, R 30, BP 92/50, GCS 14, and T. 97.5 °

The patient is given a second IV fluid bolus of 20 ml/kg normal saline and is placed on 100% oxygen by non-rebreather mask. Trauma tier 1 is activated. Physician assessment reveals tender, distended abdomen.
Vitals following primary and secondary survey (ten minutes after arrival) were as follows: HR 128, R 24, BP 98/60, T 96.2°.

Following assessment and treatment in the trauma bay the patient is transported to radiology. A head CT demonstrated a left parietal cephalohematoma, a small epidural hematoma, and a parietal skull fracture. Abdominal CT with IV contrast showed grade 3 liver and spleen lacerations with moderate hemoperitoneum and bilateral pulmonary contusions.

After completion of radiographs the patient is transported to the PICU. Upon arrival the patient is assessed as continuing to be confused. Skin parameters revealed that she was pale, cool, with a prolonged capillary refill.

Vital signs: HR 138, R 30, BP 92/58, T 95.8°. The patient immediately received a third warmed fluid bolus of normal saline at 20 ml/kg. Warmed blankets were applied. Following interventions the patient’s heart rate and temperature improve.

The case is pulled for PIPS review due to triggering the following audit filter:

Failure to activate the trauma team
### Pediatric Burn Vignette – Case 2

A coordinator from a regional burn center is reviewing the chart of two patients (sisters) transferred to their facility the previous weekend from a Level 1 pediatric trauma center. The following case summaries were created (note - assume use of age appropriate pediatric pain scale 1-10):

<table>
<thead>
<tr>
<th>Patient 1</th>
<th>Patient 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 year old female (13.6 kg) taken to local ED in private vehicle by mom with hot water burns to buttocks, shoulder, and bilateral feet</td>
<td>4 year old female (16.8 kg) taken to local ED in private vehicle by mom with hot water burns to buttocks and bilateral feet</td>
</tr>
<tr>
<td>Mom reports patient was in the care of a babysitter who shared that she accidentally spilled hot water on this patient and her sister.</td>
<td>Mom reports patient was in the care of a babysitter who shared that she accidentally spilled hot water on this patient and her sister.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1810</td>
<td>Arrived to ED by private vehicle accompanied by her mother and sister</td>
</tr>
<tr>
<td>1812</td>
<td>GCS 15</td>
</tr>
<tr>
<td>1813</td>
<td>HR 107, BP 115/57, RR 107, Sat 100%, T 98.3, Pain score - 10</td>
</tr>
<tr>
<td>1810</td>
<td>Trauma team activation</td>
</tr>
<tr>
<td>1815</td>
<td>Trauma surgeon arrives</td>
</tr>
<tr>
<td>1820</td>
<td>Warm blankets applied, Pain score 10</td>
</tr>
<tr>
<td>1827</td>
<td>IV placed in left hand</td>
</tr>
<tr>
<td>1829</td>
<td>Morphine 1.5mg VG given</td>
</tr>
<tr>
<td>1841</td>
<td>Pain score 5</td>
</tr>
<tr>
<td>1845</td>
<td>Silvadene and Xeroform applied</td>
</tr>
<tr>
<td>1853</td>
<td>Morphine 1mg IV given</td>
</tr>
<tr>
<td>1906</td>
<td>LR 280ml bolus given per order</td>
</tr>
<tr>
<td>1909</td>
<td>HR 105, BP 97/59, RR 24, Sat 97%, T 98.8</td>
</tr>
<tr>
<td>1941</td>
<td>Osseous survey obtained per order – no obvious bone abnormalities noted</td>
</tr>
<tr>
<td>2038</td>
<td>HR 87, BP 88/61, RR 24, Sat 97%, T 98.8</td>
</tr>
<tr>
<td>2042</td>
<td>GCS 15. Report called to floor nurse.</td>
</tr>
<tr>
<td>2045</td>
<td>Patient transferred to the floor via stretcher with parents. Second degree burns to buttocks and bilateral feet, first degree burns to shoulder, TBSA 20%</td>
</tr>
</tbody>
</table>

**Day 2**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>0730</td>
<td>VSS, Pain score 7, bruising noted to bilateral upper extremities</td>
</tr>
<tr>
<td>2015</td>
<td>Social work consulted with patient with burns. Health and Human Services notified.</td>
</tr>
</tbody>
</table>

**Day 3**

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>0800</td>
<td>Transfer to burn center initiated</td>
</tr>
<tr>
<td>1300</td>
<td>Patient transferred to burn center per EMS</td>
</tr>
<tr>
<td>1350</td>
<td>Upon arrival to the burn center, dressings were removed and wounds washed. Required transfer to the OR for gross wound debridement. Pain score 8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1400</td>
<td>Upon arrival to the burn center, dressings were removed and wounds washed. Required transfer to the OR for gross wound debridement. Pain score 7</td>
</tr>
</tbody>
</table>

The coordinator was reviewing the record as part of the trauma center’s performance improvement and patient safety process (PIPS) and considering what feedback should be provided to the transferring center.
A coordinator from a regional burn center is reviewing the chart of patient transferred to their facility the previous weekend. The following summary of the case is created (note - assume use of age appropriate pediatric pain scale 1-10):

A 4 year old female (19.5 kg) was holding a firecracker in her hand when it went off. The injury occurred around 2345. Family put the child’s hand in ice water and drove 50 miles to the local ED in private vehicle.

0124: Patient arrived at outside ED and documentation notes the patient’s right hand was red and swollen with second degree burns to the thumb, first 2 fingers, and inside palm.
0140: HR 124, BP 126/98, RR 24, O2 saturations 100%, GCS 15, temp 98.1. Pain score 10
0151: Fentanyl 28.5mcg given intranasal
0202: GCS 15
0203: Pain score 10
0209: Pain score 5
0232: X-ray of right hand obtained
0325: Trauma activation paged
0334: Trauma surgeon at bedside
0341: HR 98, BP 104/53, RR 20, Sats 95%, Temp 98.4, GCS 15
0406: Patient accepted by the Burn Center and report called
0414: Peripheral IV placed
0430: Chest x-ray obtained
0526: HR 71, BP 105/48, RR 18 Sats 100%, temp 97.1, GCS 15
0706: Social worker at bedside. Transport arrangements pending.
0722: HR 78, BP 86/51, RR 20, Sats 99%, temp 97.9, GCS 15
0812: Patient transferred to burn center per ambulance
0915: Arrived at burn center. No dressing noted to the hand. Pain score 8

The coordinator was reviewing the record as part of the trauma center’s performance improvement and patient safety process (PIPS) and considering what feedback should be provided to the transferring center.
The Pediatric Trauma PI Coordinator at a designated trauma center reviews the following case of a patient referred to their hospital from a regional facility -

A 3 year old (15 kg) child was transported to the local hospital after being struck by a car at city speeds. It was reported that she was running between two cars chasing after a ball. Witnesses on scene state she was thrown approximately 20 feet landing on her head and shoulder. The BLS ambulance run report includes the following information –

Crying (V on AVPU scale) / Airway patent / Skin pale and cool / Pulse rapid and weak / Respirations rapid

The trauma team was activated at the regional facility and a complete head to toe exam was completed. Injuries noted included the following:

- Bruising to head with swelling on left side of head.
- Skin abrasions noted on all extremities. T
- Abdomen pain (moaning) on palpation especially on the right.

Vital signs: Pulse 160 BP 72 R 26 Temp 36 (96.8)

The child was given supplemental oxygen and a 22g IV was established followed by a one liter normal saline bolus. Portable chest and pelvis films were obtained.

The CT tech was called in as part of the trauma team and responded in a timely manner. The child was taken to the CT scanner for a head, cervical spine, chest, abdomen, and pelvis films thirty (30) minutes after arrival to the ED. Sixty (60) minutes later the results of these films were called to the ED physician by the tele-radiologist service. The head CT was positive for a skull fracture and subdural hematoma. A grade IV splenic laceration was diagnosed on the abdominal CT. The ED physician immediately called the closest pediatric trauma center and a helicopter was dispatched to transfer the child.

The child arrived at the tertiary care facility three hours after her injury and 2.5 hours after presentation at the local emergency department. The developing machine that creates a DVD of the films at the facility was down for repair so no imaging was available for viewing and all needed to be repeated. It was noted in the referring hospital record that the child’s vital signs were somewhat labile and a total of four liters of crystalloid was given to maintain pulse and BP within normal limits for her age.

The coordinator was reviewing the record as part of the trauma center’s performance improvement and patient safety process (PIPS) and considering what feedback should be provided to the transferring center.
List all of the events (issues) found in the given case

1. __________________
2. __________________
3. __________________
4. __________________
5. __________________
6. __________________
7. __________________
8. __________________

Summarize the content of an appropriate review at each level

Primary

Secondary

Tertiary

Quaternary

Create an action plan for event resolution (prevention and mitigation)

Describe when the event can be considered resolved
### Trauma Event Tracking Form

<table>
<thead>
<tr>
<th>Date of report:</th>
<th>Medical record No:</th>
<th>Admit Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nature of event:</td>
<td>Date:</td>
<td>Time:</td>
</tr>
<tr>
<td>Patient Name:</td>
<td>Age:</td>
<td>Gender:</td>
</tr>
<tr>
<td>Diagnosis:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of Activation:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Pertinent Information:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Impact (√)

<table>
<thead>
<tr>
<th>Physical</th>
<th>Psychological</th>
<th>Legal</th>
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</thead>
<tbody>
<tr>
<td>- No harm</td>
<td>- No harm</td>
<td>- Legal department contacted</td>
</tr>
<tr>
<td>- Potential for harm</td>
<td>- Minimal temporary harm</td>
<td>- Complaint registered w/ Patient Affairs</td>
</tr>
<tr>
<td>- Minimal temporary harm</td>
<td>- Minimal permanent harm</td>
<td>- Potential legal risk</td>
</tr>
<tr>
<td>- Minimal permanent harm</td>
<td>- Moderate temporary harm</td>
<td>- Delayed disposition</td>
</tr>
<tr>
<td>- Moderate temporary harm</td>
<td>- Moderate permanent harm</td>
<td>- Unnecessary hospital admission</td>
</tr>
<tr>
<td>- Moderate permanent harm</td>
<td>- Severe temporary harm</td>
<td>- Unnecessary EMS/Air transport</td>
</tr>
<tr>
<td>- Severe temporary harm</td>
<td>- Severe permanent harm</td>
<td>- Unnecessary procedure</td>
</tr>
<tr>
<td>- Severe permanent harm</td>
<td>- Profound mental harm</td>
<td>- Unnecessary treatment</td>
</tr>
<tr>
<td>- Death</td>
<td></td>
<td>- Behavioral issue</td>
</tr>
</tbody>
</table>

#### Type (√)

<table>
<thead>
<tr>
<th>Communication</th>
<th>Patient Management</th>
<th>Social</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Inaccurate or incomplete information</td>
<td>- Delegation of care or tasks</td>
<td>- Legal department contacted</td>
</tr>
<tr>
<td>- Questionable advice or interpretation</td>
<td>- Patient follow-up</td>
<td>- Unnecessary hospital admission</td>
</tr>
<tr>
<td>- Questionable consent process</td>
<td>- Consultation or referral</td>
<td>- Unnecessary EMS/Air transport</td>
</tr>
<tr>
<td>- Questionable disclosure process</td>
<td></td>
<td>- Unnecessary procedure</td>
</tr>
<tr>
<td>- Questionable documentation</td>
<td>- Resource utilization</td>
<td>- Unnecessary treatment</td>
</tr>
</tbody>
</table>

#### Clinical Performance

**Pre-Interventional:**
- Correct diagnosis, questionable intervention
- Inaccurate diagnosis
- Incomplete diagnosis

**Interventional:**
- Correct procedure with complications
- Correct procedure, incorrectly performed
- Correct procedure but untimely
- Omission of essential procedure
- Procedure contraindicated
- Procedure not indicated

**Post-Interventional:**
- Unexpected outcome
- Inadequate post-procedural instructions
- Inadequate home-going instructions

#### Setting

<table>
<thead>
<tr>
<th>Phase</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Scene</td>
<td>- Evaluation</td>
</tr>
<tr>
<td>- Transport</td>
<td>- Resuscitation</td>
</tr>
<tr>
<td>- Transferring facility</td>
<td>- Acute Care</td>
</tr>
<tr>
<td>- ED</td>
<td>- Post discharge</td>
</tr>
<tr>
<td>- Radiology</td>
<td></td>
</tr>
<tr>
<td>- IR</td>
<td></td>
</tr>
<tr>
<td>- OR</td>
<td></td>
</tr>
<tr>
<td>- PACU</td>
<td></td>
</tr>
<tr>
<td>- ICU</td>
<td></td>
</tr>
<tr>
<td>- Step Down</td>
<td></td>
</tr>
<tr>
<td>- Floor</td>
<td></td>
</tr>
<tr>
<td>- Clinic</td>
<td></td>
</tr>
<tr>
<td>- Day</td>
<td>- Night</td>
</tr>
<tr>
<td>- Weekday</td>
<td>- Shift change</td>
</tr>
<tr>
<td>- Weekend/Holiday</td>
<td>- Mass Casualty</td>
</tr>
</tbody>
</table>

#### Domain (√) - continued

<table>
<thead>
<tr>
<th>Staff</th>
<th>Nurses</th>
<th>Therapists</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providers:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Trauma surgeon</td>
<td>- Nursing assistant</td>
<td>- Physical therapist</td>
<td>- Pharmacist</td>
</tr>
<tr>
<td>- Fellow</td>
<td>- LPN</td>
<td>- Occupational therapist</td>
<td>- X-ray technician</td>
</tr>
<tr>
<td>- Resident</td>
<td>- Registered nurse</td>
<td>- Respiratory Therapist</td>
<td>- Lab</td>
</tr>
<tr>
<td>- PA /NP</td>
<td>- Float Staff</td>
<td>- Speech Therapist</td>
<td>- Transfusion</td>
</tr>
<tr>
<td>- EM physician</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- ICU physician</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Anesthesia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Neurosurgery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Radiology</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**System Factors (✓)**

- Electronic Medical Record
- Registration
- Schedules
- Resource availability
- Equipment issue
- Hand-off
- Multiple casualty incident
- Inadequate/absent policy or practice management guideline
- Diversion

**Human Factors (✓)**

**Practitioner factors**
- Practitioner skill-based
- Practitioner rule-based
- Practitioner knowledge-based
- Practitioner fatigue
- Practitioner unclassifiable
- Intentional rule violations
- Negligence
- Recklessness

**Patient Factors**
- Uncooperative/Non-compliance
- Left against medical advice
- Left without being seen
- Left before treatment completed
- Family issues

**Determination**
- Mortality with Opportunity for Improvement
- Mortality without Opportunity for Improvement
- Missed injury
- Delay in Diagnosis
- Incorrect Diagnosis
- Technique issue
- System Issue
- Inadequate Protocol
- Communication Issue
- Other Identified Component—Specify ________________
- Patient Disease
- No Error

**Action Plan**
- Periodic Reporting
- Develop Practice Management Guideline/policy
- Education
- Counseling
- PIPS Team Project
- Hospital/System PI
- Other

**Event Resolution**

**Date ________________________**

**Signature: __________________**  
**Date: ________________________**
List all of the events (issues) found in the given case

1. ________________
2. ________________
3. ________________
4. ________________
5. ________________
6. ________________
7. ________________
8. ________________

Summarize the content of an appropriate review at each level

Primary

Secondary

Tertiary

Quaternary

Create an action plan for event resolution (prevention and mitigation)

Describe when the event can be considered resolved
# Trauma Event Tracking Form

<table>
<thead>
<tr>
<th>Date of report:</th>
<th>Medical record No:</th>
<th>Admit Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient Name:</td>
<td>Age:</td>
<td>Gender:</td>
</tr>
<tr>
<td>Nature of event:</td>
<td>Date:</td>
<td>Time:</td>
</tr>
<tr>
<td>Level of Activation:</td>
<td>Other Pertinent Information:</td>
<td>Report completed by:</td>
</tr>
</tbody>
</table>

### Impact (✓)

#### Physical
- [ ] No harm
- [ ] Potential for harm
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- [ ] Moderate temporary harm
- [ ] Moderate permanent harm
- [ ] Severe temporary harm
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### Psychological
- [ ] Delayed disposition
- [ ] Unnecessary hospital admission
- [ ] Unnecessary EMS/Air transport
- [ ] Unnecessary procedure
- [ ] Unnecessary treatment
- [ ] Behavioral issue

### Communication
- [ ] Inaccurate or incomplete information
- [ ] Questionable advice or interpretation
- [ ] Questionable consent process
- [ ] Questionable disclosure process
- [ ] Questionable documentation

### Patient Management
- [ ] Delegation of care or tasks
- [ ] Patient follow-up
- [ ] Consultation or referral
- [ ] Resource utilization

### Clinical Performance
#### Pre-Interventional:
- [ ] Correct diagnosis, questionable intervention
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- [ ] Incomplete diagnosis

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- [ ] Correct procedure with complications
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- [ ] Procedure not indicated

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- [ ] Post discharge

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- [ ] Weekend/Holiday
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- [ ] Night
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- [ ] Mass Casualty

### Domain (✓) - continued

#### Staff
- Providers:
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  - [ ] Fellow
  - [ ] Resident
  - [ ] PA/NP
  - [ ] EM physician
  - [ ] ICU physician
  - [ ] Anesthesia
  - [ ] Neurosurgery
  - [ ] Radiology

- Nurses:
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  - [ ] Registered nurse
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  - [ ] Speech Therapist

- Others:
  - [ ] Pharmacist
  - [ ] X-ray technician
  - [ ] Lab
  - [ ] Transfusion
## Trauma Event Tracking Form

### System Factors (✓)
- Electronic Medical Record
- Registration
- Schedules
- Resource availability
- Equipment issue
- Hand-off
- Multiple casualty incident
- Inadequate/absent policy or practice management guideline
- Diversion

## Referral process:
- Incorrect service/consultation
- Incorrect transfer team
- Surgeon not available to speak with referring physician

## Trauma Team Activation:
- Short notification
- Page confusing
- Incomplete page

### Human Factors (✓)

#### Practitioner factors
- Practitioner skill-based
- Practitioner rule-based
- Practitioner knowledge-based
- Practitioner fatigue
- Practitioner unclassifiable
- Intentional rule violations
- Negligence
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- Counseling
- PIPS Team Project
- Hospital/System PI
- Other

### Event Resolution

Date ________________________

Signature: ____________________ Date: ____________________
Suggested Reading
REFERENCES AND SUGGESTED READINGS


2. American College of Surgeons, TQIP Geriatric Trauma Management Guidelines, 2014


28. Glance, L. MD; A. Dick, PhD; D.. Mukamel, PhD; T. Osler, MD; Association Between Trauma Quality Indicators and Outcomes for Injured Patients. Archives of Surgery, April 2012, Vol 147, No. 4


38. Lefering, Rolf, Stefan Huber-Wagner, Ulrike Nienaber, Marc Maegele and Bertil Bouillon. Update of the trauma risk adjustment model of the TraumaRegister DGU™: the Revised Injury Severity Classification, version II. *Critical Care* 2014, 18:476


43. Osler, Turner MD, MSc, Laurent Glance, MD, Jeffery S. Buzas, PhD, Dana Mukamel, PhD, Jacob Wagner, MD, PhD, and Andrew Dick, PhD. A Trauma Mortality Prediction Model Based On the Anatomic Injury Scale. *Annals of Surgery* • Volume 247, Number 6, June 2008.


51. Shafi,S., MD,,MPH,FACS, Nathens, A., MD, PhD, FACS, Cryer, H., MD, PhD, FACS, Hemmila, M., MD,FACS, Pasquale, M., MD, FACS, Clark, D., MD,FACS, Neal, M., MS, Goble, S. MS, Meredith, W., MD, FACS, Fildes, J., MD, FACS. The Trauma Quality Improvement Program of the American College of Surgeons Committee on Trauma. American College of Surgeons, 2009, 07. 001


58. Wargo, C MSN; Bolig, N; Hixson, H; McWilliams, N MPA, RHIA; Rummerfield, H; Stratton, E; Woodruff, T CSTR. Trauma Registry Reengineered. Journal of Trauma Nursing: November/December 2014 - Volume 21 - Issue 6 - p 287–290


60. Werner RM, Bradlow ET. Public reporting on hospital process improvements is linked to better patient outcomes. Health Aff (Millwood). 2010;29(7):1319-1324.


Classifying errors in preventable and potentially preventable trauma deaths: a 9-year review using the Joint Commission’s standardized methodology


aDepartment of Surgery, Parc Taulí Hospital, Sabadell, Barcelona, Spain; bDivision of Traumatology, Surgical Critical Care & Emergency Surgery, University of Pennsylvania Perelman School of Medicine, Philadelphia, PA, USA

Abstract

BACKGROUND: Benchmarking and classification of avoidable errors in trauma care are difficult as most reports classify errors using variable locally derived schemes. We sought to classify errors in a large trauma population using standardized Joint Commission taxonomy.

METHODS: All preventable/potentially preventable deaths identified at an urban, level-1 trauma center (January 2002 to December 2010) were abstracted from the trauma registry. Errors deemed avoidable were classified within the 5-node (impact, type, domain, cause, and prevention) Joint Commission taxonomy.

RESULTS: Of the 377 deaths in 11,100 trauma contacts, 106 (7.7%) were preventable/potentially preventable deaths related to 142 avoidable errors. Most common error types were in clinical performance (inaccurate diagnosis). Error domain involved primarily the emergency department (therapeutic interventions), caused mostly by knowledge deficits. Communication improvement was the most common mitigation strategy.

CONCLUSION: Standardized classification of errors in preventable trauma deaths most often involve clinical performance in the early phases of care and can be mitigated with universal strategies.

Trauma is the leading cause of death in patients younger than 45 years and uses significant healthcare resources. However, diverse performance improvement (PI) efforts, particularly in the area of preventable deaths, have improved the management of injured patients worldwide. Nevertheless, for such initiatives to result in improved trauma outcomes, clear identification and characterization of avoidable errors must be possible and reporting of these events must be standardized across trauma centers. Awareness of patient safety issues is steadily rising in all medical fields, and institutions. Governments and regulatory bodies are increasingly demanding rigorous reporting of avoidable errors to develop mitigation strategies and improve delivery of care.
Although trauma care is well advanced in this field with more than 30 years of published PI initiatives, current reporting of avoidable errors leading to death remains center-dependent and lacks a common terminology. Most trauma centers separate trauma patient deaths into 3 categories—preventable, potentially preventable, and non-preventable—by benchmarking care to accepted guidelines (eg, Advanced Trauma Life Support) or by determining risk of death using severity scores (Injury Severity Scale [ISS] and Trauma Score - Injury Severity Score [TRISS]).

Regardless of methodology, efforts at trauma PI are contingent upon the identification of avoidable errors management of trauma patients. In this context, preventable deaths are those directly caused by an avoidable error and potentially preventable deaths are those in which an avoidable error is found, but the death would likely have occurred despite this error.

In an effort to standardize the reporting of avoidable errors in health care, the Joint Commission (JC, formerly known as the Joint Commission on Accreditation of Healthcare Organizations) established in 2005 a taxonomy to classify errors in 5 interacting root nodes: impact, type, domain, cause, and prevention. This standardized reporting of preventable errors has since been used in multiple medical fields including the Committee on Trauma of the American College of Surgeons (ACS) and has become the benchmark of patient safety error reporting globally.

In a review of the trauma literature, only one report directly applied the complete JC taxonomy to analyze avoidable errors leading to preventable and potentially preventable deaths in trauma. Ivatury et al reported a 5-year account of 76 deaths in the trauma service at the Virginia Commonwealth University Medical Center classifying errors in the 5 domains of the JC taxonomy. Others have used their own tiered classification schemes to analyze avoidable errors in trauma, many bearing resemblances to the JC classification system but often omitting certain elements considered important in patient safety analysis. Unfortunately, the lack of uniformity in these different reports renders difficult comparisons between studies and universal applicability of results when gauging quality of the management of trauma patients across centers. Repeated appeals have been made to standardize the reporting of preventable mortality in trauma.

In this study, we sought to characterize the preventable mortality in a mature urban trauma center in a 9-year review. Our secondary objective was to categorize all avoidable errors identified in these cases using the common language of quality standards proposed by the JC. We hypothesized that preventable deaths were not uncommon and were primarily associated with management errors by physician providers in the early phases of resuscitations.

Patients and Methods

Study setting

The Trauma Center at Penn is a level-I trauma center accredited by the Pennsylvania Trauma Systems Foundation (PTSF), the sole accrediting authority of trauma centers in the state of Pennsylvania. The Trauma Center at Penn is based at the Hospital of the University of Pennsylvania (HUP), an academic tertiary care medical center in Philadelphia, Pennsylvania. The trauma service evaluates all patients meeting field triage criteria for trauma as established by the state bureau of Emergency Medical Services. Additionally, as a level-I trauma center, HUP is a regional resource for trauma referrals from other hospitals. The trauma registry captures all injured patients meeting the criteria of the Pennsylvania Trauma Outcomes Study, as mandated by the PTSF (http://PTSF.org). HUP has a 24/7/365 in-house attending trauma surgeon responding to all trauma activations including alerts (highest tier—full trauma team at bedside), responses (less serious but also requiring part of the trauma team at bedside), and consults (limited trauma team present at bedside). The trauma team typically consists of a nurse and paramedic, a senior/chief and junior resident (with a trauma fellow in some cases), and for alerts also summon the emergency department (ED) airway team (attending, senior resident, respiratory technician) and the automatic dispatch of blood products. A 128-slice CT scan and fully staffed angiography suite are adjacent to the ED and prioritize trauma requests at all times. All multisystem injured patients are admitted to the trauma service and only single system injuries are considered for admission to subspecialty services. Patients admitted to subspecialty services are also reviewed in trauma PI activities.

Data on all trauma patients admitted to the hospital are entered in the hospital trauma registry that contributes entries to the Pennsylvania Trauma Outcomes Study registry and the National Trauma Data Bank. The Trauma Program Medical Director (P.K.K.) and 2 PI Coordinators (J.M.) are collectively responsible for all PI efforts of the division and actively maintain the PI database.

Trauma performance improvement process and database

The PI program has been an integral component of the trauma center since its inception. The PI program is led by a PI Medical Director and PI coordinator(s), but all trauma providers participate in its processes. PI occurrences are defined in the PTSF Data Dictionary. PI issues, identified through a variety of methods, are reviewed on an ongoing basis by PI coordinators and the PI Medical Director. PI issues requiring further discussion are peer-reviewed by an attending trauma surgeon not involved in the patient’s care. The peer surgeon, guided by a dedicated checklist,
comprehensively reviews the medical record with particular attention to examining the cause of death and antecedent events. On a monthly basis, the findings of peer review are discussed in the committee (Trauma PI Conference [TPIC]), with all attendings participating. The TPIC meetings are multidisciplinary and assemble a variety of trauma care providers including trauma surgeons (8 full-time attending staff), emergency physicians, trauma nurses, and subspecialty surgeons (orthopedics, neurosurgery, etc) and seek to identify avoidable errors in each case. Autopsy reports are consulted where available. Peer review concludes with the determination of preventability and identification of opportunity for improvement, if it exists. Detailed conference notes and determinations of death preventability are entered into the dedicated database, POPIMS (Pennsylvania Outcomes Performance Improvement Monitoring System). Events found to be associated with possible or definite errors in management are communicated to the specific provider by the medical director and this exchange is documented in the database and used to determine appropriate system or provider corrective actions.

Preventable, potentially preventable, and nonpreventable deaths

Deaths are classified by the TPIC as preventable if they are found to be caused directly by (an) avoidable error(s). The group uses criteria and audit filters promulgated by the ACS including survivability of injuries, stability of the patient on arrival, proper use of algorithms (Advanced Trauma Life Support), time spent in the ED, time to arrival of team members, and unexplained return to the operating room (OR).33 To ascertain potentially preventable deaths, the TPIC uses 3 key criteria outlined by MacKenzie34 as follows: (1) the injury must be survivable, (2) the delivery of care was suboptimal, and (3) the error must be directly or indirectly implicated in the death of the patient.

Database queries

Approval by the Institutional Review Board of the University of Pennsylvania was obtained before the study activity. The trauma PI database was queried for all in-patient deaths that occurred between January 1, 2002 and January 1, 2011. For each case, the electronic medical record was reviewed for patient demographics (age, sex), history (comorbidities), injury information (date, mechanism of injury, ISS, and revised trauma scores), and conditions surrounding the death. The POPIMS database was further queried to obtain a summary of the discussions conducted by the TPIC particularly to determine death preventability and identification of avoidable errors.

Classification of errors using the Joint Commission taxonomy

Five interacting nodes form part of the JC taxonomy and each error identified was classified in one or multiple categories using this methodology.18 The error impact or outcome/harm to the patient was death in all cases. Error type describing the implied or observed events/processes that failed or were faulty was divided into diagnosis, intervention, or prognosis errors. Error domain referring to the setting in which the incident occurred categorized the hospital location of the event, the discipline of staff providers involved, as well as the target of the intervention (therapeutic or diagnostic). The error cause referring to the factors and agents that led to the incident were divided in to human (knowledge, rule, and skill-based settings) and system (organizational or technical) errors. Finally, prevention or mitigation measures enacted to prevent further occurrence of the event were further subclassified as universal, selective, or indicated.

Data analysis

Data collected were entered in the POPIMS database. All descriptive analyses present data as means with standard deviation (SD) (continuous variables) and percentages (categorical variables).

Results

Patient population and demographics

Annual trauma visits in the study time period ranged from 2,253 to 3,162 with a mean of 2,708 trauma contacts
per year. A total of 11,100 trauma patient admissions were identified in the registry in the specified time period, of which 1,377 (12.4%) in-hospital deaths were reported. Of these, 18 (1.3% of all deaths, 16% of all trauma admissions) were classified as preventable, 88 (6.4% of all deaths, 79% of all trauma admissions) as potentially preventable, and 1,271 (92.3% of all deaths, 11.5% of all trauma admissions) as nonpreventable (Table 1) deaths. For study purposes, only data from the 106 preventable or potentially preventable deaths were analyzed and PI data were available for all 106 cases. Mean (SD) age of the cohort was 23.2 (52.6) years with a preponderance of men (76.4%, 81 cases). Mean (SD) ISS was 17.9 (27.3).

Categorization of avoidable errors by TPIC discussions

<table>
<thead>
<tr>
<th>Avoidable errors as identified by TPIC before formal classification using JC taxonomy (n = 142)</th>
<th>n (% incidence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questionable treatment</td>
<td>21 (14.8%)</td>
</tr>
<tr>
<td>Delay of appropriate treatment</td>
<td>18 (12.7%)</td>
</tr>
<tr>
<td>Incorrect treatment</td>
<td>18 (12.7%)</td>
</tr>
<tr>
<td>Omission of essential procedure</td>
<td>14 (9.9%)</td>
</tr>
<tr>
<td>Inappropriate documentation</td>
<td>11 (7.8%)</td>
</tr>
<tr>
<td>Delayed diagnosis because of incorrect interpretation of vital signs</td>
<td>8 (5.6%)</td>
</tr>
<tr>
<td>Inaccurate diagnosis</td>
<td>6 (4.2%)</td>
</tr>
<tr>
<td>Preventable pulmonary embolism</td>
<td>5 (3.5%)</td>
</tr>
<tr>
<td>Inappropriate use of damage control techniques</td>
<td>4 (2.8%)</td>
</tr>
<tr>
<td>Self-extubation or extubation out of protocol</td>
<td>4 (2.8%)</td>
</tr>
<tr>
<td>Admission to an inappropriate hospital location</td>
<td>4 (2.8%)</td>
</tr>
<tr>
<td>Aspiration during placement of nasogastric tube</td>
<td>3 (2.2%)</td>
</tr>
<tr>
<td>Lack of transfusion products because of unavailability</td>
<td>3 (2.2%)</td>
</tr>
<tr>
<td>Complications of an appropriate treatment</td>
<td>3 (2.2%)</td>
</tr>
<tr>
<td>Cause of death unknown or unexpected</td>
<td>3 (2.2%)</td>
</tr>
<tr>
<td>Lack of monitoring</td>
<td>2 (1.4%)</td>
</tr>
<tr>
<td>Airway occluded by mucus plug</td>
<td>2 (1.4%)</td>
</tr>
<tr>
<td>Femoral access resuscitation in the setting of active abdominal bleeding</td>
<td>2 (1.4%)</td>
</tr>
<tr>
<td>Esophageal intubation</td>
<td>2 (1.4%)</td>
</tr>
<tr>
<td>Emergency room triage error</td>
<td>2 (1.4%)</td>
</tr>
<tr>
<td>Radiologic misinterpretation</td>
<td>1 (0.7%)</td>
</tr>
<tr>
<td>Medication reaction</td>
<td>1 (0.7%)</td>
</tr>
<tr>
<td>Inordinate prehospital delay</td>
<td>1 (0.7%)</td>
</tr>
<tr>
<td>Ventilator malfunction</td>
<td>1 (0.7%)</td>
</tr>
<tr>
<td>Inaccurate medical history report</td>
<td>1 (0.7%)</td>
</tr>
<tr>
<td>Iatrogenic pneumothorax</td>
<td>1 (0.7%)</td>
</tr>
<tr>
<td>Communication error</td>
<td>1 (0.7%)</td>
</tr>
<tr>
<td>Total</td>
<td>142</td>
</tr>
</tbody>
</table>

| JC = Joint Commission; TPIC = Trauma Performance Improvement Conference. |

Qualifying avoidable errors by Joint Commission taxonomy

The main causes of preventable and potentially preventable deaths were multiple organ failure (28.3%) and hypovolemic shock (21.7%) (Table 2). One hundred forty-two (142) avoidable errors were identified by the TPIC and are summarized in Table 3.

These avoidable errors were then classified using the JC taxonomy 1st by error type (Table 4). The most common error type was in clinical performance (132 errors—eg, an inaccurate diagnosis, a procedure not indicated, timely correct procedures, and omission of an essential procedure). Forty-six management errors involved primarily questionable follow-up (23 cases) and 37 communication deficiencies were identified including 20 that involved a questionable advice or interpretation.

The most frequent domain setting was the ED (59 cases) followed by the intensive care unit (ICU) (42 cases) and involved cases such as delayed recognition of a tension pneumothorax resulting in cardiac arrest/cerebral anoxia and a recently extubated patient requiring reintubation for respiratory failure (Table 5). The most often involved care providers were physicians (122 cases) with only 5 cases where a bedside nurse was identified as the primary provider involved. The targets were primarily therapeutic (104 cases—eg, a colon anastomotic leak resulting in multiorgan failure and death, a femur fracture not immobilized before ED departure) and diagnostic (26 cases—eg, nonidentification of asystole and death in a patient who should have been on telemetry, delayed diagnosis of abdominal bleeding despite tachycardia and anemia).

By far, most error causes were human (139 cases), the majority of which identified a knowledge deficiency (61 cases—eg, inappropriate venous thromboembolic prophylaxis resulting in a fatal pulmonary embolism) (Table 6). System causes were rare (9 cases) involving primarily equipment unavailability (4 cases—eg, a missing ventilator connector during a procedure resulting in hypoxia without alarm and subsequent death).

Table 2 Cause of death for 106 preventable or potentially preventable deaths identified during study period

<table>
<thead>
<tr>
<th>Cause of death (n = 106)</th>
<th>n (% incidence)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple organ failure</td>
<td>30 (28.3)</td>
</tr>
<tr>
<td>Hypovolemic shock</td>
<td>23 (21.7)</td>
</tr>
<tr>
<td>Respiratory failure</td>
<td>19 (17.9)</td>
</tr>
<tr>
<td>Cardiac arrest/failure</td>
<td>14 (13.2)</td>
</tr>
<tr>
<td>Neurologic death</td>
<td>12 (11.3)</td>
</tr>
<tr>
<td>Sepsis or infection</td>
<td>8 (7.6)</td>
</tr>
</tbody>
</table>
Several (142) mitigation or preventive strategies were implemented after identification of errors in preventable and potentially preventable deaths. The vast majority of improvements involved correcting ineffective communication (66 cases—eg, improving alarm systems to detect abnormal vital signs as soon as possible, instituting guidelines requiring charted medical orders before departure from the ED, routine review of documentation to assure the correct accomplishment of tasks, or that wound packing remains in situ for 72 hours), followed by eliminating wrong procedures (17 cases—eg, instituting a 2-step nasogastric tube insertion technique to avoid tracheal placement, protocolized direct laryngoscopy in transferred patients for timely identification of esophageal intubations) and improving the safety of high-alert medications (30 cases) (Table 7).

### Comments

Depending on definitions used in published reports, the incidence of preventable death in trauma ranges from 2% to 29%.\cite{4,15,23,24} Determining preventability of death depends on the identification of avoidable errors in the management of injured patients during their hospital care and sometimes also their prehospital care. In a 9-year review, we found a 7% incidence of preventable and potentially preventable deaths in our urban academic trauma center. We classified 142 avoidable errors identified in these cases using the JC taxonomy to allow a better comparison with the experience of other trauma centers. Deaths resulted primarily from multiorgan dysfunction, hemorrhage, and failure in airway management and primarily involved the clinical performance of physicians in the early ED resuscitative phase. Avoidable errors were overwhelmingly human and resulted primarily in universal mitigation strategies.

More than one decade has passed since The Institute of Medicine published the report “To Err is Human: Building a
Table 7  Error prevention/mitigation derived from 142 avoidable errors found in 106 preventable or potentially preventable deaths as classified by the Joint Commission

<table>
<thead>
<tr>
<th>Joint Commission taxonomy: error prevention/mitigation</th>
<th>66</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improving the effectiveness of caregiver communication</td>
<td></td>
</tr>
<tr>
<td>Reducing the risk of healthcare-acquired infections</td>
<td></td>
</tr>
<tr>
<td>Improving effectiveness of clinical alarm systems</td>
<td></td>
</tr>
<tr>
<td>Selective</td>
<td></td>
</tr>
<tr>
<td>Eliminating wrong procedures</td>
<td>17</td>
</tr>
<tr>
<td>Eliminating wrong procedure surgery</td>
<td>14</td>
</tr>
<tr>
<td>Eliminate wrong-site surgery</td>
<td>6</td>
</tr>
<tr>
<td>Indicated</td>
<td></td>
</tr>
<tr>
<td>Improving the safety of high-alert medications</td>
<td>30</td>
</tr>
<tr>
<td>Improving the safety of using infusion pumps</td>
<td>1</td>
</tr>
</tbody>
</table>

Note: Prevention parameters identified in certain errors were assigned to more than 1 mitigation strategy. Conversely, several similar errors were addressed with the same prevention strategy. As such, the number of errors of a given type in the preceding tables does not match the number of strategies of the same type under Table 6. Categories not involving a single case are omitted.

Safer Heath System.” This sentinel document exposed the alarming absence of routine and standardized reporting of the errors that occur with abundant frequency in health care. With growing scrutiny from regulatory bodies, reliable reporting of avoidable errors in management has become increasingly necessary as the 1st step to improve the quality of health care. Although trauma PI efforts have existed for decades, there remains no uniformity in reporting death preventability among trauma centers and even greater variability exists in classifying and reporting avoidable errors. Unfortunately, this lack of standard language in error categorization makes difficult comparisons between different centers and challenging the setting of benchmark goals. This study is one of a few to use the JC scheme to organize avoidable errors in preventable trauma deaths, classifying each into the 5 nodes required by the taxonomy.

Definitions of trauma death preventability vary between institutions, some using a TRISS survival probability threshold (≥50% or >75%) where deaths in patients with greater survival are considered preventable or potentially preventable. However, this alone may not identify all cases otherwise identified by peer review panels that yield more reproducible results. Other recent studies in large cohorts of trauma admissions have demonstrated varying rates of preventable deaths. Gruen et al 22 in a 9-year study used TRISS survival probability (>50%) in combination with mortality and morbidity (M + M) conferences to determine death preventability and found a 2.5% rate of cases where errors were likely to have contributed to death. In a different 1-year state-wide trauma outcome study, the reported rate of preventable mortality was 7%, but 11% when only including patients surviving to hospital admission.1 In a large 7-year study of 2,081 trauma patient deaths admitted to Los Angeles County - University of Southern California, Teixeira et al 15 found a 2.4% rate of preventable deaths using peer case review. Ivatury et al 22 who studied 19,000 trauma admissions over a 5-year period in an urban Virginia trauma center found a preventable death rate of 9.9%. Outside the United States, in studies from Amsterdam 30 and South Wales, Australia, 24 preventable mortality rates were 29% and 22%, respectively, although patients dead on arrival were excluded. In this study, using peer case review, the combined preventable and potentially preventable death rate was 7.4%, which closely resembles the Virginia study. These wide variations in trauma death preventability may indeed relate to dissimilarities in the quality of care provided at different trauma centers, but may also reflect variations in the definition of avoidable errors in the absence of a standardized classification scheme. While all studies used error classification systems that have common elements, only 2 of these studies 22,32 to date have employed the JC standards endorsed by the National Quality Forum.18

The most common cause of death we encountered was organ failure (28%) followed by hemorrhage (21%) and airway management issues (18%). Teixeira et al 15 reported a greater contribution of hemorrhage (40%) than organ dysfunction (27%) and only a minority (6%) of errors involving airway or respiratory issues. Others also reported hemorrhage as the predominant cause of death, but also found neurologic causes to be responsible for 30% of cases.30 Taken together, the 4 most commonly reported causes of preventable/potentially preventable trauma deaths are hemorrhage, organ failure, airway failure, and neurologic demise.

The classification of error types (the processes that failed or were faulty) is highly variable among published reports and the JC taxonomy specifically differentiates communication from management errors (improper delegation, referral, or follow-up) and further distinguishes the latter from clinical performance errors. Performance errors are subdivided in relation to the intervention (procedure, surgery) as preintervention (diagnosis) and postintervention (prognosis). Many studies that use their own classification systems combine management and performance errors, often without further breaking down error type. Ivatury et al 22 and Gruen et al 32 used the JC classification system, but subclassified error type differently, the latter group separating them into diagnosis, treatment, and prevention errors. As in our study, Ivatury found that the majority of error types were in patient management (resuscitation or
OR/ICU care), which we rather classified as clinical performance (intervention) error types. Other studies have also identified treatment or delay in treatment as predominant error types, although rate comparisons are difficult because of the lack of consistency in subclassification schemes. Interestingly, communication errors that were not infrequently found by both Ivatury and Gruen were not part of error type classification in most other large and small studies. The JC considers communication as a principal error type and reports that greater than 80% of serious or sentinel medical errors involve miscommunication between caregivers, particularly when patients are transferred or handed-off. Trauma care is multidisciplinary and involves frequent provider handoffs making communication and miscommunication particularly relevant to error occurrence. Missed injuries or delays in diagnosis have been extensively studied in trauma and were common errors types reported by this and most other studies, here classified as inaccurate diagnosis/clinical performance error types using JC taxonomy.

Error domain, commonly referred to as the management phase (resuscitative, definitive, or rehabilitative), and often including hospital location (ED, OR, ward) and provider type is classified by the JC into setting (phase), staff (physician, nurse), and target (therapeutic, diagnostic). We found that the domain of most avoidable errors was in the resuscitative (ED) phase and in the ICU, least often occurring in the OR. These results are consistent with other studies identifying the OR and ICU as 2nd or 3rd to the emergency room regardless of classification scheme. Sanddal et al, in the only study closely scrutinizing the prehospital phase, described how the prehospital domain accounted for almost 40% of avoidable errors in a statewide (mostly rural) analysis. As in our study, Ivatury found the provider most commonly to be the physician, but other accounts did not distinguish the type of providers specifically in their classification schemes.

Error causes (factors or agents) are separated into system (process/structure) and human causes, where system errors are remote from the direct control of the physician (orientation/training, staffing levels, physical environment, organization). Human errors are further subdivided into their relation to skills (execution), rules (input), or knowledge (insufficient familiarity). Gruen et al, who based their classification on the JC taxonomy, classified errors differently into input, intention, and execution causes and found a majority to be related to intention. Again, comparisons in error cause between this and other studies are difficult without standard terminology. Other studies used their own classification of error causes and although human causes were more prevalent, these were not further subcategorized. Our study also demonstrated that human errors predominate (13-fold) and are primarily related to knowledge deficits, although system-related errors do also occur.

The 5th node (prevention/mitigation strategies) of the JC taxonomy is the least often addressed category in locally derived classification schemes. This node is further classified into universal (directed at entire population), selective (directed at different subpopulations), or targeted (directed only at specific subpopulations). Interestingly, the only 2 other published studies that used JC taxonomy in trauma deaths either did not use this node or created their own, more specific subcategories of prevention strategies. Although not specifically categorized, several other studies discussed prevention strategies, describing the establishing of guidelines and the training for providers. We found that universal measures targeted at general trauma patient populations were twice as frequently enacted as those directed at selective subgroups of patients and primarily involved improving communication between caregivers.

While this study is among the larger series reported and uses a standardized classification scheme, it only evaluates 106 cases and as such has limitations. While our TPIC case review discussions identified trauma deaths that were judged as preventable or potentially preventable, the classification of errors using JC taxonomy was conducted after the fact by one of the authors reviewing each case file (S.M.V.) and as such this may have been the subject of interpretation bias. We did not use external panels to corroborate determinations by the TPICs, although this may improve identification of avoidable errors. Nonetheless, such independent review is resource and time consuming and impracticable for the vast majority of trauma centers. Also, our method of searching for preventable deaths may have missed certain cases as it was conducted through self-reporting by the trauma team or the presence of the coordinator at the morning report. Yet, one of our PI coordinators was present at all weekly morning reports and their search for identifiable errors remained constant during the study period. Additionally, this study is limited to only those errors deemed to have contributed to mortality, the highest level of impact by JC criteria. As such, it does not address the medical errors which occurred leading to serious nonmortal consequences or in near-misses. Finally, although this report has only evaluated errors in preventable and potentially preventable deaths, it has not explored avoidable errors that occurred in nonpreventable mortalities. Despite this, it is likely that increasing familiarity with the JC taxonomy will likely yield opportunities for improvement in all trauma deaths and even in complications/near-misses reviewed using this framework.

Outside the JC taxonomy, no other universal classification of avoidable errors in trauma exists. To date, the lack of a standard language among studies makes it difficult to compare the results and apply findings across different centers. As expressed in the American Surgical Association presidential address by H.C. Polk, “quality, safety and transparency are key to minimizing surgical errors.” Using a comprehensive common classification of avoidable errors allows a decentralized approach of patient safety reporting using a common language and framework that will facilitate an eventual coding structure to reconcile data collected by different institutions.
References


The JCAHO patient safety event taxonomy: a standardized terminology and classification schema for near misses and adverse events

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Abstract

Background. The current US national discussions on patient safety are not based on a common language. This hinders systematic application of data obtained from incident reports, and learning from near misses and adverse events.

Objective. To develop a common terminology and classification schema (taxonomy) for collecting and organizing patient safety data.

Methods. The project comprised a systematic literature review; evaluation of existing patient safety terminologies and classifications, and identification of those that should be included in the core set of a standardized taxonomy; assessment of the taxonomy’s face and content validity; the gathering of input from patient safety stakeholders in multiple disciplines; and a preliminary study of the taxonomy’s comparative reliability.

Results. Elements (terms) and structures (data fields) from existing classification schemes and reporting systems could be grouped into five complementary root nodes or primary classifications: impact, type, domain, cause, and prevention and mitigation. The root nodes were then divided into 21 subclassifications which in turn are subdivided into more than 200 coded categories and an indefinite number of uncoded text fields to capture narrative information. An earlier version of the taxonomy (n = 111 coded categories) demonstrated acceptable comparability with the categorized data requirements of the ICU safety reporting system.

Conclusions. The results suggest that the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) Patient Safety Event Taxonomy could facilitate a common approach for patient safety information systems. Having access to standardized data would make it easier to file patient safety event reports and to conduct root cause analyses in a consistent fashion.

Keywords: patient safety, standardized terminology and classification, taxonomy

Introduction

Concerns about safety in patient care have called attention to the need for governmental agencies and private sector accrediting bodies to work together with health care organizations to coordinate the monitoring, reporting, and analysis of medical errors. The 2003 Institute of Medicine report, Patient Safety: Achieving a New Standard of Care [1], recommends that standardization and better management of information on patient safety—including near misses and adverse events— are needed to inform the development of strategies that reduce the risk of preventable medical incidents. However, patient safety incident reporting systems differ in design and therefore in their ability to define, count, and track adverse events [2]. Among reporting systems, there are often disparate data fields, conflicting patient safety terminologies, classifications, characteristics, and uses that make standardization difficult. In addition, each source of data on near misses and adverse events usually requires different methods for interpreting and deconstructing these events [3]. Finally, misused terminology in the research literature, conference papers and presentations, and media contributes to widespread misunderstandings about the language of patient safety.

The proliferation of reporting systems has created a pressing need for organization of patient safety information systems and terminology. Unfortunately, much of the work to date has fallen short in meeting identified needs for epidemiological data [4]. Given the current state of the art, it is
extremely difficult to achieve broad-based and timely improvements in patient safety, since there is no standard determination as to which events to capture and report [5,6]. Additionally, the lack of a common patient safety terminology is a critical obstacle to sharing and aggregating data to support patient safety.

The concept of a taxonomy combines terminology and the science of classification—in the case of patient safety, the identification and classification of things that go wrong in healthcare, the reasons why they occur, and the preventive strategies that can minimize their future occurrence. There is consensus that standardization of patient safety data would facilitate improvements in incident reporting, tracking, and analysis [7,8]. The core set of terms in patient safety, like other health disciplines, should incorporate both theoretical concepts and generally accepted vocabulary.

Several methods have been developed to define and classify medical errors, adverse events, near misses, and other patient safety concepts and terms [9,10]. However, these methods have tended to be, with notable exceptions, narrowly and predominantly focused on specific areas of health care—medication errors [11–13], transfusion reactions [14], primary care [15,16], and nursing care [17,18].

In this project we developed and applied a method of classification that is based on evaluations of extant taxonomies and reporting systems with feedback from individuals who would use the taxonomy. This approach sought to identify similarities and gaps in the terminology and classification to create a multidimensional taxonomy that encompasses diverse health care settings and incident reporting systems.

**Methods**

Terms and definitions used in patient safety were gathered from a wide range of print and web resources (e.g., book glossaries, published journals). Current, practical, and colloquial terms that underlie the communication among users were listed in a comparative glossary. Because the terms and their definitions are extensive, they are not reproduced herein. However, this patient safety dictionary is available electronically from the authors.

A comprehensive literature search was performed in Medline (PubMed) and Excerpta Medica (Embase). Literature that describes approaches to the definition of medical errors, adverse events, near misses, and other patient safety concepts and terms, including existing classification schemes on patient safety, was retrieved. The searches were not limited to articles published in the English language or within a particular geographical area. The databases were searched for articles with publication dates between January 1993 and June 2003. In addition to database searches, the Internet sites of Departments of Public Health, Ministries of Health, and Patient Safety Organizations and Groups in Africa, Asia, Australia, Europe, and North America were searched. The reference lists of major reports were also scanned for relevant publications that date from the 1980s.

A total of 512 distinct references were identified from the Medline search. The Embase search resulted in 15 additional unique references. The titles and/or abstracts of these articles were initially scanned, and inclusion/exclusion decisions made. Based on the review of the abstracts, we eliminated 429 articles on the following criteria: (i) not relevant to the field of patient safety/medical error/adverse event classification; (ii) relevant to the field of patient safety/medical error/adverse event classification but did not provide adequate description of the components needed to define a coherent classification scheme; (iii) classifications that are in the early stages of development; (iv) unpublished classifications. The very few exceptions to this are classifications that hold particular conceptual or methodological interest in the development of the field.

**Methodological concerns**

Of the 96 full articles that were reviewed, 73 were eliminated according to the above criteria. Eleven formal classification schemes identified in the remaining 23 articles that address the frequencies, types, causes and contributing factors, consequences, and prevention of medical/medication errors are summarized in a report prepared for the World Health Organization [19].

The 11 classifications of medical and medication errors, patient safety events, and incident reporting systems were reviewed and compared for homogeneity. The semantic relationships, equivalent categories, and linkages among these classifications schemes were identified and used to construct the overarching framework of a preliminary taxonomy. This version also referenced human factors and safety research.

We reviewed data collected by the Joint Commission’s Sentinel Event Program from January 1995 to December 2002 to validate the construct of the preliminary taxonomy. This was supplemented by recommendations from a nominal expert advisory taxonomy workgroup (see Acknowledgements for composition of workgroup). We asked the workgroup to assess the content and face validity of an initial iteration of the taxonomy. They offered a checklist of five attributes to be used in judging appropriateness of the elements of the taxonomy; these judgments involved subjective assessments rather than statistical analyses. Input was also solicited from medical specialty societies, business groups, government health care agencies, and health care organizations.

Since it is difficult, if not impossible, to prove formally that the items chosen were representative of all relevant terms and classifications, subjective tests of linguistic clarity were used to indicate whether the terminology of the classifications was clear. In the absence of a ‘gold standard’ to test criterion validity, we conducted a simplified item analysis of each variable of the taxonomy against those found in an established classification in one US hospital. Responses were coded as follows: ‘unmatched’ = 0, ‘extrapolated’ = 1, ‘related’ = 2, ‘synonymous’ = 3, and ‘identical’ = 4. Results of this work were used to inform the development of a beta version of the patient safety event taxonomy.
Results

Our review of the literature reinforces the fact that various approaches used in the health care sector to define and classify near misses, adverse events, and other patient safety concepts have generally been fragmented [20]. Early efforts to define and classify ‘error’ or ‘mistakes’ were burdened by theoretical and methodological flaws. The model of medical error was largely unspecified. Where classification instruments were described, their validity was found to be modest and their reliability not reported. A systematic review of classification schemes used in primary care by Elder and Dovedy [10], found a limited number of studies that attempted to categorize medical errors, including near misses and adverse events [21–25]. Most of these studies were not designed with the development of a functional classification scheme in mind; thus, they did not offer a conceptual explanation of what they had classified.

Busse and Wright [26] proposed a more promising classification methodology and an enhanced evaluation approach for the Edinburgh Incident Classification. Focusing on in-depth analysis and a search for multiple levels of causation and contributing factors, including the identification of active and latent failures, this classification model exemplifies a theory-driven analytical framework that integrates, functionally and technically, with an incident reporting system. This systematic approach to classification in patient safety did not become the de facto standard for quite some time, and is still often neglected.

The classification of error types framework and theoretical and technical foundation for in-depth analysis of root causes of adverse events did not materialize until after the publication of the seminal works by Reason [27], Rasmussen [28], and Hale [29]. Contributions from aviation [30] and high-technology/high-risk industries have also been instrumental in advancing the reporting, analysis, and classification of adverse events in health care. A few more theoretically based studies—such as those reported by Makeham [15], Battles [31], and Victoroff [32]—have focused on more rigorous classification schemes and give greater consideration to validity and reliability issues. Like the earlier classifications, however, the process and outcome ‘root causes’ of adverse events in these schemes were only described where a significant impact was recorded [33].

Finally, Runciman and colleagues [34] have developed a structured approach based on Reason’s model and framework of contributory and causative factors to draw out all of the relevant information about an incident and to describe patient safety phenomena in terms that can be analyzed statistically.

Homogeneous elements of these models—which comprise terms and the relationships between terms that make up the building blocks of a classification scheme—were categorized into five complementary root nodes, or primary classifications.

1. Impact—the outcome or effects of medical error and systems failure, commonly referred to as harm to the patient.
2. Type—the implied or visible processes that were faulty or failed.
3. Domain—the characteristics of the setting in which an incident occurred and the type of individuals involved.
4. Cause—the factors and agents that led to an incident.
5. Prevention and mitigation—the measures taken or proposed to reduce incidence and effects of adverse occurrences.

The root nodes were then divided into 21 subclassifications, which were in turn subdivided into more than 200 coded categories and an indefinite number of non-coded text fields to capture narrative information about specific incidents.

The ‘Impact’ classification (shown in Figure 1) comprised three subclassifications that could discriminate between 18 types of outcomes or effects (harm). The harm index was based on the NCC-MERP Medication Error Taxonomy [12], and is characterized by the degree of harm—ranging from no harm to temporary or permanent impairment of physical or psychological function. Broad distinctions were also made between medical (psychological or physical) and non-medical (legal, social, or economic) impacts.

The ‘Type’ classification included three levels that address communication, patient management, and clinical performance (see Figure 2). The ‘communication’ subclassification identified communication problems that exist between provider and patient, provider and patient’s proxy, provider and non-medical staff, and among providers. The ‘patient management’ node classified substandard patient management that involved improper delegation, failure in tracking or follow-up, wrong referral or consultation, or questionable use of resources. The ‘clinical performance’ subclassification included the full range of failures that could lead to iatrogenic events during the pre-intervention, intervention, and post-intervention phases of care. Analysis of Joint Commission sentinel event data (reported from 1995 to 2002) related to wrong-site surgeries (n = 209) showed that these adverse events could be classified in the following principal groups: (i) Communication—including communication with the patient and among members of the surgical team; availability of information, and operating room hierarchy; (ii) Patient management—such as preoperative assessment of the patient; and (iii) Clinical performance—including orientation and training, the procedures used to verify the operative site, and distraction. Alternatively, these areas could represent the clinical or management processes that are associated with events without any judgments about root causes within these processes.

The ‘Domain’ classification included the types of health care professionals commonly involved in patient care and the demographics of patients in a variety of health care settings where events might have occurred (see Figure 3). Analysis of voluntarily reported sentinel events showed that they occur most frequently in the following settings: general hospital (64%); psychiatric hospital (13%); psychiatric unit (6%); outpatient behavioral health (5%); emergency department (4%); long-term care facility (4%); home care service (3%); and ambulatory care setting (1.5%). From this, we postulated a link between where the event took place (>10 coded categories) and which medical specialty was involved (>21 coded...
Figure 1 Classification of impact.
categories). In addition, we specified the intended patient care intervention (eight coded categories—therapeutic, diagnostic, rehabilitative, preventive, palliative, research, cosmetic, and other), which pre-existing conditions the patient had (ICD-9-CM coded categories), and the associated causes and outcomes delineated in the other four primary classifications.

The classification of ‘Causes’ is shown in Figure 4. Root cause analyses of sentinel events in all categories showed that the underlying causes of these events could be classified into two principal groupings: system failures and human failures. The principal nodes of the ‘Cause’ classification comprised two subclassifications: system (process/structure) failures and human failures. System failures are errors in the design, organization,
Figure 4  Classification of cause.
training, or maintenance that lead to operator errors. Those failures involving direct contact with the patient—human failures—are often part of the proximate cause of an event [35]. The root cause analysis data yielded groupings that included communication, patient assessment, and continuum of care, among others. The subclassification, ‘latent organizational failure’, included five coded categories: (i) management, (ii) organizational culture, (iii) protocols and processes, (iv) transfer of knowledge, and (v) external factors. Two categories for latent technical failure—facilities and external factors—were derived from the Eindhoven Classification System [31].

Terminology for the ‘Prevention and Mitigation’ classification was adopted from the definitions proposed by Gordon [36] for physical disease prevention. In this classification, three types of prevention and mitigation were identified: universal, selective, and indicated. The ‘universal’ subclassification covered preventive and corrective measures that are designed for everyone in the eligible population. Prevention and mitigation measures that are directed toward a subgroup of the population whose risk of adverse events is above average were grouped in the ‘selective’ subclassification. Lastly, the ‘indicated’ subclassification combined interventions that are targeted to specific high-risk individuals identified as having a minimal but detectable risk for sustaining an adverse event. Figure 5 illustrates how the preventive strategies of the Joint Commission’s 2004 National Patient Safety Goals [37] could be classified according to this scheme.

The proposed interrelationships depicted in Figure 6 show the assumptions underlying the Taxonomy framework. The linkages in this visual analytical framework provide an organized approach to guide the retrospective process of identifying the factors (causes) that contribute to systems failures (type) and adverse events, or to prospectively identify potential risk factors and devise preventive strategies (prevention) and corrective actions (mitigation) to protect the patient (in a domain) from harm (impact). The linkages are not meant to lead to premature conclusions about an event, nor are they intended as the only analytical framework. Although the linkages define the specific types of queries, they do not identify precise data sources nor which units of data should populate the taxonomy.

A preliminary test of the alpha version taxonomy conducted at one hospital with an active incident reporting system (Stanford’s ICUs) demonstrated acceptable correlation between its coded categories (n = 111) and the categorized data requirements of the system. Thirteen (12%) categories were identical, 42 (38%) were synonymous, 45 (41%) were related, and six (5%) had to be extrapolated. Five (4%) categories were unmatched—date and time of incident, patient or family dissatisfaction, and two patient identifiers—and were therefore omitted from the taxonomy.

Using the desirable attributes of patient safety taxonomy identified by the expert advisory workgroup (see Box 1), the face validity of the terminology and classifications inferred from the comments of the experts who reviewed their clarity and completeness was judged to be high. The workgroup recommended inclusion of external factors that are perceived to influence patient safety. The workgroup concluded that the Taxonomy was well suited to meet the need for integration of patient safety data from disparate sources. A variety of patient safety stakeholders concurred in the taxonomy’s suitability and feasibility for application in incident investigation, reporting, tracking, and analysis at US hospitals and elsewhere.

**Discussion**

The Patient Safety Event Taxonomy developed and tested in this study represents a synthesis of traditional, hierarchical classifications represented by single topic areas and settings and the heuristic, multidimensional/multisetting classifications that rely on a systems approach to understanding patient safety [38]. It includes all events that are not due to an underlying physiological or pathological process and is sensitive to minor variations among similar events. This approach compels the user to make explicit, a priori decisions about the key variations in structure and process that relate to any given patient safety event. It also allows others to judge whether important variables were overlooked. Finally, it makes explicit the relationships between these variables and their relevance as valid markers of patient safety.

The number of relevant categories constituting the optimum classification scheme or how best to deconstruct an adverse event will always be subject to debate [39]. Hobgood [40], using a modified Delphi process to differentiate between specific classes of medical error common to emergency medicine practice, found that cognitive errors in medical decision-making can be difficult to identify, and suggested that consensus on terminology and classification may be challenging. One source of difficulty we encountered in choosing logical data variables to link disparate terminologies and classifications is that they are all loosely attached in an intricate network of information characterized by events, settings, individuals, and teams of people, protocols, procedures, policies, and communications that function in an uncertain environment. Understanding these relationships could provide a useful basis to guide the development and improvement of information about near misses and adverse events, and use of the information to make health care safer for patients.

We critiqued existing taxonomies on several grounds. Most were developed in relative isolation from other classification approaches for a specific medical specialty, and few were improvements of earlier work. In this regard, we believe that research that compares different classification schemas constitutes a crucial stage in consolidating the discipline of patient safety event reporting.

Aggregating data gathered through different measurement methods into the framework of a standardized taxonomy has been used successfully by epidemiologists to detect nosocomial infections [41], and is likely to be useful in detecting trends and patterns in patient safety. In a number of studies, there appears to be an evolving effort to build a science of patient safety measurement that is equivalent to health measurement or psychometrics. This is important because decisions affecting the welfare of patients and the expenditure of public funds are based on the results of patient safety measurements [42].
The potential applications for patient safety event information vary widely depending on the identity of the user—e.g. internal evaluations, oversight bodies, patient safety managers, patients, ethicists, and lawyers, among others. In order to meet the needs of these diverse audiences it is essential to identify a common language that is widely applicable and straightforward. The vocabulary adopted for the Taxonomy closely resembles the lexicon commonly used among various users today, and avoids pejorative terms.

In its simplest form, the Taxonomy’s classifications can represent individual fields for the front end of paper-based or electronic reporting systems with individual incidents comprising the records. At its broadest application, the Taxonomy describes processes that determine the quality of incident reports, the effectiveness of reporting systems, and the success of intervention strategies. The significance is that the Taxonomy could potentially be used as a common backbone when mapped to disparate reporting systems unifying terminologies and classifications. This allows aggregated data to be...
The JCAHO patient safety event taxonomy combined and tracked over time, provides for consistency across reporting systems, and structures data documentation and presentation using a standardized format. Applied to an electronic health record system, the taxonomy offers a means for interoperability, facilitating exchange of patient safety data across systems.

A decentralized approach to patient safety reporting, using a standardized terminology and classification framework, would simplify the development and maintenance of a coding structure for reporting. Reconciling the data collected by local or focused reporting programs to a national standard would provide a means to integrate the already existing data collection efforts relating to health care errors and systems failures. The framework of the Taxonomy will also lessen the burden on patient safety organizations that operate in multiple states and/or must be responsive to multiple government agencies, private oversight bodies, and group purchasers, without requiring expensive re-engineering of existing reporting systems.

Limitations

Health care error classification systems are not free of their own problems. For example, they partition categories more coarsely than do keywords, and users, who are accustomed to the everyday colloquial language of patient safety used in the workplace environment, may not be fluent in the terminology of the classifications. The finite number of elements in the Taxonomy nevertheless encompasses a broad range of areas that could possibly be classified, but there are still likely many areas that could escape detection and reporting. Furthermore, because the anatomy of an event is multidimensional, its deconstructed components may not be mutually exclusive to each of the classifications, sub-classifications, coded categories, and narrative fields in the taxonomy. In addition, the multi-tiered features may be too complicated for some audiences to use. For example, wrong-site surgery not only results in physical harm, but may also affect the emotional (psychological) and functional status of the patient, and his or her ability to return to work (economics). Near misses in the taxonomy are assumed to have the same root causes as the much smaller subset that actually develops into adverse events. Arguably, the very advantage of using near-miss data to provide information on how an incident ‘recovered’ from a potential adverse event also has a downside. Adverse events are by definition near misses that failed to be recovered in time [43]. By contrast, the events that a hospital successfully prevents from occurring will be just those events that will never be identified in a near-miss information system. Thus,
the Taxonomy must be clear on just what near misses have in common, or not, with adverse events. Notwithstanding the potential limitations of near-miss data, near misses are sufficiently clear precursors of adverse events to point the way to identification of specific individual and systems failures.

Conclusion

The Joint Commission Patient Safety Event Taxonomy focuses on the most salient terminologies and classifications. Its design will permit the progressive incorporation of new patient safety data and information over time. However, additional field-testing will be required to bring the taxonomy to full maturity and permit it to realize its overall objectives.

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References

2. Implementation Planning Study for the Integration of Medical Event Reporting Input and Data Structure for Reporting to AHRQ, CDC, CMS, and FDA. Medstat Report submitted to AHRQ, 2002.


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