Trauma Coordinator Orientation Manual for Level IV Trauma Centers

2017 Edition

Revised 4/2017
Foreword

“Injury is a public health problem of enormous magnitude, whether measured by years of productive life lost, prolonged or permanent disability, or financial cost.” (Resources for Optimal Care of the Injured Patient – American College of Surgeons, 2014)

Trauma Program Managers/Trauma Coordinators are often responsible for many different programs within their facility and having a resource available such as this manual will provide some assistance in the running of the trauma program. Trauma Medical Directors should be provided this manual to read and support the Trauma Program Manager/Trauma Coordinator in running the trauma center.

Disclaimer:
This manual is not intended to replace the individual trauma center’s orientation process. This manual is intended to provide the Trauma Coordinator/Trauma Program Manager who is new to the role some helpful tools in understanding and building your individual trauma center. The contributing authors share their experience and knowledge to facilitate the transitional role of the new Trauma Program Manager/Trauma Coordinator.

The Trauma Program Manager/Trauma Coordinator will be referred to in this manual as the Trauma Coordinator (TC).

Information contained in this manual is current as of the date of publication. Please continue to update information as it becomes available.

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Acknowledgements

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Trauma Coordinator Orientation Manual Work Team

SMRTAC Trauma Program Managers and Coordinators

The final product is the end result of collation of input from all stakeholders.
Introduction

Trauma Center History

Trauma Care has evolved into a specialty in many local and regional hospitals over recent years. Historically called emergency rooms, trauma centers have established high quality, comprehensive medical services for patients. The public relies on trauma centers to provide quality care from the initial injury to final disposition, whether at the local hospital or tertiary care center. Regardless of where your program is located, it provides critical services in a timely manner to patients who often need lifesaving measures. As a Trauma Coordinator (TC), or a Trauma Program Manager (TPM) it is your primary responsibility to ensure patients are receiving the best care possible. This is often accomplished by compilation and analysis of data, policy review, and continuous quality improvement initiatives. The following chapters will provide an overview of many aspects of trauma care and acts as a guide to help you succeed in your new role as a TC or TPM.

Trauma Center Levels

The designation of trauma levels is important to distinguish what essential services are offered at a hospital. The Minnesota Department of Health (MDH) is responsible for the designation, or re-designation, of your hospital on a three year cycle. Recommendations are given by the American College of Surgeons’ Committee on Trauma to ensure consistent practice standards and available resources. Basic definitions of each trauma level are outlined below.

LEVEL I

Verified by the American College of Surgeons’ Committee on Trauma, a Level I Adult or Pediatric Trauma Center is a comprehensive regional resource that is a tertiary care facility central to the trauma system. A Level I Trauma Center is capable of providing total care for every aspect of injury – from prevention through rehabilitation.

- Key elements of a Level I Trauma Center include 24-hour in-house coverage by general surgeons, and prompt availability of care in specialties such as orthopedic surgery, neurosurgery, anesthesiology, emergency medicine, radiology, internal medicine and critical care. Other capabilities include cardiac, hand, pediatric, microvascular surgery and hemodialysis. The Level I Trauma Center provides leadership in prevention, public education and continuing education of the trauma team members. The Level I Trauma Center is committed to continued improvement through a comprehensive quality assessment program and an organized research effort to help direct new innovations in trauma care.

LEVEL II

Verified by the American College of Surgeons' Committee on Trauma, a Level II Adult or Pediatric Trauma Center is able to initiate definitive care for all injured patients.

- Key elements of a Level II Trauma Center include 24-hour immediate coverage by general surgeons, as well as coverage by the specialties of orthopedic surgery, neurosurgery, anesthesiology, emergency medicine, radiology and critical care. Tertiary care needs such as cardiac surgery, hemodialysis and microvascular surgery may be referred to a Level I Trauma Center. The Level II Trauma Center is committed to trauma care.
prevention and to continuing education of the trauma team members. The Level II Trauma Center is dedicated to continued improvement in trauma care through a comprehensive quality assessment program.

**LEVEL III**
Verified by the American College of Surgeons' Committee on Trauma and/or the Minnesota Trauma System, a Level III Trauma Center has demonstrated an ability to provide prompt assessment, resuscitation, stabilization of injured patients and emergency operations.

- Key elements of a Level III Trauma Center include 24-hour immediate coverage by emergency medicine physicians and the prompt availability of general surgeons and anesthesiologists. The Level III program is dedicated to continued improvement in trauma care through a comprehensive quality assessment program. The Level III Trauma Center has developed transfer agreements for patients requiring more comprehensive care at a Level I or Level II Trauma Center. A Level III Trauma Center is committed to the continued education of the nursing and allied health personnel or the trauma team. It must be involved with prevention and must have an active outreach program for its referring communities. The Level III Trauma Center is also dedicated to improving trauma care through a comprehensive quality assessment program.

**LEVEL IV**
Verified by the Minnesota Trauma System, a Level IV Trauma Center has demonstrated an ability to provide Advanced Trauma Life Support (ATLS) prior to transfer of patients to a higher level trauma center.

- Key elements of a Level IV Trauma Center include basic emergency department facilities to implement ATLS protocols and 24-hour laboratory coverage. Transfer to higher level trauma centers follows the guidelines outlined in formal transfer agreements. The Level IV center is committed to continued improvement of these trauma care activities through a formal quality assessment program. The Level IV center should be involved in prevention, outreach and education within its community.
- For more information on trauma centers visit: [http://www.health.state.mn.us/traumasystem/hospresources/criteria_level4.pdf](http://www.health.state.mn.us/traumasystem/hospresources/criteria_level4.pdf)


How to Start Your Level IV Trauma Program

What Is Required
In order to become a Level IV Trauma Program in the State of Minnesota, there are certain required and desired elements. For the latest requirements visit:

Create an Action Plan
- What criteria do you already meet?
- What criteria are lacking?

For each of the criteria you do not meet or have questionable compliance, it is best to call on additional input from another TC with experience to discuss your thoughts on how to reach compliance with all essential elements. All essential criteria not met must also be discussed with the TMD and the administrator responsible for the trauma center.

Do You Have the Foundational Elements?
- **Physician Partner** (TMD)
  - Essential to begin process
- **Institutional/Administrative Support**
  - Essential to move program forward
- **Trauma Team Activation (TTA) Criteria and Response**
  - See SMRTAC approved criteria
    - SMRTAC Trauma Team Activation Criteria *(Appendix A)*
    - Meets state requirements for Trauma Centers
- **Trauma Flow Sheet**
  - Captures patient assessment and team response
- **Blood Availability**
  - Emergency Blood Release Protocol
  - Process in place to obtain more if needed
- **Trauma Registry support**
  - Must maintain a trauma registry
  - Consider who will enter this data
- **Transfer Agreements**
  - With what facilities for what type of patient
  - Minimum of two Level I/II Trauma Centers
  - Minimum of two Burn Centers
Data Collection

All of the MN Department of Health forms and resources referred to below are available on the MN Dept of Health Website  http://www.health.state.mn.us/traumasystem

Defining a Trauma Patient
The Minnesota statewide trauma system requires trauma centers to have a trauma Performance Improvement (PI) program. Fundamental to this PI program is a formal policy that includes a description of the patients to be entered into the state required trauma registry. The state requires a specific population of patients to be entered.

Locating Patients in Your Hospital
You will to develop a system for locating trauma patients that received care at your hospital and meet inclusion criteria. It is best to find these patients in real time by reviewing emergency department (ED) activity logs, transfer logs, emergency medical record (EMR) reports, etc. Look for assistance from ED nurses and health unit coordinators to be notified of a possible trauma patient. Check with the electronic registration system in the ED. It may be possible to add a specific code when registering a patient so a report can be pulled electronically. The state trauma patient criteria include ICD-10 codes for the various injuries. After a patient is discharged codes will be assigned to that patient’s hospital occurrence. Looking for patients with those codes after discharge is another way to locate your trauma patients. Just note that if you wait for a coding report to find your patients, there will be a delay. This makes your feedback to trauma team members and follow-up on events less effective. This also reduces the amount of time you have to get your patients entered into the registry. The state requires patient data submission into the state registry (MN Trauma) within 60 days from discharge.

Audit Filters
Audit filters are tools that assist with monitoring the process of care relative to standards of care. There are a few state required filters. Use only those that apply to your hospital. Other filters are standards that you choose to work on. This is based on PI (See Chapter 4, Performance Improvement). Keep this to a manageable list, usually 3-5 site specific filters. As you review trauma patients, these PI filters offer a flag to dig deeper into the case to find issues and processes that have potential to improve. PI filters do not necessarily mean something is wrong or bad, it just offers the opportunity to find out more information.

Inclusion Criteria for Trauma Registry
Keep a copy of the state’s inclusion criteria close by as you begin looking for trauma patients. You may choose to review trauma patients for PI that do not meet state inclusion criteria. When you follow the algorithm and reach “not required”, that patient will not need to be entered into the registry. There will be times when you are not sure if a patient should be included or not sure how to interpret the criteria for a given situation. The state’s hospital designation coordinator or trauma coordinator are good resources in these circumstances.

Discordant Reports
Occasionally you may receive a discordant report. These are reports of patients that may have met inclusion criteria but did not get entered into the registry. Please review this list as you normally would look for inclusion criteria. If the patient does not meet criteria, they need to be entered into the registry. Once you’ve determined which patients need to be added and
complete the registry, reply to the sender of the discordant report with a list of patients entered and a list of patients that did not meet criteria. (Currently, the state of Minnesota has suspended this process but may reinstitute it in the future.)

**Organize Your Patient Tracking along with PI**
There are as many different ways of organizing your patient tracking and PI as there are trauma coordinators. Find a system that makes sense for you. Some use binders with paper copies, others use various spreadsheets. Organize it in a way that you can find anything you may be asked for and so that you know where you’re at with PI feedback and follow up items.

You will find two standardized state PI tracking worksheets, one for audit filters and one for individual events, available at the website noted above.

Experienced TCs and TMDs are a valuable resource. Many institutions use their trauma registry data to inform the leadership of trauma center activity and outcomes. Get involved in your regional advisory committee; this is the best way to get good advice, learn lessons and bounce ideas off other with more experience.

**Resources**

MNTRAUMA: [https://traumaregistry.mn.gov](https://traumaregistry.mn.gov)
- Video tutorials: These tutorials will walk you through the steps from entering a patient into the registry to creating reports. The MNTRAUMA Data Dictionary is also helpful to print off and have next to you as begin entering patients.
  - One common standard state report includes the percentage of data entered <60 days from discharge.
  - When viewing these tutorials consider what individual facility reports might be relevant for your trauma hospital.

ImageTrend: Registry classes and training are offered quarterly by ImageTrend, the vendor for MN Data.

Data Dictionary:  [http://www.health.state.mn.us/traumasystem/registry/datadictionary.pdf](http://www.health.state.mn.us/traumasystem/registry/datadictionary.pdf)

TraumaBase:  [http://c-d-m.com/products/traumabase-v9](http://c-d-m.com/products/traumabase-v9)
Some hospitals utilize TraumaBase for their registry. TraumaBase interfaces with MNTRAUMA and information is transferred to the state registry.

National Trauma Data Bank:  [https://www.ntdbdatacenter.com](https://www.ntdbdatacenter.com)
NTDB also has tutorials on their website.

Bleedingcontrol.org
Performance Improvement

All of the MN Department of Health forms and resources referred to below are available on the MN Dept of Health Website: [http://www.health.state.mn.us/traumasystem](http://www.health.state.mn.us/traumasystem)

**PI Background**

**What is Performance Improvement (PI)?**

- One way to improve patient care is by careful reflection of the events surrounding a patient encounter to ferret out details of the care that could have been improved upon.
- PI is a confidential systematic review and discussion of the trauma patients care with continuing monitoring of processes, systems, and the impact both have on outcomes.
- Trauma PI is time and data intensive
- Trauma PI is vital to the existence of your trauma program
  - Documents the quality and timeliness of trauma care you provide
  - Provides direction to improve the trauma care
- Includes multiple processes that will be described in this chapter.

**Why do PI in your trauma center?**

- PI is required by the state trauma system in order to be designated as a trauma center
- All trauma programs are quality programs so we must constantly strive to provide the best care to all injured patients
- The Rural Trauma Team Development Course (RTTDC) manual quote captures the concept very well: “Without a free and broad ranging review of its own outcomes, a hospital is doomed to keep performing at a potentially sub-optimal level.”
  - Don’t wait for something to go wrong…
- There are multiple opportunities for improvement in all level trauma centers. It is imperative we do not wait for a bad outcome to look for things we can do better. Consider Dr. Donald Jenkins’ football analogy: It is late in the fourth quarter and your team is down by 5 points. Your quarter back goes back to throw a pass. He is almost sacked several times but manages to get the pass off. Meanwhile the receiver forgets his route but manages to catch the ball on his fingertips while balancing on his toes on the sideline. TOUCHDOWN and your team wins the game, so outcome good. But the play certainly didn’t go as schemed: the offensive line allowed pressure on the quarterback, the receiver ran the wrong route, and the pass barely caught. The same concepts apply to trauma PI; there are many PI initiatives we can work on even when the outcome is good!
- Think of your PI process as occurring in phases (a full description follows)
  - Event Identification
  - Validation via Levels of Review
  - Discussion via Structured Committee Review
  - Action Plan Development
  - Implementation
  - Evaluation of Effect
  - Loop Closure

**Identification of PI Events for Review**

Potential sources include but are not limited to:

- Emergency Medical Services (EMS) documentation and medical record
- Compare care delivered to standards of care
- Did care follow your own practice management guidelines

- Feedback from providers – email, verbal
- For admitted patients – daily rounds
- Feedback from tertiary trauma centers
- Autopsies
  - Potential identification of missed injuries
  - Can be used to determine if appropriate lifesaving interventions were provided
  - Assist to accurately describe injuries in the trauma registry
- Reports from external agencies – as regional PI and data improves
- Audit filters - Measures that helps you focus your attention on specific, relevant events. An event does not mean there is a problem. Audit filters help focus on areas that may be problematic and give you a reason to review the care

**Tracking PI Activities**

It is important you have a consistent way to track what you and your team are doing from time of event identification to loop closure. You will find two standardized state PI tracking worksheets, one for audit filters and one for individual events, available on the MN Dept of Health website. This will also help you organize your PI materials to show to reviewers at your site visit. Make note of every conversation and email you sent related to a particular case, “Sent case 12459 to Dr. Jones for review 09-10-2014”.

**Levels of Review/Validation**

Level of Review Algorithm (*Appendix B*)

**Primary Review-typically done by TC or TPM**
- Goal of primary review is to identify and validate events
  - Responsibility of the TC or TPM
  - Validation of information is key – make sure and find out the specifics and the entire story
  - There are several courses of actions that may follow the primary review:
    - Resolution of the event/loop closed
    - As an example a patient is brought to your attention because of the audit filter “non-surgical admit”. Your chart review shows this was an elderly patient with a humerus fracture and the note clearly states patient would have been discharged but was admitted for social reasons only because there was no one at home to care for her and daughter would not arrive until the next day. Appropriate non-surgical admit as patient not being admitted for the injury. No concerns, loop closed, you document your review on the tracking form.
  - Another example: You get an email from an ED nurse that the trauma patient from last night was in the ED “for a long time” because the trauma center “wouldn’t take them right away.” After chart review you elect to call the TC/TPM at the trauma center in question. You find out that the neurosurgeon at the trauma center reviewed the head CT in order to make a determination regarding best plan of care. This delayed transfer acceptance by 15 minutes documented in the transfer note. The TC/TPM goes on to explain this decision making was critical prior to acceptance related to other trauma patients expected at the trauma center in the same time frame. This length of stay in the ED was appropriate. You document your chart review and discussion with the TC/TPM from the tertiary center on the tracking form.
• Refer the event on for TMD review
  • TMD reviews the case and directs if it should go to committee.
  • Your review indicates a need for further validation and triage of the event
• Continue to do period monitoring an event
  • You notice a temperature was not recorded on a trauma team activation patient. You have not seen this before. You would speak to the nurse involved to provide immediate feedback. As you do your future chart reviews take note of temperatures and if this becomes a trend you would take action.

Secondary Review
• Goal of secondary review is further investigation and triage of event.
  o Responsibility of TMD – physicians see things differently than nursing so you are getting another perspective on the event
  o There are several courses of actions that may follow the secondary review:
    ▪ Resolution of event/loop closed
      • As an example a TC chart review raises a concern because the ED length of stay (LOS) was > 60 minutes prior to transfer to definitive care. TMD reviews chart. Patient was activated because of mechanism of intrusion into passenger compartment > 18 inches. VSS. TMD determines need to scan appropriate due to stable vital signs and physical exam. Spleen laceration found on CT necessitated transfer. Care appropriate, no concerns, no further action required, loop closed and both reviews documented on tracking form.
    ▪ Referral for further review to specialty group (i.e. orthopedics), refer to multidisciplinary peer review committee (PI committee).
    ▪ Cases where care was questionable (patient did well but protocol not followed) should go to committee for discussion.

Tertiary Review
• This is a structured review by a group usually multi-disciplinary
• Goal of the tertiary review is to determine the best course of action to provide loop closure
• Will include Southern Minnesota Regional Trauma Advisory Committee (SMRTAC) regional PI as system matures
• Cases appropriate for committee review
  o All deaths
  o All transfers out
  o Unexpected outcomes
  o Review requested by trauma stakeholder
  o Sentinel events
  o System events
  o Policy/protocol non-compliance
  o Low volume populations such as pediatrics, pregnant women, burns
  o TMD must review cases and write brief statement and assign other reviewers (for their patients or when other disciplines are involved) to better inform the discussion at committee.
• There are several courses of action that may follow the tertiary review:
  o Mortality determination/judgment as with opportunities for improvement or without opportunities for improvement
    ▪ Mortality with opportunities for improvement: Provides a gross measure of individual or system errors that were evident in individual and aggregate cases.
• Mortality without opportunities for improvement: Provides a gross measure of in which no individual or system errors identified in individual or aggregate cases.
  o Corrective action plan is initiated – explained in detail under Action Plan Development in this section.

Meeting Structure
• TMD must review charts with TC/TPM to assure quality care and event identification.
• The trauma program is required to have a forum in which all trauma deaths and other events are reviewed and discussed.
• TMD chairs this committee and must assure attendance requirements are met.
• The actual structure of how this will be operationalized is left up to each trauma center.
• One option is a physician peer review committee to review provider related events → corrective actions and judgments are referred to trauma program leadership→ this should be chaired by the TMD
• In centers where there is a separate physician PI meeting, there should also be a multi-disciplinary PI meeting to review all identified events. Attendees should include as applicable:
  o Emergency Department (physician and nursing) Representatives
  o Radiology representative
  o EMS
  o NP/PA’s involved in trauma care
  o Social Services
  o TMD and TC
  o Administration
  o Trauma Registrar
  o Surgeons
  o Orthopedic Representative
  o Anesthesia Representative
  o ICU Representative
  o Pediatrics
  o Rehab Specialists
• The other option is to have one multi-disciplinary meeting in which all PI events are reviewed, discussed and action plans are developed as necessary.
• All information presented at trauma PI meetings is confidential and protected by MN Peer Review Statute.
• Attendance should be recorded for each meeting to so that all disciplines are involved.
• Minutes from trauma PI meetings should be written carefully but document a candid discussion and action planning activities that will follow based upon the discussion
• A sample PI meeting minutes and completed PI tracking log can be found on the Department of Health website

Action Plan Development
Once an opportunity for improvement is identified through your PI process, appropriate action must be taken to prevent similar future adverse events.

As you work on the action plan ties to a specific event you and your team should always have this key concept in mind:

Future similar patients are less likely to have this outcome because…
Next time the same situation occurs the outcome will be different because...

TMD must be involved in all states of action plan, development and implementation and put a plan in place to assure compliance.

Think of your action plan as phases:
- Mitigation strategies to address event
- Implementation
- Evaluation of effect
- Loop closure

Sometimes your action plan will require more than one corrective action.
Examples of corrective actions:
- Guideline/protocol development
- PI team project
- Education
- System enhancements
- Remediation/counseling
- External review

**Guideline/Protocol Development**
- Goal of a practice management guideline (PMG) is to decrease variation in practice by following established standards of care.
- Can be clinical or administrative
  - Clinical → Anti-coagulation Reversal
  - Administrative → Trauma Call Expectations
- Should be evidence based
- Best if drafted with input from appropriate stakeholders
  - If it is determined at your PI meeting a PMG should be developed related to clinical clearance of c-spines, you should include ED providers, orthopedics if appropriate, perhaps even EMS depending on your system
- Do not re-invent the wheel. Chances are high that if your trauma center needs a PMG about a topic others have also. Use available resources to find what others have developed and use that as a starting point. Some of your available resources for PMG’s include:
  - Contact the TC at the Level 1 or 2 trauma center that is your major referral center
  - If you are part of a healthcare system contact your colleagues there
  - Various professional organizations share best practice guidelines on their websites.
    - American College of Emergency Physicians – [www.acep.org](http://www.acep.org)
    - Brain Trauma Foundation – [www.braintrauma.org](http://www.braintrauma.org)
    - Eastern Association for the Surgery of Trauma – [www.east.org](http://www.east.org)
    - Pediatric Trauma Society – [www.pediatrictraumasociety.org](http://www.pediatrictraumasociety.org)
    - SMRTAC – [www.smrtac.org](http://www.smrtac.org)
    - Western Trauma Association – [www.westerntraumaassociation.org](http://www.westerntraumaassociation.org)
  - Ask a question on a listserv like Society of Trauma Nurses [www.traumanurse.org](http://www.traumanurse.org)
    - If you are not a member seek someone who is and can ask the question for you
- Elicit feedback from all stakeholders prior to seeking approval from committee
• Remember that simply creating and approving a PMG does not mean you have achieved loop closure
• All PMG’s must be monitored for compliance and achievement of desired outcome – why did you create the PMG
  o For example over the past 6 months your PI process identified an increase in poor outcomes for major trauma patients transferred from your hospital to the Level 1 trauma center and internal review attributed this to variation in resuscitation practice including late blood administration. As part of your action plan a guideline for Initial Management of Major Trauma was developed to include early blood administration. Monitoring would include:
    ▪ Outcomes → rate of poor outcomes decreases, decrease in time from identification of shock to blood administration
    ▪ Processes → 100% compliance with ED education regarding PMG
• Frequency of monitoring will depend on volume → if low volume occurrence can review each case
• For more frequent occurrences helpful to look at data in aggregate

PI Team Project
• Workgroup of stakeholders to work on specific issue, usually less urgent but still important
• Must have oversight by trauma center leadership. TMD must act as champion.
• Use available data to determine effectiveness of suggested changes
  o For example it is noted that frequently there is no temperature documented on the trauma flow sheet and nurses are not utilizing warming measures consistently. A workgroup of ED nurses with an interest in trauma is formed to try to improve this problem. They use chart review to look at documentation of temperatures, use of warming measures and temperature of the patient at first destination from the ED. After solutions are implemented the same metrics will be used to determine success.

Education
• Invite a speaker to present on area of identified knowledge deficit
• Address need at nursing competencies
  o For example case review demonstrated a knowledge/comfort deficit with pediatric medication dosing. Every ED nurse as part of annual competencies was required to take a medication test and return demonstration pediatric drug calculations and dosing.
• Ensure communication regarding new PMG’s Yon can create a fantastic PMG but if no one is aware it will not be successful.
• On-line education
• Newsletters
• Conferences

System Enhancements
• TMD must be champion.
• Resources (staff, support staff, equipment, drugs)
  o Equipment example is implementation of StO2 monitoring regionally and use of tourniquets statewide
  o For example the state site review at your visit identifies the TC needs more dedicated time for trauma
  o Perhaps a delay in care is identified because mannitol is not available in the ED and has to come from pharmacy – develop a system to ensure needed drugs are available for the team
Child had a bad outcome because no pediatric ETT was available in the ED – implement the Length Based Resuscitation Tape (ex. Broselow system)

- Facilities
  - For example the site reviewers identify a safety concern because helicopters cannot land at your hospital. You create a process by which part of the parking lot is made into a helipad to mitigate the safety concern
- Communication
  - Any change to improve all forms of communication

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

**External Review**
- Especially with a small staff sometimes it is helpful to have an outside provider review a case to ensure objectivity.
- The resources at the tertiary care centers where you refer your patients (i.e. level 1 and 2 trauma centers) can help with this review.
- Your trauma site visit will also provide an external review of your care and processes.
- Other hospitals within your healthcare system.
- The SMRTAC PI subcommittee can also provide an external review. Reference the SMRTAC PI Subcommittee Case Review Request (Appendix C)

**Loop Closure/Event Resolution**
Closure refers to the ability of your trauma program to show you have resolved an identified event. Loop refers to the cycle of monitoring, identifying, resolving and monitoring again. Your resolution should address the key aspects of the problem. In laymen’s terms “We have solved the problem and here is the proof”. Remember that some loops take a long time to close. Remember that some loops may never be closed. To assure loop closure, TC/TPM and TMD should take “data” to trauma committee.

Here is an example of how loop closure might look in your trauma center:
- A 4 year old presents after being thrown from an ATV
- Found to have significant head injury and abdominal injury
- Transferred to an adult only level 2 trauma center
- Transferred from ED of level 2 center to pediatric level 1 trauma center after 60 minutes for pediatric neurosurgery unavailable at level 2 center
- Event identification → double transfer leading to delay to definitive care
- Action plan → TMD to TMD phone call to discuss transfer, development of guideline outlining injuries that should be triaged directly to a pediatric trauma center, provider conference with speaker from pediatric trauma center to present cases
- Monitoring → secure documentation of phone call discussion points, record attendance of providers at education, review next pediatric trauma activations for compliance with new guideline
- Loop Closure → The next severely injured children that present following implementation of guideline are transferred directly to pediatric trauma center
- Event is now resolved but monitoring should be on-going

Resources
- Never hesitate to call the TC at the level 1 or 2 trauma center that serves as your major referral center. All are well versed in PI and the PI process and will be more than willing to help answer any question you may have.
- There are also several on-line resources that might be helpful:
  - MN Trauma System
    - [http://www.health.state.mn.us/traumasystem/](http://www.health.state.mn.us/traumasystem/)
  - ACS Committee on Trauma
    - [www.facs.org/trauma](http://www.facs.org/trauma)
- Practice Management Guideline, SMRTAC Sample (*Appendix D*)
- Practice Management Guideline, Template (*Appendix E*) link on SMRTAC website?
- Trauma Center Newsletter devoted to trauma PI:

  **Subscribe to Mayo Clinic Trauma Centers E-Newsletter**
  1. [www.mayo clinic.org](http://www.mayo clinic.org)
  2. For Medical Professionals—Publications
  3. Right column *Email Newsletters for physicians*
  4. Trauma Physician Update e-Edition
It is essential that your trauma program is following accepted, evidenced based and most current trauma care standards. The professional organizations listed below offer a repository of valuable information.

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<tr>
<th>Source</th>
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<td><a href="http://www.acep.org">www.acep.org</a></td>
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<td>Regional Practice Management Guidelines</td>
<td>Southern Minnesota Regional Trauma Advisory Committee <a href="http://www.smrtac.org">www.smrtac.org</a></td>
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<td>Society of Trauma Nurses</td>
<td><a href="http://www.traumanurse.org">www.traumanurse.org</a></td>
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<td>Substance Abuse &amp; Mental Health Service Administration</td>
<td><a href="http://www.samhsa.gov">www.samhsa.gov</a></td>
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<td>Western Trauma Association</td>
<td><a href="http://www.westerntraumaassociation.org">www.westerntraumaassociation.org</a></td>
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<td>Stop the Bleed</td>
<td>Bleedingcontrol.org</td>
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Emergency Preparedness

Emergency Preparedness is a general term used to describe the way in which hospitals and local governments plan to address community health care needs when unusual circumstances develop. Most often within the hospital setting we plan for multi-casualty or mass casualty events.

**Multi-casualty event:** Multiple victims that the hospital is able to manage with local resources

**Mass casualty event:** The number, severity, or diversity of injuries overwhelms the local resources. This will vary from community to community. In a level 4 trauma center a MVC with 4 critically injured victims including 2 children could trigger a mass casualty event.

In either type of event there is potential for significant impact to any level trauma center. When mass casualties are associated with a disaster of any sort, a tremendous burden is placed on communities to minimize mortality, injury and destruction of property. All level trauma centers have a special obligation to participate in disaster preparation and management. Proper preparation and planning enable communities faced with disaster and mass casualty events to address devastation and death. The role of the trauma center in the preparation for and management of such events is critical.

Emergency Preparedness planning requires a cooperative multidisciplinary effort by local medical resources, area law enforcement, fire departments, County Emergency Management, and other identified entities in a specific jurisdiction. Local, regional, and national government resources should be identified and contact information identified so it is easily accessible when needed. Disaster drills planned by the multidisciplinary group enhance working relationships between agencies.

The Joint Commission for the Accreditation of Hospital Organizations (JCAHO) recognizes the importance of emergency preparedness. The Joint Commission requires accredited health care organizations to plan for a disaster. The organization must plan with the assumption that their local community would be compromised and they would need to be self-sufficient for up to 96 hours. Hospitals must develop an Emergency Operations Plan and twice per year they must conduct emergency response exercises coordinated with their community to evaluate the effectiveness of their plan. Its standards provide a framework for comprehensive emergency management. The standards require organizations to identify the potential emergencies that could affect them, and develop a plan that addresses the four phases of emergency management activities: mitigation, preparedness, response, and recovery. Emergency management plans must also address command structures, backup communications systems, building evacuations, and coordination with other community health care organizations and emergency responders.

**How to get started**

1. Find your hospitals disaster plan and review it
2. If areas of opportunity or threats are identified created a work plan to address them
3. Review findings from your hospitals last disaster drill and how issues were addressed
   a. You can build your next drill to test the solutions implemented
4. Identify your community partners in disaster management:
a. Local fire department chief
b. Local police chief and/or county sheriff
c. Local EMS director
d. Other nearby trauma centers
e. RTAC resources
f. Aero-medical transport agencies

5. Reach out to other TC's or regional contacts to help you in this process
6. Remember a drill does not need to be huge to effectively test your processes. Invite experts from your region to observe the drill. An objective pair of eyes provides great information.

Emergency Preparedness Drills
The standards related to disaster drill exercises are listed below:
• Standard 1 – the hospital tests its Emergency Operations Plan twice a year, either in response to an actual emergency or in a planned exercise.
• Standard 2 - hospitals that offer emergency services or are community-designated disaster receiving stations conduct at least one exercise a year that includes an influx of actual or simulated patients.
• Standard 3 - At least one exercise a year is escalated to evaluate how effectively the organization performs when it cannot be supported by the local community. Need to work with community partners.
• Standard 4 - Must also incorporate clinics into hospital disaster plans. Must have one clinic drill per year at each offsite clinic. If clinic attached to hospital, it can be incorporated into any hospital drill.

Resources
JCAHO Emergency Preparedness resources can be found at the following website:
http://www.disasterpreparation.net/resources.html

Minnesota Department of Health (MDH) Office of Emergency Preparedness
MDS has many resources for Emergency Preparedness. Phone 651-201-5700 for questions. http://www.health.state.mn.us/macros/topics/emergency.html
Emergency Blood Release / Massive Blood Transfusion

Patient mortality rates following trauma typically follow a trimodal distribution. The first phase includes those patients who die within minutes of injury. The usual causes for this are severe head injury, spinal cord injury, aortic injury or other areas of exsanguination. The second time period occurs within a few hours. Included in these cases are patients who are hemorrhaging. In those cases, patients are saved and kept from secondary injury through rapid recognition of shock, stopping the bleeding, and replacement of blood volume/products. Evidence has shown that a patient who arrives in your ED with a systolic BP less than 90 or age specific for pediatrics a 50% chance of dying. 50% of those patients who do not have this management (recognition of shock, bleeding control, replacement of blood volume) performed within 30 minutes of arrival will die.

To provide optimal care for the seriously injured your hospital must have a way to expeditiously transfuse blood to a hemorrhaging patient. The way to make this a reality is to have an emergency blood release policy/protocol that allows for 0-negative blood to be given without delay. If you work at a hospital that has red cells and plasma you can create a massive blood transfusion policy/protocol that clearly states how a patient will be transfused until transferred to definitive care.

Emergency Blood Release (EBR)

- Steps in creating an EBR policy/protocol
  - Inquire if a policy/protocol already exists at your facility. If it does, discuss with your TMD to see if there have been any issues with the protocol.
    - If no issues make certain EBR is captured in your trauma registry as a data element
  - If there is no current policy discuss with your TMD the need to create one
    - If you are part of a hospital system, see if other facilities already have an EBR. This will be extremely helpful in getting this through at your hospital
    - Meet with lab/blood bank personnel to work in collaboration in creation of the policy
    - Lab/blood bank have extremely strict transfusion rules that come from the FDA and other safety organizations. You must acknowledge these when you meet with them. Do not try to ask them to throw out any rules. There are ways to follow the rules and still provide blood in a timely manner
    - The blood bank is going to need some form of patient identifier to hang blood. Having a name, birthdate, and other common identifiers is often not possible in these situations (patients are unconscious). Develop some type of unidentified patient system.
      - Jane Doe and John Doe common in many centers
      - Will also need some unique number associated with the name
      - Have a way to identify a pediatric patient. Examples, baby Jane Doe, toddler John Doe, etc.
    - Decide on the paperwork. You must have a process that doesn’t require a physician to stop life-saving procedures to sign a form. Blood Bank needs to work with you on that.
- Decide who is going to bring the blood to the patient. In smaller facilities this can be tough. The ED is busy with the patient and the Blood Bank is busy with getting you blood. Collaborate
- Make certain EBR is captured in your trauma registry as a data element. These instances should be reviewed through the PI process.
  - Low volume/high risk instances
  - Any issues getting the blood to the patient?
  - Was EBR order appropriate?
  - These are good cases to bring to your multidisciplinary trauma review committee. Invite the Blood Bank.

**Massive Blood Transfusion (MBT)**
- If the only blood products available at your hospital are red cells you do not need a MBT protocol. You need an EBR protocol. However, patients who are hemorrhaging need more than red cells. When creating your EBR protocol include how you will get the other products to the patient.
  - Some helicopter services now carry red cells and plasma. Plasma is life-saving. Get it to your patient as soon as possible however possible.
- If you have red cells and plasma readily available at your hospital then you should create a MBT. The Massive Blood Transfusion Policy/Protocol states how to give blood products and standard lab tests that are drawn during the resuscitation. The goal of transfusion is 1:1 – 1 RBC:1 Plasma [one red: one white].
  - If you are part of a hospital system, see if other facilities already have a MBT. This will be extremely helpful in getting this accepted at your hospital.
  - If you are not part of a hospital system reach out to established trauma centers and work with their TC in the creation of this document. Your TMD may have contacts at the facility where he/she trained which also helps in creating this process.
- Make certain EBR is captured in your trauma registry as a data element. These instances should be reviewed through the PI process.
  - Low volume/high risk patients/process
  - Any issues getting the blood to the patient?
  - Was EBR order appropriate?
  - These are good cases to bring to your multidisciplinary trauma review committee. Invite the Blood Bank.
All members of the trauma team must be able to demonstrate proper training related to the care of injured patients. The minimum educational requirements are determined by the State Trauma System. Additional trauma education beyond the minimum is strongly encouraged.

**Physician Educational Requirements**
- [www.health.state.mn.us/traumasystem](http://www.health.state.mn.us/traumasystem)
- It is desirable but not required that the TMD participate in PI training

**RN/LPN/Allied Health Education Requirements**
- [www.health.state.mn.us/traumasystem](http://www.health.state.mn.us/traumasystem)
- In addition, the TC must show evidence of educational preparation and clinical experience in the care of injured patients.
- It is desirable but not required that the TC participate in PI training.

**Trauma Registrars**
- People who are responsible for data entry into the trauma registry should receive initial training. Appropriate education may include attending a Trauma Registrars course, a data entry course offered by the state trauma system, or on-line tutorials from the software vendor.

**Educational Opportunities**

**Advanced Trauma Life Support (ATLS)**
ATLS provides participants with a safe and reliable method for the immediate treatment of injured patients and the basic knowledge to assess the patient rapidly, resuscitate and stabilize according to the priorities of airway, breathing, and circulation (ATLS Course Manual 9th Edition). ATLS concepts are the gold standard by which trauma care is measured. Courses are taught by ACS verified trauma centers with limited availability in rural locations. Additional information is available on the ACS website.

**Advanced Trauma Care for Nurses (ATCN)**
ATCN is an advanced course designed for the registered nurse interested in increasing his/her knowledge in the management of the multi-trauma patient. This course is taught concurrently with ATLS. Additional information is available on the STN website.

**Rochester Trauma Center Administrative Office**
507-538-3740

**Comprehensive Advanced Life Support (CALS)**
CALS is an educational program designed specifically for the emergency medical training needs of rural healthcare teams. CALS combines the concepts contained in many of the other advanced life support courses, providing a customizable, team-based training program uniquely suited for resource-constrained environments. For CALS to meet the MN Trauma System educational requirements, the benchmark lab or additional trauma module must be completed also. Additional information is available on the CALS website.

**Performance Improvement Forums for Level III and IV Centers**
These forums are sponsored by SMRTAC in collaboration with regional performance improvement experts focusing on building a strong effective performance improvement
program at Level III and Level IV trauma centers. There are currently a series of 6 seminars available. Contact: Rochester Trauma Center Administrative Office at 507-538-3740.

**Rural Trauma Team Development Course (RTTDC)**
The Rural Trauma Team Development Course (RTTDC) emphasizes a team approach to the initial evaluation and resuscitation of the trauma patient. Course dates are available on the American College of Surgeons website or contact Rochester Trauma Center Administrative Office at 507-538-3740.

**Trauma Nursing Core Course (TNCC)**
TNCC presents core level knowledge, refinement of skills, and facilitates building a firm foundation in trauma nursing. Intended participants are RNs who care for trauma patients. Other disciplines (EMS and LPN) may audit this course. TNCC meets the requirements for MN Trauma System nursing education. More information is available on the ENA website or MN ENA.

**Trauma Outcomes Performance Improvement Course (TOPIC)**
TOPIC is designed to provide all disciplines regardless of level of expertise with practical information on how to operationalize a trauma Performance Improvement and Patient Safety (PIPS) Program. Lecture and practical application of concepts taught round out the learning experience. Additional information is available on the STN website.
Preparing for Trauma Designation Site Visit

Overview
The trauma designation process is a quality program aimed at assuring seriously injured patients receive the best care possible based on the resources available at a given hospital. This process requires the commitment and support of hospital administration, physicians, and allied health partners. Allow at least one year to prepare for a site visit as designation requirements include a reporting period of one year.

The site reviewers will compare the components of your trauma program with those required for your chosen level of trauma care. These components are considered minimum standards. A complete list of these requirements is located on the Minnesota Trauma System Website.

This section will focus on those hospitals undergoing site review by the State of Minnesota. TC from facilities seeking review by the American College of Surgeons are encouraged to contact the TC from Level 1 facilities in your region.

Listed below are the steps involved in preparing for your hospital’s site visit.

One year prior to the visit
1. Meet with TMD/Advisor and hospital leadership to review all which follows
2. Decide the level of designation for which your hospital will apply
   a. The level of designation is determined by the resources at your hospital. It has no bearing on the quality of care given. (See Level Definitions in Chapter One, Introduction)
   b. Level 1 and Level 2 trauma centers are designated by the American College of Surgeons
   c. Level III trauma centers can be designated by either the American College of Surgeons or the State of Minnesota. Most Level III centers in Minnesota are designated by the state.
   d. Level IV trauma centers are designated by the State of Minnesota

Consider contacting the State Hospital Designation Coordinator early on to discuss your site visit and the level your hospital should consider for designation.

Consider contacting an experienced TPM/Coordinator at a hospital in your region or affiliated with your hospital system as a mentor through this process.

3. Contact one of the MDH designation coordinators regarding access to the electronic application. Locate the appropriate designation (Level III or Level IV) Work Plan located on the State of Minnesota’s Statewide Trauma Systems website.
a. Complete the Online application inserting the names of the responsible person in each area and a targeted date.

4. Review the electronic application that will be submitted by your facility to familiarize yourself with the materials needed to submit with the application.

5. Use the resources located in the Trauma Hospital’s Resource Manual on the Minnesota state website for needed administrative documents, job descriptions, trauma resuscitation record template, registry information, and performance improvement documents. Performance Improvement is covered in greater detail in Chapter 4 of this manual.

6. Establish your trauma team, trauma team activation criteria, and trauma response policy.

7. Establish your Trauma Committees. You need a Multidisciplinary Trauma Review Committee (sometimes called Trauma Operations, Trauma Systems, or simply Trauma Committee) made up of physicians and allied health personnel to review cases and/or events. This committee often looks at systems and processes. You also need a Morbidity and Mortality Review committee. This is composed of all physicians who care for trauma patients. This group will review all patient deaths, problematic cases, and any other physician event identified by the TMD. (Refer to the Minnesota Trauma Website)
   a. Small hospitals can combine these meetings with other established committee meetings. Example, ED Department meeting could be Multidisciplinary Trauma Review.
   b. How often meetings occur depends on size of institution and number of trauma patients. Each should occur quarterly at a minimum.
   c. Each committee should have attendance requirements. You will need to include these in your application to the state for trauma designation.

8. The main focus of the site visit will be Performance Improvement. The reviewers will look at patient charts and look to see care rendered at your hospital reflects principles of Advanced Trauma Life Support (ATLS), Rural Trauma Team Development Course (RTTDC), Trauma Nursing Core Course (TNCC), and other trauma standards. You will need to have established audit filters and reviewed each trauma patient record (Refer to Chapter 3, Data Collection) to see if any audit filter was triggered. An audit filter does not mean inadequate care was provided. It is a cue that a record needs to be reviewed with critical eyes to see if the care given was appropriate. You will need a record of every audit filter that was triggered and the PI activity that accompanied the review. The forms on the Minnesota State Website are easy to use and provide everything you need to document PI activities.

9. Assure all members of the trauma team have the required trauma education. TMD needs to be involved and Hospital Administration must back them up.
   a. Physicians – ATLS or CALS if not board certified in Emergency Medicine or General Surgery.
   b. Nurses – TNCC, CALS, ATCN, or In-house training (Refer to the Minnesota Trauma Website – RN trauma education). This includes RNs working in ICUs in Level III centers
   c. Licensed Practical Nurses – Need trauma education if working in ED or ICU. (Refer to the Minnesota Trauma Website – LPN trauma education)
10. Gather transfer agreements with the tertiary care facilities to which you generally refer your patients. Level I hospitals will have capabilities for hemodialysis and acute spinal cord injury care. Some Level II centers will as well. You will need a transfer agreement with two burn centers. Hennepin County Medical Center and Regions Hospital would be the burn center referral hospitals for the SMRTAC region.

11. Begin entering patients into the trauma registry. Patient data should be completely entered within 60 days of discharge from your hospital.
   a. Consider delegating trauma registry duties to someone else. Possibilities include medical records, QI department, ED or ICU staff nurse, etc. Assure proper training.

12. Look at injury prevention activities. The number of these will depend on the size of your facility and the number of resources you have. (Refer to Chapter 13, Injury Prevention)


Six months prior to the visit
14. Continue performance improvement activities
   a. Daily review of cases
   b. PI reviews at committee
   c. Getting to “Loop Closure” on identified events
   d. Entering registry cases

15. Continue completing education requirements
   a. Common reason hospitals do not pass initial designation is failure to have all trauma team members current in educational requirements

16. Complete and submit the trauma application. You will designate your “reporting year” on this application. Have this timeframe end no sooner than 3 months prior to your visit so you have time to prepare all of your materials for the site reviewers

17. Meet with TMD and strategize on problem areas

Three months prior to the visit
18. Work with state designation coordinator to correct any events/gaps found in the application

19. Schedule your site visit (this will be done by the state hospital designation coordinator).

20. Reserve a room large enough to accommodate your hospital administrator, TMD, three site reviewers, nursing administrator, and any others who may attend the meeting.

21. Block calendars on the above people. At a minimum your TMD/Advisor and hospital administrator need to be available for the site reviewers. The medical director should be available the entire day. The administrator during the exit interview at a minimum

22. Every chart to be available for review by designation team from the state must be reviewed by the TMD/Advisor. One obvious shortcoming of a trauma center is having the reviewers “discover” events in your charts that you did not find. It is expected that there will be opportunities for improvement (no one is perfect). The reviewers care mostly that you found and addressed those opportunities.
23. Assure a room large enough to accommodate chart review for two site reviewers. Assure two people highly experienced in navigating the EMR are available (one for each reviewer).

24. TMD/Advisor should be reviewing charts and identifying any areas for improvement in care.

**One month prior to visit**

25. Request letter of RTAC participation from SMRTAC at www.smrtac.org

26. Pull charts for the site reviewers. Cases should be identified through the trauma registry and placed in the following categories:
   a. Deaths
   b. Trauma Team Activation Patients
   c. Transfers out
   d. Trauma patients admitted by non-surgeon (Level III and Level IV centers)
   e. Trauma care provided by NPs/PAs (Level IV)

   A record should not be in more than one category. For example, if you have a patient death that was admitted by a non-surgeon it would go in the death pile only.

27. For each case – print the following:
   a. ED record (trauma flow sheet if used)
   b. Ambulance record
   c. ED provider note
   d. Surgeon note (Level III and Level IV only)
   e. All PI minutes, forms, etc. showing reviews for each record

28. Create a report to give the site reviewers about your trauma program. Power Point works well. Include the following information:
   a. Trauma volumes, deaths, transfers out, ED volumes.
   b. General information about your hospital (specialty services, catchment area, medical staff, etc.)
   c. Ambulance services
   d. Information on your Multidisciplinary Committee and Peer Review (who is on each, how often each committee meets, attendance requirements, etc.)
   e. PI process – how events are identified, how they are reviewed, how loop closure is achieved
   f. Re-designation visit – How opportunities identified at last visit have been addressed.

29. TMD/Advisor must be familiar with all charts and associated PI. Block calendar as needed for review of charts.

**One week prior to the visit**

30. Assure all charts have been pulled and in order.
   a. Review each case. You will want to be familiar with them.

31. Assure one person who is experienced in navigating the EMR is available for each site reviewer the day of the review.

32. Assure no last minute meetings have been put on the TMD’s or administrator’s calendars.

33. Schedule something special just for you.
34. Schedule an after site visit “debriefing” for your trauma team. (Restaurant, party, etc.)
35. TMD must be flexible and available to address any last minute concerns

**Day of visit**
36. Greet site reviewers and state hospital designation coordinator at a mutually agreed upon location.
37. **SHOW OFF YOUR PROGRAM!**
   a. You have just spent a year preparing for this day. Show off what you have done!
38. The site reviewers will offer advice based on their experience as trauma providers. Listen to them. They are really there to help.
39. The tour of the hospital will follow the path of the patient. The reviewers will look at the ambulance bay, ED trauma bay, lab, radiology, OR, ICU, helipad. On the Minnesota Trauma System website look under site reviewers resources, then Tour checklist. Here you will see everything the reviewers need to find during the hospital tour. Much of this is equipment in the ED. (Refer to Chapter 11, Equipment)
40. Expect at least two hours for chart review. You will be asked questions about the patients and/or PI. Having the PI sheets with the records will make everyone’s job easier.
41. The hospital designation coordinator will go over your PI process. Be prepared to speak to how you review cases and bring things to loop closure.
42. The site reviewers will take about 30 minutes after chart reviews to summarize their findings. You will be given a time for the exit interview.
43. During the exit interview expect to hear strengths of your program and opportunities for improvement. Having administration present to hear about these opportunities directly from the site reviewers is powerful. Get them there!

**Visit is over**
44. Attend your “debriefing” session.
45. Take time off! Re-acquaint yourself with your family!
46. Pat yourself on the back for a job well done.
47. Update SMRTAC on your designation.
**Working Relationships**

The TC and the TMD share the responsibility for the success of their trauma team. Like all partnerships, the TC/TMD must support each other, share a common vision, and mutually respect each other and the members of their team. They must be relentless in their pursuit of excellence, resilient in their discovery of failures and human behaviors, and fearless in their speaking of the truth. Each report to a different hierarchy, but both share the burden of ensuring quality trauma care. The relationship of the TMD to the TC is like a marriage, each party has to give and take to make it work. There are good times, full of triumphs, and bad times, filled with conflicts and disappointments. Maintaining mutual respect smooth’s out the bumps and helps the dynamic duo succeed.

The clear delineation of roles and responsibilities is crucial from the outset. Boundaries, timelines and working relationships need to be defined and discussed candidly. The logistics of accomplishing the work need to be honestly assessed and assigned. How you work together as a team, who is accountable for what, and the best means of communicating (phone, email, in-person meetings) are important aspects of your relationship building. Your TMD should be an ally, not the enemy. Never surprise them or ambush them in a meeting. Have difficult conversations in private. And, establish a pool of common values, “we are on the same side—that of the trauma patient. “The TMD has the difficult responsibility in holding the medical staff accountable for their performance as well as setting the tone for the trauma center. It is comparable to herding cats at times. (Sometimes, cookies help bribe your partner or your committee members)

Sample Medical Director Job Description: (As taken from the Minnesota Statewide Trauma System, MN Department of Health website. Not all areas will be relevant to Level IV programs. The TC/TMD at the Level IV facility should work together to modify this job description is a decision is made to use it) :

**“Nature and scope -** The TMD is responsible for the ongoing development, growth and oversight/authority of the Trauma Program. He/she must be able to demonstrate effective interpersonal skills and an understanding of the interdependent roles of various allied health professions. The TMD is responsible for promoting high standards of practice through development of trauma policies, protocols and practice guidelines; participating in rigorous performance improvement monitoring; resident and staff education and trauma research. He/she has authority to act on all trauma performance improvement and administrative events and critically review trauma deaths and complications that occur within the hospital. Decisions affecting the care of trauma patients will not be made without the knowledge, input and approval of the TMD."

**Principal Duties and Responsibilities**

**Administration**

- Participate in the research, development and writing of trauma policies, protocols and practice guidelines.
- Implement all trauma program policies and procedures as they pertain to patient care.
- Organize, direct and integrate the trauma program with all other departments and services within the hospital.
- Promote a cooperative and collaborative working environment among the clinical disciplines involved in trauma care.
• Maintain an effective working relationship with the medical staff, trauma service staff, administration and other departments.
• Provide advice and direction in recommending privileges for the trauma service.
• Participate in trauma program marketing activities.
• Establish a physician case management process that fosters cost-effective, high quality patient care.
• Assesses need for equipment, supplies, budget
• Assist the TC in developing and meeting the trauma program budgetary goals.

Program Initiatives
• Lead efforts to develop and maintain a trauma center.
• Collaborate with the TC to establish trauma program goals and objectives consistent with those of the hospital and ensure that those of the trauma program are being met.
• Develop and provide input on the development and maintenance of practice guidelines, policies and methodologies for medical/surgical trauma care.
• Participate in site review by regulatory agencies.
• Organize, direct and implement departmental practices to assure continued compliance with applicable laws including the guidelines established by the Statewide Trauma System and the Joint Commission on Accreditation of Hospitals.
• Demonstrate positive interpersonal relationship with colleagues, referral physicians, hospital personnel, and patients/families in order to achieve maximum operational effectiveness and customer satisfaction.
• Assure transfer agreements in place and in good standing; maintain relationship with receiving facilities, foster collaborative relationship.
• Make appropriate referrals for specialty services and communicate regularly with referring physician as appropriate.
• Assume clinical responsibility for all trauma patients.
• Ensure that adequate attending physician availability is provided to render care to trauma patients.
• Ensure establishment of physician/surgeon call schedules for all trauma care, excluding those who do not meet educational and credentialing requirements.
• Provide trauma care leadership and consultation for emergency, surgery and intensive care unit departments.
• Participate in regional and statewide activities affecting the trauma program.
• Attend local and national meetings and conferences to remain current regarding issues relevant to the performance of duties.
• Demonstrate consistent, efficient, cost effective and quality trauma care at all times.
• Participate in trauma patient/family satisfaction projects as developed by hospital.

Performance Improvement
• Determine and implement PI activities appropriate to the trauma program.
• Oversee the trauma PI program and participate in other quality initiatives that deal with the care of injured patients.
• Review and investigate all trauma PI inquiries in collaboration with the TC and refer to the appropriate committees.
• Monitor compliance with trauma treatment guidelines, policies and protocols.
• Assure that the quality and appropriateness of patient care are monitored and evaluated and that appropriate actions based on findings are taken on a consistent basis.
• Report quality of care events promptly to appropriate individuals, including TC and hospital administration.
• Identify and correct deficiencies in trauma care policies, guidelines and protocols.
• Consult with appropriate medical staff and administration regarding quality care events and adverse outcomes; identify areas to improve patient care.
• Assure that continuum of care is maintained.
• Identify representatives from various disciplines appropriate to participate in PI activities.
• Coordinate, schedule and facilitate the PI peer review process.
• Chair the Morbidity and Mortality Committee meeting and the Multidisciplinary Trauma Conference.
• Review all trauma-related peer review and initiate action as necessary.
• Assist the TC in evaluating the effectiveness of corrective actions resulting from PI processes.
• Assume responsibility for the accuracy and validity of trauma statistics.

Clinical Education
• Support the requirements for trauma CME by participating and assisting in the education and training of hospital personnel physicians and specialists.
• Provide education for hospital staff regarding trauma program policies and appropriate medical practices.

Community Outreach
• Maintain relations with community organization and legislative bodies whose activities relate to trauma care and injury prevention
• Participate in hospital outreach activities as may be requested by administration.
• Develop and participate in trauma community education and injury prevention activities.
• Function as a liaison to other hospitals within the region.

Knowledge and Skill
• Lead the hospital in program development.
• Oversee the clinical practice of medical staff.
• Analyze and interpret complicated information.
• Determines a course of action based on research, data, standards of care and general guidelines/protocols.
• Communicate effectively with a wide variety of intra- and inter-facility staff and administration using both oral and written communication.
• Possess critical thinking, analytical, teaching/coaching and research skills
• Overseer, participate in and develop projects that ensure the cost-effectiveness of care provided by physicians and hospital.

Networking resources for TMDs
• The American College of Surgeons
• Regional Level 1 and 2 TMDs
• SMRTAC Coordinator
• State Trauma Coordinator or Hospital Designation Coordinators (who can help find a colleague to assist)
HAVING THE PROPER EQUIPMENT IS A MUST

To be part of a designated trauma center you need to have the required and necessary equipment to care for trauma patients of any age. Equipment lists can be found on the Minnesota State wide Trauma System website.

In order to assist trauma hospitals to care for children more effectively, the Emergency Medical Services for Children Resource Center of Minnesota (MN-EMSC) has a recommended list. Refer to Recommended Pediatric Equipment Checklist (*Appendix F*).

It is not only important to have the required equipment but to be sure the staff is able to use the equipment when needed. This can be difficult especially for equipment that does not get utilized very often. Some hospitals overcome this by reviewing set up/use of low use equipment as a part of nursing staff meetings.

If you are getting a new piece of equipment many manufactures will come to your site and help with staff orientation to the equipment.
Special Populations

Pediatric
Injury continues to cause more deaths in children than the next 5 causes of childhood death combined. The unique anatomic and physiologic differences in children can lead to pitfalls in their treatment especially for providers who care for children infrequently.

### Anatomic and Physiologic Differences/ Clinical Significance

<table>
<thead>
<tr>
<th>Difference</th>
<th>Clinical Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large head to body ratio</td>
<td>Increased risk for head injuries</td>
</tr>
<tr>
<td>Large tongue</td>
<td>Common cause of airway obstruction</td>
</tr>
<tr>
<td>Trachea shorter, more anterior</td>
<td>Increased risk of aspiration &amp; missed intubation</td>
</tr>
<tr>
<td>Smaller airway diameter</td>
<td>Less blood, edema to cause obstruction</td>
</tr>
<tr>
<td>Weak neck muscles</td>
<td>Fewer bony c-spine injuries, more ligamentous</td>
</tr>
<tr>
<td>RR varies with age</td>
<td>Sustained RR &gt; 60 increases risk for arrest</td>
</tr>
<tr>
<td>Compensatory mechanism effective</td>
<td>Look good until rapid decompensation</td>
</tr>
<tr>
<td>Large occiput &lt; 2 years of age</td>
<td>Need to compensate for spinal precautions</td>
</tr>
<tr>
<td>Chest wall thin, cartilaginous</td>
<td>Rib fractures concerning for lung injury</td>
</tr>
<tr>
<td>Increased circulating blood volume</td>
<td>Any blood loss can lead to compromise</td>
</tr>
<tr>
<td>High metabolic rate &amp; limited glycogen stores</td>
<td>Increased risk for hypoglycemia</td>
</tr>
<tr>
<td>Myocardium less compliant</td>
<td>CO maintained by increasing HR – tachycardia is shock until proven otherwise</td>
</tr>
<tr>
<td>Hypotension is a late sign of shock</td>
<td>Can lose 30% of blood volume before BP drops</td>
</tr>
</tbody>
</table>

**Special considerations for your trauma program related to injured children:**

- It is important that adequate pediatric resources be available to your staff
- Length based resuscitation tape – adjunct for rapid determination of weight based on length so ensure appropriate fluid volumes, drug dosages, and equipment sizes are used.
  - Refer to Length Based Resuscitation Tape (*Appendix G*)
- Pediatric sized equipment readily available
- Resource for drug dosing in children
- Resources for normal vital signs in children and GCS in children can be found on the SMRTAC website

**Pediatric Specific Standards for Chart Review:**

- Was shock recognized early – difficult in children
  - Signs of early shock in children include sustained tachycardia for age, increased respiratory rate for age, capillary refill > 2 seconds, diminished peripheral pulses
  - Hypotension is a late sign (after 25% blood volume loss)
- Was shock treated appropriately
  - Children in shock should get 20cc/kg bolus of warmed crystalloid
• If signs of poor perfusion persist was bolus repeated
• If signs of poor perfusion persist did child get blood products
  o Blood product dosing is weight based 10cc/kg
• Was definitive airway placed in a timely manner
• Able to establish an IV in a timely manner
• Was child treated appropriately for pain
• Was only appropriate imaging done prior to transfer
  o There is growing recognition of potential untoward effects of ionizing radiation
    on the developing brain of children
  o Clinical decision making regarding imaging in children must always include
    consideration of important of injury identification in addition to radiation
    exposure risk.
  o Transfer should never be delayed for imaging
  o SMRTAC has a PMG about imaging in head injuries

Care providers need to be alert to the possibility of non-accidental trauma:
• Physical/history findings suggestive of child maltreatment/non-accidental trauma
  include but are not limited to:
  o Discrepancy in the reported history and the physical findings
  o Bruising in infants/children unable to move on their own
  o Intra-cranial bleeding without clear history of trauma
  o Perioral injuries
  o Trauma to genital or perianal area
  o Suspicious bruising patterns
  o Sharply demarcated burns in unusual areas
• Any suspicion of non-accidental trauma/ child maltreatment requires a report be filed
  with county social services.
• Make sure you are aware of resources in your county

Resources
Located on the SMRTAC website www.smrtac.org

• Management of Injured Children PMG
• Non-accidental Trauma PMG
• Indications for Head CT in Injured Children PMG
• Pediatric Trauma Transfer Guidelines PMG
• Initial Management of Major Pediatric Trauma Patients PMG
• Pediatric TTA Criteria

Geriatric
“Traumatic injury in the geriatric population is increasing in prevalence and is associated with
higher mortality and complications rates compared with younger patients.” (TQIP 2012)
Studies demonstrate that a majority of seriously injured older patients fail to return to their
pre-injury functional state. Geriatric trauma patients (defined as ≥ 65 for this resource) have
unique needs in the trauma bay and after admission. As a TC assure your facility has
protocols, guidelines, and/or order sets that address the following:

Trauma evaluation in the Emergency Department
Consider the following in the Secondary Survey:

Medications
• Anticoagulants – have a low threshold for assessing for bleeding
- Beta blockers, ACS inhibitors – be wary of their effect on blood pressure and pulse

**Medical events that may complicate patient presentation**
- Acute coronary syndrome
- Hypovolemia/dehydration
- Urinary tract infection
- Pneumonia
- Acute renal failure
- CVA
- Syncope

**Laboratory Studies**
- Lactic acid or blood gas to determine base deficit
- PT/PTT/INR
- Renal function studies
- Blood alcohol
- Urine toxicology
- Electrolytes

**Imaging**
- Liberal use of CT as occult injuries are common in the elderly. Bone loss makes plain film imaging less reliable

**Reversal of Anti-coagulation**
- Need a guideline or protocol for anti-coagulation reversal that matches the resources available at your facility. (Refer to resources at end of this section)
- A minor mechanism of injury can cause a devastating head bleed to a patient on anti-coagulation. Make certain your facility has a guideline or protocols assuring those in the ED consider this when evaluating patients with same level falls or minor "bumps" to the head.

**Inpatient Care**

**Mobility**
- Geriatric patients are at a higher risk for complications from bedrest. Patients should be mobilized within 48 hours of admission (the sooner the better).
- Assess for fall risk

**Mentation**
- Geriatric trauma patients are at higher risk for delirium after trauma which is associated with increased morbidity and mortality. Monitor for reversible causes of delirium
  - Wake-sleep disturbances
  - Hypoxia
  - Infection
  - Pain
  - Renal insufficiency
  - Electrolyte disturbances

**Medications**
- Geriatric patients are more sensitive to certain medications. Use elderly appropriate dosages.
• It is generally advised to avoid benzodiazepines in geriatric patients.
• Narcotic use for pain management increases the risk for constipation in patients already at risk. Include bowel management regimes in all trauma patients and especially those taking narcotics.
• Consider early use of non-narcotics.
• Assure baseline renal studies have been obtained.

**Nutrition**

- Geriatric patients often suffer from poor nutrition which should be included in the patient’s history.
- Cervical spine fractures managed with cervical orthotic devices (such as c-collars) can increase the risk of aspiration. Consider swallow studies for patients at risk.

**Pulmonary Toilet**

- Geriatric patients have a higher than usual morbidity and mortality from rib fractures. Aggressive pulmonary toilet is essential to prevent atelectasis and pneumonia.
  - Patients must be able to deep breath and cough often and effectively. Consider transfer to hospital with rib stabilization capabilities for patients who do not respond to conventional pain regimes.

**Discharge Planning**

- Discharge planning begins at admission. Evaluate the patient’s home environment and resources that may already be in place.
- If the patient is a fall risk, have the provider weigh risk/benefit of resuming home anti-coagulation medications (if relevant).
- Assure clear discharge instructions given to someone who will be assisting the geriatric patient.

**Resources**

- Reverse Anticoagulation Guideline for the Known or Suspected Adult Head Injured Patient PMG (Located on the SMRTAC website www.smrtac.org)
- American College of Surgeons Trauma Quality Improvement Program. (2012). *Geriatric Trauma Management Guidelines*.
**Trauma in Pregnancy**

The care of an injured female who is pregnant requires providers to have a working knowledge and appreciation for the normal anatomy and physiology of pregnancy and how these changes impact the trauma assessment.

<table>
<thead>
<tr>
<th>Anatomic and Physiologic Differences/ Clinical Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase in plasma volume by 40-50%</td>
</tr>
<tr>
<td>Maternal BP 20% lower and HR higher in 2nd trimester</td>
</tr>
<tr>
<td>Oxygen consumption and demands higher during pregnancy</td>
</tr>
<tr>
<td>Uterine blood flow increases throughout pregnancy</td>
</tr>
<tr>
<td>Esophageal sphincter relaxes secondary to hormonal changes</td>
</tr>
<tr>
<td>Gravid uterus can created a vena cava syndrome (nausea, tachycardia, and hypotension) when patient supine</td>
</tr>
<tr>
<td>Domestic violence increases during pregnancy</td>
</tr>
<tr>
<td>Minor trauma can lead to fetal demise 2-5%</td>
</tr>
</tbody>
</table>

**Important considerations in caring for pregnant trauma patients:**

- The best chance of fetal survival is maternal survival. All efforts are focused on sound ATLS resuscitation of the mother. The initial management and interventions are unchanged.
- Imaging necessary to identify injuries is done with fetal protection when possible.
- Normal fetal heart rates range from 120-160. Use a fetal monitor and where possible and/or tocometer.
- Early transfer to definitive care is important to optimal maternal and fetal outcomes.
- Do you have any OB resources in your hospital? Consider early US of the fetus.

**Trauma in Pregnancy Specific Standards for Chart Review:**

- Was shock recognized and treated early?
  - Backboard tilted to relief supine hypotension from gravid uterus
  - 2 IV's started and warm crystalloid bolus given
  - Blood given early
- Did patient receive 100% oxygen?
- If major injuries identified on initial assessment was patient transferred out in a timely manner < 60 minutes?
  - If LOS > 60 minutes what contributed to the time
  - Was imaging done and did it contribute to transfer delay
- Was there documentation of fetal heart tones?
**Bariatric**
According to the WHO there are more than 300 million clinically obese patients (WHO, 2009). In the USA, more than 20% of the population that fit in the obese category. Trauma is the 5th leading cause of death in adults. The mortality rate for obese trauma patients is more than eight times that of victims whose weight is within normal limits (Bushard, 2002).

In the ED, we need to be ready to serve our population. The first step is to take an inventory of your equipment for the Bariatric or Expanded Capacity population. From experience, it is advisable to mark each piece of equipment with the weight limit, so that you don’t have to look more than once for the answer (We marked it EC 400—for expanded capacity 400 pounds). In addition, use a webpage to keep all of your information for your facility regarding this population. Here is a “snap shot” example:

A list to start with from an ED perspective:
1. Carts—motorized, extra wide
2. Blood Pressure Cuffs—can use the thigh cuffs, or they make tapered cuffs
3. Doppler for aide in cardiovascular assessment
4. Transfer Device, example: Air Pal or Hovermat
5. Cervical Collars—No Neck Philadelphia or Stout from Miami
6. Splints—most of the time need to be made
7. Limb lifting/holding device for splinting
8. IV supplies—extra-long catheters and use of the Ultrasound Guided IV techniques for nursing
9. Intraosseous needles in the extra long
10. Difficult Airway equipment
11. Commode for bariatric patients
12. Other units outside of the ED:
   a. CT scanner limits
   b. Which elevators to use
   c. Inpatient room that has extra room for Extra-large beds—these can be rented from supply companies—should work on a contract ahead of time, so that you don’t have to do it from scratch when you need it.
   d. OR tables—what is their weight limit?
   e. Physical Therapy equipment

13. Ambulance Services, including air—know their weight limits and how long to get a bariatric cart for ground. (Most air ambulances have 350 pound limits). Advanced notice is crucial.

14. Tertiary Care Center notification is helpful before patient transport for preparation of the correct equipment.

15. If you are admitting to your facility, be aware of special challenges. According to Tarnowski Goodell (1996) respiratory failure is common in obese trauma patients and carries a higher mortality rate. Wound care is challenging. Missed injuries such as chest and cardiac contusion can happen due to the difficulty in assessment. DVTs are more pronounced in the obese patients due to difficulty in mobility.

Examples of Inpatient checklists for the bariatric patient’s care, refer to Bariatric Patient Equipment (Appendix H).

Resources

Limited English Proficiency Populations
- Review your hospital’s policies on interpretation services
- When using an interpreter for a patient, make sure that the interpreter is competent.
- Poll others in the area to see who they have used and if they are good/trustworthy.
- Should not rely on family and friends as they may offer opinions and not just the facts.
- If patient requests to use a friend/family member it would be in the best interest of the hospital to have their own interpreter present to make sure that the information is being relayed correctly. Also may need to have patient sign a refusal for the interpreter that is provided.
### Interpreting Services

<table>
<thead>
<tr>
<th>Service Provider</th>
<th>Description</th>
<th>Phone Details</th>
</tr>
</thead>
</table>
| ARCH Language Network         | Will bill the insurance company if they have a contract with that company. Can be very expensive if they don’t have a contract. Provide translation for 50 different languages. | Phone: 1-651-789-7897  
Fax: Attn Scheduling: 1-651-789-7898 |
| Garden and Associates         | Will bill insurance if they have a contract with that company. Provide translation for 100 different languages. | Phone: 1-952-920-6160 ext. 1  
Fax: 1-952-922-8150  
On-line: www.gardentranslation.com |
| Optimal Phone Interpreters    | Three way phone call. Would need to set up a contract with this company. Provide translation for 150 different languages. | Phone: 1-877-746-4674 |
| Local Interpreters            | Make a list of Interpreters in your area that would agree to be on call. | |

### Websites to help Answer Questions about Interpreters

<table>
<thead>
<tr>
<th>Website</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>MDH Interpreter Roster</td>
<td><a href="https://pqc.health.state.mn.us/hci/searchinterpreter.jsp">https://pqc.health.state.mn.us/hci/searchinterpreter.jsp</a></td>
</tr>
<tr>
<td>The Upper Midwest Translators &amp; Interpreters Association</td>
<td><a href="http://umtia.org">http://umtia.org</a></td>
</tr>
<tr>
<td>Low Literacy Patient Education</td>
<td><a href="http://www.healthyroadsmedia.org/english/index.htm">http://www.healthyroadsmedia.org/english/index.htm</a></td>
</tr>
<tr>
<td>MN Medicine</td>
<td><a href="http://www.minnesotamedicine.com/CurrentIssue/ClinicalHeartApril2010/tabid/3373">http://www.minnesotamedicine.com/CurrentIssue/ClinicalHeartApril2010/tabid/3373</a></td>
</tr>
</tbody>
</table>
Injury Prevention

Your Injury Prevention Program can become whatever you envision. The challenge will be in deciding on a focus, gathering the information, and finally implementing your plan. It is always in the best interest of your community to choose the focus of your Injury Prevention efforts based upon your trauma registry data. For example, if most of the injuries in your service area are related to falls then one of your focused efforts should focus on falls prevention. It will be easy to get overwhelmed as there is so much information out there at your fingertips. Below are a few of the best resources to help you get started.

Resources

Minnesota Department of Health Trauma Resource Manual
The Trauma Hospital Resource Manual has a section regarding Injury Prevention and how to get started. The key is to recognize your resources in your community and become a partner with them so as to not do the work someone else has already done but to complement one another in your efforts of preventing injuries in your area.
http://www.health.state.mn.us/traumasystem/

Injury Prevention Resources
If you have questions, seek assistance! The following trauma centers have injury prevention specialists who are experts in their field:

- Gundersen Health System
- Hennepin County Medical Center
- Mayo Clinic Trauma Centers
- MCHS SW Injury Prevention Coordinator
- Mercy North IA
- Regions Hospital

Data sources
Injury data can provide the information needed to make informed decisions regarding which injuries, populations and geographic locations should be prioritized for intervention efforts and prevention strategies. Examples of data sources:

- Hospital and Emergency Department Records
- Health Department Vital Records
- EMS Run Reports
- Surveys
- Traffic Records
- Case Management Records
- Child Death Review Team
- Poison Control System Reports

Community Department of Human Services
Many county and state health departments may already be addressing injury prevention interventions with the communities they serve. Partnering with these individuals and organizations will allow you to combine resources and expertise to work toward a common goal. Contact your county directly.

Local Law Enforcement
Network with your law enforcement partners to develop strategies regarding injury prevention. Contact: Initiate a call to your local sheriff’s department

**Toward Zero Death**
A good informational resource on traffic safety (motor vehicle, pedestrian, bicycle, and motorcycle) for helping get you the statistics you need to bring home your injury prevention message. TZD website offers a list of classes, educational opportunities, and updates that can help you stay informed of injury prevention initiatives as they become available.
Contact: [www.MinnesotaTZD.org](http://www.MinnesotaTZD.org)

**Physical Therapy Department**
Partnering with your own PT department can often help you determine education strategies especially as it relates to falls in the elderly. Remember physical therapists are the experts in balance, gait, and strength building.
Contact: Contact your local department directly

**Minnesota Department of Transportation**
Excellent resource for informational statistics and general road safety.
Contact: [www.dot.state.mn.us](http://www.dot.state.mn.us)

**Centers for Disease Control and Prevention**
CDC is a national resource of information including free educational materials, statistics and podcasts to watch, and evidence based injury prevention programs that you can tailor and implement in your own organization/community.
Contact: [www.cdc.gov](http://www.cdc.gov)

**Safe Kids Worldwide**
Safe Kids is a network of coalitions throughout the US whose sole focus is to prevent and reduce unintentional injuries for children. Connect with your local or state Safe Kids Coalition to see how you can join their efforts to keep kids safe.
Contact: [www.safekids.org/find-your-safe-kids](http://www.safekids.org/find-your-safe-kids)

**The National Safety Council**
The National Safety Council eliminates preventable deaths at work, in homes and communities, and on the road through leadership, research, education and advocacy. This site provides information on different safety training courses available throughout the State in addition to some great information.
[http://www.nsc.org/pages/home.aspx?gclid=CPv7nsHNJ9ECFYa1wAodlEcMrA](http://www.nsc.org/pages/home.aspx?gclid=CPv7nsHNJ9ECFYa1wAodlEcMrA)

**Minnesota Department of Natural Resources**
The MN DNR is an excellent resource for education and safety information. This includes different training and safety classes like hunter safety, recreational vehicle safety and many others.
[http://www.dnr.state.mn.us/index.html](http://www.dnr.state.mn.us/index.html)

**Trauma Coordinators – Don’t Forget US!**
Remember all levels of trauma centers are required to do injury prevention activities. That means in the SMRTAC regions you have many resources available to you.
Appendices

A. SMRTAC Trauma Team Activation Criteria Delete R8 (StO2)
   a. Adult
   b. Pediatric

B. Level of Review Algorithm

C. SMRTAC PI Subcommittee Case Review Request

D. Practice Management Guideline SMRTAC Sample

E. Practice Management Guideline Template

F. Recommended Pediatric Equipment Checklist

G. Length Based Resuscitation Tape

H. Bariatric Patient Equipment

I. Online Resources
## Appendix A - Adult

### SMRTAC Trauma Team Activation Criteria

#### Trauma Activation Criteria

**Adult--15 years and older**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Airway</strong></td>
<td></td>
</tr>
<tr>
<td>R1</td>
<td>Threatened or Compromised Airway or Intubated Patient</td>
</tr>
<tr>
<td><strong>Breathing</strong></td>
<td></td>
</tr>
<tr>
<td>R2</td>
<td>Respiratory Distress</td>
</tr>
<tr>
<td>R3</td>
<td>Respiratory rate &lt;10 or &gt;30</td>
</tr>
<tr>
<td>R4</td>
<td>Flail chest (known or suspected)</td>
</tr>
<tr>
<td><strong>Circulation</strong></td>
<td></td>
</tr>
<tr>
<td>R5</td>
<td>Heart rate &gt;120 and/or heart rate &gt; systolic blood pressure</td>
</tr>
<tr>
<td>R6</td>
<td>Confirmed Systolic BP&lt; 90 at any time</td>
</tr>
<tr>
<td>R7</td>
<td>Transfer patients receiving blood to maintain vital signs</td>
</tr>
<tr>
<td>R8</td>
<td>STO2 ≤65%</td>
</tr>
<tr>
<td><strong>Disability</strong></td>
<td></td>
</tr>
<tr>
<td>R9</td>
<td>GCS ≤12 associated with injury</td>
</tr>
<tr>
<td>R10</td>
<td>Paralysis, loss of sensation, and/or suspected spinal cord injury</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td></td>
</tr>
<tr>
<td>R11</td>
<td>Unstable pelvic fracture (known or suspected)</td>
</tr>
<tr>
<td>R12</td>
<td>Bilateral femur fractures (known or suspected)</td>
</tr>
<tr>
<td>R13</td>
<td>Traumatic amputation/crushed, degloved, mangled or pulseless injured extremity (excluded isolated hand/foot)</td>
</tr>
<tr>
<td>R14</td>
<td>Patients with tourniquets to control hemorrhage</td>
</tr>
<tr>
<td>R15</td>
<td>Burns &gt;10% body surface area (2nd/3rd degree) or with any known or potential airway compromise</td>
</tr>
<tr>
<td>R16</td>
<td>High voltage electrocution including lightning</td>
</tr>
<tr>
<td>R17</td>
<td>Gunshot wound proximal to elbow or knee OR any penetrating injury to head, neck, torso, axilla, or groin</td>
</tr>
<tr>
<td>R18</td>
<td>Patients with known intracranial bleed on anticoagulation (excluding ASA)</td>
</tr>
</tbody>
</table>

#### Red criteria patients meet RTTDC® recommendations for early transfer to definitive trauma care.

RTTDC® developed by the American College of Surgeons | rev0815

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;</td>
<td>Less Than</td>
</tr>
<tr>
<td>&gt;</td>
<td>Greater Than</td>
</tr>
<tr>
<td>≤ or ≥</td>
<td>Less than/equal to or greater than/equal to</td>
</tr>
</tbody>
</table>

These criteria are not a substitute for clinical judgment. Medical professionals (EMS, RN, PA-C/CNP, Physician) intuition may prompt a trauma activation even if these criteria are not met.
# Appendix A - Pediatric SMRTAC Trauma Team Activation Criteria

## Trauma Activation Criteria

**Pediatric — Up to but not yet 15 years of age**

| Airway | pr-1 | Threatened or Compromised Airway or Intubated Patient
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Breathing</td>
<td>pr-2</td>
<td>Respiratory Distress-grunting, stridor, or retractions</td>
</tr>
<tr>
<td></td>
<td>pr-3</td>
<td>Respiratory rate for age</td>
</tr>
<tr>
<td></td>
<td>pr-4</td>
<td>Flail chest (known or suspected)</td>
</tr>
<tr>
<td></td>
<td>pr-5</td>
<td>Heart rate for age</td>
</tr>
<tr>
<td></td>
<td>pr-6</td>
<td>Hypotension for age (systolic blood pressure at any time)</td>
</tr>
<tr>
<td></td>
<td>pr-7</td>
<td>Transfer patients receiving blood to maintain vital signs</td>
</tr>
<tr>
<td>Circulation</td>
<td>pr-8</td>
<td>GCS ≤12 associated with injury or deteriorating by 2 associated with an injury</td>
</tr>
<tr>
<td></td>
<td>pr-9</td>
<td>Open or depressed skull fracture or known intra-cranial bleed</td>
</tr>
<tr>
<td></td>
<td>pr-10</td>
<td>Paralysis, loss of sensation, and/or suspected spinal cord injury</td>
</tr>
<tr>
<td>Disability</td>
<td>pr-11</td>
<td>Unstable pelvic fracture (known or suspected)</td>
</tr>
<tr>
<td></td>
<td>pr-12</td>
<td>Bilateral femur fractures (known or suspected)</td>
</tr>
<tr>
<td></td>
<td>pr-13</td>
<td>Traumatic amputation/crushed, degloved, mangled or pulseless injured extremity (excluded isolated hand/foot)</td>
</tr>
<tr>
<td></td>
<td>pr-14</td>
<td>Patients with tourniquets to control hemorrhage</td>
</tr>
<tr>
<td></td>
<td>pr-15</td>
<td>Burns &gt; 10% body surface area (2/3/3° degree) or with any known or potential airway compromise</td>
</tr>
<tr>
<td></td>
<td>pr-16</td>
<td>High voltage electrocution including lightning</td>
</tr>
<tr>
<td></td>
<td>pr-17</td>
<td>Gunshot wound proximal to elbow or knee OR any penetrating injury to head, neck, torso, axilla, or groin</td>
</tr>
</tbody>
</table>

**YELLOW**

- pr-1: Two or more proximal long bone fractures (bilateral femur = Red) (known or suspected)
- pr-2: Death of restrained passenger in same vehicle
- pr-3: Major auto deformity (intrusion into passenger compartment)
- pr-4: Auto vs. Pedestrian/bicyclist/motorcyclist thrown, run over, or with significant (>20 mph) impact
- pr-5: Ejection from motorized vehicle (car, motorcycle, snowmobile, ATV, motocross)
- pr-6: Unprotected falls, greater than or equal to twice the child’s height

**Red criteria patients meet RTTDC® recommendations for early transfer to definitive pediatric trauma care.**

| < Less Than | >Greater Than | ≤ or ≥ Less than/equal to or greater than/equal to |

*These criteria are not a substitute for clinical judgment. Medical professionals (EMS, RN, PA-C/CNP, Physician) intuition may prompt a trauma activation even if these criteria are not met.*
Appendix B
Level of Review Algorithm

Regional Trauma PI Levels of Review

Case Review Request to SMRTAC Coordinator

Primary Review

Secondary Review

Tertiary Review

Actions as Determined by SMRTAC PI Committee

- Education Session
- Discussion or Feedback
- Periodic Recording
- PMG Development
- Focused PI Project

Issues Elevated to State Trauma System leadership or RTAC Leadership Forum

Review by SMRTAC Coordinator and/or PI Committee Chairperson

Review by Medical Director and/or SMRTAC Chair and designees as appropriate

SMRTAC larger PI subcommittee

June 2015
Southern Minnesota Regional Trauma Advisory Committee  
Performance Improvement Subcommittee Case Review Request

<table>
<thead>
<tr>
<th>Date of Request</th>
<th>Name ____________________________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person referring case</td>
<td>Title ____________________________________________</td>
</tr>
<tr>
<td>(please print)</td>
<td>Agency __________________________________________</td>
</tr>
</tbody>
</table>

Date of occurrence

Please describe the problem.  
Please note: 
The PI Committee reviews system issues. You may submit any issue you define as a system issue that needs review. The PI Committee, however, may decide the issue is not appropriate for system discussion and recommend that it is managed internally in your facility or agency. The PI Subcommittee meets the second Tuesday of each month. You will be notified when your case is up for review. If you have any questions please call SMRTAC Coordinator at 507-255-1844.

Location of incident (check all that apply):
- Scene First Responder/Law Enforcement
- EMS
- Air
- Enroute
- ED
- Hospital (Inpatient status)
- Dispatch

Communication:
<table>
<thead>
<tr>
<th>What actions have you taken to address the problem? (Example: Contacted agency PI person and requested run sheet/chart; talked with PI person and informed them of issue, etc.)</th>
</tr>
</thead>
</table>

Send via e-mail or fax to SMRTAC Coordinator
Deb.horsman@smrtfoundation.org  or (507)255-9872
### Initial Review by PI Chair

| Date Reviewed |  
|---------------|----------------------------------|
| Regional System Issue Determination | □ This is a regional issue, appropriate for PI Subcommittee  
  □ This is a non-regional issue between involved entities  
  □ This is a trend that should be reviewed by PI Subcommittee |
| Recommendations (check all that apply) | □ Refer to PI Subcommittee  
  □ More in-depth information is required  
  □ Do not refer to PI Subcommittee |
| Chair (or designee) will discuss with referring agency to obtain names/specifiscs | Hospital/Facility: ___________________________  
EMS Agency: ___________________________  
Other: ___________________________ |

**Signature of PI Chair**_______________________________ Date___________________

---

### This page to be completed by SMRTAC PI Subcommittee

<table>
<thead>
<tr>
<th>Date referred to PI Subcommittee</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summary of discussion</td>
</tr>
</tbody>
</table>
| Regional System Issue Determination | □ This case is a regional system issue  
  □ This case is not a regional system issue but requires review by subcommittee due to a trend.  
  □ This case is not a regional system issue and will be referred back. |
| Case Determination | □ System-related  
  □ Disease-related |
<table>
<thead>
<tr>
<th>Preventability Determination</th>
<th>Provider-related</th>
<th>Cannot be determined</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action Plan Determination</td>
<td>Non-preventable</td>
<td>Non-preventable with opportunity for improvement</td>
</tr>
<tr>
<td></td>
<td>Potentially preventable</td>
<td>Preventable</td>
</tr>
<tr>
<td></td>
<td>Cannot be determined</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Action Plan(s)</th>
<th>Requires written communication from the SMRTAC in the form of:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Recommendations for improvement</td>
</tr>
<tr>
<td></td>
<td>1.</td>
</tr>
<tr>
<td></td>
<td>2.</td>
</tr>
<tr>
<td></td>
<td>3.</td>
</tr>
<tr>
<td></td>
<td>Education on _______________________________________________</td>
</tr>
<tr>
<td></td>
<td>___________________________________________________________</td>
</tr>
<tr>
<td></td>
<td>One-on-one discussion between _____________________________ &amp;</td>
</tr>
<tr>
<td></td>
<td>Referral to home RTAC (if outside SMRTAC)</td>
</tr>
<tr>
<td></td>
<td>Requires verbal communication</td>
</tr>
<tr>
<td></td>
<td>Communication is unnecessary</td>
</tr>
<tr>
<td></td>
<td>Communication is inappropriate</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Person(s) responsible for taking corrective actions</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Date to be completed</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Date loop closed</th>
</tr>
</thead>
</table>

**Signature of PI Chair_____________________________
Date_________________________
Appendix D
Practice Management Guideline – SMRTAC Sample

Southern Minnesota Regional Trauma Advisory Committee (SMRTAC)
Regional Practice Management Guideline

<table>
<thead>
<tr>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult Practice Management Guideline</td>
</tr>
<tr>
<td>Contact: SMRTAC Coordinator</td>
</tr>
</tbody>
</table>

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

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

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

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

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

Policy Statements
May be one or multiple statements

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

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

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

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

Example: literature review; existing guideline

Prepared by: SMRTAC Leadership

Approvals: SMRTAC PI Subcommittee; SMRTAC 12/15/2011

Disclaimer: This is a general guideline and is not intended as a substitute for clinical judgment or as a protocol for the management of all trauma patients.

- 1 -
Appendix E
Practice Management Guideline – Template

Your Hospital Logo

Your Hospital Name
Regional Practice Management Guideline

<table>
<thead>
<tr>
<th>Title</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Adult Practice Management Guideline</td>
<td>Effective: 11/2011</td>
</tr>
<tr>
<td>Contact: Trauma Coordinator</td>
<td>Last Reviewed:</td>
</tr>
</tbody>
</table>

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

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

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

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

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May be one or multiple statements

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

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

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

Example: literature review, existing guideline

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

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

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

4/2017
## Appendix F
Recommended Pediatric Equipment Checklist

### Monitoring

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Defibrillator (0-400J) capability with pediatric paddles (4.5 cm)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Pediatric monitor electrodes</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Pulse oximeter with sensors sizes (newborn through adult)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Thermometer/rectal probe*</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Blood Pressure cuffs–neonatal, infant child, adult and thigh cuff</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Method to monitor endotracheal tube and placement†</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

* Suitable for hypothermic and hyperthermic measurements with temperature capability from 25º to 44º.
† May be satisfied by a disposable ET co² detector, bulb, or feeding tube methods for endotracheal tube placement.

### Vascular Access

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butterfly needles (19-25-gauge)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Catheter-over-needle devices (14 to 24 gauge)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Infusion device‡</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Tubing for above</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Intraosseous needles (16 and 18 gauge)§</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Arm boards – (infant, child)</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Intravenous fluid/blood warmers</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Umbilical vein catheters (sizes 3.5 Fr and 5 Fr)!!</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Seldinger technique vascular access kit (with pediatric sizes 3, 4, 5, Fr catheters)</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

‡ To regulate rate and volume.
§ May be satisfied by standard bone marrow aspiration needles, 13- or 15- gauge.
‼ Available within the hospital
Appendix G
Length Based Resuscitation Tape

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Newborn/Small Infant (3-5 kg)</th>
<th>Infant (6-9 kg)</th>
<th>Toddler (10-11 kg)</th>
<th>Small Child (12-14 kg)</th>
<th>Child (15-18 kg)</th>
<th>Child (19-22 kg)</th>
<th>Large Child (24-30 kg)</th>
<th>Adult (&gt;32 kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resuscitation bag</td>
<td>Infant</td>
<td>Child</td>
<td>Child</td>
<td>Child</td>
<td>Child</td>
<td>Child</td>
<td>Child/adult</td>
<td>Adult</td>
</tr>
<tr>
<td>O₂ mask</td>
<td>Newborn</td>
<td>Newborn</td>
<td>Pediatric</td>
<td>Pediatric</td>
<td>Pediatric</td>
<td>Pediatric</td>
<td>Adult</td>
<td>Adult</td>
</tr>
<tr>
<td>Oral airway</td>
<td>Infant/small child</td>
<td>Infant/small child</td>
<td>Child</td>
<td>Child</td>
<td>Child</td>
<td>Child</td>
<td>Child</td>
<td>Child/small adult</td>
</tr>
<tr>
<td>Laryngoscope blade (size)</td>
<td>0-1 straight</td>
<td>1 straight</td>
<td>1 straight</td>
<td>2 straight or curved</td>
<td>2 straight or curved</td>
<td>2 straight or curved</td>
<td>3 straight or curved</td>
<td>Medium adult</td>
</tr>
<tr>
<td>Tracheal tube length (cm at tip)</td>
<td>Premature infant 2.5</td>
<td>3.5 uncuffed</td>
<td>4.0 Uncuffed</td>
<td>4.5 uncuffed</td>
<td>5.0 uncuffed</td>
<td>5.5 uncuffed</td>
<td>6.0 cutted</td>
<td>6.5 cutted</td>
</tr>
<tr>
<td>Tracheal tube length (cm at lip)</td>
<td>10-10.5</td>
<td>10-10.5</td>
<td>11-12</td>
<td>12.5-13.5</td>
<td>14-15</td>
<td>15.5-16.5</td>
<td>17-18</td>
<td>18.5-19.5</td>
</tr>
<tr>
<td>Styllet (F)</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Suction catheter (F)</td>
<td>6-8</td>
<td>8</td>
<td>8-10</td>
<td>8-10</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>BP cuff</td>
<td>Newborn/Infant</td>
<td>Newborn/Infant</td>
<td>Childhood</td>
<td>CHILD</td>
<td>CHILD</td>
<td>CHILD</td>
<td>Child/adult</td>
<td>Adult</td>
</tr>
<tr>
<td>IV catheter (G)</td>
<td>22-24</td>
<td>22-24</td>
<td>20-24</td>
<td>18-22</td>
<td>18-22</td>
<td>18-20</td>
<td>16-20</td>
<td>16-20</td>
</tr>
<tr>
<td>Nasogastric tube (F)</td>
<td>5-8</td>
<td>5-8</td>
<td>5-10</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Urinary catheter (F)</td>
<td>5-8</td>
<td>5-8</td>
<td>6-10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>Defibrillator/cardioversion/external paddles</td>
<td>Infant paddles until 1 yr or 10 kg</td>
<td>Adult paddles when ≤1 yr or ≤10 kg</td>
<td>Adult paddles</td>
<td>Adult paddles</td>
<td>Adult paddles</td>
<td>Adult paddles</td>
<td>Adult paddles</td>
<td>Adult paddles</td>
</tr>
<tr>
<td>Chest tube (F)</td>
<td>10-12</td>
<td>10-12</td>
<td>16-20</td>
<td>20-24</td>
<td>20-24</td>
<td>24-32</td>
<td>26-32</td>
<td>32-40</td>
</tr>
</tbody>
</table>
## Appendix H
### Bariatric Patient Equipment

<table>
<thead>
<tr>
<th>Description</th>
<th>Maximum Weight</th>
<th>How to Contact:</th>
<th>Contact’s email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stryker Electric Bed</td>
<td>700 lbs</td>
<td>Trauma Coordinator (TC)</td>
<td></td>
</tr>
<tr>
<td>Ferno 35-P PROFlexx (Gold Cross cot)</td>
<td>650 lbs / 295 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>AMBU; NAJO (ED Backboard)</td>
<td>600 lbs / 272 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Stryker; Renaissance Series Stretcher</td>
<td>495 lbs / 225 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Stryker; Atlas 660 Stretcher</td>
<td>660 lbs / 300 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Stryker; Chair/Bed #5050</td>
<td>400 lbs / 181 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Ritter; 230 Power Examination Table</td>
<td>510 lbs</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Shuttle Wheelchair</td>
<td>200 lbs</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Allegiance; Crutchers (Child - Tall Adult)</td>
<td>250 lbs/113 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Guardian; Easy Care Folding Walker #7731</td>
<td>300 lbs / 136 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Medline; Excel XW Wheelchair</td>
<td>300 lbs / 136 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Guardian; Commode #302010</td>
<td>225 lbs / 102 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Guardian; PVC Pipe Commode</td>
<td>350 lbs / 159 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Steelcase; Chrome Frame Chair #474410</td>
<td>500 lbs / 227 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>The Brewer Company; Adjustable Chrome Base Stool</td>
<td>300 lbs / 136 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>United Chair; Adjustable Rolling Stool</td>
<td>300 lbs / 136 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Detecto; Digital Portable Handrail Scale</td>
<td>600 lbs / 272 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Bathroom Handrails</td>
<td>200 lbs / 90 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Bathroom Toilet</td>
<td>400 lbs / 181 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Hill-Rom; Sleeper Chair</td>
<td>Unknown</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Kwalu inc; Couch</td>
<td>Unknown</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Schmidt-Goodman; Ultimate Recliner</td>
<td>375 lbs / 170 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Cosco; 2 step stool</td>
<td>200 lbs / 90 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Steelcase Castared Office Chair</td>
<td>350 lbs / 159 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Model #4535300</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sauder Manufacturing; Wood Frame Chair</td>
<td>700 lbs / 218 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>EZ Lift; Electric Lift/ Transfer System #598</td>
<td>600 lbs / 272 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>KI Manufacturing (AGI); Waiting Room Couch</td>
<td>Unknown</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Stryker Zoom Cart (Electric)</td>
<td>700 lbs / 218 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>AirGlide; Air Transfer Device Radiolucent for X-Ray/MRI useful in Patient Positioning</td>
<td>No Weight Limit</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>The Brewer Company; Adjustable Chrome Base Stool with Handle</td>
<td>300 lbs / 136 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>KI Manufacturing (AGI); Waiting Room Bench Seat</td>
<td>400 lbs / 181 kg</td>
<td>TC</td>
<td></td>
</tr>
<tr>
<td>Motorized Stretcher with scale</td>
<td>700 lbs / 218 kg</td>
<td>TC</td>
<td></td>
</tr>
</tbody>
</table>
Appendix I
Online Resources

Organizations
Advanced Trauma Care for Nurses
http://www.atcnnurses.org/

American Academy of Orthopedic Surgeons
http://www.aaos.org/

The American Association for the Surgery of Trauma
http://www.aast.org

American College of Emergency Physicians
http://www.acep.org/

American College of Surgeons
http://www.facs.org/

American College of Surgeons, Trauma Program
http://www.facs.org/trauma

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

Brain Injury Association of America
http://www.biausa.org/

Comprehensive Advanced Life Support
https://calsprogram.org/

Eastern Association for the Surgery of Trauma
http://www.east.org/

Emergency Nurses Association
http://www.ena.org/

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

Minnesota ENA
http://www.minnesotaena.com/

National Highway Traffic Safety Administration
http://www.nhtsa.gov/

Society of Critical Care Medicine
http://www.sccm.org

Society of Trauma Nurses
http://www.traumanursessoc.org/
Trauma.org  
http://www.trauma.org/

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

Toward Zero Deaths  
http://www.minnesotatzd.org

Western Trauma Association  
http://westerntrauma.org/

Publications/Resources  
American Academy of Experts in Traumatic Stress  
http://www.aaets.org/

Gift from Within (Survivors of Trauma and Victimization)  
http://www.giftfromwithin.org/

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

Pediatrics  
American Academy of Pediatrics  
http://www.aap.org/

Children’s Safety Network  
http://www.childrenssafetynetwork.org/

Emergency Medical Services for Children (Minnesota)  
http://www.emscmn.org/

Emergency Medical Services for Children (National)  
http://www.ems-c.org/

National Child Traumatic Stress Network  
http://www.nctsn.org

Prevention  
Helmets R Us  
http://www.helmetsrus.net
I Keep Safe (internet safety for kids)  
http://ikeepsafe.org/

National Center for Injury Prevention and Control  
http://www.cdc.gov/ncipc/

Risk Watch  
http://www.riskwatch.org/teacher.html
Safety Belt Safe U.S.A.
http://www.carseat.org/