NAEMSP Trauma Compendium conclusions and recommendations

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Below is a compilation of conclusions and recommendations from the trauma compendium articles published by the National Association of EMS physicians. Many of these articles were jointly developed with other national associations. A link to each article is provided. It is highly encouraged to review the entire article to understand the context and nuances of the recommendations. The article on pediatric trauma arrest is pending publication.

The trauma compendium article on prehospital management of spinal cord injuries is included below. It is a comprehensive review of current available literature, and the conclusion is included below. Medical Direction Committee has developed a separate white paper to make recommendations.

IVF in trauma (excludes discussion on blood products)

Full article: Prehospital Trauma Compendium: Fluid Resuscitation in Trauma – a Position Statement and Resource Document of NAEMSP

Use of prehospital IV fluids in trauma should be focused on individual patients, as universal large volume resuscitations and universal withholding of fluids may be harmful. Resuscitation should target mental status and signs of perfusion instead of arbitrary BP values. Warmed fluids can be considered as part of an overall temperature-management strategy. Significant evidence gaps exist in determining best practices for pediatric patients, and standardizing educational curricula may improve prehospital provider understanding of the nuance of IV fluid resuscitation in trauma

- Isotonic crystalloid solutions should be the preferred fluids for use in prehospital trauma management. Specific choice of isotonic crystalloid solutions may be driven by medication compatibility and other operational issues.
- Permissive hypotension is reasonable in patients without traumatic brain injury (TBI).
- Avoiding or correcting hypotension in polytrauma patients with TBI may be a higher priority than restricting fluid use.
- Large volume crystalloid resuscitation should be generally avoided.
- Developing processes to administer warmed intravenous (IV) fluids is reasonable.

- Risks of IV fluid use, or restriction, in trauma resuscitation should be weighed against possible benefits.
- Strategies to reduce the need for IV fluids should be considered.
- A standard trauma resuscitation curriculum for prehospital providers should be developed to improve evidence-based delivery of IV fluids in trauma.

Blood products in trauma

Full article: Prehospital Trauma Compendium: Transfusion of Blood Products in Trauma – A Position Statement and Resource Document of NAEMSP

Among trauma patients with hemorrhagic shock, there is evidence in support of the shift of prehospital resuscitation strategies toward blood product use when such resources are available. While much of the literature supporting this change in practice is retrospective with limitations, the existing evidence suggests there is an early mortality benefit with a reduction in total transfusion requirements when prehospital blood product resuscitation is employed. Importantly, these benefits are realized without risk of increased adverse events. For these reasons we recommend use of blood components over crystalloids and suggest LTOWB as the preferred transfusion product for the first-line prehospital treatment of patients with life-threatening bleeding and/or hemorrhagic shock. A multidisciplinary approach involving multiple trauma system stakeholders, with well-defined indications, active monitoring/quality assurance, and planned recycling of products to reduce wastage are essential components of a robust and sustainable prehospital transfusion program.

- Use of blood components over crystalloids for the first-line treatment of patients with traumatic life-threatening bleeding in the prehospital phase of resuscitation
- Use of low titer group O whole blood (LTOWB) as the first-choice blood product for treatment of patients with traumatic life-threatening bleeding in the prehospital phase of resuscitation
- Use of a combination or composite of prehospital transfusion indications, focused on physiologic abnormalities and/or injury patterns with obvious significant blood loss.
- Use of active monitoring for transfusion-related adverse events.
- Developing a mechanism to recycle unused blood product units nearing their expiration date to a high-use hospital facility to minimize wastage.
- Engaging in a comprehensive longitudinal active collaboration between EMS agencies, trauma centers, and blood suppliers to ensure the success of a prehospital transfusion program

TXA in trauma

Full article: Prehospital Trauma Compendium: Tranexamic Acid in Trauma – A Joint Position Statement and Resource Document of NAEMSP, ACEP, and ACS-COT

Tranexamic acid has been widely adopted in civilian EMS systems and appears safe, but the beneficial effect of prehospital TXA for adult trauma patients with hemorrhagic shock remains uncertain despite earlier excitement about improving outcomes. In aggregate, evidence from a mix of military and civilian studies appears to show potential benefits in reducing early mortality when TXA is administered less than 3 h from the time of injury. Considering the conflicting and uncertain evidence there is a need for high-quality studies to further define the role TXA for prehospital trauma. In the absence of clear evidence, local individual EMS agencies and trauma systems must determine the feasibility of incorporating TXA into their prehospital traumatic hemorrhagic shock protocols, balancing potential clinical outcomes benefits with resource costs of implementation, education, training, and quality improvement programs.

- Prehospital TXA administration may reduce mortality in adult trauma patients with hemorrhagic shock when administered after lifesaving interventions.
- Prehospital TXA administration appears safe, with low risk of thromboembolic events or seizure.
- The ideal dose, rate, and route of prehospital administration of TXA for adult trauma patients with hemorrhagic shock has not been determined. Current evidence suggest EMS agencies may administer either a 1-gram IV/IO dose (followed by a hospital-based 1-gram infusion over 8 hours), or a 2-gram IV/IO dose as an infusion or slow push.
- Prehospital TXA administration, if used for adult trauma patients, should be given to those with clinical signs of hemorrhagic shock and no later than 3 hours post-injury. There is no evidence to date to suggest improved clinical outcomes from TXA initiation beyond this time or in those without clinically significant bleeding.
- The role of prehospital TXA in pediatric trauma patients with clinical signs of hemorrhagic shock has not been studied and standardized dosing has not been established. If used, it should be given within 3 hours of injury.
- Prehospital TXA administration, if used, should be clearly communicated to receiving healthcare professionals to promote appropriate monitoring and to avoid duplicate administration(s).
- A multidisciplinary team, led by EMS physicians, that includes EMS clinicians, emergency physicians, and trauma surgeons should be responsible for developing a

quality improvement program to assess prehospital TXA administration for protocol compliance and identification of clinical complications.

Vasopresssors in Trauma

Full article: Prehospital Trauma Compendium: Vasopressors in Trauma – a Position Statement and Resource Document of NAEMSP

Based on the limited available evidence suggesting no benefit or potential worse outcomes in hemorrhagic shock refractory to volume expansion, we recommend against the use of prehospital vasopressors in this trauma patient cohort. Although prehospital vasopressors may have a theoretical role in the management of SCI, neurogenic shock, or TBI patients in the prehospital setting, there is insufficient evidence to base recommendations for or against their use by EMS clinicians. Resuscitation with crystalloids or blood product transfusion remains the primary approach to address these conditions in the prehospital setting. The absence of robust evidence regarding the role of vasopressors in trauma-related shock resuscitation underscores the critical need for future research in this area to inform clinical practice and improve outcomes for critically injured patients.

- Current evidence does not support the routine use of vasopressors by EMS clinicians for traumatic hemorrhagic shock and suggests the possibility of harm.
- Current evidence does not address the use of vasopressors by EMS clinicians in the treatment of patients with severe spinal cord injury presenting with neurogenic shock or to achieve specific mean arterial pressure goals in spine injured patients in the prehospital setting.
- Prehospital hypotension has been shown to be harmful to patients with TBI; however, there is currently no evidence to support or refute the use of vasopressors by EMS clinicians in the setting of TBI.

Traumatic pneumothorax

Full article: Prehospital Trauma Compendium: Traumatic Pneumothorax Care: Position Statement and Resource Document of NAEMSP

Traumatic tension pneumothorax and open pneumothorax are life-threatening, high risk, low frequency events that can be mitigated by EMS clinicians when they are appropriately recognized and treated. To optimize patient outcomes, improvements must be made in the EMS clinician's ability to recognize these conditions. Further, techniques to assess for successful decompression must be employed. Importantly, we must also improve in the quality oversight of the interventions used by EMS clinicians to treat these injuries. Emergency Medical Services

agencies can take steps toward improving patient outcomes by implementing the recommendations in this document.

- EMS identification of a tension pneumothorax must be guided by a combination of risk factors and physical findings, which may be augmented by diagnostic technologies.
- EMS clinicians should recognize the differences in the clinical presentation of a tension pneumothorax in spontaneously breathing patients and in patients receiving positive pressure ventilation (PPV).
- EMS clinicians should not perform pleural decompression in patients with simple pneumothoraxes but should perform pleural decompression in patients with tension pneumothorax, if within the clinician's scope of practice.
- When within scope of practice, EMS clinicians should use needle thoracostomy as the primary strategy for pleural decompression of tension pneumothorax in most cases. EMS clinicians should take a patient-individualized approach to performing needle thoracostomy, influenced by factors known to impact chest wall thickness and risk for iatrogenic injury.
- Simple thoracostomy and tube thoracostomy may be used by highly trained EMS clinicians in select clinical settings with appropriate medical oversight and quality assurance.
- EMS systems must investigate and adopt strategies to confirm successful pleural decompression at the time thoracostomy is performed
- Pleural decompression should be performed for patients with traumatic out-of-hospital circulatory arrest (TOHCA) if there are clinical signs of tension pneumothorax or suspicion thereof due to significant thoraco-abdominal trauma. Empiric bilateral decompression, however, is not routinely indicated in the absence of such findings.
- EMS clinicians should not routinely perform pleural decompression of suspected or confirmed simple pneumothorax prior to air-medical transport in most situations.
- EMS clinicians may consider placement of a vented chest seal in spontaneously breathing patients with open pneumothoraxes.
- In patients receiving PPV who have open pneumothoraxes, chest seals may be harmful and are not recommended.
- EMS physicians play an important role in developing curricula and leading quality management programs to both ensure that EMS clinicians are properly trained in the recognition and management of tension pneumothorax and to ensure that interventions for tension pneumothorax are performed appropriately, safely, and effectively

Femur fractures

Full article: Prehospital Trauma Compendium: Management of Suspected Femoral Shaft Fractures – A Position Statement and Resource Document of NAEMSP

Although femur fractures are associated with significant morbidity and mortality, management of these injuries is an infrequent event in the EMS setting. While open femoral shaft fractures may lead to significant hemorrhage and shock, historical concerns that closed femoral shaft fractures cause hemorrhagic shock appear mostly unfounded, and EMS clinicians must remain vigilant for other causes of shock in these patients. There is no clear clinical superiority of traction vs static splinting in the EMS setting. However, traction splinting is associated with several contraindications and complications, requires more expensive equipment to perform, presents several logistical challenges with packaging and moving patients, and is subject to skill decay. These issues do not impact static splinting to the same degree, and as such, static splinting may be operationally superior to traction splinting in the EMS setting. Additional research is needed to guide prehospital analgesic interventions for femoral shaft fractures, including research that addresses disparities and inequities in provision of analgesia, and that investigates potentially broader use of regional anesthesia. Finally, EMS physicians should play a critical role in the implementation, oversight, and advancement of the recommendations in this manuscript

- Hemorrhagic shock from femoral shaft fractures is uncommon. EMS clinicians should carefully evaluate for other sources of shock in the hemodynamically unstable trauma patient with suspected midshaft femur fracture(s).
- EMS clinicians must recognize the challenges in accurately identifying femoral shaft fractures and associated comorbid injuries involving the pelvis and distal extremities.
- EMS clinicians may use either static or traction splinting to immobilize suspected femoral shaft fractures. Traction splinting carries contraindications, additional risks, and technical complexities that are not present with static splinting.
    - Static splinting may be the preferred method of immobilizing midshaft femur fractures in the prehospital setting.
    - EMS clinicians should not use traction splints unless they have reliably assessed for and reasonably excluded the presence of distal femur fractures, knee joint disruption, and co-morbid ipsilateral lower extremity or pelvic fractures.
- EMS clinicians should manage pain associated with suspected femur fractures.
    - EMS clinicians should immobilize suspected femoral shaft fractures using either static or traction splinting devices or other means to help reduce movement and control pain in adult and pediatric patients.

    - Analgesic medications should be administered to patients with femoral shaft fractures in the prehospital setting whenever they are within the scope of practice and available to EMS clinicians.
    - Regional anesthesia interventions may have a role in the prehospital treatment of femoral shaft fractures when used by appropriately trained EMS clinicians, but widespread adoption of these interventions in the prehospital setting is not yet supported by existing evidence.
- EMS clinicians should transport patients with suspected midshaft femur fractures who also meet other triage criteria of the National Trauma Triage Guidelines to a major trauma center. Transport via air-based EMS may be appropriate in select circumstances.
- EMS physicians play an important role in developing curricula and leading quality management programs to both ensure that EMS clinicians are properly trained in the recognition and management of femoral shaft fractures and that interventions for femoral shaft fractures are performed appropriately, safely, and effectively.

Pelvic fractures

Full article: Prehospital Trauma Compendium: Evaluation and Management of Suspected Pelvis Fractures – An NAEMSP Position Statement and Resource Document

Implementation of the recommendations in this document may require revision of existing training paradigms and clinical protocols that emphasize the use of pelvic splinting in the prehospital setting. Purchase of new equipment to implement these recommendations is unlikely to be necessary. Although devices are relatively inexpensive, prehospital use of PCCDs does incur equipment and training costs. Opportunity costs are also present when limited equipment and training resources that could be used to support more impactful interventions are instead used to support use of PCCDs in the field.

The value of PCCDs in the prehospital management of unstable pelvic fractures is questionable and PCCDs are not without risk for iatrogenic injury. It appears reasonable for EMS agencies that currently use PCCDs to discontinue their use. If EMS agencies consider discontinuing use of PCCDs they should advise local trauma systems of this change, as education of clinicians at receiving trauma hospitals may be necessary to help them gain an understanding and acceptance of any changes in use of PCCDs in the prehospital environment.

For EMS agencies that choose to continue use of PCCDs, it may be necessary to dedicate more training resources to ensure EMS clinicians are appropriately educated on patient selection criteria and appropriate anatomic placement of PCCDs and splinting of the lower extremities.

Agencies and systems should also dedicate quality management resources toward monitoring for proper use of PCCDs and assessing for positive and negative impacts on patient outcomes.

- While hemorrhagic shock directly attributable to pelvic fractures may occur, concomitant injuries are commonly the cause of shock. EMS clinicians should carefully evaluate for other sources of shock in the hemodynamically unstable trauma patient with suspected pelvic fractures.
- EMS clinicians should recognize the challenges in accurately identifying pelvic fractures by physical exam alone. Manual stability testing of the pelvis is neither sensitive nor specific and may cause harm.
- Prehospital use of PCCDs should be reconsidered given lack of proven clinical benefit including insufficient evidence that PCCDs reduce traumatic hemorrhage or mortality, and potential for iatrogenic injuries.
- If PCCDs are used, care must be taken to ensure they are placed in anatomically appropriate position over the trochanters, and that the legs are internally rotated by securing the feet together.
- EMS clinicians should transport patients with suspected pelvis fractures who also meet other triage criteria of the National Trauma Triage Guidelines to a major trauma center, when possible. Transport via air-based EMS may be appropriate in select circumstances.
- Pelvic splinting is a low-frequency skill that is not without risk to the patient. Agencies that include use of PCCDs in their protocols should ensure their EMS clinicians receive initial and ongoing training and education that addresses the development of both cognitive and psychomotor aptitudes related to pelvic fracture identification and management. The training should be comprehensive and directed by quality improvement programs. Pelvic fracture identification, proper patient selection, and appropriate placement and tension of pelvic splints should be emphasized.
- EMS physicians play an important role in developing curricula and leading quality management programs to both ensure that EMS clinicians are properly trained in the recognition and management of pelvis fractures and that interventions for pelvis fractures are performed appropriately, safely, and effectively.

Management of spinal cord injuries

Full article: Prehospital Trauma Compendium: Prehospital Management of Spinal Cord Injuries – A NAEMSP Comprehensive Review and Analysis of the Literature

There are no data in the published literature to support spinal immobilization and spinal motion restriction as standard of care. Efforts aimed to reduce the use of cervical collars should be considered, and the use of backboards and full body vacuum splints should be limited to the point in time of active patient extrication

Antibiotics in trauma

Full article: Prehospital Trauma Compendium: Prehospital Administration of Antibiotics in Trauma Patients – an NAEMSP Resource Document

Prehospital administration of antibiotics for trauma patients with open fractures and other open wounds appears safe but has an unknown impact on important patient outcomes. Local practice characteristics may support adoption of multidisciplinary-developed prudent and practicable protocols recommending use of prophylactic antibiotics for some trauma patients such as those with open fractures. Overall, prehospital administration of prophylactic antibiotics for trauma patients needs further study, which should attempt to specifically identify the types of wounds that have the highest likelihood of benefit from prehospital administration of antibiotics as well as the ideal timing of administering the antibiotic(s) following initial injury and impact on infection rates.

1. In a responsive patient with no history of penicillin or cephalosporin allergy, the administration by EMS of a 1st generation cephalosporin should be performed after the management of life threats. This intervention should not delay transport.
2. In an obtunded patient, the administration by EMS of a 1st generation cephalosporin should be performed after the management of life-threats. This intervention should not delay transport.
3. In a responsive patient with a documented penicillin allergy, the administration by EMS of a 1st generation cephalosporin should be performed with close monitoring after the management of life-threats. This intervention should not delay transport.

Traumatic cardiac arrest

Full article: Prehospital Trauma Compendium: Prehospital Management of Adults with Traumatic Out-of-Hospital Circulatory Arrest – A Joint Position Statement and Resource Document of NAEMSP, ACS-COT, and ACEP

Patients with TOHCA generally have low survivability, but achievement of ROSC with neurologic recovery and survival is possible for some patients. Except when death is obvious, there are no singular criteria on which EMS agencies should base decisions to initiate, withhold,

or discontinue resuscitative efforts in the field for adult TOHCA. Within the scope of practice of their local EMS clinicians, resource availability, and other operational and geographical considerations, EMS agencies may incorporate multiple variables including mechanism of injury, presenting cardiac rhythm, duration of arrest, proximity to definitive care, and public safety implications when developing prehospital protocols to guide withholding or discontinuation of resuscitation attempts in TOHCA patients. Further research is needed to better define factors that are more objectively predictive of survival or death, including duration of arrest, proximity to definitive care, and the role of prehospital clinical interventions on TOHCA outcomes.

- EMS resuscitation of adults with TOHCA should:
    - Prioritize prompt identification of patients who may benefit from transport to definitive care at trauma centers when safe and appropriate.
    - Emphasize the identification of reversible causes of traumatic circulatory arrest and timely use of clinically indicated life-saving interventions (LSIs) within the EMS clinician's scope of practice. These include:
        - External hemorrhage control with direct pressure, wound packing, and tourniquets
        - Airway management using the least-invasive approach necessary to achieve and maintain airway patency, oxygenation, and adequate ventilation.
        - Chest decompression if there is clinical concern for a tension pneumothorax. Empiric bilateral decompression, however, is not indicated in the absence of suspected chest trauma.
        - External chest compressions may be considered but only secondary to other LSIs.
        - Epinephrine should not be routinely used, and if used should not be administered before other LSIs.
    - If point-of-care ultrasound (POCUS) demonstrates no evidence of cardiac motion, this may have utility in TOHCA management for prognostication.
    - Emphasize that placement of cardiac monitors and/or use of POCUS should occur after indicated LSIs have been appropriately performed
- Conditions where resuscitation attempts should be withheld, include TOHCA patients with:
    - Injuries that are incompatible with life (e.g., decapitation, hemi-corpectomy, incineration, open skull injury with extruding brain matter).

    - Evidence of prolonged circulatory arrest (e.g., rigor mortis, dependent lividity, decomposition).
    - Advance care planning documents that indicate Do Not Resuscitate (DNR)/ Do Not Attempt Resuscitation (DNAR)/Allow Natural Death medical orders.
- Conditions where resuscitation attempts are discontinued for TOHCA patients should recognize:
    - Mechanism of injury should not be used as the sole determinant to discontinue resuscitation efforts**.**
    - Electrical rhythm should not be used as the sole determinant to discontinue resuscitation efforts. Of note, non-shockable rhythms (Pulseless Electrical Activity/Asystole) are associated with an extremely low likelihood of return of spontaneous circulation (ROSC) or survival with neurologic recovery.
    - There is insufficient evidence to support any specific universal standardized time-based cutoffs to discontinue resuscitation efforts based on the duration of resuscitation or transport times to definitive care. EMS decisions to transport or discontinue resuscitation should be locally determined based on EMS and trauma system resources and proximity.
- Implementation of protocols for TOHCA should consider:
    - Risks and benefits of resuscitation attempts and transport for public safety and EMS clinician safety.
    - Individual patient cost and organ donation should not be a factor in EMS clinical decision-making on-scene.
    - Local provisions for specific clinical resources (e.g. regional trauma capabilities), environmental (e.g. avalanche, etc.), or population-based situations are important and require active EMS physician oversight in collaboration with local trauma system stakeholders.

Pediatric traumatic cardiac arrest

Pending

Care of entrapped patient

Full article: Prehospital Trauma Compendium: Management of the Entrapped Patient – a Position Statement and Resource Document of NAEMSP

All EMS clinicians must have the training and skills to manage entrapped patients. Best practices include performing a timely thorough assessment with the use of remote assessment strategies when necessary, establishing clear communications among the team and with the patient, taking measures to prevent and treat hypothermia, optimizing airway management strategies, initiating large-volume fluid resuscitation and medications in patients at risk for crush syndrome, and considering tourniquet placement and physician field response.

- EMS clinicians must perform a timely and thorough primary and secondary assessment and reassessments in parallel with dynamic extrication planning; the environment may require adaption of standard assessment techniques and devices.
- EMS clinicians should establish early, clear, and ongoing communications with rescue personnel to ensure a coordinated patient-centered medically directed approach to extrication. Communication with the patient should be frequent, clear, and reassuring.
- EMS clinicians should immediately take measures to effectively prevent and manage hypothermia.
- EMS clinicians should recognize airway management in the entrapped patient is always challenging. When required, advanced airway placement should be performed by the most experienced operator with proficiency in multiple modalities and alternative techniques in limited access situations.
- In entrapped patients who are experiencing or are at risk for crush syndrome, EMS clinicians should initiate large-volume (i.e., 1–1.5 L/h for adults and 20 mL/kg/h for pediatric patients for the initial 3–4 h) fluid resuscitation with crystalloid, preferably normal saline, as early as possible and prior to extrication.
- In entrapped patients who are experiencing or are at risk for crush syndrome, EMS clinicians should administer medications to mitigate risks of hyperkalemia, infection, and renal failure, early and prior to extrication.
- Tourniquet application should be considered in the setting of the crushed extremity as a potential adjunct to medical optimization before extrication of some patients.
- Patients with prolonged entrapment with the potential for severe injuries require complex resuscitation and may benefit from EMS physician management on scene. EMS systems should consider an early EMS physician response to entrapped patients.

Pregnant trauma patients

Full article: Prehospital Trauma Compendium: Management of Injured Pregnant Patients– A Position Statement and Resource Document of NAEMSP

When EMS clinicians care for a pregnant trauma patient, it is imperative to remember that providing optimal maternal resuscitation to prevent or correct hypoxia, hypoperfusion, acidosis, and hypothermia provides the best chances of both maternal and fetal survival. EMS clinicians must maintain awareness that the physiological adaptations of pregnancy can mask early clinical signs of maternal decompensation. EMS clinicians must also recognize important modifications that injured pregnant patients require from standard trauma care including differences in patient positioning and technique modifications for certain life-saving interventions. Efforts should be made to build a more robust scientific evidence base on which to build future recommendations for EMS care of pregnant trauma patients.

- For injured pregnant patients who are at least 20 weeks' gestation (or fundal height at the level of the umbilicus), manual left lateral uterine displacement should be performed whenever possible.
- EMS clinicians should be aware that signs of hemorrhagic shock may be subtle or delayed in injured pregnant patients.
- EMS clinicians should be aware of clinical characteristics unique to the pregnant patient population that require modification of typical lifesaving interventions including hemorrhage control and resuscitation, airway and ventilation management, tension pneumothorax decompression, management of burn and inhalational injuries, and pain management.
- For Traumatic Out of Hospital Circulatory Arrest (TOHCA) in injured pregnant patients of at least 20 weeks' gestation, after correctable causes of TOHCA have been addressed and spontaneous circulation has not returned, if an EMS physician is present, a resuscitative hysterotomy should be initiated ideally within four minutes of maternal arrest. EMS clinicians should understand when an in-hospital resuscitative hysterotomy is indicated, provide a clear and early pre-arrival notification, and expedite transport to the closest appropriate hospital.
- When a pregnant patient is considering refusal of medical aid, EMS clinicians should carefully consider and discuss the potential that life-threatening risks for maternal and fetal morbidity and mortality can occur after even seemingly minor trauma.
- EMS clinicians should promote conversations regarding injury prevention strategies unique to pregnancy, such as correct seatbelt use.
- EMS clinicians should consider the possibility of intimate partner violence when caring for injured pregnant patients.

Pediatric trauma patients

Full article: Prehospital Trauma Compendium: Pediatric Severe and Inflicted Trauma – A Position Statement and Resource Document of NAEMSP

Clinicians in EMS can recognize and respond to injury patterns indicative of severe and/or inflicted trauma in children. Reviewing and evaluating the available prehospital pediatric trauma literature supports the importance of prehospital care on patient outcomes. Comprehensive, pediatric-specific patient assessment and treatment to prevent and mitigate hypoxia and hypotension are crucial.

- Emergency Medical Services (EMS) clinicians should receive initial and ongoing pediatric-specific training in trauma patient assessment, which includes an understanding of pediatric anatomy and physiology and continuous monitoring for changes in vital signs.
- Initial and ongoing training of EMS clinicians should include the recognition of signs of shock, including the Shock Index Pediatric Adjusted (SIPA) score, altered mental status, and other pathophysiology associated with severe trauma in pediatric patients.
- Vital signs should be assessed in all pediatric patients with trauma, including heart rate, respiratory rate, pulse oximetry, blood pressure, and motor Glasgow Coma Scale (GCS) score.
- EMS clinicians should be trained to identify likely inflicted injuries, with an emphasis on cutaneous injuries and injuries sustained by children with comorbidities.
- EMS clinicians should be trained to identify physiological factors and mechanisms of injury associated with more severe trauma.
- When clinically appropriate, key prehospital interventions for severe and/or inflicted trauma in children should include judicious use of crystalloid fluids, administration of blood for hemorrhagic shock when available, prevention of hypoxia and hypotension especially in patients with traumatic brain injury (TBI), adequate assessment and treatment of pain, and appropriate transport to a pediatric trauma center.
- EMS systems should work with regional partners including local and specialized facilities to establish guidelines for the appropriate triage of pediatric trauma patients from a scene and for the interfacility transfer to higher levels of trauma care, especially in rural areas.
- EMS clinicians should receive regular continuing education about pediatric trauma with an emphasis on pediatric patient assessment and infrequently performed invasive procedures, with use of hands-on simulation and case review when able.

Geriatric trauma patients

Full article: Prehospital Trauma Compendium: Management of geriatric trauma patients – A position statement and resource document of NAEMSP

Geriatric patients have unique physiologic and anatomic characteristics that impact their risk for severe morbidity and mortality, even when injured by low-energy mechanisms of injury. Prehospital clinicians should develop and apply an understanding of the special needs of this population about trauma assessment, pain management, medication metabolism and drug-drug interactions, spinal motion restriction practices, and trauma triage, transport, and destination decisions. Treatment and transport of geriatric trauma patients should be guided by patients' existing advance care planning documents when possible.

- EMS clinicians should use age-adjusted, physiologic criteria to guide decisions to transport geriatric trauma patients to the most appropriate level of trauma center available in the community.
- Geriatric trauma patients should be promptly evaluated for pain and should receive analgesic interventions in a timely manner. Analgesic medications should be dosed following weight-based guidance and should be administered with consideration of potential drug interactions and age-related changes in drug metabolism and side effects.
- EMS clinicians should consult advance care planning documents, e.g., Physician Orders for Life-Sustaining Treatment (POLST), when available, to guide care in emergency scenarios, including management of traumatic injuries.
- While older patients are at higher risk for spinal injuries, including lumbar and cervical spine fractures, traditional spinal motion restriction practices may not be suitable for older patients due to age-related anatomic changes in spinal alignment and increased risk for cutaneous pressure-related injuries. EMS clinicians should exercise judgment to determine when and how to best achieve spinal motion restriction if spinal injury is suspected in geriatric trauma patients.