THE
COMMITTEE
ON **TRAUMA**

National Trauma and Emergency Preparedness System (NTEPS)

CONFIDENTIAL DRAFT FOR REVIEW

ACS AMERICAN COLLEGE OF SURGEONS

Executive Summary

Traumatic injury in the United States is the most common cause of death for children and adults younger than 45 years and the leading cause of potential life lost before the age of 75.[1] Trauma systems are designed to deliver optimal trauma care for injured patients, informed by best evidence and accessible to all injured patients regardless of circumstance. While there are exemplary regional trauma system models that have demonstrated robust access to high-quality trauma care, there is broad variability in the quality, continuity, and access to trauma care.[2-6] This leaves many Americans at increased risk for death and disability resulting from injury. It is estimated that 20% of trauma-related deaths could be prevented if optimal care was available to everyone.[7] Injury research is a cornerstone for finding new ways to save lives, yet federal support for injury research remains uncoordinated, underfunded, and understudied.[8-10] This is despite the fact that traumatic injuries rival cancer and heart disease in health and financial impact.[1]

Trauma systems also form the backbone for disaster preparedness and response to other time-sensitive emergencies. Trauma surgeons have learned from mass casualty events that regional coordination is vital to match resources with casualty needs.[11-13] Public health agencies, emergency management services, and acute-care health systems do not routinely work together, and there is no overarching body to assist in coordinating the medical response to disasters. This gap became apparent during the COVID-19 pandemic.[14] In response, many trauma surgeons and emergency medicine physicians helped to establish Regional Medical Operation Centers (RMOCs) in their states and regions.[12] RMOCs enabled a more rapid response to pandemic demands by coordinating the activities of emergency medical services (EMS) agencies, hospitals and healthcare systems, long-term care facilities, public health agencies, and emergency management. Where RMOCs were established, lives were saved. Where they were not, lives were lost.

The time has come to connect daily injury care and mass casualty readiness as a National Trauma and Emergency Preparedness System (NTEPS). Building on the strengths of highly functional state/regional trauma systems and RMOCs, Congress should establish the NTEPS to:

Background

Trauma is a neglected public health emergency in the US.[1] Injuries and violence affect everyone, regardless of age, demographics, or economic status. According to the Centers for Disease Control and Prevention (CDC), injury is the leading cause of death among individuals 1 to 45 years old, and overall injury approaches 200,000 deaths per year.[1,15] Millions more live with long-term disability following injury. Trauma accounts for almost 30% of all life-years lost in the US, more than cancer (16%) and heart disease (12%) combined.[16] Yet injury remains understudied. Injury research is underfunded and uncoordinated and accounts for only 2.9% of the total National Institutes of Health extramural budget.[8-10,17] Systems-based and patient-centered research is vital for a successful trauma system that saves more lives and restores living.

These facts are not new discoveries. In 1966, the National Academy of Sciences published "Accidental Death and Disability: The Neglected Disease of Modern Society," its first report on injury as a national public health problem.[18] Fifty years later, the National Academies of Science, Engineering, and Medicine (NASEM) released the report, "A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths After Injury."[19] This report cited lessons learned from both military and civilian trauma experiences and sought to energize the development of a national trauma care system to reach zero preventable deaths after injury and minimize disability secondary to trauma. It also called for a national trauma research action plan, which the multi-stakeholder Coalition for National Trauma Research has worked to develop with limited resources.

Care for the injured patient has improved substantially over the past 100 years, and the American College of Surgeons (ACS) has helped to accelerate change by defining standards.[20,21] These are codified as optimal resources for care of the injured patient in trauma centers and are inclusive of prevention, prehospital care, acute care, rehabilitation, and research. Standards are the basis for verification of trauma centers at one of four levels. Studies have shown that patients treated at a verified trauma center have a decreased chance of dying.[22-28]

The ACS has extended work with standards to metropolitan, state, and regional systems. In collaboration with multiple stakeholders and with approval from NASEM, the Department of Defense, and the National Highway Traffic Safety Administration, 11 essential trauma system elements (Appendix) have been defined for governance, architecture, and function of regional trauma systems. These elements are informed by two decades of trauma systems study, conducted by the ACS Committee on Trauma (COT) Trauma Systems Planning and Evaluation Committee and including nearly 50 regional trauma system consultations across the US. Where regionalization of trauma care has taken place with an organized and inclusive system of care, a reduction in morbidity and mortality has followed.[24,27]

Trauma systems have sought to function as learning healthcare systems, consistently evaluating their own outcome data to improve care at the local, regional, and state levels. The ACS

supports the National Trauma Databank, which collects uniform data from trauma centers across the US and through the Trauma Quality Improvement Program (TQIP), which provides risk-adjusted benchmarking data to hospitals to support quality improvement. In some states, TQIP collaboratives have formed to share hospital data across a regional trauma system and work on joint quality improvement projects. These efforts have contributed to significant process improvement in trauma centers, yet there is a need to develop data linkage efforts across the continuum of care that includes prehospital care, rehabilitation, and long-term function.

Despite standards, verification, and quality improvement initiatives, significant gaps for injury care remain in our healthcare system that lead to unnecessary death and disability. Current trauma systems have been developed at the state level and are highly variable: not all states have an organized system, many have failed to engage rural hospitals as part of a broader system, and interstate regionalization remains sporadic.[3-6,29-32] As a result, our defacto "national trauma system" is a fragmented and disorganized patchwork of healthcare professionals, hospitals, EMS organizations, rehabilitation facilities, and public health agencies without coherence.

Effective daily trauma care requires timely access to a system with optimal resources for pre-hospital interventions, initial evaluation and imaging, operative care, intensive care, post-injury care, rehabilitation, and recovery (to include social and mental health services). With life-threatening injury, time is of the essence; this reality underscores the need to implement a robust system of injury care that reaches every community in the US. Disparities in trauma care are well documented and seen in both rural and urban areas.[4,6,29,30,32] Racial and ethnic differences in access to trauma care are associated with disparities in geographic access to trauma centers.[5,6] The COVID-19 pandemic has further illuminated health inequity in communities across America as it revealed gaps in our public health emergency preparedness system, as well as a healthcare infrastructure unable to meet the ongoing demand for care.[14,33]

COVID-19 represents a mass population event in which a large number of people are ill or injured and overwhelm a region's ability to care for all. Trauma surgeons have a great deal of experience in systemic management of injuries from mass population events, and trauma systems are standing integrators of care across settings. Thus, for pandemic response, it was only natural for trauma surgeons and systems to develop Regional Medical Operation Centers (RMOCs), also called Medical Operations Coordinating Cells (MOCCs).[12] RMOCs are local/regional organizations that bring emergency management, public health, and acute medical care systems together in a mass population event to balance the distribution of resources and patients in the acute healthcare system. RMOCs are like air traffic control towers for inclusive coordination of the health and medical response in affected areas across all healthcare partners. They enable real-time reporting of critical information, such as EMS and transportation resources, hospital bed capacity, essential logistic availability (e.g., PPE and ventilators), and patient volume and acuity.

RMOCs can also function daily to coordinate regular community healthcare needs for patients with time-sensitive conditions (e.g., injury, heart attack, and stroke) and existing inpatients who may need to move between healthcare facilities. An RMOC can scale more quickly from daily patient to mass casualty management: the population of patients in need expands with casualties from the surge event while the daily population of emergent patients unrelated to the surge event and inpatients remains. The RMOC can readily manage casualties in the

context of existing healthcare needs and resources. Importantly, an RMOC may prevent an incident that generates a large number of injured or infectious people from becoming an overwhelming mass population event with scarce resources resulting in regional crisis.

For optimal, accessible care for daily injuries and mass population events, the common denominator is a national trauma and emergency preparedness system that links local, state, and regional systems with a common data network and drives performance improvement, readiness, and research. The private sector and professional societies have reached the limit of what they can do to structure a national trauma system. The National Trauma and Emergency Preparedness System (NTEPS) is consistent with the mission of the Health and Human Services Office of the Assistant Secretary for Preparedness and Response (ASPR) to collaborate with multiple stakeholders to improve readiness and response capabilities for 21st century health security threats. Injury and mass population events are such threats. The NTEPS will integrate response and care resources for daily and progressive mass population events and lead to a more unified approach that reduces death and disability from injury and disease.

Request to Congress

Building on the strengths of highly functional state/regional trauma systems and RMOCs, Congress should establish the National Trauma and Emergency Preparedness System to:

- Promote universal and equitable access to high quality trauma care across the US
- Support public health readiness and coordination of care during major events

Congress should emphasize these NTEPS functions:

1. Public health readiness
   a. Provide daily coordination of patient movement and transport resources, scalable for mass casualty events
   b. Coordinate public health, emergency management, and healthcare systems regionally, statewide, and nationally, for clinical integration and deployment of medical assets in a mass population event
   c. Sustain comprehensive, real-time data system of critical data elements, to include EMS and transportation resources, hospital bed capacity, resource availability, and patient/casualty volumes
   d. Support domestic mutual military-civilian readiness integration
   e. Establish process for state, regional, and national situational awareness of emerging events

2. Standards
   a. Establish best practices for prevention, effective and efficient field triage, emergency response, inpatient care, rehabilitation, and recovery
   b. Establish system for verification of trauma system standards across continuum of care
   c. Provide clinical expertise with timely consultation across regional and state systems
   d. Determine optimal resources for the trauma and emergency preparedness system
   e. Establish rubric for trauma center apportionment

3. Performance improvement
   a. Conduct annual needs assessment for trauma and emergency preparedness
   b. Evaluate operational readiness at state and regional levels
   c. Provide risk-adjusted benchmarking for system improvement
   d. Support rural hospitals and develop strategies to address the rural medical work force issues
   e. Support state-level EMS systems

4. Research
   a. Collect and sustain national trauma dataset spanning the continuum of care
   b. Coordinate, fund, and disseminate research

5. Public outreach
   a. Disseminate and support implementation of best practices in injury prevention
   b. Promote STOP THE BLEED® training and deployment of public access bleeding control equipment
   c. Inform communities about the role of their trauma systems for daily injury and mass casualty care

NTEPS Strategic Elements

Vision

The vision of the NTEPS is to have timely and high-quality trauma care with equitable access for everyone injured across the entire spectrum of care, from prevention to long-term outcomes and from individual injuries to mass population events.

Mission

The NTEPS will oversee the coordination of resource and patient/casualty distribution in daily and mass population events, develop system standards and benchmark regional system performance, synthesize and disseminate knowledge, and promote uniform community outreach for prevention and resiliency.

Goals

- Reduce rates of injury in the population.
- Ensure timely access to equitable, high-quality care for all.
- Enhance survivability and minimize disability for all injured patients.
- Maximize survival after mass population events.
- Accelerate high-quality research to advance trauma care.

Guiding Principles

- The NTEPS should have administrative and regulatory oversight.
  - National standards should be established to support state and regional trauma systems. The specific processes, integration, and delivery of care needed to meet these standards should be implemented at a regional level.

- A national verification process should be established to assess each regional system for timely and equitable access to quality injury care and prevention for all.

- The NTEPS should span the medical response to daily trauma and mass population events. It should:
  - Be unifying in its approach across the US as a multidisciplinary collaborative effort.
  - Optimize resource matching across the entire response system as informed by real-time situational awareness.
  - Support military and civilian trauma care cooperation.

- The NTEPS should work to strengthen the role and involvement of EMS. The system will ensure that:
  - EMS is established as an essential service, locally, regionally, and nationally.
  - EMS remains an integral stakeholder in a national system.

- The NTEPS should reflect a collaboration of trauma stakeholders from both the private and public sectors.

- The NTEPS should be a learning healthcare system that continuously improves care based on the best available evidence, cutting-edge research, and concurrent review of system data. This system will include:
  - Data acquisition and analysis to support a robust continuous performance improvement plan.
  - A comprehensive, national, de-identified patient registry that encompasses all phases of trauma and mass population care.
  - Support for trauma care, injury prevention, and patient-reported outcomes research through prioritization and distribution of funding, as well as dissemination of findings for implementation.
  - Regional benchmarks of performance.
  - Interconnectivity of data from all phases of response and care with data sharing agreements for linkage and transparency.

Objectives

1. National Public Health Readiness: Using existing frameworks, such as those developed by FEMA and ASPR, establish and fund a system of care that helps injured patients get to the right hospitals to meet their needs, and that expands during large-scale disasters to prevent overloading any single hospital. ASPR's model for Medical Operations Coordination Cells developed by the FEMA Healthcare Resilience Task Force could serve as a guide.
2. National Standards
   a. Establish and update national standards for trauma system performance across the continuum of trauma care, from point of injury to community reintegration, and inclusive of injury prevention programs and system readiness benchmarks.
   b. Support the implementation of evidence-based trauma care practices by all elements of the trauma system.
3. Performance Improvement
   a. Establish a system of mutual reporting and monitoring that aligns with existing oversight from state agencies, The Joint Commission , and the American College of Surgeons.
   b. Support the examination of system-wide issues to identify opportunities for improvement, develop national metrics and corrective action plans, and facilitate issue resolution.

c. Provide an ability to enhance military-civilian coordination and exchange, to include support of military-civilian trauma training partnerships such as Mission Zero.

4. Research: Study the optimal management of injured patients, trauma system design and operation, and public health readiness, and disseminate findings to close critical knowledge gaps in trauma care across military and civilian systems.
5. Outreach: Ensure an even application of community resiliency activities, to include best practices for injury prevention and enhancement of public skills in bleeding control.

Structure and Governance

The Organizing Body will represent stakeholder organizations from across the continuum of trauma care and will be responsible for oversight of the NTEPS core functions (public health readiness, standards, performance improvement, research, and public outreach) to support local, state, and regional trauma systems. It will provide central coordination to unify public and private entities for optimal integration of all services.

Responsibilities

1. Provide leadership, governance, and accountability.
2. Maintain partnerships with stakeholders, such as leading specialty and professional organizations, and state and federal governmental agencies.
3. Promote standards to support state and regional trauma system development.
4. Identify, implement, and operationalize funding mechanisms for sustainability.
5. Monitor system performance.

Governance Model

A system of coordination, with an emphasis on patient care, oversight, and accountability, is best achieved as a private-public partnership through an Organizing Body. The Organizing Body should include the following components:

- Board of Directors—Composed of representatives from national professional societies spanning the continuum of care, to include trauma surgeons, emergency medicine providers, EMS providers, pediatric trauma specialists, rehabilitation specialists, nursing trauma program managers, injury prevention specialists, mental health professionals, patient advocacy representatives, and public representatives. The Directors should reflect the core functions of the NTEPS. The Board elects a Chairperson to lead the governance of the organization and appoints a Chief Executive Officer (CEO) to manage the organization.
- Regional Council—Advisory to the Board of Directors. The Board appoints regional leaders to represent local, state, and regional trauma systems and provide support for program implementation.
- Advisory Board—Composed of additional stakeholder representatives who advise the Board of Directors as ex-officios and as subject matter experts. It is representative of vulnerable populations and prioritizes inclusivity. Ex-officio roles are held by government representatives from federal health and defense agencies. There are also roles for subject matter experts from healthcare systems, insurers, specialty physician groups, and injury prevention specialists.

The administrative leadership team is led by the CEO and composed of full-time employees who run the day-to-day operations of the NTEPS.

The NTEPS will work closely with governmental agencies relevant to each of the core functions, both during daily operations and during mass population events.

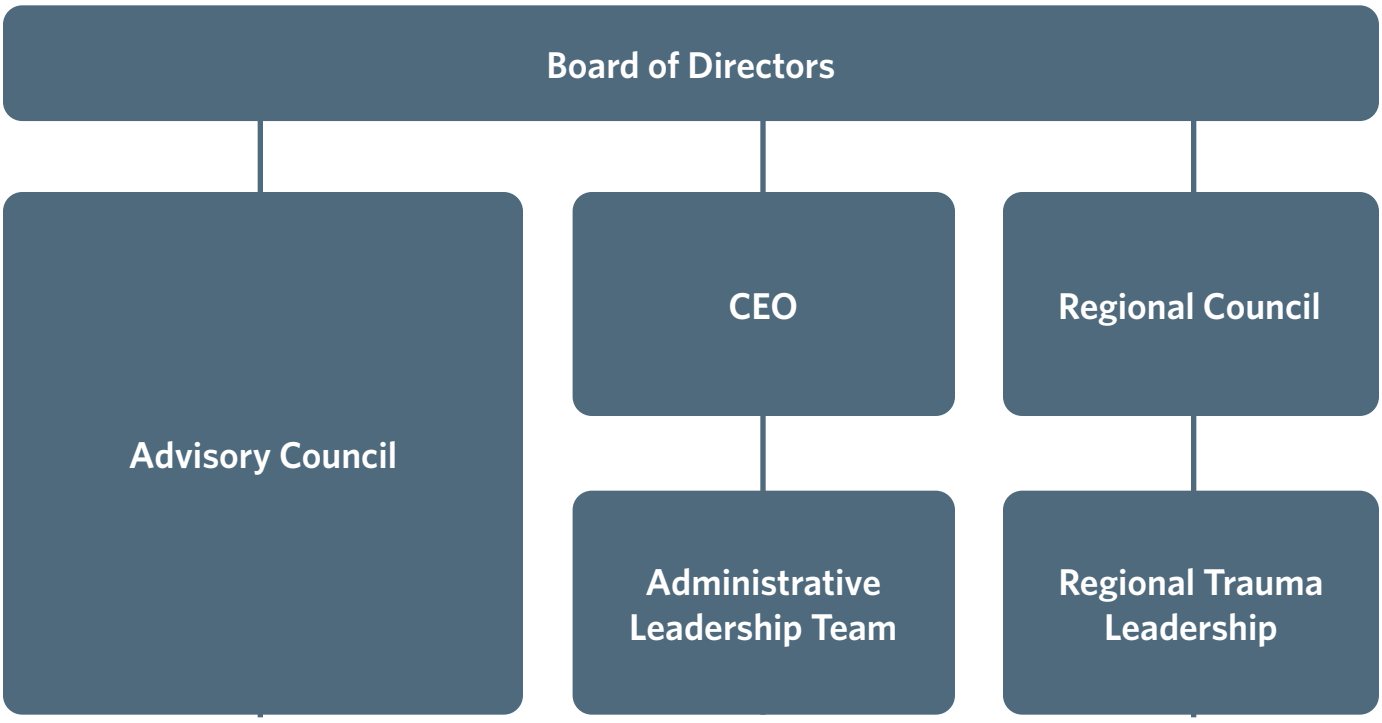

Figure. NTEPS Governance Structure

Appendix: Essential Trauma System Elements

Essential Trauma System Element #1: Trauma System Components
The trauma system should address the full spectrum of injury and its causes, including public education and awareness, prevention, pre-hospital/inter-facility emergency medical services, acute evidence-based hospital care (referring and accepting facility), and rehabilitation. The system should address all injured patients with special attention to pediatric patients, geriatric patients, those with mental illness, and other vulnerable populations.

Essential Trauma System Element #2: Statutory Authority
Statutory authority to enable development and implementation of a trauma system should exist. A lead agency with sufficient authority to implement policy, maintain evidence-based administrative rules, and allocate trauma system funds should be established or identified. A multidisciplinary advisory group, consisting of stakeholders representing the full spectrum of trauma care, should guide the lead agency.

Essential Trauma System Element #3: Multidisciplinary Advisory Group
A multidisciplinary advisory group, consisting of stakeholders representing the full spectrum of trauma care, should be established. The role of the advisory group should be to guide the lead agency regarding trauma system development and operations. Representation should be diverse, with respect to geography, population (rural/urban, adult/pediatric, burn), and trauma center level designation.

Essential Trauma System Element #4: Trauma System Plan
An integrated, evidence-based trauma system plan should be created and implemented. This plan should be reviewed annually and updated every three years at a minimum, under the direction of the lead agency and the multidisciplinary advisory group.

Essential Trauma System Element #5: Designation Based on Need
The lead agency should develop and administer a trauma center designation process based upon population needs in accordance with nationally recognized standards.

Essential Trauma System Element #6: Funding
The lead agency should establish a sustained funding mechanism for trauma system infrastructure. Funding should include physical and staffing resources for program administration and oversight, quality improvement activities, and data collection, storage, and analysis, as well as support for disaster response and military integration.

Essential Trauma System Element #7: Data Collection
The lead agency should have the authority to collect, validate, and analyze injury surveillance data. Data collection should include the full continuum of care from point of injury through rehabilitation. This data should include all care facilities and should have the ability to integrate with other data collection systems (i.e., vital records, medical examiner, law enforcement, and rehabilitation). Data sharing should be optimized to include system stakeholders to support quality improvement, research efforts, and to inform legislation pertaining to trauma.

Essential Trauma System Element #8: Confidentiality and Discoverability
The lead agency should establish a process to ensure patient confidentiality and provide statutory protection from discoverability to support trauma system quality improvement and research efforts.

Essential Trauma System Element #9: System-Wide Performance Improvement
The lead agency should establish a system-wide trauma registry that meets national data collection standards and has the capacity to assess trauma system quality. The lead agency should provide regular reports, at least annually, to stakeholders to support system operations, evaluate quality metrics such as outcomes and preventability of mortality, benchmark internal system components, and inform injury prevention activities.

Essential Trauma System Element #10: Disaster Preparedness
A comprehensive emergency disaster preparedness and response plan should be established and reviewed annually. This plan should integrate all components of the trauma system and coordinate with all existing response entities, including local, state, federal, and military partners. The plan should be exercised regularly, at a minimum, semiannually. One of these exercises should be operationally based, testing all components of the system.

Essential Trauma System Element #11: Military Integration
The trauma system should actively support integration and cooperation with military personnel, medical treatment facilities, and transport capabilities. This should include patient care, education, research, training, disaster response, and deployment readiness preparation.

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