



ACS White Book

Trauma Systems Consultation Guide

**Essential Elements, Framework, and Assessment for State and
Regional Trauma Systems**

Effective November 2022



Trauma Systems Consultation Guide

AMERICAN COLLEGE OF SURGEONS

Copyright © 2022 American College of Surgeons, 633 N. Saint Clair St., Chicago, IL 60611-3295. All rights reserved.

ISBN 978-1-7369212-0-3

Acknowledgments

Executive Director

Patricia L. Turner, MD, MBA, FACS

David B. Hoyt, MD, FACS (Past)

Committee on Trauma Chair

Jeffrey Kerby, MD, PhD, FACS

Eileen Bulger, MD, FACS (Past)

Trauma Programs Medical Director

Eileen Bulger, MD, FACS

Ronald M. Stewart, MD, FACS (Past)

Avery B. Nathens, MD, PhD, FACS (Trauma Quality Programs
Medical Director)

Steering Committee

Brian Eastridge, MD, FACS, COL (Retired), MC, USA (Chair of
Systems Committee)

Kristan L. Staudenmayer, MD, MS, FACS (Vice Chair of
Systems Committee)

Robert J. Winchell, MD, FACS (Past Chair of Systems Committee)

Warren Dorlac, MD, FACS, Col (Retired), USAF, MC, FS (Past
Vice Chair and Workgroup Lead)

Anne Rizzo, MD, FACS, DABS (Workgroup Lead)

Barbara Gaines, MD, FACS, FAAP (Workgroup Lead)

John Armstrong, MD, FACS (Workgroup Lead)

Robbie Dumond, MHA, BSN, TCRN, AEMT (Workgroup Lead)

D. Anderson Millar, MD, FACS (ACS COT Future
Trauma Leader)

Contributors

Dennis W. Ashley, MD, FACS

Elizabeth Atkins, MSN, RN, TCRN

Jeffrey A. Bailey, MD, FACS

Vicki Bennett, MSN, RN

Denis D. Bensard, MD

Stephanie Bonne, MD

David Borgstrom, MD, MBA, FACS

Eric Champion, MD, FACS

Dudley B. Christie, MD, FACS

Tracy Cotner-Pouncy, BSN, RN, TCRN

Jay J. Doucet, MD, FACS

Mary Elizabeth Fallat, MD, FACS, FAAP
 James Ficke, MD, FACS
 Peter E. Fischer, MD, MS, FACS
 Jeffrey B. Friedrich, MD, MC, FACS
 John Gallagher, MD, FAEMS, FACEP
 Joseph Giacino, PhD
 Rajan Gupta, MD, MHCDS, FACS, FCCP
 Brian Harbrecht, MD
 Michael S. Hayashi, MD, FACS
 John Hunt, MD, MPH
 Maria Fernanda Jiménez, MD, FACS
 Christopher A Kasal, MD, FACS
 Jorie Klein, MSN, MHA, BSN, RN
 Amy Koestner, RN, MSN
 James C Krieg, MD, FACS
 Jon Krohmer, MD, FACEP, FAEMS
 George Kushner, DMD, MD, FACS
 Amber Kyle, MSN, RN
 Ajai Malhotra, MD, MBBS, FACS
 N. Clay Mann, PhD, MS, MBA
 Kathleen Martin, MSN, RN
 Robert Shayn Martin, MD, FACS
 Robert Mazzoli, MD, FACS
 Richard S Miller, MD, FACS
 A. Cate Miller, PhD
 Hassan Riaz Mir, MD, MBA
 Margaret M. Moore, MD
 Nicholas Namias, MD, MBA, FACS
 Debra Perina, MD, FACEP
 Jon Perlstein, MD, FACS
 Kelli Perrotti, MS, BSN, RN
 Kyle Remick, MD, FACS, Colonel (Retired), US Army
 Dennis Rowe, EMT-P
 Lisa L. Schlitzkus, MD, FACS
 Stacy Shackleford, MD, FACS, Col, USAF, MC
 Javed Siddiqi, MD, DPhil (Oxon), FRCSC, FACS, FAANS
 Richard Sidwell, MD, FACS
 Mary Ann Spott, PhD
 Scott G. Thomas, MD, FACS
 Amy Wagner, MD
 Rich Wisniewski, MA, NRP

Committee on Trauma Staff Contributors

Maria Alvi, MHA (Past Program Manager, Trauma Systems Programs)
 Hannah Chargin (Past Congressional Lobbyist, Division of Advocacy and Health Policy)
 Jean Clemency (Administrative Director, Trauma Programs)
 Mackenzie Dafferner, MPH (Program Manager, Trauma Systems Programs)
 Jimm Dodd, MPAS, MA, US Army (Retired) (Senior Manager, STOP THE BLEED® Program)
 Christopher Hoeft, MS (Senior Manager, Data and Report Operations)
 Holly Michaels, MPH (Manager, Trauma Systems and Injury Prevention Programs)
 Tammy Morgan (Manager, Trauma Center Programs)
 Melanie Neal, MS (Assistant Director, Trauma Quality Programs)

Table of Contents

| | |
|---|-----------|
| Acknowledgments | ii |
| Table of Contents | iv |
| Preamble | vi |
| Essential Trauma System Element #1: Statutory Authority | 1 |
| Purpose and Rationale | 2 |
| Prereview Questionnaire | 2 |
| Documentation Requested | 2 |
| Essential Trauma System Element #2: Funding | 5 |
| Purpose and Rationale | 6 |
| Prereview Questionnaire | 6 |
| Documentation Requested | 6 |
| Essential Trauma System Element #3: Multidisciplinary Advisory Group | 9 |
| Purpose and Rationale | 10 |
| Prereview Questionnaire | 10 |
| Documentation Requested | 11 |
| Essential Trauma System Element #4: Trauma System Plan | 13 |
| Purpose and Rationale | 14 |
| Prereview Questionnaire | 14 |
| Documentation Requested | 14 |
| Essential Trauma System Element #5: Continuum of Care | 17 |
| Prevention and Outreach | 18 |
| Prereview Questionnaire | 18 |
| Documentation Requested | 36 |
| Emergency Medical Services | 19 |
| Prereview Questionnaire | 20 |
| Requested Documentation | 21 |

| | | | |
|--|-----------|--|-----------|
| System Triage and Patient Flow | 21 | Essential Trauma System Element #10: | 45 |
| Prereview Questionnaire | 22 | Confidentiality and Discoverability | |
| Documentation Requested | 22 | Purpose and Rationale | 46 |
| Definitive Care Facilities | 23 | Prereview Questionnaire | 46 |
| Prereview Questionnaire | 24 | Documentation Requested | 46 |
| Documentation Requested | 24 | Essential Trauma System Element #11: Disaster | 49 |
| Rehabilitation | 24 | Preparedness | |
| Prereview Questionnaire | 25 | Purpose and Rationale | 50 |
| Documentation Requested | 25 | Prereview Questionnaire | 50 |
| System Integration | 26 | Documentation Requested | 51 |
| Prereview Questionnaire | 26 | Essential Trauma System Element #12: Military | 53 |
| Documentation Requested | 26 | Integration | |
| Essential Trauma System Element #6: Needs Based | 29 | Purpose and Rationale | 54 |
| Designation | | Prereview Questionnaire | 54 |
| Purpose and Rationale | 30 | Documentation Requested | 54 |
| Prereview Questionnaire | 30 | Appendix A: National Guideline for the Field Triage | 57 |
| Documentation Requested | 30 | of Injured Patients | |
| Essential Trauma System Element #7: Trauma | 33 | Appendix B: Prereview Questionnaire and | 61 |
| System Registry | | Documentation Requested | |
| Purpose and Rationale | 34 | | |
| Prereview Questionnaire | 34 | | |
| Documentation Requested | 35 | | |
| Essential Trauma System Element #8: Injury | 37 | | |
| Epidemiology | | | |
| Purpose and Rationale | 38 | | |
| Prereview Questionnaire | 38 | | |
| Documentation Requested | 38 | | |
| Essential Trauma System Element #9: System-wide | 41 | | |
| Performance Improvement | | | |
| Purpose and Rationale | 41 | | |
| Prereview Questionnaire | 41 | | |
| Documentation Requested | 41 | | |

Preamble

Need for Trauma Systems

Injury is a highly prevalent and lethal disease. It affects all populations, whether urban or rural, young or old. It is a disease marked by diversity of mechanisms, all of which are connected by a common thread—the acute disruption of the body’s homeostatic processes by an external force. Unfortunately, the disease “injury” tends to be treated as an isolated and often unpredictable event. Using a public health model, however, provides a framework to integrate the full spectrum of the disease into one cohesive model. Trauma begins when prevention fails, and only ends when the patient has been restored to their level of function prior to the event. Each individual component of the trauma system should be fully developed and supported, but equally importantly, key leaders and stakeholders should ensure that the components work together and that the public is aware of the burden of injury in the community.

- Trauma systems are a vital part of injury care across the United States.
- Injury is a major public health problem, causing great loss of life and productivity.
- Injury is the leading cause of death during the first four decades of life and among the top 10 causes in all decades of life.
- Organized systems of care have been shown to save lives after injury.
- Trauma systems are essential to combat the injury epidemic across the spectrum, ranging from injury prevention, to specialized care, to rehabilitation.
- Across the U.S. and the world, regional trauma systems vary dramatically in their level of organization and function.
- Trauma systems at all levels of maturity can benefit from an external analysis leading to additional development or refinement.

U.S. Trauma System History

The earliest organized systems of trauma care in the 1970’s and early 1980’s were characterized by a concentration of care at centers dedicated to the treatment of injured patients and a prehospital bypass philosophy—in which severely injured patients were transported not to the closest facility but to trauma centers. This exclusive trauma system model, with its concentration upon transport and definitive care facilities, was associated with a

significant reduction in injury-related mortality within the region served. These systems typically served population-dense urban centers such that the designation of relatively few Level I or Level II centers was sufficient to address local needs. With an increasing recognition of the burden of injury associated with trauma outside of major metropolitan areas, including suburban, rural, and frontier environments, it became evident that this exclusive approach to trauma center designation was inadequate.

To better serve the needs of the entire population, inclusive trauma system models were developed and implemented. These inclusive injury care systems, in which all acute care facilities participate to the extent their resources allow, have two distinguishing features. Most importantly, they provide all centers within the system with guidance to assess and stabilize more severely injured patients before transport to Level I or II centers. In addition, they allow for less severely injured patients to be cared for within their community. This system structure allows for appropriate load balancing of patients within the trauma system based upon injury acuity. Recent evidence suggests that inclusive systems of trauma care are associated with a greater reduction in injury-related mortality within a region when compared to exclusive systems. As the trauma system's role in reducing mortality and reintegrating the injured back into society was increasingly understood, the trauma system's expanded role in post-acute care and rehabilitation has been recognized.

Organized systems of trauma care are more comprehensive than emergency medical services and definitive care facilities. The system must be supported with legislation, including policies and procedures to ensure that the system evolves to meet regional injury care needs. There must be a means to ensure adequate funding and personnel to support systems operations, continuing quality improvement, and injury surveillance to identify emergent new threats. With a mechanism to identify prevalence of specific injury types within the community, these data should be utilized to foster the implementation of salient injury prevention initiatives.

History of the American College of Surgeons Trauma System Consultation Process

In the United States, care of injured patients historically focused on trauma centers, not trauma systems. This focus stemmed from the existence of large county hospitals, which became de facto trauma centers. Dedicated trauma centers beyond these county hospitals were developed beginning in 1966. Sporadic development of trauma systems began when the state of Illinois designated trauma centers (a “system”) in 1971 and Maryland created the statewide Shock Trauma System in Baltimore. Other regions followed, such as Orange County and San Diego, California, in the early 1980s.

The first document to establish resource and process standards for trauma *centers*—“Optimal Hospital Resources for Care of the Seriously Injured”—was published in the *Bulletin of the American College of Surgeons* in 1976. This document formed the basis for the subsequent American College of Surgeons (ACS) Committee on Trauma (COT) Trauma Center Verification Program. During the first several iterations of trauma center verification site visits, the need to invest in the development and maturation of regional trauma systems became evident. However, at that time, the ACS COT did not have the necessary infrastructure or processes to provide this service. In 1992, the Health Resources and Services Administration (HRSA) developed the Model Trauma Care System Plan for the United States. This HRSA Model Trauma plan was the basis for the development of the ACS COT Trauma Systems Consultation Program in 1996.

The ACS COT multidisciplinary committee established the following fundamental principles for the Trauma Systems Consultation Program:

- Trauma systems should be inclusive.
- The program should be consultative as opposed to a “verification” program. It was thought that the program should be designed to assist any region desirous of developing or improving an already existing trauma system.
- The process and consultation team should be multidisciplinary, reflecting the multidisciplinary nature of a trauma system.

- The consultative visit should be adapted to meet the needs of the requesting state or region. The review team should include people with the requisite expertise to serve the needs of the requesting agency and participants.
- All site visit stakeholder sessions should be inclusive and thereby include all participants who represent the various components of the system (such as surgeons, nurses, hospital administrators, Emergency Medical Services providers and administrators, lead agency personnel, fire chiefs, and law enforcement).

The committee conducted the first consultation visit in Montana in 1999. During this initial consultation, the process was tested and modified, including the use of an electronic format for creating the consultation report. Since then, numerous consultation site visits have been conducted, which enabled refinements to the consultation process. For example, a Client Manual was developed to assist states and regions in preparing for the site visit. This document was followed by the development of a Reviewer Manual to assist review team participants to assess the level of trauma system maturity and recommend operational processes to move the system forward.

Based upon the recommendation for healthcare regionalization by the Institute of Medicine's 2006 report *The Future of Emergency Care in the U.S. Health Care System*, the ACS COT updated and reformatted the *Trauma Systems Consultation Guide* in 2008, with an emphasis on the public health model. The Institute of Medicine report specifically acknowledged the ACS COT Trauma System Evaluation and Planning Committee efforts to promote regionalized, coordinated, and accountable systems of care as a model for other emergency healthcare responses. The public health model provided a conceptual framework for trauma system development, management, and ongoing performance improvement.

The three core functions of public health services highlighted within the 2008 consultation guide were assessment, policy development, and assurance.

- **Assessment** is the regular and systematic collection and analysis of data from a variety of sources to determine the status and cause of a problem and to identify potential opportunities for interventions.
- **Policy development** uses the results of the assessment in an organized manner to establish comprehensive policies intended to improve the public's health.
- **Assurance**, agreed-on goals to improve the public's health, is achieved by providing services directly, requiring services through regulation, or encouraging the actions of others (public or private).

The 2008 *Trauma Systems Consultation Guide* was also philosophically informed by the 2006 HRSA *Model Trauma System Planning and Evaluation (MTSPE)*, which offered a conceptual framework for trauma system design and implementation at the regional level. Subsequent experience in trauma system consultations using this architecture proved challenging and difficult to operationalize due to the heterogeneity of the trauma systems under assessment. The MTSPE contained a self-assessment tool for trauma system planning, development, and evaluation. This tool, referred to as the BIS (benchmarks, indicators, and scoring), served to allow systems to identify gaps and monitor their progress over time. Though a solid tool, end users could not ubiquitously and comprehensively apply it to their regional trauma systems.

Essential Trauma System Elements

A 2016 report by the National Academy of Sciences, Engineering, and Medicine (NASEM), entitled "A National Trauma Care System: Integrating Military and Civilian Trauma Systems to Achieve Zero Preventable Deaths after Injury," identified the necessity of creating an integrated national system for the care of trauma to eliminate preventable death and disability. A subsequent consensus conference cosponsored by the ACS COT sought to develop a plan to operationalize the implementation of this overarching trauma system guidance. One highly critical component of this effort was the emphasis on identifying essential trauma system elements necessary to maintain a functional trauma system.

Since the 1980s, experts in the field of trauma system development have sought to define the necessary and essential components of a working trauma system. The functional elements of highly effective trauma systems were outlined in two documents published by HRSA, the *Model Trauma Care System Plan* in 1992 and *Model Trauma Systems Planning and Evaluation* in 2006.

Using these sources as well as data gained from over 40 trauma system consultations performed by the Trauma Systems Evaluation and Planning Committee of the ACS COT, a draft set of essential elements was developed in 2018 by a multidisciplinary workgroup led by the ACS COT. These essential trauma system elements were subsequently refined through input from provider organizations from across the spectrum of injury care.

The following essential trauma system elements form the basis of the revised trauma system consultation process.

Essential Trauma System Element #1: 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 well-defined 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 #2: 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, data collection, data storage, data analysis, quality improvement activities, education, and support for disaster response and military integration.

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), phases of care (prehospital and rehabilitative), and trauma center level designation._

Essential Trauma System Element #4: Trauma System Plan

An integrated 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: Continuum of Care

The trauma system should address the full continuum of injury, from prevention and prehospital/interfacility emergency medical services to acute hospital care (referring and accepting facilities) through rehabilitation. The system should address all injured patients, with special attention to pediatric, geriatric, and other vulnerable populations.

Essential Trauma System Element #6: Needs-Based Designation

The lead agency should develop and administer a trauma center designation process, which is based upon population needs.

Essential Trauma System Element #7: Trauma System Registry

The lead agency should have the authority to establish and maintain a trauma system registry to collect, validate, and analyze injury surveillance data. Data collection should include the full continuum of care from point of injury through rehabilitation. These data should include all care facilities that treat injured patients. These data should be integrated with other data collection systems (such as vital records, medical examiner, law enforcement, and rehabilitation). Data definitions and patient inclusion criteria should be standardized to a national standard. Data sharing should be inclusive of system stakeholders to support quality improvement, research efforts, and legislative outreach pertaining to trauma.

Essential Trauma System Element #8: Injury Epidemiology

The lead agency should have systems and processes in place to regularly track and report on injury frequency, rates, and patterns across the entire jurisdictional population. Analysis and reporting should be based on multiple pertinent data sources (such as vital statistics, hospital discharge data, EMS, emergency department data, and trauma registries), including information obtained through surveillance activities. Data from these sources should be synthesized to provide a comprehensive description of injury and then analyzed to identify trends and patterns to inform system development, injury prevention, and performance improvement efforts._

Essential Trauma System Element #9: System-wide Performance Improvement

The lead agency should establish a system-wide trauma performance improvement process to evaluate all aspects of the trauma system. The plan should define audit filters to monitor and track specific processes and outcomes, such as access to care, availability of services, and effectiveness of injury prevention initiatives. In addition, the plan should define a process for tracking the audit filters, addressing performance gaps, and determining loop closure._

Essential Trauma System Element #10: Confidentiality and Discoverability

The lead agency should establish a process to ensure confidentiality and provide statutory protection from discoverability to support trauma system performance improvement and research efforts.

Essential Trauma System Element #11: 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 particularly military partners. There should be a developed and operational network of Regional Medical Operations Centers (RMOCs) as a major component of the disaster preparedness plan. The plan should be exercised at least semiannually. One of these exercises should be operationally based (not tabletop) and test all components of the system.

standards, assurance of appropriate resources for designated facilities, and cost containment and efficacy enhancement.

Essential Trauma System Element #12: Military Integration

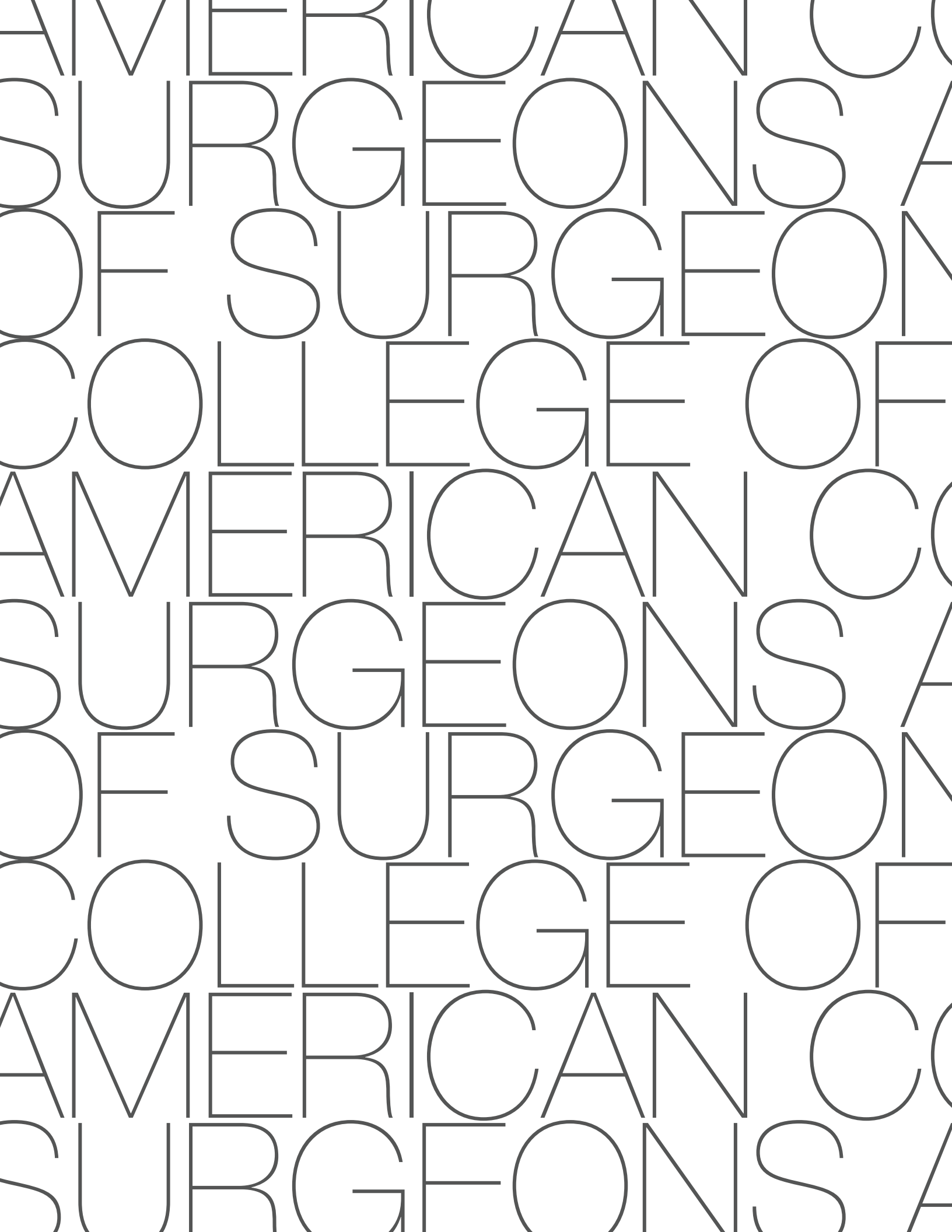
The trauma system should actively support integration and cooperation with military personnel, medical treatment facilities, and transport capabilities. This should include patient care, education, data collection, performance improvement, research, training, disaster response, and clinical readiness.

Trauma System Consultation Program

In developing this current iteration of the *Trauma System Consultation Guide*, we attempted to ensure that the needs of the general population and special populations are met. Likewise, we developed this guide to support the needs of regional trauma systems across the spectrum of population density, from urban to frontier. In addition, we attempted to achieve a workable balance in addressing the needs of patients, providers, payers, and the public.

A trauma system consultation provides policymakers, operational personnel, and key stakeholders with valuable insights and specific recommendations that will help overcome barriers, improve efficiency, and advance system performance. The Trauma Systems Consultation Program of the ACS COT can evaluate your trauma system and provide consultative guidance for future system development. The ACS is the only entity that has a structured trauma system consultation process that can be tailored to meet the specific needs of a state or region, regardless of the current status of the trauma system or healthcare assets.

Our consultation program offers you a critical analysis of the current system status, including its challenges and opportunities, and provides recommendations for system improvement and enhancement. Principles that are important to the program mission include reduction of injury incidence and severity, rigorous performance improvement





ESSENTIAL TRAUMA SYSTEM ELEMENT #1

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 well-defined 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.

Purpose and Rationale

A trauma system is a public good with public and private sector partners. It integrates all-population injury care and prevention to achieve optimal outcomes by saving lives and restoring function in life for injured patients and communities. Statutory authority for the trauma system is provided through legislative action. Statute may define the sources of funding and mechanism of fund distribution to elements of the trauma system. A trauma system requires deliberate development and implementation to ensure optimal resources for care of the injured patient and readiness for mass casualties. State legislatures and municipalities determine requirements for components of trauma systems through statutes (laws) and administrative codes. Statutes and codes are implemented through public rulemaking by a lead agency designated by statute, typically within a state department of health. On occasion, a legislative body may create and/or designate a not-for-profit foundation as the vehicle for trauma system oversight. Aggregated rules are the regulations that must be followed by the components of a trauma system. Regulations in the trauma system are subject to administrative judicial review and deliberation. The lead agency should regularly review trauma system statutes and regulations.

The legislature and chief governmental executive designate a lead agency to fulfill the functions described in statutes. Core functions of the lead agency should include implementation of prevention activities, coordination of EMS transport protocols, designation of trauma centers, data management and system-wide performance improvement, and provision to support patient data confidentiality and protection from discoverability. Lead agencies also implement trauma system-related policies within the statutory framework. The lead agency should monitor aggregate care outcomes through a risk-adjusted, benchmarked registry program with validated data.

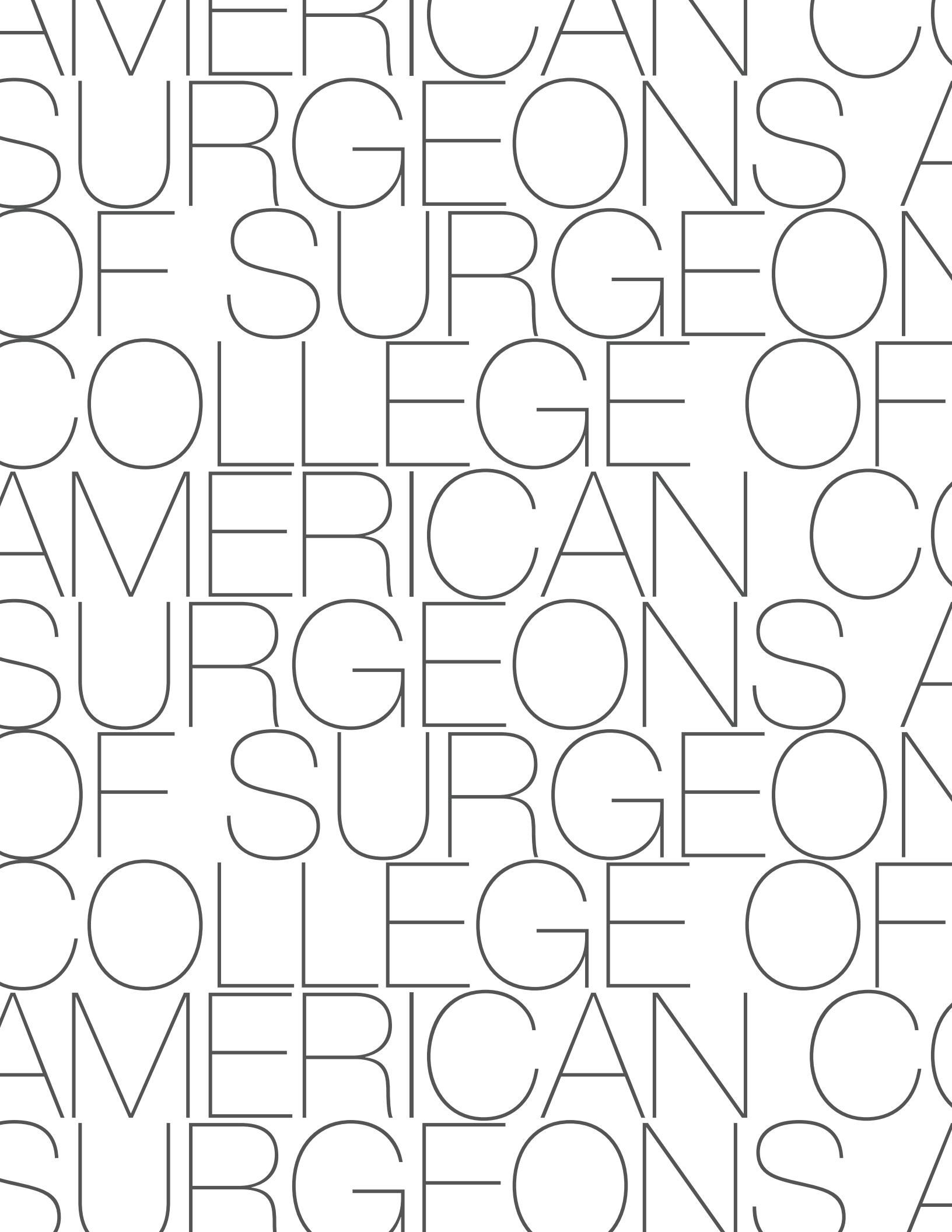
Lead agency and trauma system component accountability is enhanced with transparency, such as an annual report on trauma system performance and public funding. The chief governmental executive or lead agency should have the authority to appoint a multidisciplinary advisory group of stakeholders, representing the full spectrum of trauma care, to conduct a gap assessment, anticipate emerging system needs, and share guidance with the lead agency.

Prereview Questionnaire

- 1.1 How often are the trauma system regulations reviewed?
- 1.2 In which year were the trauma system statutes last revised?
- 1.3 Describe how the current statutes and regulations allow the state or region to:
 - a. Develop, plan, and implement the trauma system.
 - b. Monitor and enforce rules.
 - c. Designate the lead agency.
 - d. Collect and protect confidential data.
 - e. Protect confidentiality of the quality improvement process.
- 1.4 Describe the process by which trauma system policies and procedures are developed or updated to manage the system, including:
 - a. Adoption of standards of care
 - b. Verification and designation of trauma centers
 - c. Direct patient flow on the basis of designation
 - d. Data collection
 - e. System evaluation
- 1.5 Describe how injury prevention, EMS, public health, rehabilitation, needs of special populations, and integration of emergency management into the trauma system are enabled by statute and regulation.

Documentation Requested

- 1.a State statute or municipal code that establishes a trauma system, including legislative findings and intent
- 1.b Statute or code that designates specific lead agency and responsibilities
- 1.c Documentation outlining rule-making process
- 1.d Annual trauma system report
- 1.e Trauma system statutes and/or administrative rules
- 1.f EMS statutes and regulations
- 1.g Any additional trauma system policies, procedures, or guidelines not otherwise listed in the applicable statute or administrative rule





ESSENTIAL TRAUMA SYSTEM ELEMENT #2

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, data collection, data storage, data analysis, quality improvement activities, education, and support for disaster response and military integration.

Purpose and Rationale

Trauma systems need sufficient funding to plan, implement, and evaluate a statewide or regional system of care. Public funding should support trauma system components, including trauma system administration, system-level registry functions, and participation in statewide or municipal trauma performance improvement activities. The trauma system is a foundation for mass casualty readiness and response, and funds should be allocated to trauma system elements for this purpose as well.

The lead agency should have sustained funding for trauma system infrastructure, which should be established in statute or code. Funding might also come from sources external to the trauma system (such as traffic fines, offender court fees, vehicle title and driver's license fees, grants, and general revenue), rather than from internal trauma system elements (such as trauma center fees for verification). Funding mechanisms should be transparent and well documented, including identified funding sources, determination of allocations, and anticipated uses. Funding allocation plans to support the trauma system may be linked to population density and injury rates within a specific geography or by facility and should be periodically reassessed to ensure system needs are met. Participation in system-level quality improvement, and reporting of data and outcomes to the lead agency, may be required prior to fund distribution. Uses of funds may relate to trauma readiness costs, uncompensated care, and discretionary needs. Organizations receiving public funds should report annually on the use of those funds.

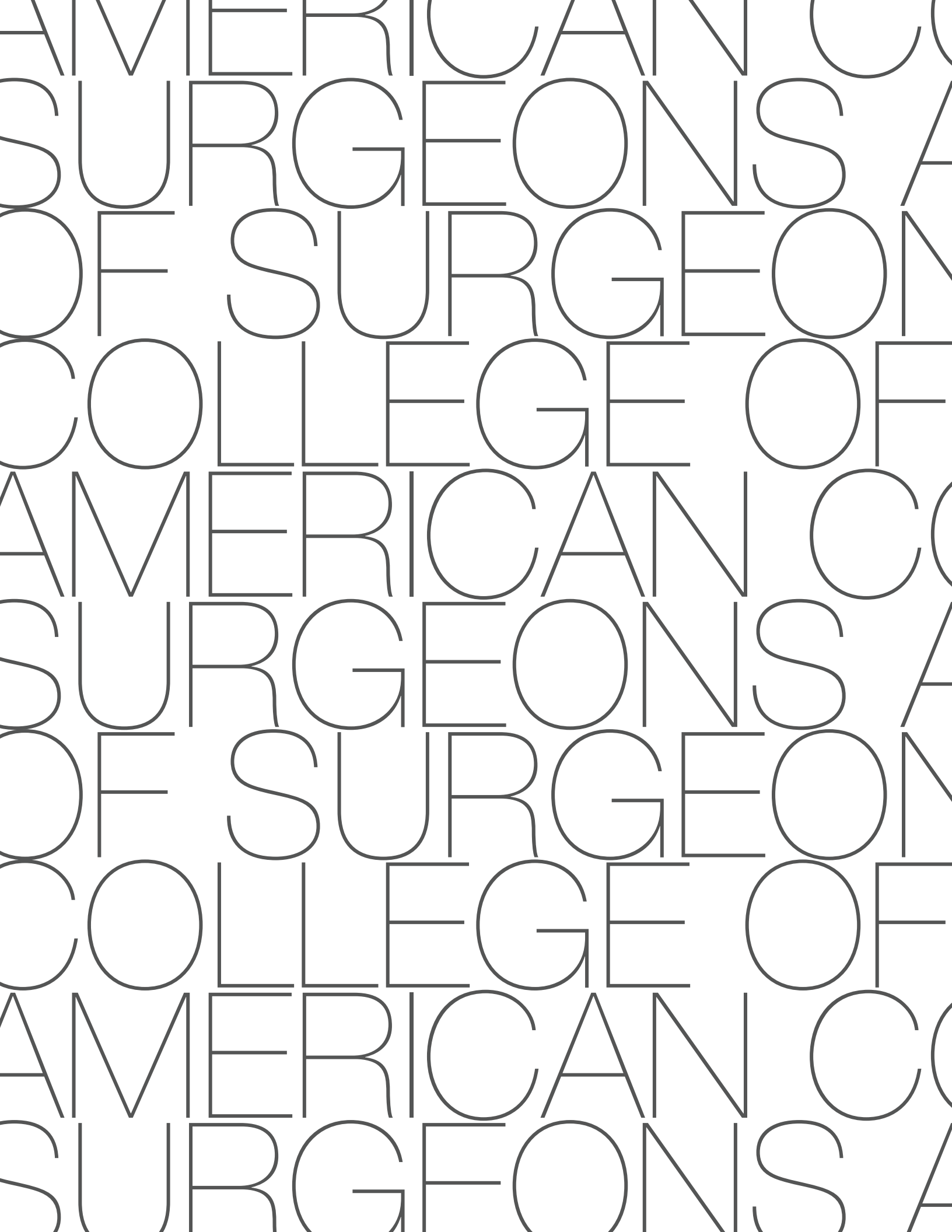
Funding is also required to sustain the trauma system oversight functions of the lead agency. The lead agency should have a program office that administers the trauma system with an appointed trauma system medical director, program manager, and necessary support personnel. The primary objectives of the trauma program office are data management, system wide performance improvement, trauma center verification/designation, and facilitating integration of injury prevention, education, and advocacy within the trauma system.

Prereview Questionnaire

- 2.1 What is the lead agency's budget for the trauma system?
- 2.2 What is the source of funding available to support the development, operations, and management of the trauma system (for example, general funds and dedicated funds)?
- 2.3 How does the lead agency track and analyze internal trauma system finances?
 - a. How does the advisory committee participate in the financial review process?
 - b. How frequently are trauma system financial reports published?
 - c. Which financial data are reported (lead agency data, health facility data, or both)?
- 2.4 What financial incentives and disincentives exist for trauma center participation in the trauma system?
- 2.5 What system arrangements exist for uncompensated and undercompensated care?

Documentation Requested

- 2.a Statute or rule that describes trauma system funding
- 2.b Letters and/or legislation that document financial or in-kind commitment
- 2.c Lead agency's budgets, identifying line items directly related to goals and objectives of the trauma plan
- 2.d Lead agency internal trauma office budget
- 2.e Documentation of funding utilization from trauma system components (such as EMS and trauma centers) reported to the lead agency
- 2.f Notice of awards and abstracts (active grants)
- 2g A comprehensive organizational chart that identifies the lead agency staff, including contract employees, assigned to the trauma program (both full- and part-time)
- 2.h Position descriptions for the trauma system medical director and program manager, including qualifications, duties, and time allocation for these positions





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), phases of care (prehospital and rehabilitative), and trauma center level designation.

Purpose and Rationale

A multidisciplinary advisory group that provides subject matter expertise to the lead agency is a critical component of the trauma system. A key responsibility of the multidisciplinary trauma advisory group is regular communication to the lead agency of the trauma system's status related to the burden of injury within the trauma system and the impact of the trauma system on the community. Membership should include representatives from a broad constituency across the full spectrum of injury care, including but not limited to the following: trauma center medical directors, trauma program managers, data registry personnel, prehospital professionals, and injury prevention advocates. The multidisciplinary advisory group should be diverse with respect to geography, population (rural/urban, adult/pediatric, burn), and trauma center designation level. The group should also include representation from military treatment facilities to support military-civilian integration.

The multidisciplinary advisory group works with lead agency officials to:

- Develop and evaluate the trauma system plan
- Inform and educate the public and legislators about the trauma system
- Provide consultative assistance for enabling legislation
- Assist with trauma system quality and performance improvement and research efforts
- Implement injury prevention programs
- Promote collaboration and system integration among trauma system stakeholders
- Assist with emergency preparedness and disaster response planning

As challenges are encountered with providing optimal care to injured patients within the system, the multidisciplinary advisory group responds by evaluating the issue and collaborating with the lead agency to develop action plans with measurable results. The multidisciplinary advisory group contributes to building coalitions through the cultivation and maintenance of relationships with key constituents involved in trauma system development.

Coalition Building and Community Support

The trauma system must engage its constituents to pursue a common goal. Coalition building is a continuous process of fostering relationships with constituents in a state or region through collaboration on injury control and trauma system development. Key constituents include health professionals, trauma center administrators, prehospital care professionals, health insurers and payers, data experts, patients, patient advocates, policymakers, public safety agencies and personnel, local industry and business, and media representatives. The coalition serves an important support role for the following:

- Trauma system plan development and implementation
- Collaboration among all the trauma system members
- Integration of system elements
- Advocacy for policy development such as authorizing legislation and regulations
- Development and sustainment of system resources
- Disaster preparedness

The coalition informs the multidisciplinary state and regional advisory groups to support trauma system planning and implementation efforts. Information sharing and education are important to reduce the incidence of injury in all populations and to demonstrate the value of an effective trauma system. Regular communication about the status of the trauma system using system-derived data helps these key partners to recognize opportunities for improvement. The trauma system's stakeholders also communicate with elected officials regarding the development and sustainability of the trauma system. Stakeholders inform and educate governmental leaders to make them effective partners in policy development to support trauma system improvement.

Prereview Questionnaire

3.1 Does the multidisciplinary advisory group have broad stakeholder involvement and engagement representing the full spectrum of trauma care? Including, for example, rural and urban trauma centers; pediatric, adult, and geriatric trauma care; EMS; rehabilitation; and regional military trauma.

- a. Describe the objectives, responsibilities, activities, and composition of the multidisciplinary advisory group.
- b. Describe the lead agency involvement and leadership in the multidisciplinary advisory group.
- c. Identify the organizations with whom the multidisciplinary advisory group and lead agency collaborate.

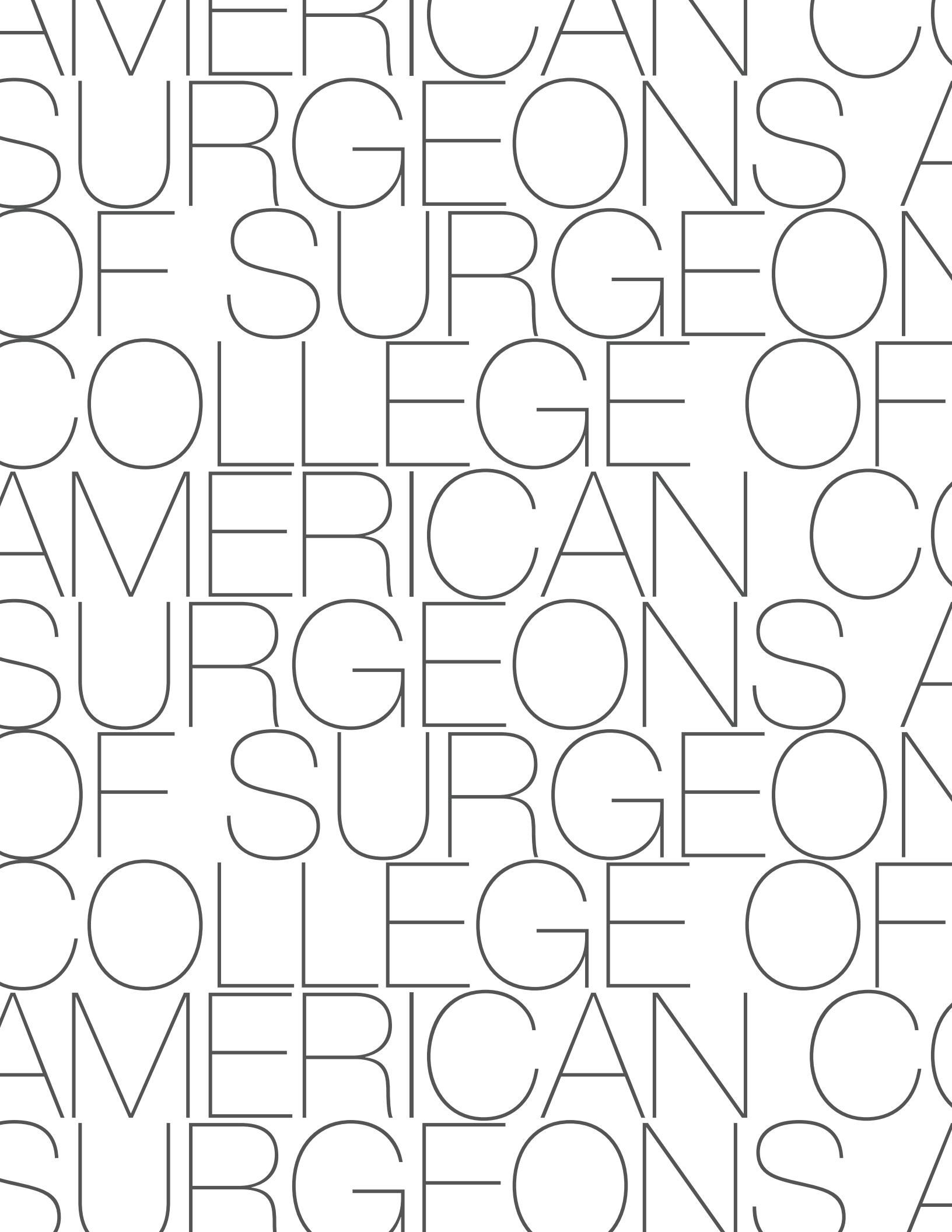
3.2 How often does the multidisciplinary advisory group meet per year?

- a. Is there an attendance requirement for participants?

- 3.3 Describe how the lead agency and multidisciplinary advisory group are involved in trauma system planning and performance evaluation.
- 3.4 Describe how the multidisciplinary advisory group assists the lead agency to inform and educate the public and legislators to foster trauma system enhancement.
- 3.5 Is there a trauma system coalition?
 - a. What is the role of the coalition members (constituents and stakeholders) in promoting trauma system development?
 - b. What is the method and frequency for communicating with coalition members?
- 3.6 Describe how the lead agency engages with the stakeholder coalition to inform and educate governmental leaders to make them effective partners in policy development for trauma system advancement.
- 3.7 Describe how the trauma system leadership mobilizes community partners to improve the trauma system through effective communication and collaboration.
 - a. How has the community been approached to identify injury control concerns?
 - b. What key problems has the community identified?
 - c. How do stakeholders bring system challenges or deficiencies to the attention of the lead agency?
- 3.8 Describe how the lead agency informs citizens about trauma care and trauma system progress on a recurring basis.

Documentation Requested

- 3.a Statute or rule creating the multidisciplinary advisory group
- 3.b A list of the multidisciplinary group membership with role identification
- 3.c A representative sample meeting schedule, agenda, and minutes of a multidisciplinary advisory group meeting
 - Meeting attendance by multidisciplinary advisory group members
- 3.d A list of organizations represented in trauma system planning or injury control (such as multidisciplinary state advisory committee, subcommittees, and other groups supporting trauma system development)
- 3.e A list of all active coalition members, with specific identification of those representing special populations (such as children and people who are elderly, need rehabilitation, or are disabled)
- 3.f Examples of communication to constituencies or the trauma system coalition (such as notice of planning meetings, newsletter, activity report, coalition updates, or media message)





ESSENTIAL TRAUMA SYSTEM ELEMENT #4

Trauma System Plan

An integrated 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.

Purpose and Rationale

Each trauma system, as defined in statute, should have a clearly articulated process to develop a trauma system plan. This strategic plan is used to guide trauma system development and functionality and should address all essential trauma system elements. The plan describes the system design with adopted standards of care for prehospital and hospital personnel. The plan should be built on an inventory of trauma system resources, identifying gaps in services or resources and the location of assets. A needs assessment should be developed to support the trauma system plan and updated periodically to assess population and system changes over time. The plan should consider trauma system resources, population demographics, and barriers to care access (such as rural location, geography, resources). It is critical that the plan also identify specific populations (such as pediatric, geriatric, and burn) within the trauma system and how the needs of each of these populations are addressed.

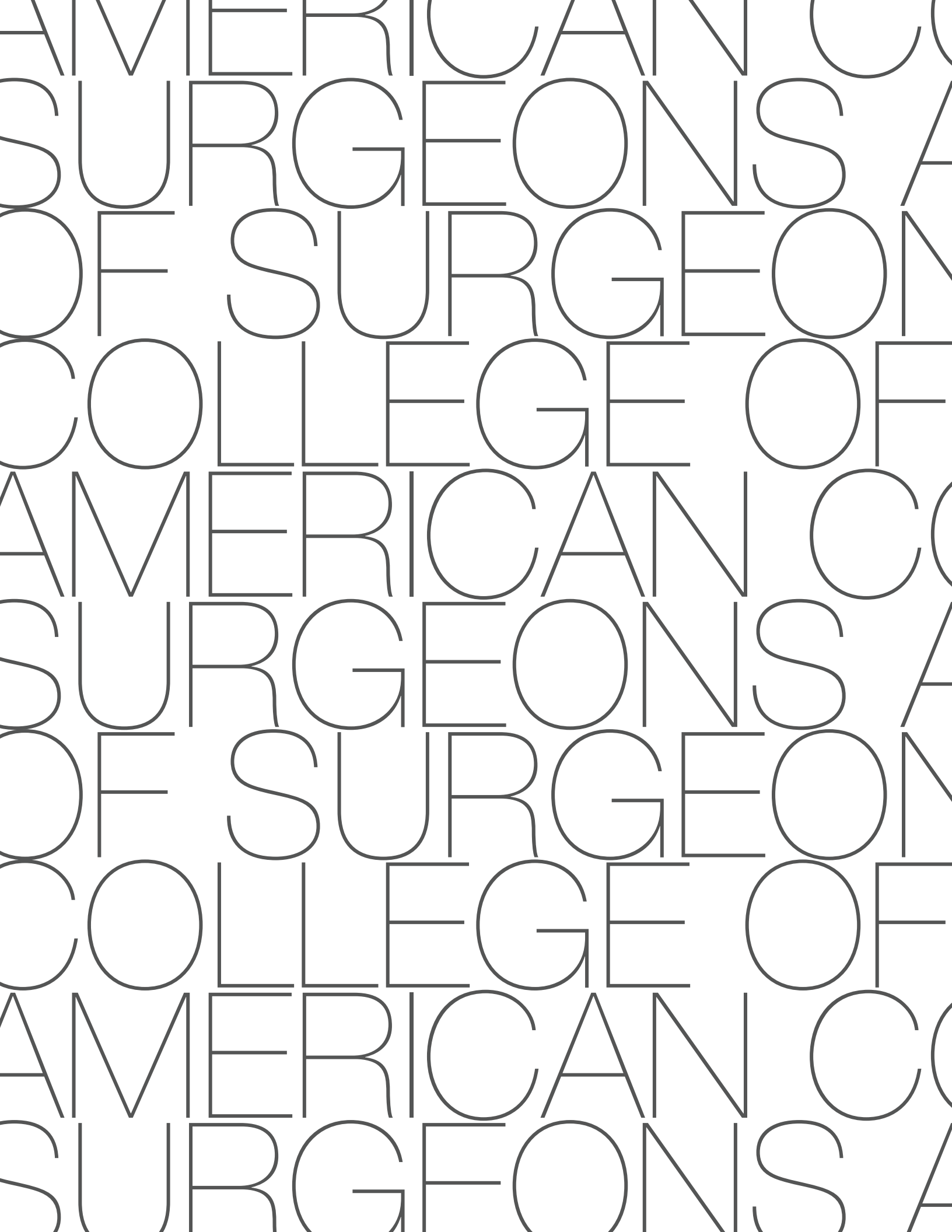
The trauma system plan should be developed by the lead agency with support from the multidisciplinary advisory group and any associated regional advisory committees. Based upon the system needs assessment, goals and objectives for each trauma system component should be developed with specific timelines for achievement. System stakeholders should regularly report to the lead agency to address barriers inhibiting system success and assure system and plan development. The plan should include references to regulatory standards, documents supporting trauma system development, and methods for data collection and analysis. The trauma system plan should include interfaces between the operational plans of supporting agencies and services, including EMS, injury prevention, public health, and emergency preparedness. The trauma system plan should be reviewed annually and updated periodically under the direction of the lead agency and the multidisciplinary advisory group.

Prereview Questionnaire

- 4.1 Describe the process used by the lead agency and multidisciplinary advisory group for review and update of the trauma system plan.
 - a. How often is the plan reviewed and updated?
- 4.2 Describe the cross-disciplinary collaboration and integration of EMS, public health agencies, emergency and disaster management, social and mental health services, law enforcement, child and adult protective services, and other community public safety entities within the trauma system development plan.
- 4.4 Describe the process for determining the trauma system plan's goals and objectives.
 - a. During review of the trauma system plan, are the goals and objectives evaluated and updated using trauma system data?
- 4.4 Describe the ongoing assessment of trauma resources and asset allocation within the system.
- 4.5 Describe the process used to integrate trauma system standards and policies in the trauma system plan.

Documentation Requested

- 4.a Trauma system plan and other supporting documents
- 4.b A list of trauma system goals and objectives (if not included in the trauma system plan)





ESSENTIAL TRAUMA SYSTEM ELEMENT #5

Continuum of Care

The trauma system should address the full continuum of injury, from prevention and prehospital/interfacility emergency medical services to acute hospital care (referring and accepting facilities) through rehabilitation. The system should address all injured patients, with special attention to pediatric, geriatric, and other vulnerable populations.

The continuum of care encompasses several components, each of which is addressed individually in the pages that follow with separate narrative descriptions, PRQ questions, and documentation requests.

Prevention and Outreach

Trauma systems must develop prevention strategies that help control injury as part of an integrated, coordinated, and inclusive trauma system. The lead agency should take a central role in fostering collaboration and cooperation between stakeholders at the state, regional, and local level for injury control. In addition, the lead agency and providers throughout the system should work with public health authorities, business organizations, social services providers, community-based organizations, and the public to support, enact, and evaluate prevention programs. Prevention strategies should be evidence-informed and based on system epidemiologic data.

Prevention efforts may represent primary, secondary, or tertiary prevention. Primary prevention efforts should be deployed across an entire population to decrease the overall risk of injury (such as civil engineering guidelines, window guards, and smoke detectors). Secondary prevention efforts focus on a known population that is at risk and should be aimed at mitigating the effects of the traumatic incident (such as car seats, seat belts, and helmets). Finally, tertiary prevention activities aim to lessen the impact of trauma on the individual and community (for example, support for EMS and trauma systems, access to care, rehabilitation).

Efforts at prevention must be well defined, structured, and directed toward the intended audience at risk, with evaluation of their impact. Further, injury prevention efforts should be informed by and relevant to the local community. The implementation of injury control and prevention also requires the same priority as other aspects of the trauma system, including adequate staffing, funding, and partnerships with community organizations. Many systems focus primarily on providing information and education directly to the general public (for example, on restraint use and not driving while intoxicated). One program that may be utilized is the STOP THE BLEED® (STB) program. STB provides a tool to partner with trauma

systems and the community by empowering, informing, and educating the public on how to respond to a bleeding emergency. Education efforts should also be directed toward all continuum components, including personnel safety for emergency medical services (EMS), acute hospital, and rehabilitation professionals (such as securing the scene and infection control). Collaboration with public agencies, such as local departments of health, is essential to successful prevention program implementation. These partnerships can synergize and increase the efficiency of individual efforts. The formation of an injury control network with alliances across multiple healthcare, professional, and community organizations is beneficial. The prevention needs of children, elderly, and other vulnerable populations should be specifically addressed.

Activities that are essential to the development and implementation of injury control and prevention programs include:

- Engagement of the lead agency and key stakeholders in the development of the community health needs assessments and community health improvement plans
- Integration with public health injury control programs for injury surveillance, coordination of resources, and implementation of prevention programs
- Preparation of annual reports by the lead agency along with partner organizations on the status of injury prevention and trauma care in the system

Prereview Questionnaire

- 5.1.1 Describe how the lead agency is engaged in the development and implementation of community health needs assessments and improvement plans.
- 5.1.2 Describe if and how the lead agency is integrated with public health injury control programs for injury surveillance, resource coordination (such as funding and human resources), and prevention program implementation.
- 5.1.3 List organizations dedicated to injury prevention within the region and the issues they address (such as MADD, SADD, SafeKids Worldwide, Injury Free Coalition for Kids, American Trauma Society, violence intervention programs, and university-based injury control programs).
- 5.1.4 List the number and describe the nature of injury prevention activities conducted throughout the trauma system in the past year (such as activities directed at which mechanism or type of injury or which patient population, such as children and elderly people).

- 5.1.5 Describe how the lead agency has funded and coordinated system-wide injury prevention or outreach activities, and include the following:
- Which injuries have been identified and prioritized for intervention strategies?
 - How are the prevention needs of children, the elderly, and other vulnerable populations addressed?
 - Which dedicated lead agency or other agency staff (full- or part-time) is responsible for injury prevention outreach and coordination for the trauma system?
 - What is the source of funding?

Documentation Requested

- 5.1.a Most recent community health needs assessment report
- 5.1.b Most recent annual injury prevention and outreach report
- 5.1.c A representative sample of brochures, pamphlets, fliers, and curricula for educational programs on injury prevention

Emergency Medical Services

Emergency Medical Services (EMS) is a critical component in the trauma system and often the vital link between the injury event and definitive care. Thus, strong relationships between leadership within EMS, trauma centers, and lead agency trauma programs are necessary for optimal management of injured patients to reduce mortality and produce best outcomes. EMS is a complex system that not only transports patients, but includes public access, communications, patient care by trained personnel, patient triage, data collection, and quality improvement activities.

There must be an EMS system medical director who has statutory authority to develop operational protocols, oversee clinical practice, and establish ongoing quality assessment to ensure optimal provision of prehospital care. The EMS system medical director should work closely with the regional trauma system leadership to ensure that care protocols and treatment goals are mutually aligned. The EMS system medical director should also have ongoing interaction with adult and pediatric stakeholders, including local EMS agency medical directors and the EMS for Children program. This will ensure that there is understanding of and compliance with trauma triage and destination protocols for trauma patients of all ages.

The lead agency should ensure that EMS is sufficiently resourced to meet the needs of the community served. To achieve this end, it is important to conduct a resource and needs assessment (and periodic reassessment) that evaluates the availability and geographic distribution of EMS personnel and physical resources. This ensures rapid and appropriate scene response as well as availability of timely and appropriate interfacility transport services. This assessment should outline a detailed description of the distribution of ground ambulance and aeromedical locations across the region. EMS system assets should be positioned according to predictable geographic or temporal demands to optimize response efficiencies. Such positioning schemes require integrated prehospital data collection systems that track the location of occurrence and timeliness of responses over time. Interfacility transport services should be available in a timely fashion and staffed with EMS professionals who are appropriately trained (ideally in critical care), ensuring optimal patient care between facilities. Preidentified transfer algorithms should be in place and readily accessible to transferring facilities to expedite patient transfer to higher levels of trauma care. Periodic assessment of dispatch and transport times provides insight into whether resources are consistent with population needs.

Each region should have objective criteria dictating the level of response (advanced life support [ALS] or basic life support [BLS]), mode of transport, and disposition of the patient based on mandatory system-wide prehospital triage criteria. The National Guideline for the Field Triage of Injured Patients (available in Appendix A) should be used as the framework for regional triage decisions. This ensures that trauma patients are transported to the most accessible and appropriate facility based on their injuries. These triage criteria should identify major trauma patients, including special populations such as pediatrics and geriatrics.

A mechanism should be in place that allows for case-based quality improvement review of trauma patients by prehospital and hospital providers. This allows bidirectional communication and continuing education. Ongoing review of triage and treatment decisions promotes continuing quality improvement of the triage process and prehospital care protocols. A more detailed discussion of prehospital (primary) triage criteria is provided in the System Triage and Patient Flow section.

Human Resources

Periodic EMS workforce assessments should be conducted to ensure adequate numbers and distribution of personnel. Addressing recruitment, retention, and engagement of qualified personnel should be a system priority. EMS system leaders must ensure that prehospital care professionals at all levels maintain competence in trauma care. This is best

accomplished by requiring standards for credentialing and certification and specifying continuing educational requirements for all prehospital personnel involved in trauma care. The core curriculum for prehospital personnel (Emergency Medical Responder [EMR], Emergency Medical Technician [EMT], Advanced EMT [AEMT], paramedic, and all other levels of prehospital personnel) has an essential orientation to trauma care for all ages. However, trauma care knowledge and skills need to be continuously updated, refined, and expanded through targeted trauma care training in collaboration with trauma system leadership (such as Prehospital Trauma Life Support®, International Trauma Life Support®, and age-specific courses). Mechanisms for the periodic assessment of competence, educational needs, and trauma education availability within the system should be incorporated into the trauma system plan. Trauma patients are best served when EMS agencies (both ground and air) and their training programs meet national standards and achieve national accreditation.

In some states, up to half of all EMS agencies are staffed by volunteers, typically in rural areas. These volunteer professionals are essential to the provision of immediate care and efficient transportation and may continue to augment care in the hospital setting. The trauma system should support these volunteer agencies in performing their vital role in the care of trauma patients. Such aid may be in the form of assistance with quality improvement activities, training, and clinical opportunities.

Due to the multidisciplinary nature of trauma care, educational conferences that include all levels of clinical professionals (such as prehospital personnel, nurses, and physicians) need to occur regularly. Communication with and respect for prehospital professionals are important, particularly in rural areas where exposure to major trauma patients might be relatively rare.

Integration of EMS within the Trauma System

In addition to its critical role in the prehospital treatment and transportation of injured patients, EMS must also engage in assessment and integration functions within the trauma system, as well as in connection with public health and other public safety agencies. EMS agencies have a critical role in ensuring that communication systems are available and have sufficient redundancy so that trauma system stakeholders will be able to access the EMS/trauma system and dispatch appropriate medical resources.

Communication systems should be functional both at the single patient level and in response to mass casualty incidents (MCIs). Enhanced 911 services and a central EMS/trauma communication system ensure field-to-facility bidirectional

communication, interfacility transfer dialogue, and an all-hazards approach among system participants. EMS should utilize all technological advances available to provide care to trauma patients, such as ultrasound, telemedicine, and wireless communications capabilities. Innovations such as automatic crash notification systems hold great promise for quickly identifying trauma-producing events, thereby reducing delays in discovery and decreasing prehospital response intervals.

EMS data define geographic and demographic characteristics of injuries and thus should assist trauma systems with the identification of injury-prevention program needs. EMS serves a critical role in the development and implementation of all-hazards response plans. This integration should be included in the state and regional trauma plan and overseen by the lead agency. EMS leadership should participate in all aspects of trauma system design, evaluation, and operation, including policy development, public education, and strategic planning.

Prereview Questionnaire

- 5.2.1 Describe the role of the EMS system medical director.
 - a. Does the EMS system medical director have statutory authority to develop operational protocols, oversee clinical practice, and establish ongoing quality assessment to ensure optimal provision of prehospital care?
 - b. In a system that does not currently have an EMS system medical director, what are the barriers to creation and/or fulfillment of this role?
- 5.2.2 Describe how EMS leadership participates in all aspects of trauma system design, evaluation, and operation, including policy development, public education, and strategic planning.
- 5.2.3 Describe the EMS system to include the following.
 - a. List the number and competencies (that is, ALS or BLS) of ground transporting agencies, nontransporting agencies, and air medical resources.
 - b. Describe how EMS resources are allocated throughout the region to serve the population.
 - c. Describe the availability of enhanced 911 and wireless E-911 access in the region.
 - d. Identify any specialty pediatric transporting agencies and aeromedical resources.
 - e. Describe the availability of pediatric equipment on all ground and/or air transporting units.
- 5.2.4 Describe the procedures for online and offline medical direction, including procedures for the pediatric population.

- 5.2.5 Describe the prehospital workforce competencies in trauma for:
- Initial training and certification/licensure requirements
 - Continuing education and recertification/license renewal requirements
 - Pediatric trauma training requirements for recertification
- 5.2.6 Describe EMS communication policies and systems used.
- 5.2.7 Describe the process for assessing the adequacy of the workforce resources within the EMS system.
- What human resource deficiencies have been identified and what corrective actions have been taken?

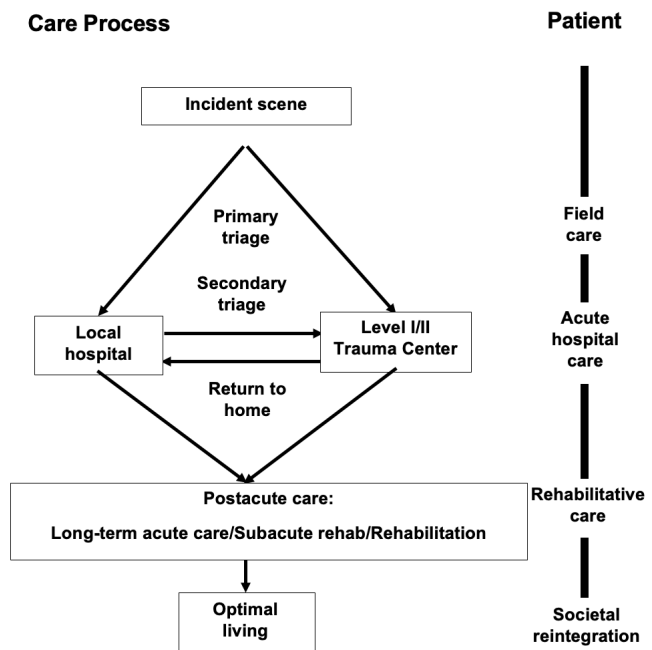
Documentation Requested

- Most recent EMS assessment
- EMS medical director job description
- Map identifying the location of aeromedical resources in the region
- Protocols dictating level of EMS response (ALS or BLS), mode of transport, and disposition of the patient
- Requirements for medical oversight of all levels of EMS agencies, ALS and BLS, transporting and nontransporting
- Prehospital care treatment protocols (ALS and BLS), including pediatric protocols and geriatric protocols, if available

System Triage and Patient Flow

One of the fundamental aims of a trauma system is seamless and timely patient care. This care should be needs-based and appropriately transition injured patients through the entire continuum of care, including prehospital, acute care, rehabilitation, and return home. Although on the surface this objective seems relatively straightforward, individual patient characteristics, geography, and transportation systems often present significant challenges. The most critically injured trauma patient is often easy to identify at the scene (such as presence of coma or hypotension). However, in some circumstances, the patients requiring the resources of a Level I or Level II center may not be immediately apparent to prehospital professionals. Primary or field triage criteria aid professionals in identifying patients at greatest risk for adverse outcomes and who might benefit from the resources of a designated trauma center. Even if the need is identified, regional geography or limited transport services might not allow for direct transport to the most appropriate facility.

This diagram shows the care process and patient movement through the trauma system.



Primary triage of a patient from the field to a center capable of providing definitive care is an initial goal of the trauma system. However, there are circumstances (such as airway management, rural environments, or inclement weather) when triaging a patient to a closer facility for stabilization and transfer is the best option for accessing definitive care. Patients sustaining severe injuries in rural environments might need immediate assessment and stabilization before a long-distance transport to a trauma center. In addition, evaluation of the patient might bring to light severe injuries for which needed care exceeds the resources of the initial receiving facility. Some patients might have specific needs that can be addressed at relatively few centers within a region (such as pediatric trauma, burns, severe traumatic brain injury, spinal cord injury, ocular trauma, and extremity reimplantation). Finally, temporary resource limitations might necessitate the transfer of patients between acute care facilities. Prehospital trauma triage protocols should be consistent with national guidelines.

Secondary triage at the initial receiving facility has several advantages, especially in systems with a large rural or suburban component. The ability to assess patients at nondesignated or Level III to V centers provides an opportunity to focus on the transfer of the most severely injured patients to Level I or Level II facilities, thus preserving limited resources for patients most in need. It also provides patients with lesser injuries the possibility of being cared for within their community.

The decision to transfer a trauma patient should be based on objective, prospectively agreed-on criteria. Established transfer criteria and transfer agreements expedite the transfer process and minimize the potential for delays in care. Delays in transfer may increase mortality, complications, and length of stay. A system with excessive trauma transfers might stress the resources of the regional trauma facility and transport agencies, particularly in smaller communities. Conversely, inappropriate retention of patients at centers without adequate facilities or expertise to appropriately take care of the patient might increase the risk of adverse outcomes. Given the importance of appropriate interfacility transfers, timeliness of the decision to transfer, time to transfer, and rates of over- and undertriage should be evaluated regularly. Bidirectional corrective actions should be instituted when events are identified. Data derived from tracking and monitoring the timeliness of access to a level of trauma care commensurate with injury type and severity should be used to help define optimal system configuration. It is critically important that injury-related data be collected from all acute care facilities where injured patients are evaluated, and not only from designated trauma centers.

A central communication coordinating base (such as a transfer center) with real-time access to information on system resources greatly facilitates the transfer process. This communication base should identify a receiving center, facilitate dialogue between the transferring and receiving facilities, and coordinate interfacility transport.

Once acute needs have been met, patients often benefit from rehabilitation to maximize function and limit disability. Some patients, such as those with limb loss, loss of sight, paralysis, or significant head injury, benefit from specialized rehabilitation. Ideally, patients requiring rehabilitation should be identified early in their acute hospital phase so arrangements for an appropriate facility and transfer planning can occur before the patient is ready for discharge from an acute care hospital.

To optimize trauma system efficiency, efforts should be made to return patients back to their local community once the acute phase of trauma care is complete. Returning patients opens the limited resources available to care for the acute severely injured patients at Level I and Level II trauma centers. In addition, it brings patients back into their social networks for reintegration into their communities.

Prereview Questionnaire

- 5.3.1 Describe how the lead agency assesses timely and appropriate triage of the most critically injured patients as well as timely and appropriate interfacility transfers through a multidisciplinary Process Improvement and Patient Safety (PIPS) process.
- 5.3.2 Describe how over- and undertriage, as well as delayed interfacility transfers, are addressed.
 - a. Define under and over triage for both pediatric and geriatric patients.
 - b. Describe how pediatric and geriatric patients are triaged from the field to appropriate facilities.
- 5.3.3 Describe the prehospital trauma triage protocols, including consistency with national guidelines.
- 5.3.4 Describe the criteria used within the system to guide the decision to transfer patients to an appropriate facility and the uniformity with which these criteria are applied across all centers.
 - a. Describe the criteria used to guide the decision to transfer patients across state lines or to nondesignated facilities.
- 5.3.5 Specify whether there are interfacility transfer agreements to address these needs:
 - a. Transfer to an appropriate resource facility
 - b. Traumatic brain injury
 - c. Spinal cord injury
 - d. Reimplantation
 - e. Burns
 - f. Children
 - g. Repatriation
- 5.3.6 Specify whether there is a central communications system to coordinate interfacility transfers and describe how this system has access to information regarding resource availability within the region. If not, describe the process for communication and acceptance of interfacility transfers to a higher level of care.

Documentation Requested

- 5.3.a Guidelines for patient care delivery decisions (primary or in-field triage and destination designation guidelines)
- 5.3.b Interfacility transfer policy and criteria
 - Policy addressing the mode of transport, transport type, and qualifications of transport personnel used for field transport and interfacility transfers
- 5.3.c Representative sample of minutes of meetings documenting ongoing quality improvement of transfer criteria
- 5.3.d Policies or procedures related to repatriation

Definitive Care Facilities

The goal of the inclusive trauma system is a system in which patient needs are matched to available resources and capabilities. Inclusive trauma systems include all healthcare facilities, where each facility contributes to the best of its ability to meet patient needs. Thus, as the core of a regional trauma system, acute care facilities operating within an inclusive trauma system may provide definitive care to the entire spectrum of patients with traumatic injuries or deliver initial stabilizing care before transferring to a facility better matched for higher patient acuity.

Acute care facilities should be well integrated into the continuum of care, including prevention and rehabilitation, and operate as part of a network of trauma-receiving hospitals. All acute care facilities, both designated and nondesignated, should participate in the essential activities of a trauma system, including performance improvement, data submission to state or regional registries, representation on regional trauma advisory committees, and readiness through mutual operational agreements to address interfacility transfer, educational support, and outreach.

The roles of all definitive care facilities, including nondesignated hospitals, designated trauma centers, and specialty hospitals (such as pediatric and burn), should be clearly outlined in the state or regional trauma plan and monitored by the lead agency. Facilities providing the highest level of trauma care are expected to provide leadership in education, outreach, patient care, and research and to participate in the design, development, evaluation, and operation of the trauma system. The system should have a funding source for expected leadership activities by facilities providing trauma care.

In an inclusive system, patients should be triaged to the appropriate facility based on their needs and facility resources. Patients with the least severe injuries might be cared for at facilities within their community, whereas the most severe injuries should be triaged to a Level I or Level II trauma center. In rural and frontier systems, smaller facilities must be ready to resuscitate and initiate treatment of major injuries and have a system in place for the most efficient and safest transfer to a higher level of care.

Trauma receiving facilities providing definitive care to patients with other than minor injuries must be specifically designated by the state or regional lead agency and equipped and qualified to do so at a level commensurate with injury severity. To assess and ensure that injury type and severity are matched to the qualifications of the facilities and personnel providing definitive care, the lead agency should have a process in place to review and verify the qualifications of a

particular facility according to a specific set of resource and quality standards. This criteria-based process for review and verification should be consistent with national standards and conducted on a periodic cycle as determined by the lead agency. When verified/designated centers do not meet set standards, there should be a process for remediation. The remediation process should include corrective action plans, probation, and ultimately accountability through suspension, revocation, or de-designation.

Designation by the lead agency should be restricted to facilities meeting criteria or statewide resource and quality standards and based on patient care needs in the regional trauma system. There should be a well-defined regulatory relationship between the lead agency, designated trauma facilities, and nondesignated acute care facilities in the form of a contract, guidelines, or memorandum of understanding. This legally binding document should define the relationships, roles, and responsibilities between the lead agency and the medical leadership from each acute care facility.

Human Resources

The ability to deliver high-quality trauma care is highly dependent on the availability of skilled human resources. Therefore, it is critical to assess the availability and educational needs of clinical professionals on a periodic basis. Because availability, particularly of subspecialty resources, is often limited, some means of addressing recruitment, retention, and engagement of qualified personnel should be a priority. Periodic workforce assessments should be conducted. Maintenance of competence should be ensured by requiring standards for credentialing and certification. Mechanisms for the periodic assessment of ancillary and subspecialty competence, educational needs, and availability within the system for all designated facilities should be incorporated into the trauma system plan. The lead trauma centers should consider teleconferencing and telemedicine to assist smaller facilities in providing education on regionally identified needs. In addition, lead trauma centers within the region should assist in meeting educational needs by sponsoring multidisciplinary annual educational events. These activities foster teamwork and cooperation in a functional, inclusive system.

Integration of Designated Trauma Facilities within the Trauma System

Designated trauma facilities must be well integrated into all other facets of an organized system of trauma care, including public health systems and injury surveillance, prevention, EMS and prehospital care, disaster preparedness, rehabilitation, and system performance improvement. This integration should be supported by the state and/or regional trauma plan and facilitated by the lead agency.

Through its trauma program leadership, each designated acute care facility should participate in all aspects of trauma system design, evaluation, and operation. This participation should include policy and legislative development, strategic planning, and education of legislators and the public. In addition, the trauma program and subspecialty leaders should provide direction and oversight for the development, implementation, and monitoring of integrated care protocols used throughout the system. The highest-level trauma facilities should provide leadership of the regional trauma committees through their trauma program medical leadership. These medical leaders can assist the lead agency and help ensure that opportunities to improve the quality of care within the system are recognized and corrected. Educational outreach by these higher-level centers should be used as appropriate to help achieve this goal.

Prereview Questionnaire

- 5.4.1 Describe if and how all acute care facilities, both designated and nondesignated, participate in the essential activities of a trauma system, including:
 - a. Data submission to state or regional registries
 - b. Performance improvement
 - c. Representation on regional trauma advisory committees
 - d. Development of operational agreements to address interfacility transfers
- 5.4.2 Describe the availability and roles of specialty centers within the system (such as pediatric and burn).
- 5.4.3 Describe how facilities providing the highest level of trauma care provide leadership in education, outreach, patient care, and research.
- 5.4.4 Describe how facilities participate in the design, development, evaluation, and operation of the trauma system.
- 5.4.5 Specify whether the system has a funding source for leadership activities expected of the facilities providing trauma care.
- 5.4.6 Specify system standards used for trauma center verification (including pediatric standards) and the extent to which they are aligned with national standards.
- 5.4.7 Describe the processes for verification and designation.
 - a. Briefly outline the extent of authority granted to the lead agency to receive applications and to verify, designate, and dedesignate regional trauma centers.
 - b. Describe any waivers or program flexibility granted to centers that do not meet verification requirements.
 - c. Describe the process and frequency of de-designation of trauma centers.

- 5.4.8 Describe the system for assessing the adequacy of the workforce resources within participating centers.
 - a. How are nursing and subspecialty needs (trauma or general surgery, intensivists, neurosurgeons, orthopedic surgeons, anesthesiologists, pediatric surgeons, and others, as required) addressed?
 - b. What human resource deficiencies have been identified, and what corrective actions have been taken?
- 5.4.9 Describe the educational standards and credentialing for emergency physicians and nursing staff, general surgeons, specialty surgeons, and critical care nurses caring for trauma patients in designated facilities.
 - a. Which regional educational multidisciplinary conferences are provided to care providers?
 - b. Who is responsible for organizing these events?

Documentation Requested

- 5.4.a Document outlining the process for designation, redesignation, and dedesignation (if necessary) of trauma centers
- 5.4.b Standards (other than those of ACS) used for trauma center verification
- 5.4.c A list of acute care facilities with the following data for each:
 - Level of designation/verification
 - A geographic map showing the location, catchment areas, and designation for all acute care facilities
 - Geospatial analysis of access to care within 60 minutes of injury by air or ground
 - Patient volume (total and with Injury Severity Score [ISS] >15, if available)
 - › Emergency department visits
 - › Admissions
 - A list of trauma facilities with their level of designation and trauma patient volume (total and with ISS >15)

Rehabilitation

An integral component of the trauma system includes rehabilitation services provided across a spectrum of injury care, including acute care, inpatient rehabilitation, and community-based services. The goals of these services are to provide coordinated care for trauma patients through rehabilitative programs that enhance recovery and speed of return to the highest level of function while reducing disability. Rehabilitative interventions require an integrated knowledge of both medical and ancillary support services, particularly in the context of social determinants of health.

and their relationship to functional outcomes for trauma survivors. Postacute and community-based rehabilitation services also should focus on the management of chronic conditions related to the injuries sustained, optimizing long-term function, and supporting secondary prevention.

The rehabilitation process should begin in the acute care facility as soon as possible, ideally within the first 24 hours, and should integrate discharge planning and wraparound services to alleviate barriers to rehabilitation access. Inpatient rehabilitation providers should be an active part of acute trauma care management. These professionals are integral to determining each patient's next level of care and functional needs and offering prognostic input about long-term functional needs and services. Rehabilitation programs should utilize best practices supported by published guidelines and recommendations for the provision of high-quality rehabilitation care. Trauma systems should include subspecialty rehabilitation services for care involving patients with spinal cord injury (SCI), traumatic brain injury (TBI), and burns. Additionally, the trauma system should conduct a rehabilitation needs assessment (including specialized programs for SCI, TBI, and children) to identify the number of beds needed for rehabilitation in the geographic region and to ensure that appropriately trained staff are available at centers to meet the needs.

Rehabilitation specialists should be integrated into the multidisciplinary advisory committee to ensure that rehabilitation issues are integrated into the trauma system plan. The trauma system should demonstrate strong linkages and transfer agreements between designated trauma centers and rehabilitation facilities located in its geographic region (in or out of state). Plans for repatriation of patients, especially when rehabilitation centers are across state lines, should be part of rehabilitation system planning. Feedback on functional outcomes after rehabilitation should be made available to the trauma centers.

Prereview Questionnaire

- 5.5.1 What are the barriers to access to rehabilitation services (such as patient insurance status)?
- 5.5.2 How long do patients wait for rehabilitation beds?
- 5.5.3 Does the average wait for rehabilitation beds vary by type of rehabilitation needed?
- 5.5.4 Identify the minimum requirements and qualifications that rehabilitation centers have established for the physician leaders (such as medical director of SCI program, medical director of TBI program, and medical director of rehabilitation program).

- 5.5.5 Describe the qualifications, roles, and responsibilities that rehabilitation leaders have in providing multidisciplinary care in the acute trauma care and rehabilitation settings (such as fellowship training, board certification, and years of experience).
- 5.5.6 Describe how rehabilitation specialists are integrated into trauma system planning and advisory groups.
- 5.5.7 Describe the established transfer agreements between designated trauma centers and rehabilitation facilities in the trauma system.

Documentation Requested

- 5.5.a A list of the rehabilitation centers and their Commission on Accreditation of Rehabilitation Facilities (CARF) accreditation status
- 5.5.b A report that specifies the proportion of patients with SCI, TBI (Abbreviated Injury Score for the head ≥ 3), major trauma (ISS > 15), and pediatric patients (age ≤ 12 years, ISS > 15) with a discharge disposition listed as an inpatient rehabilitation center
 - Summary of rehabilitation services utilized
- 5.5.c Number of new major trauma, pediatric, SCI, and TBI admissions to rehabilitation centers in the region
- 5.5.d Data describing trauma system rehabilitation resources and services that provide or support care and recovery, including:
 - Number of patients receiving rehabilitation services at all levels of care, including injury type and severity, age, race/ethnicity, gender, and geographic/socioeconomic characteristics
 - Types of rehabilitation services provided to patients across the injury spectrum
 - Number of patients that medically qualify yet do not receive the recommended level of rehabilitation care, with the reasons for not receiving recommended services
- 5.5.e Data pertaining to the number of inpatient beds designated for rehabilitation as well as staff-to-patient ratio
- 5.5.f A list of the rehabilitation data elements that are transferred to the trauma registry

System Integration

For the system to function optimally, trauma care must be integrated into the larger public health framework. A trauma system should have a plan, overseen by the lead agency, that specifies how the various components work together to achieve the intended goals and discusses how integration and cooperation from the time of injury through ultimate repatriation will be achieved. The system must also work to identify and eliminate healthcare disparities. Using this public health approach, the trauma system should aim to reduce the burden of injury in a state or region. In addition, this approach enables the trauma system to address primary, secondary, and tertiary injury prevention by mobilizing community partnerships.

Trauma system integration is essential for the daily care of injured people. Coordinated activity among emergency medical services, definitive care institutions, and rehabilitation centers ensures optimal care of the injured patient. This care, however, must be augmented by other essential services and partners, including mental health providers, social services, child protection, public safety, and disaster response and recovery. The system needs to be on alert for disparities, bias, and lesser outcomes of vulnerable populations. Collaboration with the public health community provides access to epidemiologic data that can be used for system assessment, development of public policy, and informing and educating the community.

Through its leadership, each element of the trauma system should participate in trauma system design, evaluation, and operation. This participation should include policy and legislative development, public education, and strategic planning. In addition, trauma and subspecialty leaders should provide direction and oversight to the development, implementation, and monitoring of integrated protocols for patient care used throughout the system (such as TBI guidelines used by prehospital professionals and nondesignated transferring centers). This should also include region-specific primary and secondary triage protocols. Trauma leadership, through regional trauma committees, can assist the lead agency and help ensure that system deficiencies in the quality of care relative to national standards are recognized and corrected.

The increasing level of threats to our society, such as mass violence, terrorist attacks, infectious diseases, and natural disasters, underscore the importance of trauma system integration. The trauma system is a significant state or regional resource in the response to mass casualty incidents. It has been demonstrated that communities supported by developed regional trauma systems are more organized and better able to respond to these events. The impact of disasters

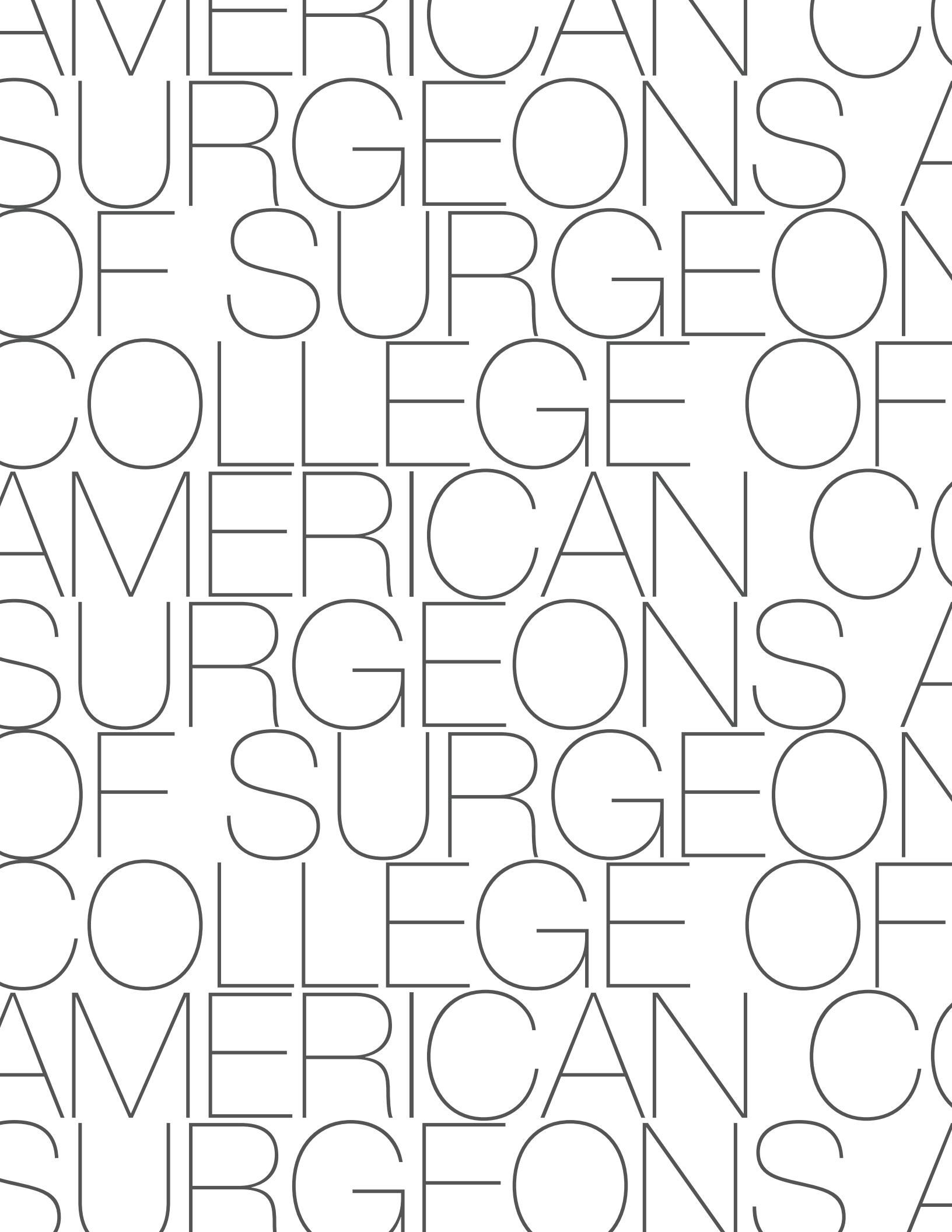
and mass casualty incidents on the functioning of trauma centers, EMS, and public health systems within an affected region or state must be considered in the joint planning for optimal use of all resources to enable a coordinated response through recovery.

Prereview Questionnaire

- 5.6.1 Describe how the trauma system plan drives the various components to work together to achieve the intended goals.
- 5.6.2 Describe how the lead agency and each aspect of the trauma system participate in trauma system design, evaluation, and operation as well as policy development, legislative advocacy, public education, and strategic planning.
- 5.6.3 Describe the working relationships with the trauma lead agency and EMS lead agency, if they are different.
- 5.6.4 Describe the trauma system's collaboration and integration with community services, including:
 - a. Public health
 - b. Emergency management system
 - c. Prevention programs
 - d. Mental health resources
 - e. Social services
 - f. Law enforcement.
 - g. Child and adult protective services
 - h. Public safety (such as fire, lifeguard, mountain rescue, and ski patrol)
- 5.6.5 Describe how the integrated trauma system identifies and addresses healthcare disparities.

Documentation Requested

- 5.6.a Organizational chart showing the trauma system's relationship with public health and community services





ESSENTIAL TRAUMA SYSTEM ELEMENT #6

Needs-Based Designation

The lead agency should develop and administer a trauma center designation process which is based upon population needs.

Purpose and Rationale

Regional trauma system implementation has been shown to improve mortality and reduce complications. The number, level, and location of trauma centers are critical elements of trauma system function and disaster response. The importance of controlling the allocation of trauma centers, as well as the need for a process to designate trauma centers based upon regional population need, has been recognized as an essential component of trauma system design since the 1980s.

The designation of trauma centers is the responsibility of the lead agency, with input from the multidisciplinary advisory group. The lead agency must have a strong mandate, clear statutory authority, and the political will to execute this responsibility. In determining number, level, and location of trauma centers, the lead agency must be guided by the local needs of the region for which it provides oversight. The applicability of specific metrics and benchmarks for establishment of need will vary depending on the unique attributes of the region. Further, the needs of patients must be optimized, and it is the professional obligation of healthcare professionals, facilities, and political leaders to work together to ensure that patients' needs come first. Assessment determinations should be transparent and derived through a broad-based, locally driven consensus process that is balanced, fair, and equitable.

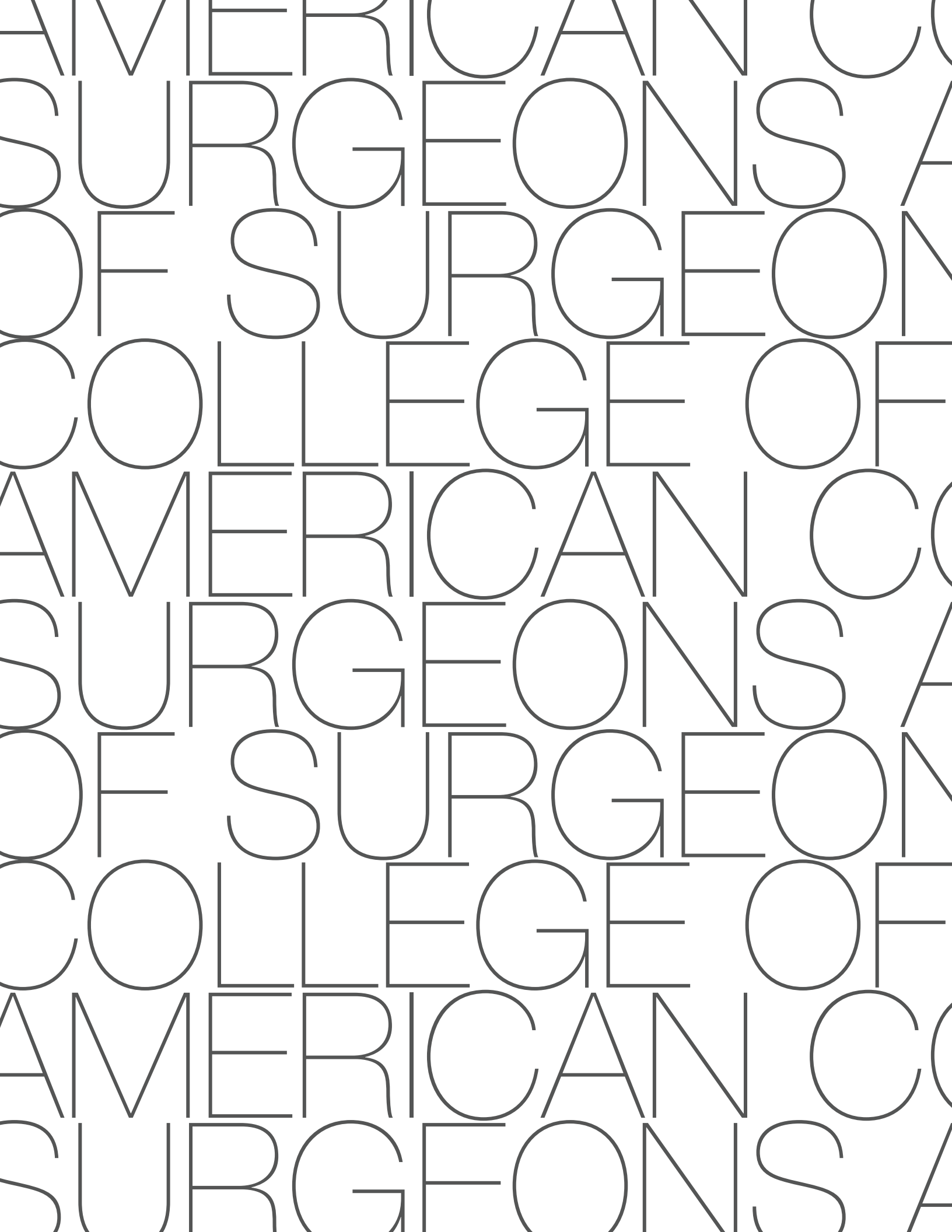
Utilizing the inclusive trauma system model, the number and location of trauma centers by level of designation and integration of nondesignated facilities must be periodically assessed by the lead agency with respect to patient care needs and timely access to definitive trauma care. There should be a process in place with the appropriate statutory authority for identifying the appropriate number and/or level of trauma centers based on these periodic assessments. The trauma system plan should address means for improving the participation of both designated and nondesignated acute care facilities to improve access to injury care within the trauma system.

Prereview Questionnaire

- 6.1 Does the lead agency have a trauma center designation process based upon population need?
 - a. If so, describe this process.
 - b. If not, describe the barriers to developing and administering such a process.
- 6.2 Describe how the needs-based designation process has been implemented.
- 6.3 Outline how the geographic distribution and number of designated acute care facilities are aligned with patient care needs.
 - a. Describe the process by which additional trauma centers are brought into the system.
 - b. Describe the system response to the voluntary withdrawal of designation by acute care facilities.
 - c. Describe the mechanism for tracking and monitoring patient volume and flow between centers and how this influences the overall configuration of designated facilities.

Documentation Requested

- 6.a Document outlining the authority of the lead agency to determine number, level, and location of trauma centers based upon population need
- 6.b Metrics used for the determination of need. Examples may include the following:
 - EMS response and transport times
 - Number of Level I and Level II centers per 1 million population
 - Percentage of population within 60 minutes of a Level I or Level II center
 - Percentage of time that trauma centers are on diversion status
 - Number and percentage of severely injured patients (ISS > 15) seen at a trauma center
 - Frequency, timeliness, and type of interhospital transfers
 - Trauma-related mortality throughout the continuum
- 6.c Number of trauma patients receiving definitive care at nondesignated facilities





ESSENTIAL TRAUMA SYSTEM ELEMENT #7

Trauma System Registry

The lead agency should have the authority to establish and maintain a trauma system registry to collect, validate, and analyze injury surveillance data. Data collection should include the full continuum of care, from point of injury through rehabilitation. These data should include all care facilities that treat injured patients. These data should be integrated with other data collection systems (such as vital records, medical examiner, law enforcement, and rehabilitation). Data definitions and patient inclusion criteria should be standardized to a national standard. Data sharing should be inclusive of system stakeholders to support quality improvement, research efforts, and legislative outreach pertaining to trauma.

Purpose and Rationale

There should be sufficient legal authority to establish a lead trauma system agency that can collect, validate, analyze, and distribute data. This legislative mandate should provide for collaboration, coordination, and integration with other entities engaged in providing care or surveillance activities related to the care of the injured patient. The lead agency should be authorized in statute to develop rules for the collection, analysis, use, and distribution of data within the system.

The lead agency should establish and maintain oversight of a single system-wide trauma registry that collates and links hospital-level data with other data collection systems into one accessible dataset to assess trauma system quality and outcomes. These data should guide planning, development, and maintenance of the trauma system during all phases of care. This system-wide trauma registry should meet national data collection standards and utilize current technology. Data collection should encompass the full continuum of care from point of injury to transport, hospitalization, rehabilitation, and return to community. Data collection should focus on identifying individual patients and linking patient-level data across the continuum of care among all relevant databases. Quality system information and data to support trauma system metrics should be provided by all those involved in a patient's care (prehospital, critical access facilities, transferring hospitals, trauma centers, rehabilitation, skilled nursing facilities, and therapy services).

The lead agency should define those responsible for contributing data and outline submission requirements such as demographics, mechanism of injury, diagnoses, treatment, and long-term outcomes. The lead agency should facilitate and foster integration of data collection systems with the addition of administrative discharge data, vital statistics data (government records), death certificates, medical examiners' records, law enforcement, and financial data to add additional perspectives. Data collection processes designed by the lead agency should address the accuracy, timeliness,

standardization, quality, validation, confidentiality, and completeness of the submitted data. An optimal information reporting process includes standardized reporting tools that allow for the assessment of historical and/or system changes and a dynamic reporting tool that permits the ability to tailor specific "views" of the information.

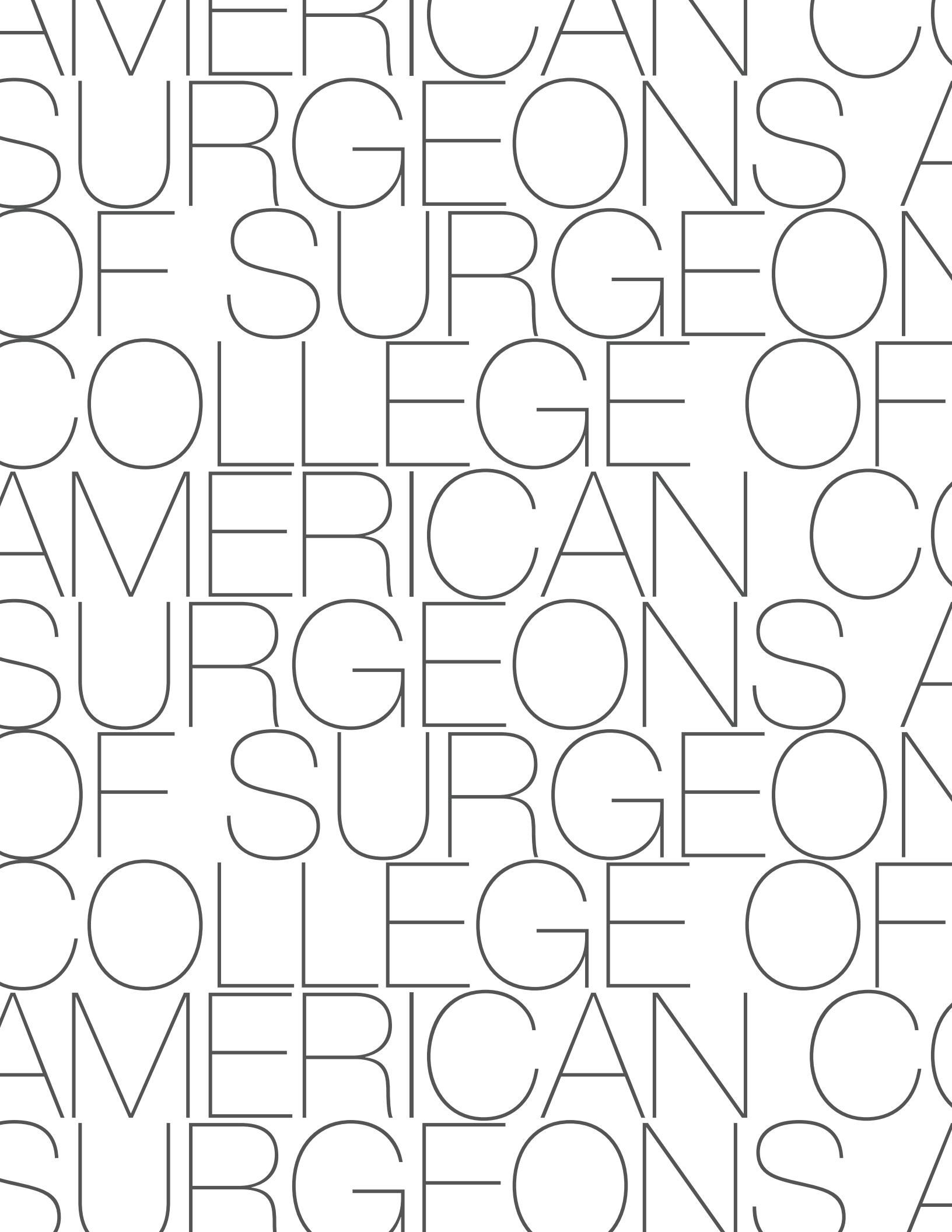
Research should drive the development of the trauma system, defines evidence-based best practices, and provides a foundation for system growth and improvement. Trauma research should be facilitated and encouraged through processes designed to make data available to investigators. The lead agency should have a protocol to address requests for research data as well as a method for evaluating these requests in a timely manner. Although most lead agencies will not have the resources to maintain a self-contained board to meet federal human subjects research standards, they should develop relationships with Institutional Review Boards that can provide this service. Grants or contracts through the lead agency or constituencies may provide funds to support research activities.

Prereview Questionnaire

- 7.1 Describe the infrastructure of the state trauma and EMS data registries.
- 7.2 Which agency has oversight of the trauma registry?
 - a. Describe the role and responsibility of the lead agency in collecting and maintaining the data.
 - b. How are the completeness, timeliness, and quality of the data monitored?
 - c. Which entity has the authority to establish, maintain, and update these registries?
 - d. Which stakeholders have a role in selecting data elements for inclusion in the regional registry?
- 7.3 Provide information on participation rates and data completeness for the registries.
- 7.4 Describe how the lead agency monitors participation within the system registries and provides system feedback to participants on data quality and completeness.
- 7.5 Specify which of the following data sources are linked to the registry and describe the method of linkage (such as probabilistic or deterministic).
 - a. Motor-vehicle crash or incident data
 - b. Law enforcement records
 - c. EMS or other transporting agency records.
 - d. Emergency department records
 - e. Hospital records (hospital trauma registries)
 - f. Rehabilitation data
 - g. Coroner and medical examiner records
 - h. Financial or payer data
 - i. Dispatch
- 7.6 Describe the reports generated from registry data to include frequency and distribution.

Documentation Requested

- 7.a Documentation for the registry processes, to include:
- Data collection methodology, plan, and schedule
 - Data dictionary
 - Patient/facility inclusion criteria
 - Data quality and validation plan as well as schedule of activities that support data quality
 - Demonstration of linkage to other data sources
- 7.b A typical regional registry report, redacted to maintain confidentiality





ESSENTIAL TRAUMA SYSTEM ELEMENT #8

Injury Epidemiology

The lead agency should have systems and processes in place to regularly track and report on injury frequency, rates, and patterns across the entire jurisdictional population. Analysis and reporting should be based on multiple pertinent data sources (such as vital statistics, hospital discharge data, EMS, emergency department data, and trauma registries), including information obtained through surveillance activities. Data from these sources should be synthesized to provide a comprehensive description of injury and then analyzed to identify trends and patterns to inform system development, injury prevention, and performance improvement efforts.

Purpose and Rationale

Trauma leaders and public health officials should collaboratively use injury surveillance data and outcome measures to describe and monitor injury events and emerging injury trends in their jurisdictions. This information will enable trauma system leaders to identify emerging threats that call for a reassessment of priorities and/or reallocation of resources. In addition, the data should be used to assist in ongoing planning, implementation, and evaluation of public health interventions and programs, to include disaster response. The trauma system, in conjunction with the system's epidemiologist, should complete a periodic trauma risk assessment and gap analysis using all available data to establish policy and develop an injury prevention and control plan.

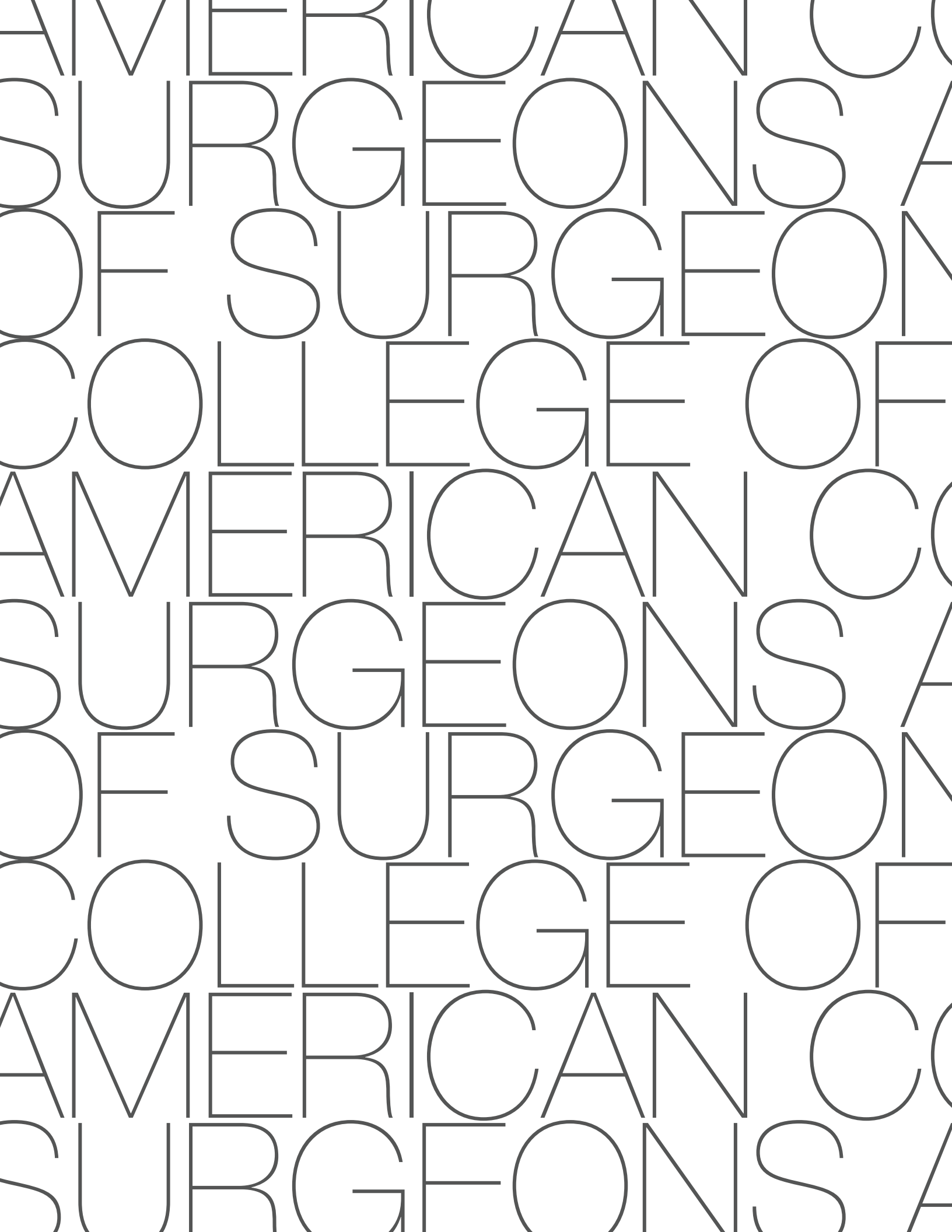
Reducing injury-related morbidity and mortality is the measure of success of a trauma system. Data from the system-wide registry and other sources must support injury epidemiology efforts with a focus on the frequency, rates, and injury pattern events in a population. Injury pattern refers to the occurrence of injury-related events by time, place, and personal characteristics, including demographic factors, preexisting conditions, behavioral influences (such as protective device use), and environmental exposures. Epidemiologic injury data provides a relatively simple form of risk-factor assessment. System data should be used to identify the burden of injury across specific population groups (such as children, elderly, races, and ethnicities) to ensure that specific needs or risk factors are identified. The lead agency should distribute this epidemiologic information to the public and government at least annually and upon reasonable request.

Prereview Questionnaire

- 8.1 Describe the systems and processes used to track injury epidemiologic data.
- 8.2 Describe the epidemiology of injury in the region, to include:
 - a. Children
 - b. Adolescents
 - c. Elderly people
 - d. Other special populations
- 8.3 Describe all analyses that are performed, populations studied, and reports produced (to include the schedule and distribution list for report dissemination).
- 8.4 Describe how emerging injury control patterns (such as from trend or surveillance data) were identified and addressed.
- 8.5 Describe how system epidemiology profile results (such as mortality rates, distribution of mechanism, and intent) are compared with benchmark values.

Documentation Requested

- 8.a List of all datasets used for epidemiologic analyses
- 8.b Most recent, regular reports that describe injury at the system level and identify trends and patterns of injury
- 8.c Most recent Safe States Alliance assessment report





ESSENTIAL TRAUMA SYSTEM ELEMENT #9

System-wide Performance Improvement

The lead agency should establish a system-wide trauma performance improvement process to evaluate all aspects of the trauma system. The plan should define audit filters to monitor and track specific processes and outcomes, such as access to care, availability of services, and effectiveness of injury-prevention initiatives. In addition, the plan should define a process for tracking the audit filters, addressing performance gaps, and determining loop closure.

Purpose and Rationale

The trauma lead agency has responsibility for instituting and analyzing the structure, processes, and outcomes to evaluate the performance of all aspects of the trauma system. Appropriate data should be collected to identify opportunities for performance improvement (PI) in the system and to develop action plans with measurable outcomes. These data should be used to monitor PI efforts and effectiveness of corrective action within the system at all levels of care. Dedicated regional staff and resources should be available to ensure time-sensitive reporting of information to stakeholders.

The lead agency should design trauma system performance indicators with meaningful accountability-based incentives focused on achieving defined quality goals. These incentives will act to ensure the support of key constituents in the healthcare community and general population. The trauma lead agency should promote ongoing dialogue with key stakeholders, ensuring that any initiatives remain aligned with system needs. Success is enhanced when all system participants consistently comply with the guidelines and can evaluate performance in a confidential manner.

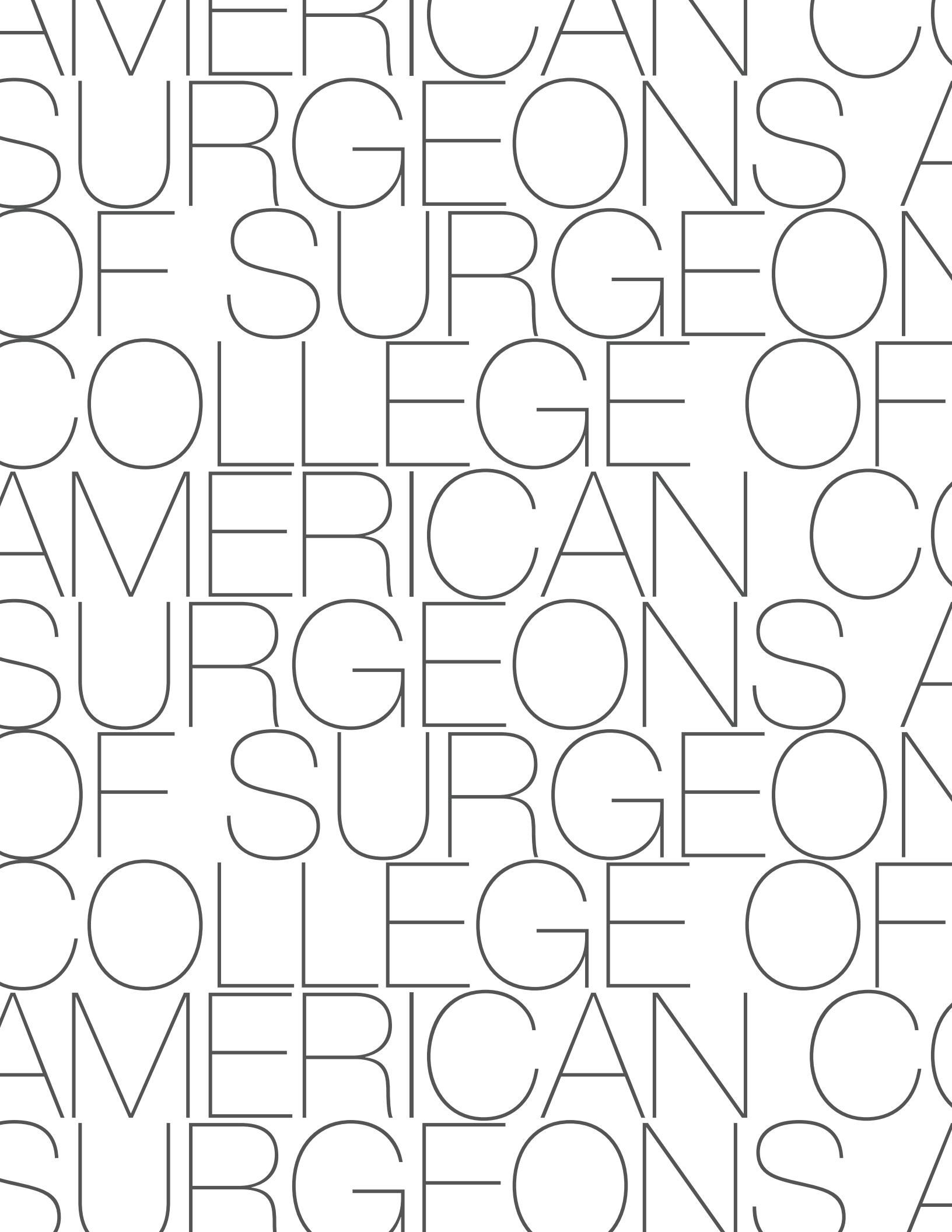
The lead agency should use data to regularly generate reports and conduct analyses. These reports should use data that compare cohort outcomes (such as adult/pediatric, varying trauma center levels, urban/rural) using risk-adjusted benchmarking. An optimal information reporting process should include standardized reporting tools that allow for the assessment of system changes over time. This dynamic reporting tool should permit stakeholders to tailor data analysis and focus on vulnerable or frequently encountered cohorts (groups based on age, injury patterns, or outcomes). The lead agency should provide regularly generated reports that support trauma system operations by evaluating trauma system performance and processes of care.

Prereview Questionnaire

- 9.1 Provide a detailed description of the process for evaluating trauma system performance, including data collection, analysis, PI initiatives, and loop closure.
- 9.2 Describe the entities that have authority and/or responsibility to develop and implement the trauma system PI infrastructure, review trauma system performance, and act on this information for loop closure.
- 9.3 Describe several examples of system-level performance issues that were identified through the system PI process, how they were addressed, and how improvements were maintained.
- 9.4 List the process and patient-outcome measures that are tracked at the trauma system level, including measures for special populations.
- 9.5 Specify the core metrics or audit filters that are assessed in the trauma system.
- 9.6 Describe how hospitals in the trauma system participate in regional or national data-driven quality improvement initiatives.

Documentation Requested

- 9.a Most recent trauma system PI plan, including all audit filters and performance indicators that are tracked and monitored
- 9.b Reports generated from audit filters that are used to track system PI over time
- 9.c Minutes or meeting notes pertaining to the identification, discussion, and resolution of a trauma system (rather than a trauma center) issue
- 9.d List of the organizations represented on the committee responsible for trauma system quality assurance





ESSENTIAL TRAUMA SYSTEM ELEMENT #10

Confidentiality and Discoverability

The lead agency should establish a process to ensure confidentiality and provide statutory protection from discoverability to support trauma system performance improvement and research efforts.

Purpose and Rationale

A designated process, with dedicated staff having expertise to protect data confidentiality, should be constructed to maintain privacy and security of any data under trauma system control. Because protected health information, personal identity information, or unique identifiers may be collected, the process must ensure that patient confidentiality is respected and consistent with state and federal law. Policy should outline how data are requested. Data requests should be reviewed with efforts to ensure compliance with privacy safeguards that prevent improper use or disclosure. Access to information must be limited to only necessary personnel for authorized purposes. Given the sensitivity of this data, the system should also determine when formal patient authorization is required for the release of registry information. There should be a mechanism for feedback to the system regarding the final utilization of the data provided and confirmation of final data disposition.

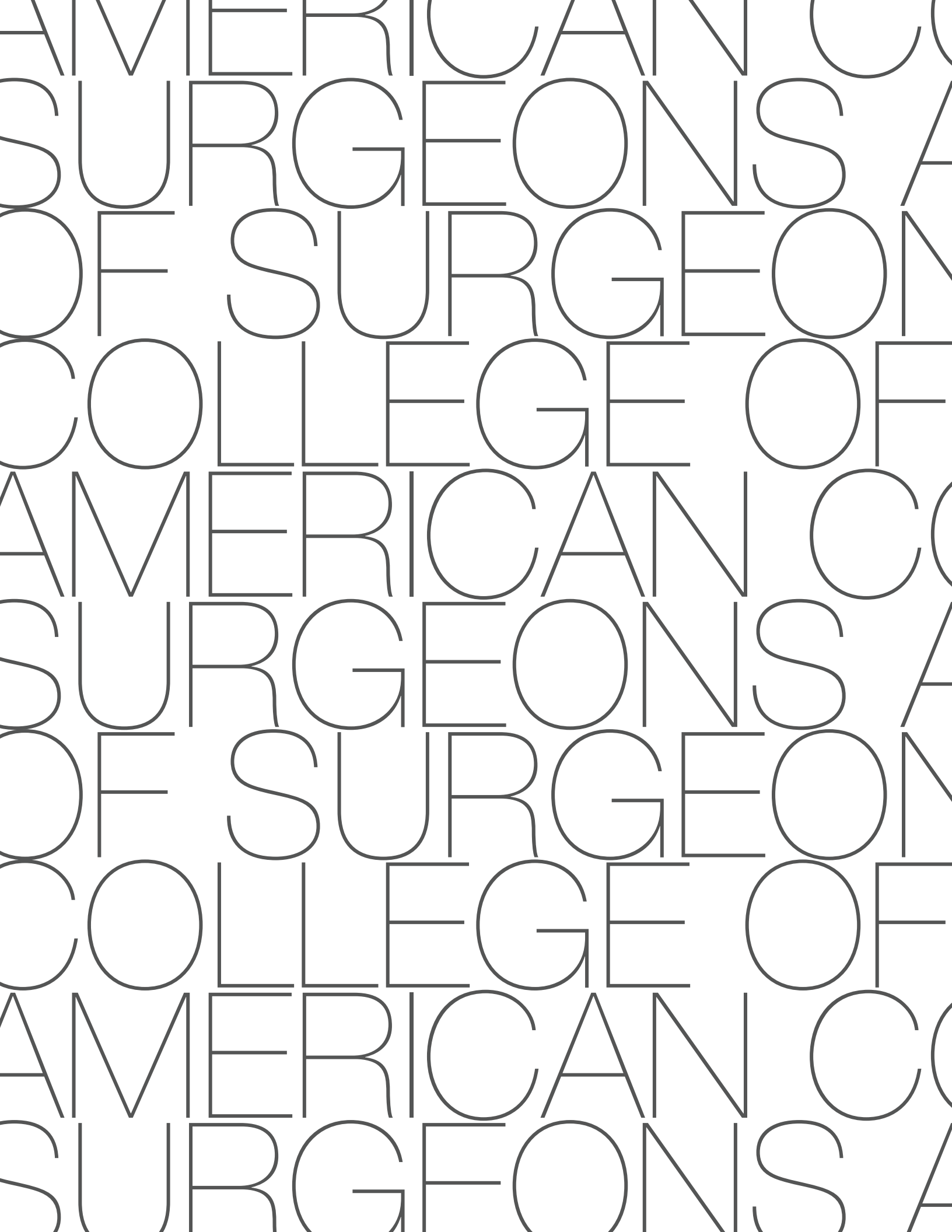
Trauma system data should be protected in statute from discoverability and used to support trauma system performance improvement and research efforts at the regional, state, and national levels. The lead agency should establish a process with explicit safeguards to ensure confidentiality throughout the performance review process. Statutory provisions should foster system development that permits data sharing, collaboration, coordination, and integration with other agencies and entities engaged in prevention, patient care, and surveillance activities related to care of the injured patient. The lead agency should encourage bidirectional flow of information across the continuum, from prevention to prehospital and return to the community.

Prereview Questionnaire

- 10.1 Describe how the lead agency utilizes a mature and formalized data security infrastructure to protect sensitive information of patients and participating stakeholders.
- 10.2 Describe the current procedures and processes that individuals must follow to request access to the trauma system registry.
- 10.3 Describe how laws related to discoverability impact the ability to conduct performance improvement and participate in robust quality improvement initiatives.

Documentation Requested

- 10.a Statute providing protection from discoverability
- 10.b Policies and procedures related to the release of data that include consequences, penalties, and/or remediation for noncompliance





ESSENTIAL TRAUMA SYSTEM ELEMENT #11

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 particularly military partners. There should be a developed and operational network of Regional Medical Operations Centers (RMOCs) as a major component of the disaster preparedness plan. The plan should be exercised at least semiannually. One of these exercises should be operationally based (not tabletop) and test all components of the system.

Purpose and Rationale

The lead agency needs to be actively involved in disaster preparedness in collaboration with trauma system leaders for the local, regional, or national area of responsibility. These system leaders should be subject matter experts in disaster preparedness to ensure that trauma system resources are optimally integrated across the continuum of the emergency response. A mass casualty incident (MCI) is defined by numbers of casualties that overwhelm available hospital and system resources. Contingent upon the size of the MCI, a plan for activation of a larger emergency response with support provided by regional, state, and national assets may be required. In an MCI, acute care facilities (sometimes including one or more trauma centers) within an affected community must be willing to adjust their daily operations to manage the MCI. This plan should be practiced to ensure effective communication between centers and public resources. An assessment of the trauma system's response to simulated incidents or tabletop drills must be conducted and documented on a regular basis to determine the trauma system's ability to respond. Resource assessment of the system should be coupled with a system-specific hazard vulnerability analysis to identify gaps requiring remediation.

Complex disasters may mimic the austere environment and logistical challenges faced in military deployments; thus, military resources for evacuation, triage, and treatment of the affected population should be incorporated into regional disaster plans if available. Planning and integration of the trauma systems with civilian agencies (public health, law enforcement, emergency medical services, and emergency management) and military partners are important because of the extensive impact disasters have on the trauma system and the need for the trauma system to provide care to the local populace. Cooperative relationships among these agencies support the provision of assets that enable a more rapid and organized disaster response on every level.

A major component of the disaster preparedness plan is a developed, integrated, and functional network of Regional Medical Operations Centers (RMOCs). The goal of the RMOC is to strengthen regional care delivery through enhanced resource coordination. The RMOC model is designed to facilitate the most appropriate level of care for as many patients as possible, while simultaneously maintaining patient safety and keeping as many patients as possible within local facilities capable of providing high-quality care. The RMOC enables the entirety of a region's healthcare system during any mass casualty or large public health event to "load balance" patient care needs across healthcare facilities and systems prior to any individual facility transitioning to a crisis standard of care. In addition, the RMOC provides a communication link to other RMOCs to lead or participate in a broader coordinated multiregional, state, or national effort, including multistate response and nationwide network integration.

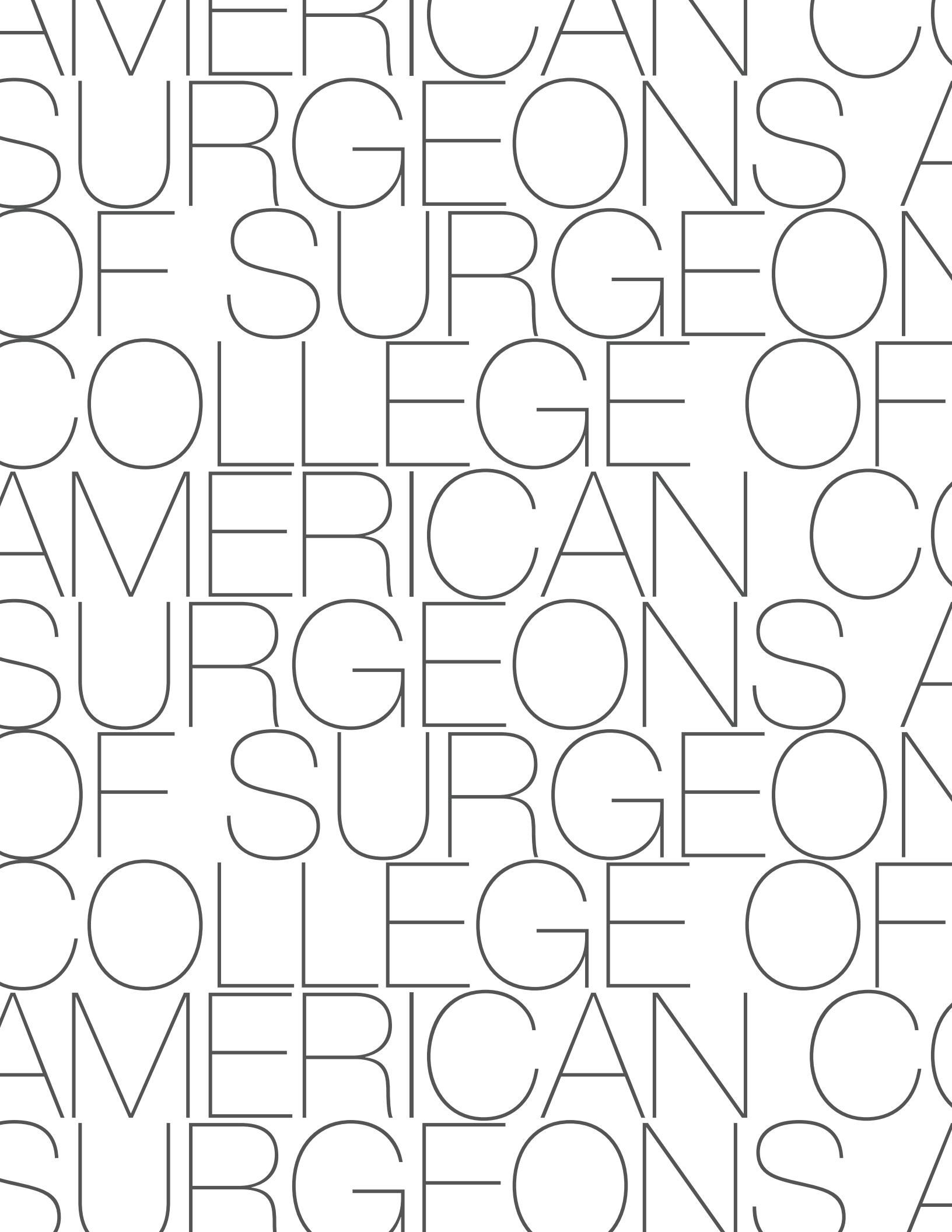
Prereview Questionnaire

- 11.1 When was the last assessment of the trauma system's emergency preparedness?
 - a. Did it include coordination with the public health agency, EMS system, local military experts, and the emergency management agency?
- 11.2 What is the lead agency's assessment of trauma system resources, including the system's ability to expand its capacity or to evacuate casualties in response to mass casualty incidents (MCIs) in an all-hazards approach?
- 11.3 Does the lead agency consult with outside experts to assist in identifying the trauma system's ability to respond to MCIs?
- 11.4 Which actions were taken to remediate or mitigate the gaps identified through tabletop or simulated responses in disaster drills?
- 11.5 What is the trauma system's plan to accommodate a need for a surge in personnel, equipment, and supplies?
- 11.6 How is the trauma system integrated into the state's incident command system and communications center?
- 11.7 What strategies and mechanisms are in place to ensure adequate interhospital communication during an MCI?
- 11.8 How specifically is the military integrated into the disaster response plan, to include resources provided?
- 11.9 Does the system have a network of Regional Medical Operations Center (RMOCs)?
 - a. What is the role of the RMOC in daily and disaster/public health event patient care?
 - b. How is the RMOC operationalized by all stakeholders?
 - c. What are the major goals of the RMOC?
 - d. Are all RMOCs on a uniform data system that can be viewed at the state level?

- e. Is there coordination across state lines with neighboring states?
- f. What funding is provided to support RMOC activities?

Documentation Requested

- 11.a State/regional disaster plan
- 11.b Reports of yearly disaster exercises, including tabletop exercises, listing the participants and types of disaster simulated
- 11.c After-action report of jointly conducted simulated or tabletop drills (including multiple emergency management agencies) that exercised the trauma system's capability to respond to MCIs
- 11.d An organizational chart identifying the relationships among key emergency management agencies (trauma system, EMS, public health, emergency management, military, and law enforcement)
- 11.e Most recent minutes from joint agency emergency management planning meeting
- 11.f Documentation of military commitment and response plan in a disaster
- 11.g Documentation of RMOC structure, operation, and funding





ESSENTIAL TRAUMA SYSTEM ELEMENT #12

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, data collection, performance improvement, research, training, disaster response, and clinical readiness.

Purpose and Rationale

Integration of military trauma and emergency care resources into the local, regional, and national trauma system is an essential component of a trauma system plan to optimize patient outcomes and support the National Security Strategy. Through military-civilian collaboration at the local, regional, and national levels, a trauma system plan should work toward achieving zero preventable death and disability from injury both for those living in the US as well as service members who are injured in defense of the nation.

When military and federal medical resources exist within the geographic area of the trauma system, public policy should authorize the lead agency to include military representation. A regional military trauma representative should serve as a member of the multidisciplinary advisory group. The military trauma resources should be fully integrated into the Department of Defense (DoD) Joint Trauma System, just as the civilian regional trauma system should be linked to the national strategic trauma and emergency care system leadership. Military treatment facilities capable of achieving trauma center verification and designation and geographically located to support population need should be supported to fully integrate and be operationalized within the state, regional, and DoD Joint trauma systems.

Military-civilian collaboration should include both individual and trauma team clinical readiness programs. There should be provisions for credentialing and privileging of medical personnel between military and civilian centers to optimize the education and training benefit for both civilian and military personnel. Standing agreements that enable military trauma teams to provide patient care in civilian trauma centers within regional trauma systems should be established and maintained to ensure clinical readiness. Level I and Level II trauma centers should engage in military-civilian partnerships for ongoing readiness training of military trauma teams.

A regional trauma system that functions daily is foundational for a successful response to crisis. The regional trauma system should be able to provide an appropriately scaled response to any disaster or mass casualty scenario. In the situation of a mass casualty scenario that overwhelms local

and regional resources, the fully integrated military and civilian trauma and emergency care system can be efficiently and effectively mobilized. Integrated military-civilian trauma system resources should be leveraged to care for military casualties that overflow the capacity of regional military treatment facilities. There should be a comprehensive plan with annual drills to leverage the full spectrum of military, federal (Department of Veterans Affairs facilities), and nonfederal partners (via the National Disaster Management System).

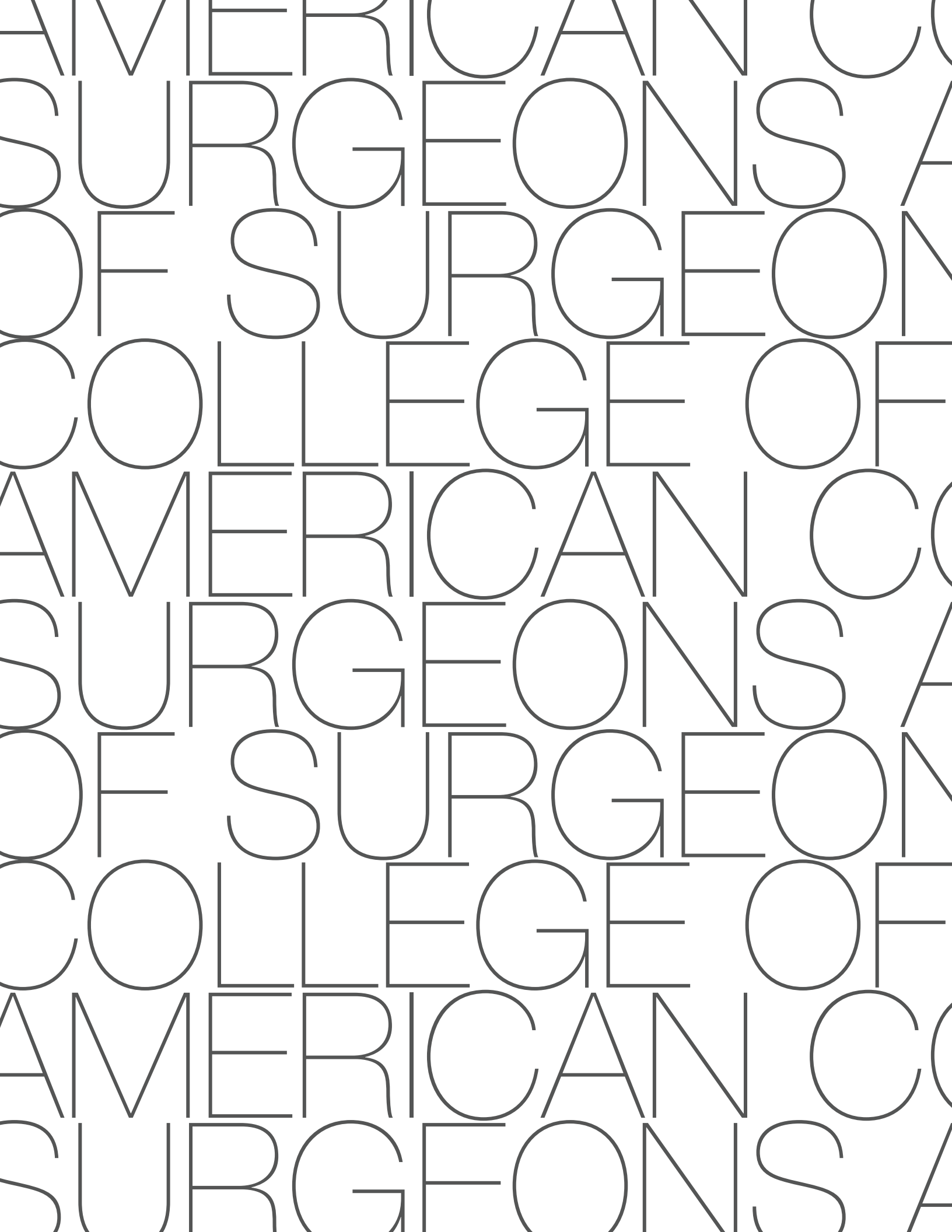
Achieving the goals of an integrated national trauma system requires better integration between civilian and military trauma system elements, which should be supported with funding. The lead agency should have situational awareness of civilian-military trauma partnership agreements within its jurisdiction.

Prereview Questionnaire

- 12.1 Describe how the trauma system plan integrates military resources and is developed in collaboration with military trauma and emergency care representatives.
- 12.2 Describe the military-civilian collaboration in the region for all components of the trauma system plan.
- 12.3 Does the system have a Memorandum of Agreement/ Understanding so that military medical personnel may participate in trauma and emergency medical care, regional civilian trauma systems, federal facilities, and agencies for clinical readiness?
- 12.4 Describe the integration of military resources into the regional mass casualty and disaster response plans.
- 12.5 Does the trauma system plan address a reciprocal partnership for the contingency of a civilian or military mass casualty event?
- 12.6 Identify a military-civilian credentialing reciprocity addressed for times of crisis.

Documentation Requested

- 12.a Military regional trauma system plan
- 12.b Memorandum of Agreement/Understanding between military and civilian stakeholders for integration





APPENDIX A:

National Guideline for the Field Triage of Injured Patients

National Guideline for the Field Triage of Injured Patients

RED CRITERIA

High Risk for Serious Injury

Injury Patterns

- Penetrating injuries to head, neck, torso, and proximal extremities
- Skull deformity, suspected skull fracture
- Suspected spinal injury with new motor or sensory loss
- Chest wall instability, deformity, or suspected flail chest
- Suspected pelvic fracture
- Suspected fracture of two or more proximal long bones
- Crushed, degloved, mangled, or pulseless extremity
- Amputation proximal to wrist or ankle
- Active bleeding requiring a tourniquet or wound packing with continuous pressure

Mental Status & Vital Signs

All Patients

- Unable to follow commands (motor GCS < 6)
- RR < 10 or > 29 breaths/min
- Respiratory distress or need for respiratory support
- Room-air pulse oximetry < 90%

Age 0–9 years

- SBP < 70mm Hg + (2 x age in years)

Age 10–64 years

- SBP < 90 mmHg or
- HR > SBP

Age ≥ 65 years

- SBP < 110 mmHg or
- HR > SBP

Patients meeting any one of the above RED criteria should be transported to the highest-level trauma center available within the geographic constraints of the regional trauma system

YELLOW CRITERIA

Moderate Risk for Serious Injury

Mechanism of Injury

- High-Risk Auto Crash
 - Partial or complete ejection
 - Significant intrusion (including roof)
 - >12 inches occupant site OR
 - >18 inches any site OR
 - Need for extrication for entrapped patient
 - Death in passenger compartment
 - Child (age 0–9 years) unrestrained or in unsecured child safety seat
 - Vehicle telemetry data consistent with severe injury
- Rider separated from transport vehicle with significant impact (eg, motorcycle, ATV, horse, etc.)
- Pedestrian/bicycle rider thrown, run over, or with significant impact
- Fall from height > 10 feet (all ages)

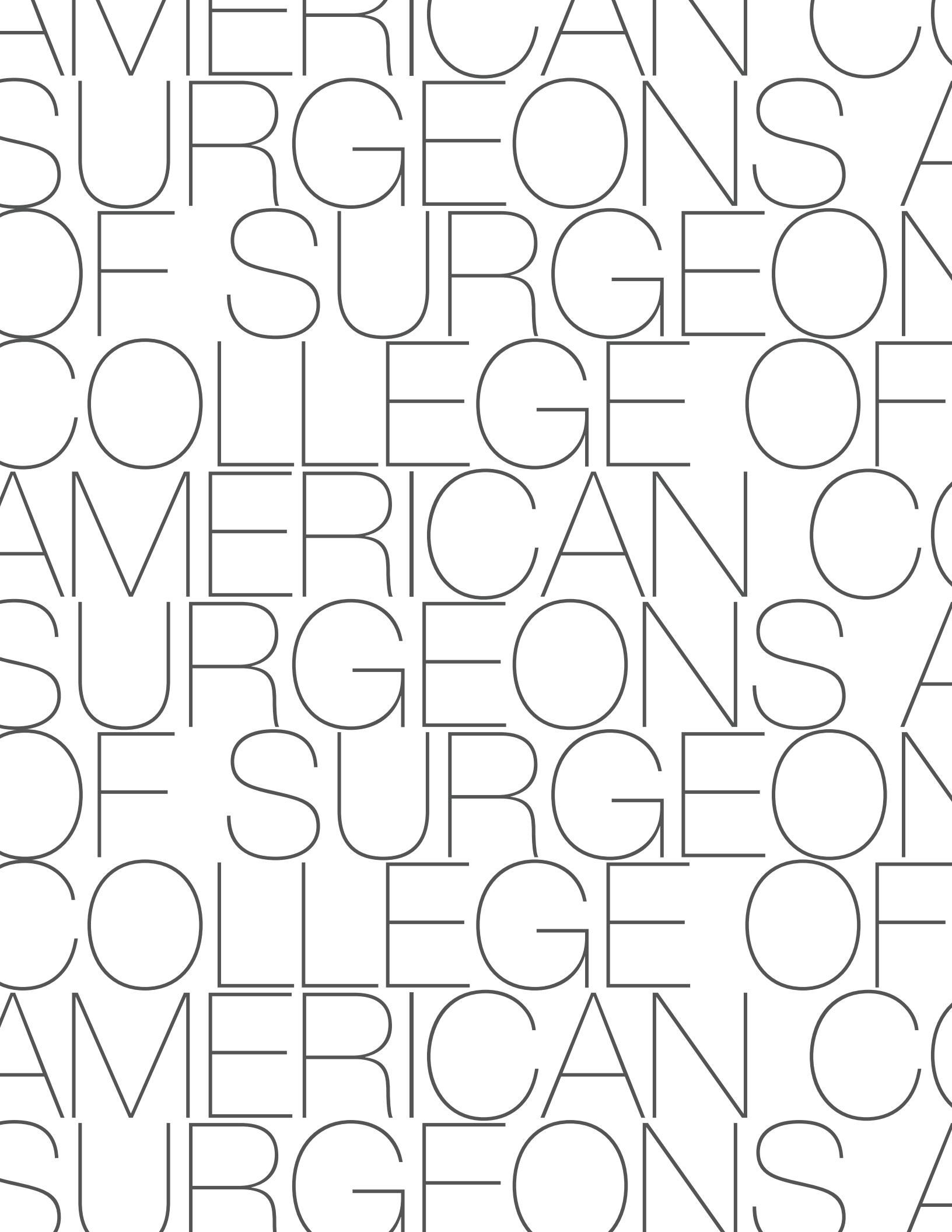
EMS Judgment

Consider risk factors, including:

- Low-level falls in young children (age ≤ 5 years) or older adults (age ≥ 65 years) with significant head impact
- Anticoagulant use
- Suspicion of child abuse
- Special, high-resource healthcare needs
- Pregnancy > 20 weeks
- Burns in conjunction with trauma
- Children should be triaged preferentially to pediatric capable centers

If concerned, take to a trauma center

Patients meeting any one of the YELLOW CRITERIA WHO DO NOT MEET RED CRITERIA should be preferentially transported to a trauma center, as available within the geographic constraints of the regional trauma system (need not be the highest-level trauma center)





APPENDIX B:

Prereview Questionnaire (PRQ) and
Documentation Requested per Element

Essential Trauma System Element #1: Statutory Authority

PRQ

- 1.1 How often are the trauma system regulations reviewed?
- 1.2 In which year were the trauma system statutes last revised?
- 1.3 Describe how the current statutes and regulations allow the state or region to:
 - a. Develop, plan, and implement the trauma system.
 - b. Monitor and enforce rules.
 - c. Designate the lead agency.
 - d. Collect and protect confidential data.
 - e. Protect confidentiality of the quality improvement process.
- 1.4 Describe the process by which trauma system policies and procedures are developed or updated to manage the system, including:
 - a. Adoption of standards of care
 - b. Verification and designation of trauma centers
 - c. Direct patient flow on the basis of designation
 - d. Data collection
 - e. System evaluation
- 1.5 Describe how injury prevention, EMS, public health, rehabilitation, needs of special populations, and integration of emergency management into the trauma system are enabled by statute and regulation.

Documentation

- 1.a State statute or municipal code that establishes a trauma system, including legislative findings and intent
- 1.b Statute or code that designates specific lead agency and responsibilities
- 1.c Documentation outlining rule-making process
- 1.d Annual trauma system report
- 1.e Trauma system statutes and/or administrative rules
- 1.f EMS statutes and regulations
- 1.g Any additional trauma system policies, procedures, or guidelines not otherwise listed in the applicable statute or administrative rule

Essential Trauma System Element #2: Funding

PRQ

- 2.1 What is the lead agency's budget for the trauma system?
- 2.2 What is the source of funding available to support the development, operations, and management of the trauma system (for example, general funds and dedicated funds)?
- 2.3 How does the lead agency track and analyze internal trauma system finances?
 - a. How does the advisory committee participate in the financial review process?
 - b. How frequently are trauma system financial reports published?
 - c. Which financial data are reported (lead agency data, health facility data, or both)?
- 2.4 What financial incentives and disincentives exist for trauma center participation in the trauma system?
- 2.5 What system arrangements exist for uncompensated and undercompensated care?

Documentation

- 2.a Statute or rule that describes trauma system funding
- 2.b Letters and/or legislation that document financial or in-kind commitment
- 2.c Lead agency's budgets, identifying line items directly related to goals and objectives of the trauma plan
- 2.d Lead agency internal trauma office budget
- 2.e Documentation of funding utilization from trauma system components (such as EMS and trauma centers) reported to the lead agency
- 2.f Notice of awards and abstracts (active grants)
- 2.g A comprehensive organizational chart that identifies the lead agency staff, including contract employees, assigned to the trauma program (both full- and part-time)
- 2.h Position descriptions for the trauma system medical director and program manager, including qualifications, duties, and time allocation for these positions

Essential Trauma System Element #3: Multidisciplinary Advisory Group

PRQ

- 3.1 Does the multidisciplinary advisory group have broad stakeholder involvement and engagement representing the full spectrum of trauma care? Including, for example, rural and urban trauma centers; pediatric, adult, and geriatric trauma care; EMS; rehabilitation; and regional military trauma.
 - a. Describe the objectives, responsibilities, activities, and composition of the multidisciplinary advisory group.
 - b. Describe the lead agency involvement and leadership in the multidisciplinary advisory group.
 - c. Identify the organizations with whom the multidisciplinary advisory group and lead agency collaborate.
- 3.2 How often does the multidisciplinary advisory group meet per year?
 - a. Is there an attendance requirement for participants?
- 3.3 Describe how the lead agency and multidisciplinary advisory group are involved in trauma system planning and performance evaluation.
- 3.4 Describe how the multidisciplinary advisory group assists the lead agency to inform and educate the public and legislators to foster trauma system enhancement.
- 3.5 Is there a trauma system coalition?
 - a. What is the role of the coalition members (constituents and stakeholders) in promoting trauma system development?
 - b. What is the method and frequency for communicating with coalition members?
- 3.6 Describe how the lead agency engages with the stakeholder coalition to inform and educate governmental leaders to make them effective partners in policy development for trauma system advancement.
- 3.7 Describe how the trauma system leadership mobilizes community partners to improve the trauma system through effective communication and collaboration.
 - a. How has the community been approached to identify injury control concerns?
 - b. What key problems has the community identified?
 - c. How do stakeholders bring system challenges or deficiencies to the attention of the lead agency?
- 3.8 Describe how the lead agency informs citizens about trauma care and trauma system progress on a recurring basis.

Documentation

- 3.a Statute or rule creating the multidisciplinary advisory group
- 3.b A list of the multidisciplinary group membership with role identification

- 3.c A representative sample meeting schedule, agenda, and minutes of a multidisciplinary advisory group meeting
 - Meeting attendance by multidisciplinary advisory group members
- 3.d A list of organizations represented in trauma system planning or injury control (such as multidisciplinary state advisory committee, subcommittees, and other groups supporting trauma system development)
- 3.e A list of all active coalition members, with specific identification of those representing special populations (such as children and people who are elderly, need rehabilitation, or are disabled)
- 3.f Examples of communication to constituencies or the trauma system coalition (such as notice of planning meetings, newsletter, activity report, coalition updates, or media message)

System Element #4: Trauma System Plan

PRQ

- 4.1 Describe the process used by the lead agency and multidisciplinary advisory group for review and update of the trauma system plan.
 - a. How often is the plan reviewed and updated?
- 4.2 Describe the cross-disciplinary collaboration and integration of EMS, public health agencies, emergency and disaster management, social and mental health services, law enforcement, child and adult protective services, and other community public safety entities within the trauma system development plan.
- 4.4 Describe the process for determining the trauma system plan's goals and objectives.
 - a. During review of the trauma system plan, are the goals and objectives evaluated and updated using trauma system data?
- 4.4 Describe the ongoing assessment of trauma resources and asset allocation within the system.
- 4.5 Describe the process used to integrate trauma system standards and policies in the trauma system plan.

Documentation

- 4.a Trauma system plan and other supporting documents
- 4.b A list of trauma system goals and objectives (if not included in the trauma system plan)

Essential Trauma System Element #5: Continuum of Care

5.1 Prevention and Outreach

PRQ

- 5.1.1 Describe how the lead agency is engaged in the development and implementation of community health needs assessments and improvement plans.
- 5.1.2 Describe if and how the lead agency is integrated with public health injury control programs for injury surveillance, resource coordination (such as funding and human resources), and prevention program implementation.
- 5.1.3 List organizations dedicated to injury prevention within the region and the issues they address (such as MADD, SADD, SafeKids Worldwide, Injury Free Coalition for Kids, American Trauma Society, violence intervention programs, and university-based injury control programs).
- 5.1.4 List the number and describe the nature of injury prevention activities conducted throughout the trauma system in the past year (such as activities directed at which mechanism or type of injury or which patient population, such as children and elderly people).

- 5.1.5 Describe how the lead agency has funded and coordinated system-wide injury prevention or outreach activities, and include the following:
- a. Which injuries have been identified and prioritized for intervention strategies?
 - b. How are the prevention needs of children, the elderly, and other vulnerable populations addressed?
 - c. Which dedicated lead agency or other agency staff (full- or part-time) is responsible for injury prevention outreach and coordination for the trauma system?
 - d. What is the source of funding?

Documentation

- 5.1.a Most recent community health needs assessment report
- 5.1.b Most recent annual injury prevention and outreach report
- 5.1.c A representative sample of brochures, pamphlets, fliers, and curricula for educational programs on injury prevention

5.2 Emergency Medical Services

PRQ

- 5.2.1 Describe the role of the EMS system medical director.
- a. Does the EMS system medical director have statutory authority to develop operational protocols, oversee clinical practice, and establish ongoing quality assessment to ensure optimal provision of prehospital care?
 - b. In a system that does not currently have an EMS system medical director, what are the barriers to creation and/or fulfillment of this role?
- 5.2.2 Describe how EMS leadership participates in all aspects of trauma system design, evaluation, and operation, including policy development, public education, and strategic planning.
- 5.2.3 Describe the EMS system to include the following.
- a. List the number and competencies (that is, ALS or BLS) of ground transporting agencies, nontransporting agencies, and air medical resources.
 - b. Describe how EMS resources are allocated throughout the region to serve the population.
 - c. Describe the availability of enhanced 911 and wireless E-911 access in the region.
 - d. Identify any specialty pediatric transporting agencies and aeromedical resources.
 - e. Describe the availability of pediatric equipment on all ground and/or air transporting units.
- 5.2.4 Describe the procedures for online and offline medical direction, including procedures for the pediatric population.
- 5.2.5 Describe the prehospital workforce competencies in trauma for:
- a. Initial training and certification/licensure requirements
 - b. Continuing education and recertification/license renewal requirements
 - c. Pediatric trauma training requirements for recertification
- 5.2.6 Describe EMS communication policies and systems used.
- 5.2.7 Describe the process for assessing the adequacy of the workforce resources within the EMS system.
- a. What human resource deficiencies have been identified and what corrective actions have been taken?

Documentation

- 5.2.a Most recent EMS assessment
- 5.2.b EMS medical director job description
- 5.2.c Map identifying the location of aeromedical resources in the region
- 5.2.d Protocols dictating level of EMS response (ALS or BLS), mode of transport, and disposition of the patient
- 5.2.e Requirements for medical oversight of all levels of EMS agencies, ALS and BLS, transporting and nontransporting
- 5.2.f Prehospital care treatment protocols (ALS and BLS), including pediatric protocols and geriatric protocols, if available

5.3 System Triage and Patient Flow

PRQ

- 5.3.1 Describe how the lead agency assesses timely and appropriate triage of the most critically injured patients as well as timely and appropriate interfacility transfers through a multidisciplinary Process Improvement and Patient Safety (PIPS) process.
- 5.3.2 Describe how over- and undertriage, as well as delayed interfacility transfers, are addressed.
 - a. Define under and over triage for both pediatric and geriatric patients.
 - b. Describe how pediatric and geriatric patients are triaged from the field to appropriate facilities.
- 5.3.3 Describe the prehospital trauma triage protocols, including consistency with national guidelines.
- 5.3.4 Describe the criteria used within the system to guide the decision to transfer patients to an appropriate facility and the uniformity with which these criteria are applied across all centers.
 - a. Describe the criteria used to guide the decision to transfer patients across state lines or to nondesignated facilities.
- 5.3.5 Specify whether there are interfacility transfer agreements to address these needs:
 - a. Transfer to an appropriate resource facility
 - b. Traumatic brain injury
 - c. Spinal cord injury
 - d. Reimplantation
 - e. Burns
 - f. Children
 - g. Repatriation
- 5.3.6 Specify whether there is a central communications system to coordinate interfacility transfers and describe how this system has access to information regarding resource availability within the region. If not, describe the process for communication and acceptance of interfacility transfers to a higher level of care.

Documentation

- 5.3.a Guidelines for patient care delivery decisions (primary or in-field triage and destination designation guidelines)
- 5.3.b Interfacility transfer policy and criteria
 - Policy addressing the mode of transport, transport type, and qualifications of transport personnel used for field transport and interfacility transfers
- 5.3.c Representative sample of minutes of meetings documenting ongoing quality improvement of transfer criteria
- 5.3.d Policies or procedures related to repatriation

5.4 Definitive Care Facilities

PRQ

- 5.4.1 Describe if and how all acute care facilities, both designated and nondesignated, participate in the essential activities of a trauma system, including:
 - a. Data submission to state or regional registries
 - b. Performance improvement
 - c. Representation on regional trauma advisory committees
 - d. Development of operational agreements to address interfacility transfers
- 5.4.2 Describe the availability and roles of specialty centers within the system (such as pediatric and burn).
- 5.4.3 Describe how facilities providing the highest level of trauma care provide leadership in education, outreach, patient care, and research.

- 5.4.4 Describe how facilities participate in the design, development, evaluation, and operation of the trauma system.
- 5.4.5 Specify whether the system has a funding source for leadership activities expected of the facilities providing trauma care.
- 5.4.6 Specify system standards used for trauma center verification (including pediatric standards) and the extent to which they are aligned with national standards.
- 5.4.7 Describe the processes for verification and designation.
 - a. Briefly outline the extent of authority granted to the lead agency to receive applications and to verify, designate, and dedesignate regional trauma centers.
 - b. Describe any waivers or program flexibility granted to centers that do not meet verification requirements.
 - c. Describe the process and frequency of de-designation of trauma centers.
- 5.4.8 Describe the system for assessing the adequacy of the workforce resources within participating centers.
 - a. How are nursing and subspecialty needs (trauma or general surgery, intensivists, neurosurgeons, orthopedic surgeons, anesthesiologists, pediatric surgeons, and others, as required) addressed?
 - b. What human resource deficiencies have been identified, and what corrective actions have been taken?
- 5.4.9 Describe the educational standards and credentialing for emergency physicians and nursing staff, general surgeons, specialty surgeons, and critical care nurses caring for trauma patients in designated facilities.
 - a. Which regional educational multidisciplinary conferences are provided to care providers?
 - b. Who is responsible for organizing these events?

Documentation

- 5.4.a Document outlining the process for designation, redesignation, and dedesignation (if necessary) of trauma centers
- 5.4.b Standards (other than those of ACS) used for trauma center verification
- 5.4.c A list of acute care facilities with the following data for each:
 - Level of designation/verification
 - A geographic map showing the location, catchment areas, and designation for all acute care facilities
 - Geospatial analysis of access to care within 60 minutes of injury by air or ground
 - Patient volume (total and with Injury Severity Score [ISS] >15, if available)
 - › Emergency department visits
 - › Admissions
 - A list of trauma facilities with their level of designation and trauma patient volume (total and with ISS >15)

5.5 Rehabilitation

PRQ

- 5.5.1 What are the barriers to access to rehabilitation services (such as patient insurance status)?
- 5.5.2 How long do patients wait for rehabilitation beds?
- 5.5.3 Does the average wait for rehabilitation beds vary by type of rehabilitation needed?
- 5.5.4 Identify the minimum requirements and qualifications that rehabilitation centers have established for the physician leaders (such as medical director of SCI program, medical director of TBI program, and medical director of rehabilitation program).
- 5.5.5 Describe the qualifications, roles, and responsibilities that rehabilitation leaders have in providing multidisciplinary care in the acute trauma care and rehabilitation settings (such as fellowship training, board certification, and years of experience).
- 5.5.6 Describe how rehabilitation specialists are integrated into trauma system planning and advisory groups.
- 5.5.7 Describe the established transfer agreements between designated trauma centers and rehabilitation facilities in the trauma system.

Documentation

- 5.5.a A list of the rehabilitation centers and their Commission on Accreditation of Rehabilitation Facilities (CARF) accreditation status
- 5.5.b A report that specifies the proportion of patients with SCI, TBI (Abbreviated Injury Score for the head ≥ 3), major trauma (ISS > 15), and pediatric patients (age ≤ 12 years, ISS > 15) with a discharge disposition listed as an inpatient rehabilitation center
 - Summary of rehabilitation services utilized
- 5.5.c Number of new major trauma, pediatric, SCI, and TBI admissions to rehabilitation centers in the region
- 5.5.d Data describing trauma system rehabilitation resources and services that provide or support care and recovery, including:
 - Number of patients receiving rehabilitation services at all levels of care, including injury type and severity, age, race/ethnicity, gender, and geographic/socioeconomic characteristics
 - Types of rehabilitation services provided to patients across the injury spectrum
 - Number of patients that medically qualify yet do not receive the recommended level of rehabilitation care, with the reasons for not receiving recommended services
- 5.5.e Data pertaining to the number of inpatient beds designated for rehabilitation as well as staff-to-patient ratio
- 5.5.f A list of the rehabilitation data elements that are transferred to the trauma registry

5.6 System Integration

PRQ

- 5.6.1 Describe how the trauma system plan drives the various components to work together to achieve the intended goals.
- 5.6.2 Describe how the lead agency and each aspect of the trauma system participate in trauma system design, evaluation, and operation as well as policy development, legislative advocacy, public education, and strategic planning.
- 5.6.3 Describe the working relationships with the trauma lead agency and EMS lead agency, if they are different.
- 5.6.4 Describe the trauma system's collaboration and integration with community services, including:
 - a. Public health
 - b. Emergency management system
 - c. Prevention programs
 - d. Mental health resources
 - e. Social services
 - f. Law enforcement.
 - g. Child and adult protective services
 - h. Public safety (such as fire, lifeguard, mountain rescue, and ski patrol)
- 5.6.5 Describe how the integrated trauma system identifies and addresses healthcare disparities.

Documentation

- 5.6.a Organizational chart showing the trauma system's relationship with public health and community services

Essential Trauma System Element #6: Needs-Based Designation

PRQ

- 6.1 Does the lead agency have a trauma center designation process based upon population need?
 - a. If so, describe this process.
 - b. If not, describe the barriers to developing and administering such a process.
- 6.2 Describe how the needs-based designation process has been implemented.
- 6.3 Outline how the geographic distribution and number of designated acute care facilities are aligned with patient care needs.
 - a. Describe the process by which additional trauma centers are brought into the system.
 - b. Describe the system response to the voluntary withdrawal of designation by acute care facilities.
 - c. Describe the mechanism for tracking and monitoring patient volume and flow between centers and how this influences the overall configuration of designated facilities.

Documentation

- 6.a Document outlining the authority of the lead agency to determine number, level, and location of trauma centers based upon population need
- 6.b Metrics used for the determination of need. Examples may include the following:
 - EMS response and transport times
 - Number of Level I and Level II centers per 1 million population
 - Percentage of population within 60 minutes of a Level I or Level II center
 - Percentage of time that trauma centers are on diversion status
 - Number and percentage of severely injured patients (ISS > 15) seen at a trauma center
 - Frequency, timeliness, and type of interhospital transfers
 - Trauma-related mortality throughout the continuum
- 6.c Number of trauma patients receiving definitive care at nondesignated facilities

Trauma System Element #7: Trauma System Registry

PRQ

- 7.1 Describe the infrastructure of the state trauma and EMS data registries.
- 7.2 Which agency has oversight of the trauma registry?
 - a. Describe the role and responsibility of the lead agency in collecting and maintaining the data.
 - b. How are the completeness, timeliness, and quality of the data monitored?
 - c. Which entity has the authority to establish, maintain, and update these registries?
 - d. Which stakeholders have a role in selecting data elements for inclusion in the regional registry?
- 7.3 Provide information on participation rates and data completeness for the registries.
- 7.4 Describe how the lead agency monitors participation within the system registries and provides system feedback to participants on data quality and completeness.
- 7.5 Specify which of the following data sources are linked to the registry and describe the method of linkage (such as probabilistic or deterministic).
 - a. Motor-vehicle crash or incident data
 - b. Law enforcement records
 - c. EMS or other transporting agency records.
 - d. Emergency department records
 - e. Hospital records (hospital trauma registries)
 - f. Rehabilitation data
 - g. Coroner and medical examiner records
 - h. Financial or payer data
 - i. Dispatch
- 7.6 Describe the reports generated from registry data to include frequency and distribution.

Documentation

- 7.a Documentation for the registry processes, to include:
- Data collection methodology, plan, and schedule
 - Data dictionary
 - Patient/facility inclusion criteria
 - Data quality and validation plan as well as schedule of activities that support data quality
 - Demonstration of linkage to other data sources
- 7.b A typical regional registry report, redacted to maintain confidentiality

System Element #8: Injury Epidemiology

PRQ

- 8.1 Describe the systems and processes used to track injury epidemiologic data.
- 8.2 Describe the epidemiology of injury in the region, to include:
- a. Children
 - b. Adolescents
 - c. Elderly people
 - d. Other special populations
- 8.3 Describe all analyses that are performed, populations studied, and reports produced (to include the schedule and distribution list for report dissemination).
- 8.4 Describe how emerging injury control patterns (such as from trend or surveillance data) were identified and addressed.
- 8.5 Describe how system epidemiology profile results (such as mortality rates, distribution of mechanism, and intent) are compared with benchmark values.

Documentation

- 8.a List of all datasets used for epidemiologic analyses
- 8.b Most recent, regular reports that describe injury at the system level and identify trends and patterns of injury
- 8.c Most recent Safe States Alliance assessment report

Essential Trauma System Element #9: System-wide Performance Improvement

PRQ

- 9.1 Provide a detailed description of the process for evaluating trauma system performance, including data collection, analysis, PI initiatives, and loop closure.
- 9.2 Describe the entities that have authority and/or responsibility to develop and implement the trauma system PI infrastructure, review trauma system performance, and act on this information for loop closure.
- 9.3 Describe several examples of system-level performance issues that were identified through the system PI process, how they were addressed, and how improvements were maintained.
- 9.4 List the process and patient-outcome measures that are tracked at the trauma system level, including measures for special populations.
- 9.5 Specify the core metrics or audit filters that are assessed in the trauma system.
- 9.6 Describe how hospitals in the trauma system participate in regional or national data-driven quality improvement initiatives.

Documentation

- 9.a Most recent trauma system PI plan, including all audit filters and performance indicators that are tracked and monitored
- 9.b Reports generated from audit filters that are used to track system PI over time
- 9.c Minutes or meeting notes pertaining to the identification, discussion, and resolution of a trauma system (rather than a trauma center) issue
- 9.d List of the organizations represented on the committee responsible for trauma system quality assurance

Essential Trauma System Element #10: Confidentiality and Discoverability

PRQ

- 10.1 Describe how the lead agency utilizes a mature and formalized data security infrastructure to protect sensitive information of patients and participating stakeholders.
- 10.2 Describe the current procedures and processes that individuals must follow to request access to the trauma system registry.
- 10.3 Describe how laws related to discoverability impact the ability to conduct performance improvement and participate in robust quality improvement initiatives.

Documentation

- 10.a Statute providing protection from discoverability
- 10.b Policies and procedures related to the release of data that include consequences, penalties, and/or remediation for noncompliance

Essential Trauma System Element #11: Disaster Preparedness

PRQ

- 11.1 When was the last assessment of the trauma system's emergency preparedness?
 - a. Did it include coordination with the public health agency, EMS system, local military experts, and the emergency management agency?
- 11.2 What is the lead agency's assessment of trauma system resources, including the system's ability to expand its capacity or to evacuate casualties in response to mass casualty incidents (MCIs) in an all-hazards approach?
- 11.3 Does the lead agency consult with outside experts to assist in identifying the trauma system's ability to respond to MCIs?
- 11.4 Which actions were taken to remediate or mitigate the gaps identified through tabletop or simulated responses in disaster drills?
- 11.5 What is the trauma system's plan to accommodate a need for a surge in personnel, equipment, and supplies?
- 11.6 How is the trauma system integrated into the state's incident command system and communications center?
- 11.7 What strategies and mechanisms are in place to ensure adequate interhospital communication during an MCI?
- 11.8 How specifically is the military integrated into the disaster response plan, to include resources provided?
- 11.9 Does the system have a network of Regional Medical Operations Center (RMOCs)?
 - a. What is the role of the RMOC in daily and disaster/public health event patient care?
 - b. How is the RMOC operationalized by all stakeholders?
 - c. What are the major goals of the RMOC?
 - d. Are all RMOCs on a uniform data system that can be viewed at the state level?
 - e. Is there coordination across state lines with neighboring states?
 - f. What funding is provided to support RMOC activities?

Documentation

- 11.a State/regional disaster plan
- 11.b Reports of yearly disaster exercises, including tabletop exercises, listing the participants and types of disaster simulated
- 11.c After-action report of jointly conducted simulated or tabletop drills (including multiple emergency management agencies) that exercised the trauma system's capability to respond to MCIs
- 11.d An organizational chart identifying the relationships among key emergency management agencies (trauma system, EMS, public health, emergency management, military, and law enforcement)
- 11.e Most recent minutes from joint agency emergency management planning meeting
- 11.f Documentation of military commitment and response plan in a disaster
- 11.g Documentation of RMOC structure, operation, and funding

Essential Trauma System Element #12: Military Integration

PRQ

- 12.1 Describe how the trauma system plan integrates military resources and is developed in collaboration with military trauma and emergency care representatives.
- 12.2 Describe the military-civilian collaboration in the region for all components of the trauma system plan.
- 12.3 Does the system have a Memorandum of Agreement/Understanding so that military medical personnel may participate in trauma and emergency medical care, regional civilian trauma systems, federal facilities, and agencies for clinical readiness?
- 12.4 Describe the integration of military resources into the regional mass casualty and disaster response plans.
- 12.5 Does the trauma system plan address a reciprocal partnership for the contingency of a civilian or military mass casualty event?
- 12.6 Identify a military-civilian credentialing reciprocity addressed for times of crisis.

Documentation

- 12.a Military regional trauma system plan
- 12.b Memorandum of Agreement/Understanding between military and civilian stakeholders for integration



American College of Surgeons

633 N. Saint Clair St.
Chicago, IL 60611-3295

facs.org

