AMERICAN COLLEGE OF SURGEONS COMMITTEE ON TRAUMA
Trauma Systems Evaluation and Planning Committee

Trauma System Consultation Report

State of Alaska

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AMERICAN COLLEGE OF SURGEONS
Inspiring Quality: Highest Standards, Better Outcomes

An interdisciplinary working group prepared this document based on the consultation visit that took place April 23 – 27, 2018, in the State of Alaska, and included the following members:

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EXECUTIVE SUMMARY

Alaska, the Last Frontier, fully embodies that concept in its geographic isolation, its culture, and its vast sparsely inhabited areas. Alaska is the largest state in the United States with 663,268 square miles of area, and also the least populated, with only 739,795 residents, as reported by the US Census Bureau in 2017. Most of the population is concentrated in a few areas, with over 50% of Alaskans living in the Boroughs of Anchorage and Matanuska-Susitna, and another 30% in the Boroughs of Juneau, Fairbanks, and the Kenai Peninsula. The remaining population is thinly spread over a vast land area, living in small isolated communities that are not connected by roads, creating a heavy reliance on air-medical transportation and on limited local resources for the provision of care. It is an understatement to say the State faces unique challenges in the development of its System of trauma care.

Since the last American College of Surgeons (ACS) Trauma System Consultation (TSC) visit in 2008, substantial progress has been made within the State Trauma System, focusing primarily on trauma center development and facility participation. At the time of the 2008 ACS TSC visit, there were only 5 designated trauma centers, a Level II center and 4 Level IV centers. The remaining facilities provided care for a significant number of injured patients, but did not participate in the Trauma System. Currently, all acute care facilities participate in the System and contribute data to the State Trauma Registry, and the number of designated centers has risen to 17, with a second Level II center in Anchorage, and 15 Level IV centers widely scattered across the State. The South Central Region is similar in structure and function to small Regional Systems in other states, including the potential for competition between trauma centers. The rest of the State consists largely of frontier and bush Regions, with limited and widely dispersed health care resources that have little operational interaction with one another. Finding the best ways to support these centers, enhance cooperation, and enable them to provide the best care possible, with available resources, will be a key function of the developing Alaska Trauma System.

Alaska has also made significant progress in the development of a comprehensive State Trauma System Plan, which was completed shortly before this 2018 Trauma System Consultation. The Plan is a thoughtful document, but does not appear to have been widely adopted by the Alaska stakeholder community. The Trauma System Review Committee (TSRC) has been working consistently with the Lead Agency to implement Recommendations from the 2008 Trauma System Consultation Report and to develop the System, but progress has been limited by infrequent meetings and the logistical difficulties involved with getting active participation from very remote areas of the State. As a result, the vision of a unified System is held by only a small group of stakeholders, primarily in the populated areas, and there is little knowledge of the Trauma System Plan and limited participation in system-level function in the remote areas of the state, which operate in a largely autonomous fashion. Implementation of the Trauma System Plan has also been hindered by a lack of State funding related to decreased State revenue. The Lead Agency has very limited resources, most of which have, of necessity, been focused on the basic operation of the System and designation of trauma centers. Developing and disseminating the global view of a state-wide System with unique regional implementation as the focus for state-level activity and finding ways to engage the far-flung stakeholder group will be essential challenges.

The next sections summarize the high-level findings of the TSC Review Team.

Assets and Advantages

- There is a robust analysis of injury surveillance data within the Trauma System.

- Statutory authority and supporting regulations exist for the Trauma System.
  - There is authority for needs based designation of centers.

- The State has established a Trauma Fund.

- The lead agency has dedicated and knowledgeable staff and leadership.

- Currently, there is political support for the Trauma System.

- There is a well-conceptualized trauma system plan.

- All facilities contribute their data to the State Trauma Registry.

- There has been a significant increase in the number of trauma centers.

- There have been efforts to build capacity in areas of need within the Trauma System including efforts toward:
  - Building capacity for some Level IVs to transition to Level IIIs and some clinics to transition to Level Vs.

- There is strong leadership within Level II centers.

- There is a high level of engagement in Level IV centers.

- There is stable leadership for the Trauma System through the Trauma System Review Committee.

- There is collaboration with the US Department of Defense partners.

- Significant progress has been made in disaster/mass casualty incidence preparedness.

- EMS to hospital registry data linkages exist.

- There is data validation and registrar training.

- There is recognition of the importance of performance improvement.

Challenges and Vulnerabilities

- There are inherent structural challenges within the Trauma System.

- The Trauma System covers a vast geographical area.

- There are very limited resources available to support the Trauma System.

- The vision for the System is not well known beyond the Trauma System Review Committee.

- The Trauma System Review Committee only meets twice per year.

- There is a lack of sub-committee workgroups.

- Many stakeholder groups are underrepresented or not represented.

- There is a lack of a legislative champion for the Trauma System.

- Lead Agency staffing is critically low.

- The State Trauma System Plan lacks specific timelines and actions.

- The Lead Agency offers no "sticks", and not many "carrots".

- There is a lack of sustainable funding for the Trauma System.

- Epidemiology resources are not linked to trauma.

- Trauma System and injury prevention activities are not integrated.

- There are no state-wide standards for EMS protocols.

- EMS is not well integrated into the Trauma System.

- There is high turnover in rural facility staff.

- Repatriation is difficult for patients who are treated out of the state.

- There is uncoordinated use of air medical assets.

- There is a lack of rehab beds and resources within the Trauma System.

- Existing data is not used for trauma system performance improvement activities.

Themes

The themes presented below were recurring aspects of the State of Alaska Trauma System noted by the ACS Trauma System Consultation Review Team during their assessment of the System's current development status.

- The State of Alaska Trauma System needs to build a bigger "tent" and should include the following:
  - A shared vision of the future.
  - Engagement of a broader group of stakeholders.
  - Engagement of the public and the state legislature.

- It is time to think more like a System.
  - Trauma centers do not equal (≠) a Trauma System.
  - There must be an integration of resources, beginning with EMS, into the Trauma System.

- The Trauma System needs to have more "carrots".
  - But sometimes a "stick" is needed as well.

- The success of the Trauma System has been driven by a dedicated, volunteer effort.
  - But volunteer effort has its limits for continued development of the Trauma System.

- While the volunteer effort is commendable within the State, dedicated Trauma Program staff are still required to perform administrative functions and to support operations.

- A sustainable infrastructure for the Trauma System is critical.

- Sometimes you have to re-allocate resources towards the Trauma System.

- A small investment into the Trauma System will reap large benefits for the State.

- Use the existing available sources of data to improve the Trauma System.

PRIORITY RECOMMENDATIONS

From the list of all recommendations proposed by the TSC Review Team for the 2018 Trauma System Consultation, a select group of recommendations was identified as requiring the most focus and attention by the State of Alaska, over the next few years. By addressing this select group of Priority Recommendations first, the State will be better aligned to address the general recommendations proposed for each of the 18 Essential Trauma System Element Sections, presented in this TSC Report.

The Priority Recommendations are organized as either Tier 1 or Tier 2 Priorities for the State Trauma System, and are organized under these separate categories in the appropriately named Sections.

The Tier 1 Priorities are those Recommendations that had been ranked critical in nature – they represent systematic issues causing a substantial deficit to the entire Trauma System and negatively impact trauma care within the state. Thus, the Tier 1 Priority Recommendations should be reviewed and addressed as efficiently as possible, in order to effectively mitigate important systemic concerns within the Trauma System.

The Tier 2 Priorities are similarly critical recommendations, but were deemed to be of less severity than the Tier 1 Priorities. The Tier 2 Priorities address major gaps in the Trauma System infrastructure, which also stress the environment of care within the State.

Tier 1 Priorities

Statutory Authority and Administrative Rules

- Update regulations to set specific standards and enforcement capabilities. Specific examples include the following:
  - Trauma field triage and destination guidelines
  - Emergency medical services treatment protocols

- Establish in regulations the standards and processes for designating trauma facilities based on need

System Leadership

- Establish Regional Trauma Advisory Councils (RTACs) with broad stakeholder engagement, and formal by-laws, membership criteria, regularly scheduled meetings, and sub-committees as needed

- Disseminate Trauma System Reports, including the Trauma System Review Committee's (TSRC) Annual Report, to public and legislators to highlight the value of the Trauma System to the citizens of the State of Alaska

- Increase stakeholder participation in the Trauma System Review Committee (TSRC), through the addition of functional sub-committees (e.g. process improvement, disaster, injury prevention, and air medical)

Coalition Building and Community Support

- Disseminate the mission and vision of the Alaska Trauma System to a broad stakeholder audience (e.g. enhanced website, publicity campaign)

Lead Agency and Human Resources within the Lead Agency

- Create a full-time dedicated position for a State Trauma Performance Improvement Manager

- Ensure adequate resources and personnel for a functional Trauma Registry

Trauma System Plan

- Revise the Trauma System Plan to identify discrete operational objectives, completion timelines, and accountable stakeholders

Financing

- Define and develop a comprehensive Financial Plan for the Trauma System
  - Define the total costs and revenues of the Alaska Trauma System

Emergency Medical Services

- Establish the infrastructure to allow bidirectional health information exchange between emergency medical services and health care facilities for performance improvement activity

System Coordination and Patient Flow

- Create a centralized resource for coordination of patient triage and transport for inter-facility transfers, state-wide. Functional elements include:
  - A method to match air medical service resources with local need
  - A means for real time tracking of all air medical resources

Rehabilitation

- Support the development of additional resources for post-acute care, including skilled nursing facilities and out-patient rehabilitation care

System-wide Evaluation and Quality Assurance

- Develop a performance improvement sub-committee of the Trauma System Review Committee (TSRC) to define a Trauma System Performance Improvement Plan with processes evaluate outcomes

- Establish a regular reporting structure that facilitates a data-driven decision making process for the Trauma System Review Committee (TSRC) and State. Begin with process measures already being captured

Trauma Management Information Systems

- Invest in cross-training and/or acquire additional staff to ensure ongoing functionality of the Registry during periods of absence of the primary Registrar

Tier 2 Priorities

Indicators as a Tool for System Assessment

- Conduct a self-assessment of the current Trauma System, collecting information from a broad-based group of trauma stakeholders. In addition to the Trauma System Review Committee (TSRC), this group would specifically include representation from Level IV centers, non-designated centers, rural and frontier emergency medical services, community health aides, payors, and the public

System Leadership

- Define the organizational structure, functions and expectations for the Regional Advisory Trauma Councils (RTACs)

- Utilize Alaska State Trauma Data to develop and distribute comprehensive interval reports on the trauma epidemiology and System performance

- Increase number of meetings of the Trauma System Review Committee (TSRC) (currently 2 meetings/ year), through in-person or by virtual tele-presence to enhance the work product of the Committee

Coalition Building and Community Support

- Expand the trauma coalition by engaging broad multidisciplinary stakeholder participation that includes all geographic Regions, military, industry, payors, the general public, and other relevant organizations

Lead Agency and Human Resources within the Lead Agency

- Review the current organization structure within the Division of Public Health and dedicate adequate resources for agency trauma system functions

Trauma System Plan

- State leadership should formally endorse the trauma system plan and its objectives to support the public health of the citizens of Alaska

System Integration

- Explore ways to incorporate telemedicine capabilities into acute care to assist with appropriate triage and management of injured patients

Financing

- Prioritize the elements of the Trauma System Plan for funding opportunities

Prevention and Outreach

- Foster collaborative partnerships between the Trauma System Review Committee (TSRC), the Chronic Disease Prevention and Health Promotion (CDPHP) section, and the Emergency Medical Services Program

System-wide Evaluation and Quality Assurance

- Establish accountable score-cards with defined targets for the Regions and State

Trauma Management Information Systems

- Develop and implement a plan and processes to ensure that Trauma Registry data are used systematically for Trauma System development, evaluation, and performance improvement

TRAUMA SYSTEM ASSESSMENT

Injury Epidemiology

Purpose and Rationale

Injury epidemiology is concerned with the evaluation of the frequency, rates, and pattern of injury events in a population. Injury pattern refers to the occurrence of injury-related events by time, place, and personal characteristics (for example, demographic factors such as age, race, and sex) and behavior and environmental exposures, and, thus, it provides a relatively simple form of risk- factor assessment.

The descriptive epidemiology of injury among the whole jurisdictional population (geographic area served) within a trauma system should be studied and reported. Injury epidemiology provides the data for public health action and becomes an important link between injury prevention and control and trauma system design and development. Within the trauma system, injury epidemiology has an integral role in describing the root causes of injury and identifying patterns of injury so that public health policy and programs can be implemented. Knowledge of a Region's injury epidemiology enables the identification of priorities for directing better allocation of resources, the nature and distribution of injury prevention activities, financing of the system, and health policy initiatives.

The epidemiology of injury is obtained by analyzing data from multiple sources. These sources might include vital statistics, hospital administrative discharge databases, and data from emergency medical services (EMS), emergency departments (EDs), and trauma registries. Motor-vehicle crash data might also prove useful, as would data from the criminal justice system focusing on interpersonal conflict. It is important to assess the burden of injury across specific population groups (for example, children, elderly people and ethnic groups) to ensure that specific needs or risk factors are identified. It is critical to assess rates of injury appropriately and, thus, to identify the appropriate denominator (for example, admissions per 100,000 population). Without such a measure, it becomes difficult to provide valid comparisons across geographic Regions and over time.

To establish injury policy and develop an injury prevention and control plan, the trauma system, in conjunction with the state or Regional epidemiologist, should complete a risk assessment and gap analysis using all available data. These data allow for an assessment of the "injury health" of the population (community, state, or Region) and will allow for the assessment of whether injury prevention programs are available, accessible, effective, and efficient.

An ongoing part of injury epidemiology is public health surveillance. In the case of injury surveillance, the trauma system provides routine and systematic data collection and, along with its partners in public health, uses the data to complete injury analysis, interpretation, and dissemination of the injury information. Public health officials and trauma leaders should use injury surveillance data to describe and monitor injury events and emerging injury trends in their jurisdictions; to identify emerging threats that will call for a reassessment of priorities and/or reallocation of resources; and to assist in the planning, implementation, and evaluation of public health interventions and programs.

Optimal Elements

I. There is a thorough description of the epidemiology of injury in the system jurisdiction using population-based data and clinical databases. **(B-101)**

    a. There is a through description of the epidemiology of injury mortality in the system jurisdiction using population-based data. **(I-101.1)**

    b. There is a description of injuries within the trauma system jurisdiction, including the distribution by geographic area, high-risk populations (pediatric, elderly, distinct cultural/ethnic, rural, and others), incidence, prevalence, mechanism, manner, intent, mortality, contributing factors, determinants, morbidity, injury severity (including death), and patient distribution using any or all the following: vital statistics, ED data, EMS data, hospital discharge data, state police data (data from law enforcement agencies), medical examiner data, trauma registry, and other data sources. The description is updated at regular intervals. **(I-101.2)**
        Note: Injury severity should be determined through the consistent and system-wide application of one of the existing injury scoring methods, for example, Injury Severity Score (ISS).

    c. There is comparison of injury mortality using local, Regional, state-wide, and national data. **(I-101.3)**

    d. Collaboration exists among EMS, public health officials, and trauma system leaders to complete injury risk assessments. **(I-101.4)**

    e. The trauma system works with EMS and public health agencies to identify special at-risk populations. **(I-101.7)**

II. Collected data are used to evaluate system performance and to develop public policy. **(B-205)**

    a. Injury prevention programs use trauma management information system data to develop intervention strategies. **(I-205.4)**

III. The trauma, public health, and emergency preparedness systems are closely linked. **(B-208)**

    a. The trauma system and the public health system have established linkages, including programs with an emphasis on population based public health surveillance and evaluation for acute and chronic traumatic injury and injury prevention. **(I-208.1)**

IV. The jurisdictional Lead Agency, in cooperation with the other agencies and organizations, uses analytic tools to monitor the performance of population-based prevention and trauma care services. **(B-304)**

    a. The Lead Agency, along with partner organizations, prepares annual reports on the status on injury prevention and trauma care in the state, Regional, or local areas. **(I-304.1)**

b. The trauma system management information system database is available for routine public health surveillance. There is concurrent access to the databases (ED, trauma, prehospital, medical examiner, and public health epidemiology) for the purpose of routine surveillance and monitoring of health status that occurs regularly and is a shared responsibility. **(I-304.2)**

Current Status

Injury is the third leading cause of death in Alaska and the leading cause of death for those 1-44 years of age. Alaska ranks higher in crude death rates in suicide and drowning compared to the rest of the nation. In addition, the native Alaskan population has an injury rate that is nearly twice that of all Alaskans and almost three times the rate of the general US population.

The State has chosen indicators from its *Healthy Alaskans 2020 Report* for use in benchmarking the health of its population and has demonstrated significant decreases in injury rates for suicide mortality, child maltreatment, and unintentional injury. However, alcohol-induced mortality still remains an area of concern within the state, and where future efforts need to be directed.

The State of Alaska Department of Health and Social Services has an epidemiology unit, with a specific injury epidemiology focus. Numerous population-based data sources are utilized to study the injury burden within Alaska, with both national and state sources examined. The Alaska State Trauma Registry collects data on all injured patients seen at acute care hospitals in the state, including non-trauma centers and military facilities. There is also a comprehensive EMS data system, known as AURORA, which is available to the Trauma System. However, data submission to the AURORA system is not uniform and data linkage with the Trauma Registry is a tenuous process.

While injury epidemiologic resources within the Department are robust, they do not appear to have a direct relationship with the trauma program. Injury trends and patient outcomes are not studied with the goal of improving the Trauma System as a whole. For example, while the Trauma Registry has been used extensively to describe Alaskan injuries, this information has not been utilized to accomplish meaningful and systematic change that results in improved population outcomes. There is little use of the data to advocate for the Trauma System to the public at large, or the State legislature.

One area of specific concern to the Trauma System remains pre-hospital deaths, which is currently a research opportunity within the state. Given the remote nature of the state, and the potential for significant delays between the time of injury and the time the patients reach medical care, a better understanding of all traumatic deaths within the state is necessary, including traumatic deaths that occur in pre-hospital settings, and those that take place in the frontier areas. For such a comprehensive analysis of all traumatic deaths within the state, the use of medical examiner and geographic information system (GIS) data would be crucial, and these additional data sources would be able to guide the development of appropriate prevention activities and system improvements to address this concern.

Recommendations

- Provide support for a trauma epidemiologist to study both significant injury trends in Alaska as well as trauma patient outcomes and their relationship to the Trauma System

- Incorporate all trauma events and phases of care, including medical examiner, pre-hospital, and rehabilitation, into injury epidemiology

Indicators as a Tool for System Assessment

Purpose and Rationale

In the absence of validated national benchmarks, or norms, the benchmarks, indicators and scoring (BIS) process included in the Health Resources and Services Administration's *Model Trauma System Planning and Evaluation* document provides a tool for each trauma system to define its system-specific health status benchmarks and performance indicators and to use a variety of community health and public health interventions to improve the community's health status. The tool also addresses reducing the burden of injury as a community-wide public health problem, not strictly as a trauma patient care issue.

This BIS tool provides the instrument and process for a relatively objective state and sub-state (Regional) trauma system self-assessment. The BIS process allows for the use of state, Regional, and local data and assets to drive consensus responses to the BIS. It is essential that the BIS process be completed by a multidisciplinary stakeholder group, most often the equivalent of a state trauma advisory committee. The BIS process can help focus the discussion on various system strengths and weaknesses, can be used to set goals or benchmarks, and provides the opportunity to target often limited resources and energies to the areas identified as most critical during the consensus process. The BIS process is useful to develop a snapshot of any given system at a moment in time. However, its true usefulness is in repeated assessments that reveal progress toward achieving various benchmarks identified in the previous application of the BIS. This process further permits the trauma system to refine goals to be attained before future reassessments using the tool.

Optimal Element

I. Assurance to constituents that services necessary to achieve agreed-on goals are provided by encouraging actions of others (public or private), requiring action through regulation, or providing services directly. **(B-300)**

Current Status

The State of Alaska last conducted the HRSA BIS Tool assessment in 2007, prior to the 2008 Trauma System Consultation. At that time, the BIS Tool was distributed only to the TSRC, which was a relatively small group of stakeholders. The group had expressed frustration with the BIS Tool then, and had also expressed concerns that they lacked sufficient information to answer questions appropriately. As a result of this exercise, however, they did build consensus and identified three areas to focus on: education, system performance, and establishing data linkages between public health and emergency preparedness. In order to improve function within these areas, the TSRC selected three measures for patient care for their review, to compare transfer performance of Level IV centers to that of non-designated facilities, and to review deaths in transport and deaths within 24 hours. Thus, development of the Trauma System that began in 2008 has largely focused on capacity building, through focused, technical visits to facilities and the designation of additional facilities as Level IV trauma centers.

During the 2018 Trauma System Consultation, the stakeholders reported that these efforts have improved transfer metrics for inter-facility transfer times, but the data describing these improvements was not immediately available for analysis by the TSC Review Team. Baseline data for selected metrics was published in the current trauma system plan document.

The DHSS Lead Agency and all Trauma System stakeholders have had a clear focus on their goal of building capacity at outlying centers and have made significant progress towards this commitment. However, the chosen metrics look at specific processes that assess individual trauma center function, rather than evaluating the overall Trauma System function. As such, these metrics closely resemble process measures that should be part of the larger system-wide process improvement plan. The development of other key elements of the Trauma System have not received as much attention; the System currently does not assess metrics to gauge progress in areas such as system-wide process improvement, system integration, the development of practice guidelines, and system advocacy.

In order to assist in defining future priorities, and to judge the progress of past efforts, the TSRC and the Trauma Program should assess a broader range of Trauma System metrics. Interviews with stakeholders reflected the frustration regarding a lack of metrics to measure the development of the Trauma System, but also revealed the reticence to re-utilize the BIS Tool since 2007, or the 16-element subset of the BIS Tool requested as part of the 2018 pre-Consultation materials. While it is true that the BIS Tool is imperfect, it is the only System Evaluation Tool that has been used widely across the US, and the TSRC and Lead Agency have not assessed any other slate of metrics, in its stead. In addition, the initial attempt to utilize the BIS Tool in 2007 did not involve anyone outside of the TSRC, and as such, represented a sub-optimal assessment of the value of the BIS Tool. Though logistical challenges were cited as a prior barrier, the BIS Tool can be used as a web-based platform, and as such is much more accessible to a broad group of System stakeholders, today.

Recommendations

- **Conduct a self-assessment of the current Trauma System, collecting information from a broad-based group of trauma stakeholders. In addition to the Trauma System Review Committee (TSRC), this group would specifically include representation from Level IV centers, non-designated centers, rural and frontier emergency medical services, community health aides, payors, and the public**

- Utilize findings from this assessment to help set priorities for future development of the Alaska Trauma System

- Conduct interval assessments at regular intervals to judge progress

TRAUMA SYSTEM POLICY DEVELOPMENT

Statutory Authority and Administrative Rules

Purpose and Rationale

Reducing morbidity and mortality due to injury is the measure of success of a trauma system. A key element to this success is having the legal authority necessary to improve and enhance care of injured people through comprehensive legislation and through implementing regulations and administrative code, including the ability to regularly update laws, policies, procedures, and protocols. In the context of the trauma system, comprehensive legislation means the statutes, regulations, or administrative codes necessary to meet or exceed a pre-described set of standards of care. It also refers to the operating procedures necessary to continually improve the care of injured patients from injury prevention and control programs through post-injury rehabilitation. The ability to enforce laws and rules guides the care and treatment of injured patients throughout the continuum of care.

There must be sufficient legal authority to establish a lead trauma agency and to plan, develop, maintain, and evaluate the trauma system during all phases of care. In addition, it is essential that as the development of the trauma system progresses, included in the legislative mandate are provisions for collaboration, coordination, and integration with other entities also engaged in providing care, treatment, or surveillance activities related to injured people. A broad approach to policy development should include the building of system infrastructure that can ensure system oversight and future development, enforcement, and routine monitoring of system performance; the updating of laws, regulations or rules, and policies and procedures; and the establishment of best practices across all phases of intervention. The success of the system in reducing morbidity and mortality due to traumatic injury improves when all service providers and system participants consistently comply with the rules, have the ability to evaluate performance in a confidential manner, and work together to improve and enhance the trauma system through defined policies.

Optimal Elements

I. Comprehensive state statutory authority and administrative rules support trauma system leaders and maintain trauma system infrastructure, planning, oversight, and future development. **(B-201)**

   a. The legislative authority states that all the trauma system components, emergency medical services (EMS), injury control, incident management, and planning documents work together for the effective implementation of the trauma system (infrastructure is in place). **(I-201.2)**

   b. Administrative rules and regulations direct the development of operational policies and procedures at the state, Regional, and local Levels. **(I-201.3)**

II. The Lead Agency acts to protect the public welfare by enforcing various laws, rules, and regulations as they pertain to the trauma system. **(B-311)**

a. Laws, rules, and regulations are routinely reviewed and revised to continually strengthen and improve the trauma system. **(I-311.4)**

Current Status

The Department of Health and Social Services (DHSS) lies within the Division of Public Health, of the State of Alaska Rural and Community Health Systems, and serves as the administrative unit for trauma and emergency medical services within the State. The Alaska State Statutes related to EMS (AS 18.08.010) provide DHSS with the authority for the development, implementation, and maintenance of a state-wide, comprehensive EMS system, which includes trauma care.

The TSC Review Team was informed that the Alaska Department of Health & Social Services (DHSS) leadership has experienced changes since 2004, from the Commissioner of Health & Social Services, through Division leadership to EMS and trauma program re-organization. From 2009 to 2014 the Trauma Program lacked consistent leadership support which negatively impacted program growth. While this reformation endures, the Trauma Program lacks continuous administrative support from the DHSS, and the Trauma System continues to experience stagnation in further development. The deficiency in engagement from the highest levels of DHSS was also cited as impeding Trauma System advocacy efforts at the State Legislature. Furthermore, the State Legislature had created the Trauma Care Fund prior to 2004, under statutory authority (AS 18.08.085). This Fund was established to direct compensation to certified trauma centers that maintain the highest appropriate level of trauma care designation. By statute, the Legislature appropriated funds to the Department. The Commissioner is responsible for the administration of the Trauma Care Fund. The TSC Review Team learned that the Legislature had not provided continual appropriations to the Trauma Care Fund, due to a reduction in the State General Funds, caused by the decrease in oil revenue.

The key to a comprehensive and sustainable trauma system is the ability of the Lead Agency to protect public welfare, by realizing authority and enforcing laws and regulations that pertain to its Trauma System. The EMS and Trauma Programs of the DHSS have accepted a culture of understanding and being supportive until the reformations subside, without enforcement of their authority to protect their charge. The TSC Review Team learned that both Programs believed that the current regulations would not afford or authorize enforcement, in order to protect the public health, over special interest, which contrasts with existing statues currently in their favor.

Despite the aforementioned challenges and setbacks, the Trauma System has continued to develop in Alaska. A significant strength for the Trauma Program is that it currently has support from the DHSS senior leadership to further develop and provide regulatory oversight to the Trauma System. The statutory authority, departmental support, and the renewed vision provide an extraordinary opportunity to the Trauma Program for identification of and collaboration with the numerous Trauma and EMS stakeholders, including the Alaska Hospital Association, the Native Alaskan healthcare providers, pre-hospital provider organizations, health professional organizations, and other countless governmental and non-governmental entities operational within the State.

There are several instances of statutes and practices encouraging such collaborative efforts to further develop the Alaska Trauma System, which have all not been fully utilized to their potential. The Alaska Council on Emergency Medical Services (ACEMS), as an example, was

established in statute (AS 18.08.020). The Council was charged with advising the Commissioner of DHSS and Governor of the State regarding the planning and implementation of a state-wide EMS system. Membership of the Council includes pre-hospital professionals, other healthcare professionals, an EMS administrator, a hospital administrator, and members of the public. The ACEMS, unfortunately, has not required surgical, pediatric, or legislative representation, to date. Additionally, the TSRC is appointed by the Commissioner of DHSS, and is composed of physicians and other healthcare professionals who are tasked with reviewing the Trauma System data. The Committee is, therefore, a legal medical-review organization, under statute (AS 18.23.010-070), with its membership approved and maintained by the Commissioner of DHSS. The TSRC's work in reviewing the Trauma Registry data, and monitoring the care being delivered, has confidentiality and liability protection, as awarded by statute (AS 18.23.020). This represents another significant strength in the State's EMS and Trauma System. The Committee's role beyond the review of the Trauma Registry data is not clearly defined, however, and no direct connection to the ACEMS currently exists.

Recently, the Trauma Program Manager worked with TSRC membership and stakeholders to revise administrative code related to the Trauma System. Proposed code changes are intended to provide guidance and requirements for the feasibility of adding trauma care facilities to the Trauma System. The proposed code changes have passed public hearing and are being reviewed by the agency attorney. It is perceived that the revised code will be enacted, as written.

Currently, hospital participation in the state-wide Trauma System is voluntary, and no incentives are provided to promote participation. The Alaska Trauma System followed the 2008 ACS Recommendation to foster an inclusive Trauma System, and to improve trauma care across the State by encouraging all hospitals to participate, not only by submitting their trauma data to the State Trauma Registry, but also through engagement and participation at some level within the Trauma System.

Recommendations

- **Update regulations to set specific standards and enforcement capabilities. Specific examples include the following:**
  - **Trauma field triage and destination guidelines**
  - **Emergency medical services treatment protocols**

- **Establish in regulations the standards and processes for designating trauma facilities based on need**

System Leadership

Purpose and Rationale

In addition to Lead Agency staff and consultants (for example, trauma system medical director), there are other significant leadership roles essential to developing mature trauma systems. A broad constituency of trauma leaders includes trauma center medical directors and nurse coordinators, prehospital personnel, injury prevention advocates, and others. This broad group of trauma leaders works with the Lead Agency to inform and educate others about the trauma system, implements trauma prevention programs, and assists in trauma system evaluation and research to ensure that the right patient, right hospital, and right time goals are met. There is a strong role for the trauma system leadership in conveying trauma system messages, building communication pathways, building coalitions, and collaborating with relevant individuals and groups. The marketing communication component of trauma system development and maintenance begins with a consensus-built public information and education plan. The plan should emphasize the need for close collaboration between coalitions and constituency groups and increased public awareness of trauma as a disease. The plan should be part of the ongoing and regular assessment of the trauma system and be updated as frequently as necessary to meet the changing environment of the trauma system.

When there are challenges to providing the optimal care to trauma patients within the system, the leadership needs to effect change to produce the desired results. Broad system improvements require the ability to identify challenges and the resources and authority to make changes to improve system performance. However, system evaluation is a shared responsibility. Although the leadership will have a key role in the acquisition and analysis of system performance data, the multidisciplinary trauma oversight committee will share the responsibility of interpreting those data from a broad systems perspective to help determine the efficiency and effectiveness of the system in meeting its stated performance goals and benchmarks. All stakeholders have the responsibility of identifying opportunities for system improvement and bringing them to the attention of the multidisciplinary committee or the Lead Agency. Often, subtle changes in system performance are noticed by clinical care providers long before they become apparent through more formal evaluation processes.

Perhaps the biggest challenge facing the Lead Agency is to synergize the diversity, complexity, and uniqueness of individuals and organizations into an integrated system for prevention of injury and for the provision of quality care for injured patients. To meet this challenge, leaders in all phases of trauma care must demonstrate a strong desire to work together to improve care provided to injured victims.

Optimal Elements

I.   Trauma system leaders (Lead Agency, trauma center personnel, and other stakeholders) use a process to establish, maintain, and constantly evaluate and improve a comprehensive trauma system in cooperation with medical, professional, governmental, and other citizen organizations. **(B-202)**

II. Collected data are used to evaluate system performance and to develop public policy. **(B-205)**

III. Trauma system leaders, including a trauma-specific state-wide multidisciplinary, multiagency advisory committee, regularly review system performance reports. **(B-206)**

IV. The Lead Agency informs and educates state, Regional, and local, constituencies and policy makers to foster collaboration and cooperation for system enhancement and injury control. **(B-207)**

Current Status

The DHSS Chief Medical Officer/Public Health Director supports the philosophy of a strong functional Trauma System for the State of Alaska. The substantive leadership architecture of the Alaska Trauma System exists within the DHSS Office of Rural and Community Health Systems, within the Trauma System Program. The principle effector component established by the Trauma System Program is the volunteer Trauma System Review Committee (TSRC). The TSRC is a Commissioner-appointed review organization, established under Alaska statute for managing Trauma System issues, including reviewing Level IV trauma centers for designation, and overseeing Trauma System performance improvement activities for the State of Alaska. The Committee consists of 18 members distributed geographically, and is currently at full membership capacity. The constituency of the TSRC includes a Trauma Registry coordinator, epidemiologist, surgeon, emergency department physician, hospital administrator, hospital trauma director, three hospital trauma nurse coordinators, two EMS pre-hospital providers (ground and air ambulance), a pediatric specialist and six other miscellaneous members. Upon reviewing the current membership of the TSRC, the TSC Review Team noted that the membership seems largely centered within the south-central Region, and specifically Anchorage. TSRC Membership does not appear to represent the broad Regional diversity of an inclusive Trauma System.

Several other key lines of ancillary trauma leadership exist within the Division of Health and Social Services (DHSS) including Emergency Medical Services and Emergency Preparedness, also within the Office of Rural and Community Health Systems, Injury Surveillance within the Office of Epidemiology, and Injury Prevention within the Office of Chronic Disease Prevention and Health Promotion. Unfortunately, though these lines appear to be independently functional. The integration necessary to develop a fully functional Trauma System does not appear to be ubiquitous.

The existing Trauma System has several strengths which have driven intermittent Trauma System development, since the 2008 ACS Trauma System Consultation. The Trauma System has maintained a modicum of political support within the last decade. The dedicated Alaska State Trauma Program Manager has demonstrated consistent commitment to advancing the trauma system and improving the injury outcomes for the citizens of Alaska. Likewise, the leadership of the TSRC and the trauma surgeons within the Level II trauma centers in Anchorage, AK have served to lead the process and make substantial advances in the Alaska Trauma System within the last decade.

However, there are several leadership barriers which impede the development of a comprehensive Trauma System. The Lead Agency staff is tasked with multiple duties within the DHSS, and though these duties are similarly important, the diminution of dedicated effort

impacts the Trauma System maturation. In addition, key stakeholders within the Trauma System provide contributions on a volunteer basis and receive no support for travel or expenses related to System engagement. An intrinsic high turnover of personnel, particularly at Level IV trauma centers limits the potential to develop Regional Trauma System leadership "champions". The TSRC has a vital role in further Trauma System development in the State but has limited opportunity to engage face to face as it only meets twice per year. In addition, the TSRC has not taken advantage of the opportunity to enlist a significant number of interested stakeholders to advance its agenda through the incorporation of strategic subcommittees.

Significant near-term leadership challenges for the Trauma System include the determination of the regulatory authority necessary to coordinate inter-hospital transfer and to optimize the number and placement of trauma centers based upon population need. In addition, due to the unique challenges of injury care within the State, the Lead Agency and TSRC were noted to have been developing a process to incorporate Regional stakeholders. Implementation of Regional Trauma Coordinating Committees (RTCCs) is underway to optimize and focus efforts on the realistic and relevant needs of those communities.

Recommendations

- **Establish Regional Trauma Advisory Councils (RTACs) with broad stakeholder engagement, and formal by-laws, membership criteria, regularly scheduled meetings, and sub-committees as needed**

- **Define the organizational structure, functions and expectations for the Regional Advisory Trauma Councils (RTAC)**

- **Utilize Alaska State Trauma Data to develop and distribute comprehensive interval reports on the trauma epidemiology and System performance**

- **Disseminate Trauma System Reports, including the Trauma System Review Committee's (TSRC) Annual Report, to public and legislators to highlight the value of the Trauma System to the citizens of the State of Alaska**

- Increase visibility of the Trauma System to State officials, through intensified engagement with the DHSS Chief Medical Officer/ Public Health Director, by the Lead Agency and Trauma System Review Committee (TSRC)

- **Increase number of meetings of the Trauma System Review Committee (TSRC) (currently 2 meetings/ year), through in-person or by virtual tele-presence to enhance the work product of the Committee**

- **Increase stakeholder participation in the Trauma System Review Committee (TSRC), through the addition of functional sub-committees (e.g. process improvement, disaster, injury prevention, and air medical)**

Coalition Building and Community Support

Purpose and Rationale

Coalition building is a continuous process of cultivating and maintaining relationships with constituents (interested citizens) in a state or Region who agree to collaborate on injury control and trauma system development. Key constituents include health professionals, trauma center administrators, prehospital care providers, health insurers and payers, data experts, consumers and advocates, policy makers, and media representatives. The coalition of key constituents comprises the trauma system's stakeholders. The involvement of these key constituents is important for the following:

- Trauma system plan development
- Regionalization: promoting collaboration rather than competition between trauma centers
- System integration
- State policy development: authorizing legislation and regulations
- Financing initiatives
- Disaster preparedness

The coalition should be effectively organized through the formation of multidisciplinary state and Regional advisory groups to coordinate trauma system planning and implementation efforts. Constituents also communicate with elected officials and policy leaders regarding the development and sustainability of the trauma system. Information and education are needed by constituents to be effective partners in policy development for trauma system planning. Regular communication about the status of the trauma system helps these key partners to recognize needs and progress made with trauma system implementation.

One of the most effective ways to educate elected officials and the public is through an organized public information and education effort that may involve a media campaign about the burden of injury in the state and the need for trauma system development. Information and education are important to reduce the incidence of injury in all age groups and to demonstrate the value of an effective trauma system when a serious injury occurs.

Optimal Element

I. The Lead Agency informs and educates state, Regional, and local constituencies and policy makers to foster collaboration and cooperation for system enhancement and injury control. **(B-207)**

Current Status

The primary stakeholders for the Alaska Trauma System are the TSRC and interested individuals who attend TSRC meetings. The TSRC voting membership is comprised of 18 members, represented by the trauma registry coordinator, epidemiologist, surgeon, emergency department physician, hospital administrator, hospital trauma director, trauma nurse coordinators, EMS providers representing ground and air transport, pediatric specialist and six

miscellaneous members. Non-voting members that attend meetings include the Trauma Program Manager, EMS Program Manager, RCHS Section Chief, and the Medical Director. The current TSRC members are predominately from the Anchorage area and may not properly represent the interest of other Regions.

Although the Trauma Program has engaged various stakeholder groups in activities related to training, education, and disaster preparedness, it was noted by the TSC Review Team that the Trauma Program would benefit from seeking broader support and engagement in system planning and design. Unfortunately, communication with stakeholders outside of the TSRC has routinely been minimal. Furthermore, a Trauma System Program webpage has been established on the DHSS website, but only nominal information has been posted about the Alaska Trauma System and activities of the TSRC. Enhancements to this site could educate the public and enlighten the elected officials about the true value of the Program.

The trauma centers within the System have displayed commendable leadership in spearheading injury prevention initiatives, training, and education within their communities. Of note, the Alaska Native Health System produces and updates the *Alaska Native Injury Atlas of Mortality and Morbidity.* This comprehensive booklet continues to be updated regularly, and distributed electronically and in-print, at no charge. Although such independent efforts have promulgated the injury prevention message to the local communities, a unifying and broad-based partnership is absent from the current operating structure. As such, a strong injury prevention coalition, with reliable relationships to State agencies, could provide the missing state-wide focus on primary, secondary, and tertiary injury prevention efforts. The TSC Review Team noted that such a coalition would not only be valuable for raising awareness of the Trauma System's role in injury prevention, but could also serve as the public messaging platform for state-wide resources and activities for the general population. As the coalition would mature over time, it would also be able to better utilize and present state-wide injury, morbidity and mortality data, to enable more comparative assessments with similar geographic Regions and across injury types. Currently, many states engage in such collaborative efforts and conduct such system analyses, on a regular basis; as the State of Alaska aligns its Injury Prevention Coalition, it would be able to obtain templates for preliminary analysis and best practice guidelines for publication from other states active in this area.

Recommendations

- **Expand the trauma coalition by engaging broad multidisciplinary stakeholder participation that includes all geographic Regions, military, industry, payors, the general public, and other relevant organizations**

- **Disseminate the mission and vision of the Alaska Trauma System to a broad stakeholder audience (e.g. enhanced website, publicity campaign)**

- Engage and educate the legislative body and public on the values of a highly functional Trauma System

Lead Agency and Human Resources within the Lead Agency

Purpose and Rationale

Each trauma system (state, Regional, local, as defined in state statute) should have a Lead Agency with a strong program manager who is responsible for leading the trauma system. The Lead Agency, usually a government agency, should have the authority, responsibility, and resources to lead the planning, development, operations, and evaluation of the trauma system throughout the continuum of care. The Lead Agency, empowered through legislation, ensures system integrity and provides for program integration with other health care and community-based entities, namely, public health, EMS, disaster preparedness, emergency management, law enforcement, social services, and other community-based organizations.

The Lead Agency works through a variety of groups to accomplish the goals of trauma system planning, implementation, and evaluation. The ability to bring multidisciplinary, multiagency advisory groups together to accomplish trauma system goals is essential in developing and maintaining the trauma system and is part of providing leadership to evolving and mature systems.

The Lead Agency's trauma system program manager coordinates trauma system design, the adoption of minimum standards (prehospital and in-hospital), and provides for overall system evaluation through performance indicator assessment and assurance. In addition to a trauma program manager, the Lead Agency must be sufficiently staffed to actively participate in each phase of development and in maintaining the system through a clearly defined structure for decision making (policies and procedures) and through proactive surveillance and evaluation. *Minimum* staffing usually consists of a trauma system program manager, data entry and analysis personnel, and monitoring and compliance personnel. Additional staff resources include administrative support and a part-time commitment from the public health epidemiology service to provide system evaluation and research support.

Within the leadership and governance structure of the trauma system, there is a role for strong physician leadership. This role is usually fulfilled by a full- or part-time trauma medical director within the Lead Agency.

Optimal Elements

I. Comprehensive state statutory authority and administrative rules support trauma system leaders and maintain trauma system infrastructure, planning, oversight, and future development. **(B-201)**

    a. The legislative authority (statutes and regulations) plans, develops, implements, manages, and evaluates the trauma system and its component parts, including the identification of the Lead Agency and the designation of trauma facilities. **(I-201.1)**

    b. The Lead Agency has adopted clearly defined trauma system standards (for example, facility standards, triage and transfer guidelines, and data collection standards) and has sufficient legal authority to ensure and enforce compliance. **(I-201.4)**.

II. Sufficient resources, including financial and infrastructure-related, support system planning, implementation, and maintenance. **(B-204)**

Current Status

The Department of Health and Social Services' (DHSS) Section on Rural and Community Health Services Systems is the Lead Agency for Trauma System development, implementation, and maintenance of a state-wide comprehensive EMS and Trauma Program.

The Trauma System currently does not have a fully-dedicated personnel support structure within its operating unit. This lack of dedicated human resources has inhibited future growth and development.

The Trauma Program Manager is employed by DHSS as a full-time equivalent (1.0 FTE) position. However, this position is completely funded by Public Health Preparedness grant funds, allowing for only 0.75 FTE being dedicated to the Trauma Program, and 0.25 allocated towards other activities. As this position maintains such a vital role for the Lead Agency's efforts to develop the Alaska Trauma System, a fully dedicated 1.0 FTE to the Trauma Program is essential.

Although the Trauma Program is supported by a full-time equivalent (1.0 FTE) Trauma Registry Manager, this position is also dependent upon the Public Health Preparedness grant funding, within the current operating structure of DHSS. In order to meet the current volume and intensity of the workload for the Trauma System, the Rural and Community Health Services Systems Section currently relies upon other staff to assist with Trauma System activities. Similar to the role of the Trauma Program Manager, a fully dedicated Trauma Registrar with the ability to monitor data submission quality and provide technical support and timely reports is crucial to the ongoing development of the Alaska Trauma System.

This dedicated Trauma Registrar could then serve as the strong foundation for conducting the Trauma System quality and performance improvement activities. Relative to the other well-resourced states, Alaska is particularly rich in its trauma data, with all hospitals reporting to the Trauma Registry Central Repository. However, this abundant data within the Trauma Registry is only valuable if it is continually monitored and queried for timely reports and benchmarking efforts. The TSC Review Team noted that the data from the Alaska Trauma Registry has not been effectively analyzed for Trauma System benchmarking and System performance improvement activities, due to the lack of effective personnel support to do so.

In addition to the 1.5 FTE of dedicated Trauma Program staff, the Program indicates having an additional 0.5 FTE of a Public Health Specialist, which has currently been assigned to trauma education and outreach The TSC Review Team noted that the Trauma Program recently strained its limited personnel resources, in order to provide trauma-related educational support to EMS and law enforcement partners, while simultaneously organizing the 2018 Trauma System Consultation. As the Trauma Program seeks to further develop its System, the TSC Review Team found that it often extends its limited staffing support to achieve results, which can have dire consequences for all stakeholders and the System as well.

Recommendations

- **Create a full-time dedicated position for the State Trauma Performance Improvement Manager**

- **Ensure adequate resources and personnel for a functional Trauma Registry**

- **Review the current organization structure within the Division of Public Health and dedicate adequate resources for agency Trauma System functions**

- Create comprehensive job descriptions for all positions within the Trauma System Program

- Provide opportunities for ongoing education and professional development for Trauma Lead Agency staff

- Identify and collaborate with other state agencies and external resources to enhance Trauma System development

Trauma System Plan

Purpose and Rationale

Each trauma system, as defined in statute, should have a clearly articulated trauma system planning process resulting in a written trauma system plan. The plan should be built on a completed inventory of trauma system resources identifying gaps in services or resources and the location of assets. It should also include an assessment of population demographics, topography, or other access enhancements (location of hospital and prehospital resources) or barriers to access. It is important that the plan identify special populations (for example, pediatric, elderly, in need of burn care, ethnic groups, rural) within the geographic area served and address the needs of those populations within the planning process. A needs assessment (or other method of identifying injury patterns, patient care review/preventable death study) should also be completed for initial trauma system planning and updated periodically as needed to assess system changes over time.

The trauma system plan is developed by the lead trauma agency based on the results of a needs assessment and other data resources available for review. It describes the system design, integrated and inclusive, with adopted standards of care for prehospital and hospital personnel and a process to regularly review the plan over time. The plan is built on input from trauma advisory committees (or stakeholder groups) that assist in analyzing data, identifying resources, and developing system standards of care, including system policies and procedures and overall system design. Ideally, although every stakeholder group may not be satisfied with the plan or system design, the plan, to the extent possible, should be based on consensus of the advisory committees and stakeholder groups. These advisory groups should be able to review the plan before final adoption and approve the plan before it is submitted to the Lead Agency with authority for plan approval.

The trauma system plan is used to guide system development, implementation, and management. Each component of the trauma system (for example, prehospital, hospital, communications, and transportation) is clearly defined and an established service Level identified (baseline) with goals for enhancement (benchmark). Within the plan are incorporated other planning documents used to ensure integration of similar services and build collaboration and cooperation with those services. Service plans for emergency preparedness, EMS, injury prevention and control, public health, social services, and mental health are examples of services for which the trauma system plan should include an interface between agencies and services.

Optimal Element

I.   The state Lead Agency has a comprehensive written trauma system plan based on national guidelines. The plan integrates the trauma system with EMS, public health, emergency preparedness, and incident management. The written trauma system plan is developed in collaboration with community partners and stakeholders. **(B-203)**

   a.   The trauma system plan clearly describes the system design (including the components necessary to have an integrated and inclusive trauma system) and is used to guide

system implementation and management. For example, the plan includes references to regulatory standards and documents and includes methods of data collection and analysis. **(I-203.4)**

Current Status

Following the 2008 Trauma System Consultation, the State of Alaska developed the *Roadmap for Improvements in the Alaska Trauma System: Trauma System Plan 2018–2020.* It is noteworthy that concomitant with the development of the Trauma System Plan, the Trauma Program and the TSRC coordinated efforts to improve the system of care in Alaska, and increased the number of trauma centers from five (1 Level II and 4 Level IVs) to seventeen (2 Level II's and 15 Level IV's), and added two Level II Pediatric Trauma Centers, as well. The Plan was developed in concert with an independent private consultant, with the intent to model the 2006 Health Resources Services Administration (HRSA) Model Trauma System Planning and Evaluation document.

The Alaska Trauma System Plan was insightfully developed, with special attention provided to overcoming unique and salient challenges to the Trauma System. The Plan also incorporated and addressed many of the Recommendations from the 2008 Trauma System Consultation. Since all trauma centers and non-designated facilities that manage trauma patients entered data into the Alaska Trauma Registry, the Trauma System Plan was extremely data-rich, and represents a valuable comprehensive view of the Trauma System, from a data perspective.

Although the Trauma System Plan had been meticulously formed, it was evident during the 2018 Trauma System Consultation that several impediments existed, which prevented its full implementation. The Plan did not specifically define a vision or mission for the Trauma System, which impeded the establishment of objectives and a specific agenda for future development. Despite having broad stakeholder involvement during the formation of the Plan, there was a general lack of "system" perspective defined within the document. The Plan also failed to develop a blue-print to integrate the individual trauma components that operate independently, into a single optimally functional and cohesive unit. The Plan did express several important goals, but these were not crafted into tangible action items, with timelines and specific stakeholder accountability identified; thus, the goals included in the Plan were limited, with a small likelihood of accomplishment. Finally, the Trauma Plan was not widely disseminated across the System, as the discussions with the TSC Review Team revealed the fact that most key stakeholders in the System were not aware of its existence.

Recommendations

- **Revise the Trauma System Plan to identify discrete operational objectives, completion timelines, and accountable stakeholders**

- Lead Agency should maintain a log of progress in attaining operational objectives described in the Trauma System Plan

- State Trauma System Plan should be updated on a defined schedule to maintain contemporary relevance and build upon interval Trauma System developmental successes

- The Trauma System Review Committee (TSRC), as vital subject matter experts, should be actively engaged in all future iterations of the State Trauma System Plan and be a signatory of the document

- **State leadership should formally endorse the Trauma System Plan and its objectives to support the public health of the citizens of Alaska**

- Preparedness and disaster management, as critical functional extensions of the Trauma System, should be distinctly identified in the State Trauma System Plan

- Expand the rehabilitation initiatives in the Trauma System Plan to reflect the more comprehensive recommendations in the Rehabilitation section of this TSC Report

System Integration

Purpose and Rationale

Trauma system integration is essential for the daily care of injured people and includes such services as mental health, social services, child protective services, and public safety. The trauma system should use the public health approach to injury prevention to contribute to reducing the entire burden of injury in a state or Region. This approach enables the trauma system to address primary, secondary, and tertiary injury prevention through closer integration with community health programs and mobilizing community partnerships. The partnerships also include mental health, social services, child protection, and public safety services. Collaboration with the public health community also provides access to health data that can be used for system assessment, development of public policy, and informing and educating the community.

Integration with EMS is essential because this system is linked with the emergency response and communication infrastructure and transports severely injured patients to trauma centers. Triage protocols should exist for treatment and patient delivery decisions. Regulations and procedures should exist for online and off -line medical direction. In the event of a disaster affecting local trauma centers, EMS would have a major role in evacuating patients from trauma centers to safety or to other facilities or to make beds available for patients in greater need.

The trauma system is a significant state and Regional resource for the response to mass casualty incidents (MCIs). The trauma system and its trauma centers are essential for the rapid mobilization of resources during MCIs. Preplanning and integration of the trauma system with related systems (public health, EMS, and emergency preparedness) are critical for rapid mobilization when a disaster or MCI occurs. The extensive impact of disasters and MCIs on the functioning of trauma centers and the EMS and public health systems within the affected Region or state must be considered, and joint planning for optimal use of all resources must occur to enable a coordinated response to an MCI. Trauma System leaders need to be actively involved in emergency management planning to ensure that trauma centers are integrated into the local, Regional, and state disaster response plans.

Optimal Elements

I. The state Lead Agency has a comprehensive written trauma system plan based on national guidelines. The plan integrates the trauma system with EMS, public health, emergency preparedness, and incident management. The written trauma system plan is developed in collaboration with community partners and stakeholders. **(B-203)**

   a. The trauma system plan has established clearly defined methods of integrating the trauma system plan with the EMS, emergency, and public health preparedness plans. **(I-203.7)**

II. The trauma, public health, and emergency preparedness systems are closely linked. **(B-208)**

Current Status

The Alaska Trauma System operates as a unique conglomerate of two health networks – the Alaskan Native Health System, and the standard Trauma Care System. In remote areas of the state, care is delivered by frontier clinics and small Regional hospitals. Fourteen of the twenty four acute care hospitals in the state are federally designated critical access hospitals. From a hospital-facility perspective, the Trauma System is fairly inclusive, with fifteen hospitals participating as Level IV centers, and two centers serving as Level II adult and pediatric centers. Two additional hospitals are exploring formal participation within the Trauma System: one, as a Level III, and the other as a Level IV. All hospitals, including those not designated as trauma centers, provide data to the State's Trauma Registry.

In the more remote areas of the state, Level IV trauma facilities serve as strong community resources for the local population. However, communication challenges, inherent to the remote nature of the state, prevent the development of an integrated health network; additionally, facilities across the health network utilize multiple disparate electronic medical record platforms, while poor cell phone coverage and lack of internet access compound these issues. An existing capability that could more broadly improve access to medical care within the state would be the use of technology, such as tele-medicine. While some remote facilities have invested in sophisticated tele-medicine capabilities, it continues to be an opportunity at other sites (including the frontier clinics) for acute and emergent care. The TSC Review Team noted that the Trauma System has not promoted the utilization of this technology to engage remote stakeholders in the PI process, nor to identify opportunities for Trauma System improvement. An example of such a process would be a Regional tele-medicine case review conference, with participation from many remote facilities of the state.

The State of Alaska, and the US Military facilities located within the State, have established a reliable and cooperative relationship over the years. Military and Coast Guard assets are utilized to transport trauma patients when civilian resources are unavailable, due to a lack of access, geographical challenges, or weather constraints. Likewise, the Military is an active participant in disaster drills. Currently, one Military hospital is designated as a Level IV trauma center, while another only contributes data to the State Trauma Registry, as it is not a designated trauma center. Integration of the Military network into the Trauma System is further apparent through the Military surgeon serving as one of the miscellaneous members on the TSRC. In light of the recent National Academies of Sciences, Engineering, and Medicine (NASEM) Report on Integrating Military and Civilian Trauma Systems, the TSC Review Team noted that the Trauma Program had an opportunity to expand the Military collaboration further within the Trauma System through the development of a centralized, state-wide medical operations center.

One recent success of system integration is in the care of burn patients. Burns are a major source of patients transferred for out-of-state care, and post-discharge follow-up has been difficult. Alaska Native Medical Center has recently recruited a burn trauma surgeon who has leveraged a relationship with the Regional Burn Center in Seattle, WA and is providing follow-up burn care to patients from Alaska. In addition, the burn trauma surgeon is utilizing tele-medicine to help triage burn patients, and potentially decrease out-of-state transfers.

Other elements of the System were noted to be not as well integrated. Within Alaska, the governing body for trauma care is the TSRC. According to the Alaska statues, the TSRC is composed of 18 members with "appropriate geographic" representation and with designated roles. The current make-up of the TSRC is very Anchorage-centric, with fifteen of the eighteen members from Anchorage, two from the South East Region, and one from Palmer/ Wasilla.

There is no substantive membership representation from the entire Bush Region of the State. The TSC Review Team noted that the State Trauma System has not integrated the Regional Trauma Advisory Council (RTAC) concept into its mission, or operations. Additionally, there is no representation of rehabilitation or disaster management on the TSRC. Other key stakeholders, such as law enforcement, the medical examiner, and public safety do not appear to be active participants within the System. Non-medical stakeholders such as legislators and payors are also not engaged, and, therefore, fail to advocate for trauma-related causes. Likewise, the Trauma System does not effectively enlist important industrial, federal, and commercial stakeholders, including the oil and gas industry and commercial fishing industries, the national park service, and the tourism and hospitality.

EMS is well represented in the TSRC, with two designated and one at-large seat. Unfortunately, the Trauma Program does not appear to have a formal position on the corresponding EMS Committee, albeit the Trauma Program Manager submits a report during session. Grassroots stakeholders from both the Trauma and EMS communities also sense a lack of communication between the two Programs. From a leadership standpoint, the Medical Director of the Section of Rural and Community Health Systems is also the State EMS Medical Director. This leadership position has not been effectively leveraged to enhance communication and cooperation between EMS and the Trauma Program.

Furthermore, while the State, through its CDPHP Section, is very involved in injury prevention activities, the Injury Prevention Program and the Trauma Program reside in separate branches of the Lead Agency, DHSS. Formal programmatic interaction is limited, although there is some sharing of administrative staff. The State does not appear to use Trauma Registry data to influence prevention activities, nor does prevention data seem to guide the Trauma Program's activities.

Recommendations

- Engage stakeholders in the trauma system, including emergency medical services, injury prevention, law enforcement, fire, payors, legislators, trauma centers, disaster preparedness, medical examiner, military, public, and others

- Re-explore military-civilian cooperation in trauma care

- Pursue integration of the electronic health record across the spectrum of trauma care

- **Explore ways to incorporate tele-medicine capabilities into acute care to assist with appropriate triage and management of injured patients**

- Develop Regional tele-conference case reviews to follow trauma care longitudinally through the System

Financing

Purpose and Rationale

Trauma systems need sufficient funding to plan, implement, and evaluate a state-wide or Regional system of care. All components of the trauma system need funding, including prehospital, acute care facilities, rehabilitation, and prevention programs. Lead Agency trauma system management requires adequate funding for daily operations and other important activities such as advisory committee meetings, development of regulations, data collection, performance improvement, and public awareness and education. Adequate funding to support the operation of trauma centers and their state of readiness to care for seriously injured patients within the state or Region is essential. The financial health of the trauma system is essential for ensuring its integrity and its improvement over time.

The trauma system Lead Agency needs a process for assessing its own financial health, as well as that of the trauma system. A trauma system budget should be prepared, and costs should be reported by each component, if possible. Routine collection of financial data from all participating health care facilities is encouraged to fully identify the costs and revenues of the trauma system, including costs and revenues pertaining to patient care, administrative, and trauma center operations. When possible, the Lead Agency financial planning should integrate with the budgets and costs of the EMS system and disaster, rehabilitation, and prevention programs to enable development of a comprehensive financial health report.

Trauma system financial planning should be related to the trauma plan outcome measures (for example, patient outcome measures such as mortality rates, length of stay, and quality-of-life indicators). Such information may demonstrate the value added by having a trauma system in place.

Optimal Elements

I. Sufficient resources, including financial and infrastructure-related, support system planning, implementation, and maintenance. **(B-204)**

    a. Financial resources exist that support the planning, implementation, and ongoing management of the administrative and clinical care components of the trauma system. **(I 204.2)**

    b. Designated funding for trauma system infrastructure support (Lead Agency) is legislatively appropriated. **(I-204.3)**

    c. Operational budgets (system administration and operations, facilities administration and operations, and EMS administration and operations) are aligned with the trauma system plan and priorities. **(I-204.4)**

II. The financial aspects of the trauma systems are integrated into the overall performance improvement system to ensure ongoing fine tuning and cost-effectiveness. **(B-309)**

a. Collection and reimbursement data are submitted by each agency or institution on at least an annual basis. Common definitions exist for collection and reimbursement data and are submitted by each agency. **(I-309.2)**

Current Status

The Trauma System requires financial support and resources to administer, manage, develop, and evaluate its performance. Funding should encompass the full spectrum of system needs including pre-hospital, definitive care, acute care facility trauma verification, trauma registry management, system integration, performance improvement, prevention, outreach education, and programs for the system stakeholder professional development, research, and rehabilitation. Funding to support stakeholder meetings to foster collaboration needs to be considered as well.

The Trauma Care Fund (AS 18.08.085) was established by state statutes in 2004. Funding is appropriated by the legislature and administered by the Health Care Commission. This appropriation is drawn from the Alaska General Fund and is specifically allocated to compensate certified trauma centers in the State. The Trauma Care Fund does not include funding for administrative oversight of the Trauma System or for salaries, travel, and contractual agreements for the Trauma Registry. A formula is defined for distribution of the funding from the account to the participating trauma centers. This funding is specifically tied to the Commission's appropriations of funds. Currently, appropriations to the account were noted to be lacking.

There was a one-time funding of five million dollars in 2010 which was never re-appropriated. The lack of continual funding has prohibited the Lead Agency from carrying out the provisions of Alaska statute (AS 18.08.085).

The Lead Agency has a current budget of $569,526. The current financial support is strategically gained through available grants from public health preparedness and is intended to provide support for injury prevention, outreach education, the trauma registry, and appropriate staff salaries related to the Trauma Program. There is minimal funding to support the other critical components of a comprehensive Trauma System. This lack of funding impedes system development.

Appropriate Trauma System funding should be based on the Trauma System Plan's aim and the tasks identified to reach to desired outcomes. The Trauma System should prioritize the development of a comprehensive financial plan to assess its financial stability and define the funding necessary to implement, manage, and evaluate the Trauma System Plan. This includes the uncompensated care provided by the pre-hospital providers, trauma centers, medical providers, and rehabilitation. The financial needs of the trauma registry, system performance improvement, and prevention programs should be defined, along with the cost of outreach education and trauma stakeholder professional development. Lastly, the cost of coalition development and Regional engagement needs to be assessed and included based on the Trauma System Plan's desired funding. A comprehensive Financial Plan for the Trauma System to include these factors should be presented to the Commissioner. The Financial Plan should define the Trauma System priorities. Routine financial data collection that includes the costs and revenues of the Trauma System components, variances, and outcomes needs to be reviewed for effectiveness. A financial scorecard reflecting the accountability of the funding should be integrated in the Trauma System Annual Report of the TSRC.

The Trauma System stakeholders need to advocate for additional funding streams for the inclusive Trauma System at both the state and Regional level. A stronger unified voice advocating for advanced trauma care in all Regions for all populations in Alaska should be a priority.

Recommendations

- **Define and develop a comprehensive Financial Plan for the Trauma System**
    - **Define the total costs and revenues of the Alaska Trauma System**

- Include the Trauma System Financial Statement in the Trauma System Annual Report

- **Prioritize the elements of the Trauma System Plan for funding opportunities**

- Develop an accountability scorecard for the expenditures

- Develop a coalition to advocate for sustainable funding for the Trauma System

TRAUMA SYSTEM ASSURANCE

Prevention and Outreach

Purpose and Rationale

Trauma systems must develop prevention strategies that help control injury as part of an integrated, coordinated, and inclusive trauma system. The Lead Agency and providers throughout the system should be working with business organizations, community groups, and the public to enact prevention programs and prevention strategies that are based on epidemiologic data gleaned from the system.

Efforts at prevention must be targeted for the intended audience, well defined, and structured, so that the impact of prevention efforts is system-wide. The implementation of injury control and prevention requires the same priority as other aspects of the trauma system, including adequate staffing, partnering with the community, and taking advantage of outreach opportunities. Many systems focus information, education, and prevention efforts directly to the general public (for example, restraint use, driving while intoxicated). However, a portion of these efforts should be directed toward emergency medical services (EMS) and trauma care personnel safety (for example, securing the scene, infection control). Collaboration with public service agencies, such as the department of health is essential to successful prevention program implementation. Such partnerships can serve to synergize and increase the efficiency of individual efforts. Alliances with multiple agencies within the system, hospitals, and professional associations, working toward the formation of an injury control network, are beneficial.

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

- A needs assessment focusing on the public information needed for media relations, public officials, general public, and third-party payers, thus ensuring a better understanding of injury control and prevention
- Needs assessment for the general medical community, including physicians, nurses, prehospital care providers, and others concerning trauma system and injury control information
- Preparation of annual reports on the status of injury prevention and trauma care in the system
- Trauma system databases that are available and usable for routine public health surveillance

Optimal Elements

I. The Lead Agency informs and educates state, Regional, and local constituencies and policy makers to foster collaboration and cooperation for system enhancement and injury control. **(B-207)**

    a. The trauma system leaders (Lead Agency, advisory committees, and others) inform and educate constituencies and policy makers through community development activities,

targeted media messaging, and active collaborations aimed at injury prevention and trauma system development. **(I-207.2)**

II. The jurisdictional Lead Agency, in cooperation with other agencies and organizations, uses analytic tools to monitor the performance of population based prevention and trauma care services. **(B-304)**

   a. The Lead Agency, along with partner organizations, prepares annual reports on the status of injury prevention and trauma care in state, Regional, or local areas. **(I-304.1)**

III. The Lead Agency ensures that the trauma system demonstrates prevention and medical outreach activities within its defined service area. **(B-306)**

   a. The trauma system is active within its jurisdiction in the evaluation of community based activities and injury prevention and response programs. **(I-306.2)**

   b. The effect or impact of outreach programs (medical and community training and support and prevention activities) is evaluated as part of a system performance improvement process. **(I-306.3)**

Current Status

Injury prevention activities are under the DHSS Division of Public Health's Chronic Disease Prevention and Health Promotion (CDPHP) Section. There is a separation between the Trauma Program and the CDPHP in the Rural and Community Health Systems Section, which ultimately houses the Trauma Registry. The CDPHP's role and function is to utilize evidence-based practice and data to build the state and Regional programs to promote health and reduce chronic disease and injuries, promote heath care equity, reduce health care expenditures, and improve the quality of life. CDPHP's focus in injury prevention is injury surveillance systems.

Injury related issues monitored through the available surveillance systems include the following:

- Child passenger safety seats
- Driver safety
- Family violence prevention
- Fire related injury
- Water safety
- Poison prevention
- Fall prevention
- Pedestrian safety
- Suicide prevention

CDPHP utilizes the State Trauma Registry for injury prevention statistics. Current injury prevention programs focus on the following activities:

- Alaska Fall Prevention
- Alaska Family Violence Prevention Project
- Alaska Child Passenger Safety Coalition
- Kids Don't Float

- Helmet Safety
- Alaska Native Tribal Consortium Injury Prevention Program

The CDPHP efforts are complimented by the Alaska Injury Prevention Center (AIPC), which is a non-profit corporation with a defined mission of injury prevention for individuals of Alaska. The AIPC has a board of directors. The center follows the public health model to define priorities. This includes data analysis, epidemiology of injuries, strategic interventions, and evaluation of outcomes. The current activities of APIC include participation in the following:

- Alaska Safe Kids – Youth Safety
- National Institute for Occupational Safety and Health
- Alaska Department of Labor
- Alaska Department of Transportation and Public Facilities – Road Safety
- Alaska Highway Safety Office – Traffic Safety, Off-road vehicle safety
- Alaska Department of Public Safety
- Alaska State Fire Marshal's Office – Home Safety
- State-wide Suicide Prevention Council
- Council on Domestic Violence and Sexual Assault
- Coast Guard and Coast Guard Auxiliaries – water safety
- Alaska Safety Advisory Council
- Denali Safety Council
- Alaska Marine Safety and Education Association
- Hospitals
- Schools
- Churches
- Boys and Girls Club - Youth Safety
- Municipality Parks and Recreation Departments
- Alaska EMS Councils
- Alaska Brain Injury Network

The challenges of these injury prevention programs are related to outcome data of the interventions, and funding.

The Occupational Injury Prevention Program monitors occupational injuries in Alaska. This program was established in 1992 and its primary mission is the oversight and management of the state-based Fatality Assessment and Control Evaluation (FACE) project. There is a contractual agreement with the National Institute for Occupational Safety and Health Alaska Pacific Regional Office to complete the assessment and to provide recommendations. This program has documented success and has significantly reduced the occupational injuries in Alaska since implementation of this agreement. This demonstrates the power of focused prevention efforts.

The TSRC does not have a formal outreach educational group, or a formal plan with priorities; however, there are elements of successes with several courses. Programs to integrate bystander education and participation as an immediate responder are needed. The Stop the Bleed (STB) initiative is an example of a program designed specifically to engage the community as immediate responders and is being utilized by multiple Regions in the state.

There is an absence of a standardized model for evaluation of the effectiveness of the injury prevention and outreach education programs. Evaluation activities are based on the injury prevention project's leading organization. A formal plan to address the evaluation process is recommended.

A specific injury prevention sub-committee that integrates stakeholders from all of the prevention resources in Alaska is recommended. Stakeholders should have the opportunity to define the injury prevention priorities and funding required to support these programs. Additional goals of this sub-committee need to be linked to processes for evidence-based program evaluation.

Recommendations

- **Foster collaborative partnerships between the Trauma System Review Committee (TSRC), the Chronic Disease Prevention (CDPHP), and the Emergency Medical Services (EMS) Program**

- Create an injury prevention sub-committee of the Trauma System Review Committee (TSRC) to identify injury prevention priorities for the Regions of Alaska
    - Utilize the Trauma Registry, vital statistics, and other data resources

- Define a budget and obtain funding for the targeted Injury Prevention Programs

- Utilize evidence-based processes for the evaluation of Injury Prevention Programs

- Include injury prevention program activities and outcomes in the Trauma System Review Committee (TSRC) Annual Report

- Define programs to integrate bystander readiness as a priority for outreach education

Emergency Medical Services

Purpose and Rationale

The trauma system includes, and/or interacts with, many different agencies, institutions, and systems. The EMS system is one of the most important of these relationships. EMS is often the critical link between the injury-producing event and definitive care at a trauma center. Even though at its inception the EMS system was a very broad system concept, over time, EMS has come to be recognized as the prehospital care component of the larger emergency health care system. It is a complex system that not only transports patients, but also includes public access, communications, personnel, triage, data collection, and quality improvement activities.

The EMS system medical director must have statutory authority to develop protocols, oversee practice, and establish a means of ongoing quality assessment to ensure the optimal provision of prehospital care. If not the same individual, the EMS system medical director must work closely with the trauma system medical director to ensure that protocols and goals are mutually aligned. The EMS system medical director must also have ongoing interaction with EMS agency medical directors at local Levels, as well as the state EMS for Children program, to ensure that there is understanding of and compliance with trauma triage and destination protocols.

Ideally, a system should have some means of ensuring whether resources meet the needs of the population. To achieve this end, a resource and needs assessment evaluating the availability and geographic distribution of EMS personnel and physical resources is important to ensure a rapid and appropriate response. This assessment includes a detailed description of the distribution of ground ambulance and aeromedical locations across the Region. Resource allocations must be assessed on a periodic basis as needs dictate a redistribution of resources. In communities with full-time paid EMS agencies, ambulances should be positioned according to predictable geographic or temporal demands to optimize response efficiencies. Such positioning schemes require strong prehospital data collection systems that can track the location of occurrences over time. Periodic assessment of dispatch and transport times will also provide insight into whether resources are consistent with needs. Each Region should have objective criteria dictating the Level of response (advanced life support [ALS], basic life support [BLS]), the mode of transport, and the disposition of the patient based on the location of the incident and the severity of injury. A mechanism for case-based review of trauma patients that involves prehospital and hospital providers allows bidirectional information sharing and continuing education, ensuring that expectations are met at both ends. Ongoing review of triage and treatment decisions allows for continuing quality improvement of the triage and prehospital care protocols. A more detailed discussion of in-field (primary) triage criteria is provided in the section titled: System Coordination and Patient Flow (p 20) (White Book).

Human Resources

Periodic workforce assessments of EMS should be conducted to ensure adequate numbers and distribution of personnel. EMS, not unlike other health care professions, experiences shortages and maldistribution of personnel. Some means of addressing recruitment, retention, and engagement of qualified personnel should be a priority. It is critical that trauma system leaders work to ensure that prehospital care providers at all Levels attain and maintain competence in trauma care. Maintenance of competence should be ensured by requiring standards for

credentialing and certification and specifying continuing educational requirements for all prehospital personnel involved in trauma care. The core curricula for First Responder, Emergency Medical Technician (EMT) Basic, EMT-Intermediate, EMT Paramedic, and other Levels of prehospital personnel have 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 such as Prehospital Trauma Life Support®, Basic Trauma Life Support®, and age-specific courses. Mechanisms for the periodic assessment of competence, educational needs, and education availability within the system should be incorporated into the trauma system plan.

Systems of excellence also encourage EMS providers to go beyond meeting state standards for agency licensure and to seek national accreditation. National accreditation standards exist for ground-based and air medical agencies, as well as for EMS educational programs. In some states, agency licensure requirements are waived or substantially simplified if the EMS agency maintains national accreditation.

EMS is the only component of the emergency health care and trauma system that depends on a large cadre of volunteers. In some states, substantially more than half of all EMS agencies are staffed by volunteers. These agencies typically serve rural areas and are essential to the provision of immediate care to trauma patients, in addition to provision of efficient transportation to the appropriate facility. In some smaller facilities, EMS personnel also become part of the emergency resuscitation team, augmenting hospital personnel. The trauma care system program should reach out to these volunteer agencies to help them achieve their vital role in the outcome of care of trauma patients. However, it must be noted that there is a delicate balance between expecting quality performance in these agencies and placing unrealistic demands on their response capacity. In many cases, it is better to ensure that there is an optimal BLS response available at all times rather than a sporadic or less timely response involving ALS personnel. Support to volunteer EMS systems may be in the form of quality improvement activities, training, clinical opportunities, and support to the system medical director.

Owing to the multidisciplinary nature of trauma system response to injury, conferences that include all Levels of providers (for example, prehospital personnel, nurses, and physicians) need to occur regularly with each Level of personnel respected for its role in the care and outcome of trauma patients. Communication with and respect for prehospital providers is particularly important, especially 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 be engaged in assessment and integration functions that include the trauma system and also public health and other public safety agencies. EMS agencies should have a critical role in ensuring that communication systems are available and have sufficient redundancy so that trauma system stakeholders will be able to assess and act to limit death and disability at the single patient Level and at the population Level in the case of mass casualty incidents (MCIs). Enhanced 911 services and a central communication system for the EMS/trauma system to ensure field-to-facility bidirectional communications, inter-facility dialogue, and all-hazards response communications among all system participants are important for integrating a system's response. Wireless communications capabilities, including automatic crash notification, hold great promise for quickly identifying trauma-producing events, thereby reducing delays in discovery and decreasing prehospital response intervals.

Further integration might be accomplished through the use of EMS data to help define high-risk geographic and demographic characteristics of injuries within a response area. EMS should assist with the identification of injury prevention program needs and in the delivery of prevention messages. EMS also serves a critical role in the development of all-hazards response plans and in the implementation of those plans during a crisis. This integration should be provided by the state and Regional trauma plan and overseen by the Lead Agency. EMS should participate through its leadership in all aspects of trauma system design, evaluation, and operation, including policy development, public education, and strategic planning.

Optimal Elements

I. The trauma system is supported by an EMS system that includes communications, medical oversight, prehospital triage, and transportation; the trauma system, EMS system, and public health agency are well integrated. **(B-302)**

    a. There is well-defined trauma system medical oversight integrating the specialty needs of the trauma system with the medical oversight for the overall EMS system. **(I-302.1)**

    b. There is a clearly defined, cooperative, and ongoing relationship between the trauma specialty physician leaders (for example, trauma medical director within each trauma center) and the EMS system medical director. **(I-302.2)**

    c. There is clear-cut legal authority and responsibility for the EMS system medical director, including the authority to adopt protocols, to implement a performance improvement system, to restrict the practice of prehospital care providers, and to generally ensure medical appropriateness of the EMS system. **(I-302.3)**

    d. The trauma system medical director is actively involved with the development, implementation, and ongoing evaluation of system dispatch protocols to ensure they are congruent with the trauma system design. These protocols include, but are not limited to, which resources to dispatch, for example, ALS versus BLS, air ground coordination, early notification of the trauma care facility, pre-arrival instructions, and other procedures necessary to ensure that resources dispatched are consistent with the needs of injured patients. **(I-302.4)**

    e. The retrospective medical oversight of the EMS system for trauma triage, communications, treatment, and transport is closely coordinated with the established performance improvement processes of the trauma system. **(I-302.5)**

    f. There is a universal access number for citizens to access the EMS/trauma system, with dispatch of appropriate medical resources. There is a central communication system for the EMS/trauma system to ensure field- to- facility bidirectional communications, inter-facility dialogue, and all-hazards response communications among all system participants. **(I-302.7)**

    g. There are sufficient and well-coordinated transportation resources to ensure that EMS providers arrive at the scene promptly and expeditiously transport the patient to the correct hospital by the correct transportation mode. **(I-302.8)**

II. The lead trauma authority ensures a competent workforce. **(B-310)**

    a. In cooperation with the prehospital certification and licensure authority, set guidelines for prehospital personnel for initial and ongoing trauma training, including trauma-specific courses and courses that are readily available throughout the state. **(I-310.1)**

    b. In cooperation with the prehospital certification and licensure authority, ensure that prehospital personnel who routinely provide care to trauma patients have a current trauma training certificate, for example, Prehospital Trauma Life Support or Basic Trauma Life Support and others, or that trauma training needs are driven by the performance improvement process. **(I-310.2)**

    c. Conduct at least 1 multidisciplinary trauma conference annually that encourages system and team approaches to trauma care. **(I-310.9)**

III. The Lead Agency acts to protect the public welfare by enforcing various laws, rules, and regulations as they pertain to the trauma system. **(B-311)**

    a. Incentives are provided to individual agencies and institutions to seek state or nationally recognized accreditation in areas that will contribute to overall improvement across the trauma system, for example, Commission on Accreditation of Ambulance Services for prehospital agencies, Council on Allied Health Education Accreditation for training programs, and American College of Surgeons (ACS) verification for trauma facilities. **(I-311.6)**

Current Status

The Lead Agency for Alaska EMS is under the Division of Public Health. The EMS System is comprised of seven EMS Regions that span a large geographic area, with extreme terrain and weather variations.

When injured or ill patients require treatment not available locally, they may be transported by ground (ambulance, privately owned vehicle, snow machine, dog sled), by water (U.S. Coast Guard, fishing boat) or air (rotor or fixed wing; medical, private or commercial). EMS ground services in Alaska include basic life support (BLS), advanced life support (ALS), with occasional BLS, and ALS services. The number of air medical services has increased with time. Each of the Regional hub cities is covered by one or more air medical services.

EMT Training Levels

ETT: The Emergency Trauma Technician training program is 40 hours in length and teaches the basics of emergency medical care. The course has evolved considerably since it was first developed in Southeast Alaska for use in logging camps. Courses are taught by certified instructors and occur throughout the state. The ETT course can be modified to meet the particular needs of the students or community. First Responders, such as the ETT, are not certified by the State.

EMT-1: The Emergency Medical Technician I is equivalent to the National Standard EMT-Basic, as described in the United States Department of Transportation (USDOT) curriculum, revised in 1994, excluding the use of advanced airway devices. The EMT provides basic life support such

as splinting, hemorrhage control, oxygen therapy, suction, cardiopulmonary resuscitation (CPR), and use of automated external defibrillators (AEDs). The use of a manual external defibrillator requires separate certification as a Defibrillator Technician. The EMT-I course is at least 120 hours in length and CPR certification is a prerequisite.

EMT-2: The Emergency Medical Technician II level exceeds the National Standard Training Program EMT-Intermediate, developed by the USDOT in 1985. The EMT-II class is at least 50 hours in length and prepares the student to initiate intravenous lines and administer fluids and certain medications. A person must have ten patient contacts as an EMT-I in order to enter an EMT-II training program. Certification as an EMT-II also requires that the individual be under the sponsorship of a department approved physician medical director.

EMT-3: The Emergency Medical Technician III program is designed to add basic cardiac care skills to those the EMT has learned already. Also included in the training program is the use of morphine, lidocaine, atropine, and epinephrine. The EMT-III training program is at least 50 hours in length. A person must have ten patient contacts and ten venipunctures as an EMT-II in order to enter an EMT-III training program. As with the EMT-II, certification requires that the individual be under the sponsorship of a department approved physician medical director.

MICP: Mobile Intensive Care Paramedics are licensed by the Alaska Department of Commerce and Economic Development. The training is in excess of the EMT-III level, and MICPs function under the direct or indirect supervision (standing orders, etc.) of a physician. Generally, paramedics are found in the most populous areas of Alaska, including Anchorage, Fairbanks, Kenai, Soldotna, Nikiski, Juneau, Sitka, and Ketchikan. In some of these communities, all pre-hospital emergency medical care is provided by Mobile Intensive Care Paramedics. In others, the MICP may act as a supervisor or EMS Director.

Most isolated communities have Community Health Aids (CHAs) who are trained and function as the primary care provider either under the distant supervision of a Physician or the direct supervision of a Nurse Practitioner or Physician Assistant located in the community. CHA's are First Responders or ETTs trained, with many at the EMT-I level or higher.

Due to the limited access to roads and a transportation system that depends on air or water and good weather, the injured patient may be in the care of the CHA for up to 72 hours. It is essential that these communities have optimal communications capabilities for access to physicians, Regional medical facilities, and medical transport services.

From the Alaska Medical Directors Handbook: "Physician Medical Directors serve as the cornerstone of Emergency Medical Services in Alaska. They provide guidance and supervision to over 4,000 EMT-Is, EMT-IIs, EMT-IIIs, and MICP. They develop and adopt standing orders, ensure proper training, and evaluate the performance of individuals and agencies."

Regional and local Physician Medical Directors are largely volunteers. A Regional or local Medical Director for State certified EMT-II or EMT-III personnel, training programs or courses (EMT II, EMT III or manual defibrillator technician training, BLS, ALS, or air medical) must be an Alaska-licensed Physician or a Physician working in the regular medical service of the U.S. Armed Services or the U.S. Public Health Service. The Medical Director must participate in an orientation. Medical Directors of an ALS ground service or air medical service have additional requirements.

Medical Director responsibilities described in the Medical Directors Handbook for the certified EMT include the following:

Supervise the medical care
- Establish and annually review treatment protocols
- Approve advanced life support standing orders for each state-certified EMT
- Provide quarterly critiques of patient care
- Schedule quarterly on-site supervision
- Approve a program of continuing medical education for each state-certified EMT supervised

Online medical direction for EMS Providers in rural and remote locations is provided by the hospital or clinic in that Region via phone (some locations have limited telemedicine capability). The Regional facility decides on patient disposition and helps arrange transport to the most appropriate health care facility. Patient transport may involve multiple transfers requiring various modes of travel.

Alaska State Troopers report problems with the current 911 system and are advocating for the next generation of 911 technology.

Recommendations

- **Establish the infrastructure to allow bidirectional health information exchange between emergency medical services and health care facilities for performance improvement activity**

- Update the Emergency Medical Services Medical Director Handbook (current edition 2001)

- Develop a mandatory online medical director course that offers continuing education hours

- Ensure all emergency medical service agencies submit data to the AURORA database in a timely fashion

- Develop a minimum set of state-wide emergency medical service treatment protocols with flexibility for Regional enhancement

- Develop Regional transfer protocols

- Develop a central coordination center for state-wide air medical resources that will maintain an updated registry of all medical aircraft to include medical services and flight characteristics (i.e. load capacity, instrument rating, landing requirements, etc.); and to monitor the availability and location of air resources

Definitive Care Facilities

Purpose and Rationale

Inclusive trauma systems are the systems that include all acute health care facilities, to the extent that their resources and capabilities allow and in which the patient's needs are matched to hospital resources and capabilities. Thus, as the core of a Regional trauma system, acute care facilities operating within an inclusive trauma system provide definitive care to the entire spectrum of patients with traumatic injuries. Acute care facilities must be well integrated into the continuum of care, including prevention and rehabilitation, and operate as part of a network of trauma-receiving hospitals within the public health framework. All acute care facilities 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 mutual operational agreements with other Regional hospitals to address inter-facility transfer, educational support, and outreach. The roles of all definitive care facilities, including specialty hospitals (for example, pediatric, burn, severe traumatic brain injury [TBI], spinal cord injury [SCI]) within the system should be clearly outlined in the 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 Regional trauma system.

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 appropriately designated facilities within their community, whereas the most severe should be triaged to a Level I or II trauma center. In rural and frontier systems, smaller facilities must be ready to resuscitate and initiate treatment of the major injuries and have a system in place that will allow for the fastest, 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 that reviews and verifies 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 be conducted on a periodic cycle as determined by the Lead Agency. When centers do not meet set standards, there should be a process for suspension, probation, revocation, or de-designation.

Designation by the Lead Agency should be restricted to facilities meeting criteria or state-wide resource and quality standards and based on patient care needs of the Regional trauma system. There should be a well-defined regulatory relationship between the Lead Agency and designated trauma 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 designated trauma facility.

The number of trauma centers by Level of designation and location of acute care 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 for augmenting and restricting, if necessary, the number and/or Level of acute care facilities based on these periodic assessments. The trauma system plan should address means for improving acute care facility participation in the trauma system, particularly in systems in which there has been difficulty addressing needs.

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 providers 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 and specifying continuing educational requirements for physicians and nurses providing care to trauma patients. 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 in rural areas will need to 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 while fostering a team approach to care through annual educational multidisciplinary trauma conferences. These activities will do much to foster a sense of teamwork and a functionally 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 provided by the state and/or Regional trauma plan and overseen by the Lead Agency.

Each designated acute care facility should participate, through its trauma program leadership, in all aspects of trauma system design, evaluation, and operation. This participation should include policy and legislative development, legislative and public education, and strategic planning. In addition, the trauma program and subspecialty leaders should provide direction and oversight to the development, implementation, and monitoring of integrated protocols for patient care used throughout the system (for example, TBI guidelines used by prehospital providers and non-designated transferring centers), including Region specific primary (field) and secondary (early transfer) triage protocols. The highest Level trauma facilities should provide leadership of the Regional trauma committees through their trauma program medical leadership. These medical leaders, through their activities on these committees, can assist the Lead Agency and help ensure that deficiencies in the quality of care within the system, relative to national standards, are recognized and corrected. Educational outreach by these higher Levels centers should be used when appropriate to help achieve this goal.

Optimal Elements

I.   Acute care facilities are integrated into a resource efficient, inclusive network that meets required standards and that provides optimal care for all injured patients. **(B-303)**

   a.   The trauma system plan has clearly defined the roles and responsibilities of all acute care facilities treating trauma and of facilities that provide care to specialty populations (for example, burn, pediatric, SCI, and others). **(I-303.1)**

II.   To maintain its state, Regional, or local designation, each hospital will continually work to improve the trauma care as measured by patient outcomes. **(B-307)**

   a.   The trauma system engages in regular evaluation of all licensed acute care facilities that provide trauma care to trauma patients and of designated trauma hospitals. Such evaluation involves independent external reviews. **(I-307.1)**

III. The lead trauma authority ensures a competent workforce. **(B-310)**

   a.   As part of the established standards, set appropriate Levels of trauma training for nursing personnel who routinely care for trauma patients in acute care facilities. **(I-310.3)**

   b.   Ensure that appropriate, approved trauma training courses are provided for nursing personnel on a regular basis. **(I-310.4)**

   c.   In cooperation with the nursing licensure authority, ensure that all nursing personnel who routinely provide care to trauma patients have a trauma training certificate (for example, Advanced Trauma Care for Nurses, Trauma Nursing Core Course, or any national or state trauma nurse verification course). As an alternative after initial trauma course completion, training can be driven by the performance improvement process. **(I-310.5)**

   d.   In cooperation with the physician licensure authority, ensure that physicians who routinely provide care to trauma patients have a current trauma training certificate of completion, for example, Advanced Trauma Life Support® (ATLS®) and others. As an alternative, physicians may maintain trauma competence through continuing medical education programs after initial ATLS completion. **(I-310.8)**

   e.   Conduct at least 1 multidisciplinary trauma conference annually that encourages system and team approaches to trauma care. **(I-310.9)**

   f.   As new protocols and treatment approaches are instituted within the system, structured mechanisms are in place to inform all personnel about the changes in a timely manner. **(I-310-10)**

Current Status

Alaska has twenty-four acute care facilities, seventeen of which are now trauma centers. Two of those centers, both in Anchorage, are ACS-verified Level II adult and pediatric centers. The remaining fifteen centers are state-verified Level IV centers. All centers are designated by the State. Re-verification review occurs on a three year cycle. Unique to Alaska, is the highly

integrated Alaskan Native Health Care System. Of the fifteen Level IV centers, six are remote Regional hospitals within the tribal system, and one of the Anchorage Level II centers, Alaska Native Medical Center, is the tertiary care facility within the Native System. While their primary mission is the care of native populations, the system also cares for non-natives, particularly in remote areas, where it serves as the only medical facility available.

Trauma care in much of the state is challenged by geography and low population density. The North West, or "Bush" Region, is sparsely populated with multiple native villages, often with populations ranging from as few as 50-100 people. Initial care and stabilization of the injured in these communities is often initiated by a Community Health Aide at a frontier health care clinic. The health aides are trained providers with at least an eighth grade education. After initial assessment, the Health Aide communicates with the Regional Level IV center for care and triage instructions. Decisions regarding triage and transfer are determined by the local practice, with no Regional or state guidelines. Transfer to a higher level facility (generally Alaska Native Hospital in Anchorage) is by fixed wing air medical transport. Transport is facilitated by the receiving hospital, although can be quite complicated sometimes involving several air medical services, and in cases of extreme weather, the Military. Delays can be significant. The Regional Level IV centers are very engaged within their communities, although challenged by high staff turn-over. Trauma volumes are low in remote, rural trauma centers with no hospital seeing more than 60 injured patients in a year.

The South East Region is a similarly geographically isolated, in this case by water. While this Region includes the state capital, Juneau, there are few roads connecting communities. Level IV centers and frontier clinics form the backbone of the health care system. Similar to the North West, transportation to higher-level care is by air, although in this Region, many patients are transported to a Level I facility in Seattle, WA.

The majority of roads, people, and specialty care are in the South Central Region, which includes the major cities of Anchorage and Fairbanks. The only trauma neurosurgical capabilities in the state are located in Anchorage. This is also the only Region in which there is the luxury of multiple hospitals, EMS agencies, and air medical facilities. Both Level II centers in Anchorage function at high levels of occupancy; issues related to the diversion of trauma patients is an important system issue, particularly for decisions regarding the designation of additional trauma hospitals in the Region. Outlying facilities do seem to perceive barriers to transfer of patients to the Anchorage Level II center. Whether this is a capacity or a communication issue is not clear, and should be monitored closely by the State. Facilities also note that there are few skilled nursing and acute rehabilitation beds available in the State, and some patients remain in acute-care for extended periods of time due to the lack of an appropriate discharge location.

All acute-care hospitals within the state participate in the Trauma System, in some capacity. The seven non-designated hospitals (including one Military hospital) voluntarily contribute data to the State Trauma Registry. The State Trauma System Plan recommends that five additional rural hospitals pursue state Level IV designation. Currently, at least one of these hospitals has indicated interest in pursuing state verification. Another hospital, in the Anchorage area, has an upcoming Level III consultation visit by the ACS. Discussions related to state designation (assuming successful ACS verification) of this center are on-going, particularly regarding system need and Regional volume. The state also has a robust system of supporting education at non-trauma centers, including providing the RTTDC course.

Current trauma center regulatory language is under review by the State Attorney General. The updated rules include language supporting a needs-based Trauma System, with the TSRC functioning as the authorizing body regarding trauma center designation.

The Trauma System Plan recommends maturation of Level IV centers to Level III centers, based upon System need and facility capability. Several candidates for such an upgrade have been identified, with one potential facility scheduled for an ACS consultation visit later this year. Despite widespread system support for this aspect of the plan, individual facilities have been slow to embrace pursuing Level III verification. Significant barriers include administrative challenges, including hospital leadership changes, financial concerns, particularly the lack of state support for ACS verification (or other trauma center costs). Alaska has a Trauma Fund, which was used entirely to provide funds to trauma centers (based upon level). Unfortunately, no appropriations have been made to the fund since 2015. In addition, State Level IV verification is provided at no cost to the hospital, whereas the ACS verification and TQIP participation cost a hospital $12,000/ year. Finally, the lack of surgical buy-in is frequently noted as significant barrier to the adoption of Level III requirements. Surgical concerns include increased requirements for emergency department coverage and nonclinical responsibilities. Hospitals note that while the ED and nursing have embraced performance improvement initiatives, the surgical staff is less engaged.

As mentioned above, for a number of patients, the first point of entry into the Trauma System is via a rural health clinic. Many of these clinics see a significant number of injured patients and would benefit from the increased resources and education that trauma designation entails. Expanding these clinics to become Frontier Extended Stay Clinics and Level V trauma centers would help meet the needs of the local community. Regulatory language supporting the development of Level V trauma centers is under current review by the State Attorney General, and the System plans to support select health clinics in the process of obtaining Level V designation. Expansion in this direction will be dependent upon adequate funding.

Alaska's trauma facilities are dependent upon a workforce willing to endure significant challenges to care for injured patients. The System suffers from the high turn-over and difficulty of recruiting new providers. The University of Washington School of Medicine's WWAMI (Washington, Wyoming, Alaska, Montana, and Idaho) Program provides medical education for twenty Alaskans a year, with evidence of high ultimate retention of these physicians within the State. Likewise, three surgical residents a year from Phoenix, AZ rotate at Alaska Native Medical Center, and a number of these residents have returned to practice in Alaska. Similar success stories have been noted within the emergency medicine community, again highlighting the importance of having training opportunities for the medical workforce within the state.

In the frontier areas, the lack of surgical capacity limits the ability to rescue potentially salvageable injured patients, particularly those with active hemorrhage. Exploring novel solutions, including rotating locums surgeons or training local providers in basic surgical skills and techniques like REBOA (resuscitative endovascular balloon occlusion of the aorta) could fill this gap. Higher-level support of providers could be provided by tele-medicine. Level IV centers should also maintain limited surgical supplies and equipment. It is unclear how many patients would benefit from increasing surgical resources; therefore, a formal evaluation of pre-hospital injury deaths is necessary, including medical examiner data. All medical facilities in the State should have at least basic training and equipment to the care for pediatric patients.

Recommendations

- Support the maturation of select Level IV centers to Level III centers, based upon System need, as determined by the Trauma System Plan and the Trauma System Review Committee (TSRC)

- Support the development of select health care clinics into Level V trauma centers, and based upon system need as determined by the Trauma System Plan and the Trauma System Review Committee (TSRC)

- Explore novel means of expanding frontier surgical capacity

System Coordination and Patient Flow

Purpose and Rationale

To achieve the best possible outcomes, the system must be designed so that the right patient is transported to the right facility at the right time. Although on the surface this objective seems relatively straightforward, patients, geography, and transportation systems often conspire to present significant challenges. The most critically injured trauma patient is often easy to identify at the scene by virtue of the presence of coma or hypotension. However, in some circumstances, the patients requiring the resources of a Level I or II center may not be immediately apparent to prehospital providers. Primary or field triage criteria aid providers in identifying which patients have the greatest likelihood of adverse outcomes and might benefit from the resources of a designated trauma center. Even if the need is identified, Regional geography or limited air medical (or land) transport services might not allow for direct transport to an appropriate facility.

Primary triage of a patient from the field to a center capable of providing definitive care is the goal of the trauma system. However, there are circumstances (for example, airway management, rural environments, 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 (for example, pediatric trauma, burns, severe TBI, SCI, and re-implantation). Finally, temporary resource limitations might necessitate the transfer of patients between acute care facilities.

Secondary triage at the initial receiving facility has several advantages in systems with a large rural or suburban component. The ability to assess patients at non-designated or Level III to V centers provides an opportunity to limit the transfer of only the most severely injured patients to Level I or II facilities, thus preserving a limited resource 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 will minimize discussions about individual patient transfers, expedite the process, and ensure optimal patient care. Delays in transfer might increase mortality, complications, and length of stay. A system with an excess of transferred patients might tax the resources of the Regional trauma facility. Conversely, inappropriate retention of patients at centers without adequate facilities or expertise might increase the risk of adverse outcomes. Given the importance of timely, appropriate inter-facility transfers, the time to transfer, as well as the rates of primary and secondary over-triage basis, and corrective actions should be instituted when problems 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.

A central communications center with real-time access to information on system resources greatly facilitates the transfer process. Ideally, this center identifies a receiving facility, facilitates dialogue between the transferring and receiving centers, and coordinates inter-facility transport.

To ensure that the system operates at the greatest efficiency, it is important that patients are repatriated back to community hospitals once the acute phase of trauma care is complete. The process of repatriation opens up the limited resources available to care for severely injured patients. In addition, it provides an opportunity to bring patients back into their local environment where their social network might help reintegrate patients into their community.

Optimal Elements

I. The trauma system is supported by an EMS system that includes communications, medical oversight, prehospital triage, and transportation; the trauma system, EMS system, and public health agency are well integrated. **(B-302)**

    a. There are mandatory system-wide prehospital triage criteria to ensure that trauma patients are transported to an appropriate facility based on their injuries. These triage criteria are regularly evaluated and updated to ensure acceptable and system-defined rates of sensitivity and specificity for appropriately identifying a major trauma patient. **(I-302.6)**

    b. There is a universal access number for citizens to access the EMS/trauma system, with dispatch of appropriate medical resources. There is a central communications system for the EMS/trauma system to ensure field-to- facility bidirectional communications, inter-facility dialogue, and all-hazards response communications among all system participants. **(I-302.7)**

    c. There is a procedure for communications among medical facilities when arranging for inter-facility transfers, including contingencies for radio or telephone system failure. **(I-302.9)**

II. Acute care facilities are integrated into a resource-efficient, inclusive network that meets required standards and that provides optimal care for all injured patients. **(B-303)**

    a. When injured patients arrive at a medical facility that cannot provide the appropriate Level of definitive care, there is an organized and regularly monitored system to ensure that the patients are expeditiously transferred to the appropriate system-defined trauma facility. **(I-303.4)**

Current Status

Trauma care varies based on location in Alaska due to Regional differences in resources, terrain, access to roads, and weather conditions. There are three distinct geographic Regions that impact care:

- Bush area: these remote areas are geographically isolated and have unique challenges including low population density, weather, few roads, and rudimentary health care capabilities with few hospitals.

- Southcentral: this urban environment is the major population center of the state and has several acute care hospitals, advanced infrastructure, subspecialty care, and system redundancy in several segments. It is the primary health care referral area for the state for all Alaskans.

- Southeast: this area is isolated from the state and has few roads. Medical capabilities are intermediate compared to the two areas listed above, and the Southeast has a special relationship with Harborview Medical Center (Level I trauma center) in Seattle.

In addition to the geographic differentiation mentioned above, Alaska health care delivery can also be viewed in the context of populations (excluding the military):

- Native Alaskans: health care delivery to this population occurs across all geographic Regions and is organized and administered by Alaska Tribal Health System/ Alaska Native Tribal Health Consortium, an integrated network of facilities and providers that deliver care to Native Alaskans as defined beneficiaries. In remote Regions, the native health system is the sole provider of health care, and native and non-natives utilize the facilities.

- Alaskans: health care delivery to this population occurs along more typical lines and involves a variety of hospitals and providers in varying density dependent on location and funding source.

There has been an increase in air medical services in Alaska over the past few years. This may or may not benefit Alaska residents. Air medical transports are expensive and often not completely covered by a patient's insurance thus imparting a significant financial burden to the patient and family. There is no regulation or protocols to help assure that the patient requires air medical transport over ground transport. In addition, there is no centralized medical command or air dispatch center to coordinate resources over significant distances and often over multiple providers and services, potentially resulting in further delays to receiving definitive care. Guidelines regarding triage and transfer are locally determined, with the exception of the Anchorage area, in which there are Regional protocols. Lack of destination guidelines occasionally results in the transfer of trauma patients to non-trauma designated hospitals. As system capacity matures, guidelines will need to be developed to determine policies regarding transfer of patients from lower levels of care to higher levels of care, as well as to address diversion.

Once a patient has been transferred, particularly to out of state locations, there is little support for repatriation into their home community. Specialty follow-up is limited, as is access to outpatient rehabilitation. Developing collaborative relationships with referral institutions and utilizing technology such as telemedicine may improve this situation. Such a program has recently been implemented for burn care.

Hospitals, particularly the larger, referral facilities in the Anchorage area, report difficulties in finding appropriate post-discharge resources for patients, particularly acute rehabilitation and skilled nursing beds. Inability to transfer patients out of the hospital results in diminished capacity to accept new patients and potential necessity for diversion. Once discharged to home, as noted above, there are few resources for out-patient rehabilitation, including physical, occupational, and speech therapies.

Recommendations

- Develop and/or update Regional triage and transfer guidelines

- **Create a centralized resource for coordination of patient triage and transport for inter-facility transfers state-wide. Functional elements include:**
  - **A method to match air medical service resources with local need**
  - **A means for real time tracking of all air medical resources**

- Track and evaluate trauma patients who are initially transported or transferred to a non-trauma designated facility

- Evaluate barriers for repatriation of patients transferred to out-of-state for acute care or rehabilitation and develop viable options for their return. This process has already been initiated for burn patients

- Develop guidelines for appropriate bypass of Level III and IV trauma facilities

- Develop a certificate of need process for new air or ground ambulance services in the state

- Expand system capacity for acute rehabilitation and skilled nursing care

Rehabilitation

Purpose and Rationale

As an integral component of the trauma system, rehabilitation services in acute care and rehabilitation centers provide coordinated care for trauma patients who have sustained severe or catastrophic injuries, resulting in long-standing or permanent impairments. Patients with less severe injuries may also benefit from rehabilitative programs that enhance recovery and speed return to function and productivity. The goal of rehabilitative interventions is to allow the patient to return to the highest Level of function, reducing disability and avoiding handicap whenever possible. The rehabilitation process should begin in the acute care facility as soon as possible, ideally within the first 24 hours. Inpatient and outpatient rehabilitation services should be available. Rehabilitation centers should have CARF (Commission on Accreditation of Rehabilitation Facilities) accreditation for comprehensive inpatient rehabilitation programs, and accreditation of specialty centers (SCI and TBI) should be strongly encouraged.

The trauma system should conduct a rehabilitation needs assessment (including specialized programs in SCI, TBI, and for children) to identify the number of beds needed and available for rehabilitation in the geographic Region. 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 across state lines are used, should be part of rehabilitation system planning. Feedback on functional outcomes after rehabilitation should be made available to the trauma centers.

Optimal Elements

I. The Lead Agency ensures that adequate rehabilitation facilities have been integrated into the trauma system and that these resources are made available to all populations requiring them. **(B-308)**

    a. The Lead Agency has incorporated, within the trauma system plan and the trauma center standards, requirements for rehabilitation services, including inter-facility transfer of trauma patients to rehabilitation centers. **(I-308.1)**

    b. Rehabilitation centers and outpatient rehabilitation services provide data on trauma patients to the central trauma system registry that include final disposition, functional outcome, and rehabilitation costs and also participate in performance improvement processes. **(I-308.2)**

II. A resource assessment for the trauma system has been completed and is regularly updated. **(B-103**)

    a. The trauma system has completed a comprehensive system status inventory that identifies the availability and distribution of current capabilities and resources. **(I-103.1)**

Current Status

The Lead Agency tracks the number of rehabilitation beds allocated within the state. Currently, there are twenty designated adult rehabilitation beds in Alaska (10 beds each at Providence Alaska Medical Center and Alaska Regional Hospital). Medical direction at both of these facilities is provided by an MD physiatrist. Both facilities have robust programs and maintain an emphasis on the traumatically injured. Both demonstrated quality metrics that met or were better than national standards. These included high patient satisfaction, low readmission rates, high return to the community at discharge, and improved Functional Independence Measures.

In addition, St. Elias Specialty Hospital (partnered with Providence Health) is the only Long Term Acute Care Hospital in Alaska and also provides rehabilitation services. The 59 bed hospital maintains Physical Therapy, Occupational Therapy, Speech, Physical Medicine, and Rehabilitation services as well as a Certified Brain Injury Specialist and Physical Therapy Neurologic Clinical Specialist for Traumatic Brain Injured (TBI) and Spinal Cord Injured (SCI) patients.

The criteria for acceptance to a rehabilitation designated bed is complex (which occurs nationally) and is based on the type of rehabilitation required, criteria needed for admission, and funding sources available. SCI and TBI patients are accepted into the Alaska facilities on a case-by-case basis, dependent on the comfort and expertise level of rehabilitation staff, the funding source, and bed availability. Most cases (approximately 20 patients per year) of severe SCI with high tetraplegic patients and severe TBI patients where long term rehabilitative care (>30 days anticipated) is required are sent out of Alaska to specialty rehabilitation centers. The two more frequently utilized out of state facilities named were University of Washington in Seattle and Craig Hospital in Denver.

The rehabilitation bed wait time averages 2 days for TBI and 20 days for SCI. These were the same wait times noted in the 2008 Trauma System Consultation Report. The areas lacking within the state were the lack of skilled nursing facilities and the lack of long term outpatient TBI and SCI rehabilitation care. This markedly increases the length of stay at all facilities and ultimately limits bed availability for other trauma patients.

Pediatric inpatient rehabilitation beds do not exist in the State.

The two rehabilitation facilities are not accredited by outside independent organizations nor are they required to be by state regulation. In addition, no State Trauma System policies and procedures exist for rehabilitation facilities.

Rehabilitation specialists are not represented on the TSRC, nor is there a specifically integrated position on the Committee. Rehabilitation specialists at PAMC and ARH are members of their hospital trauma committees.

Due to a lack of inclusion within the State Trauma System, it is more difficult to determine if adequate resources already exist within the State of Alaska for rehabilitation.

Due to a low patient volume of certain highly specialized and complex injuries (i.e. tetraplegia) it is reasonable and beneficial to continue with transfer of these patients to specialized centers.

Barriers for the repatriation of patients transferred out-of-state for sub-specialty rehabilitation or care exist and viable options for their return are lacking except for burn casualties which has recently been corrected by the ANMC.

The Trauma System Plan's rehabilitation initiatives are limited.

New construction and additional neurological resources which may be able to assist with mild TBI longer term rehabilitation in the state are planned for the Alaskan Native Medical Center. Alaska Regional Hospital is currently evaluating a long term proposal to increase their rehabilitation unit from 10 to 18 beds.

Recommendations

- **Support the development of additional resources for post-acute care, including skilled nursing facilities and out-patient rehabilitation care**

- Perform a needs assessment for inpatient and outpatient rehabilitation services for trauma patients in Alaska

- Track the following outcomes within the State Trauma Registry:
  - Functional outcome at discharge from rehabilitation
  - Additional days spent at Alaska acute care facilities while waiting for rehabilitation bed (include Long Term Acute Care (LTAC) facilities)
  - Number of patients recommended for inpatient and outpatient rehabilitation but never receive that care

- Encourage rehabilitation centers to attain accreditation by one of the major rehabilitation accrediting agencies such as the Commission on Accreditation of Rehabilitation Facilities (CARF)

- Petition the commissioner to make a bylaw change for the addition of a rehabilitation specialist to the membership in Trauma System Review Committee (TSRC)

- Create and maintain on the Trauma System website a comprehensive list of rehabilitation services offered across the State

Disaster Preparedness

Purpose and Rationale

As critically important resources for state, Regional, and local responses to MCIs, the trauma system and its trauma centers are central to disaster preparedness. Trauma system leaders need to be actively involved in public health preparedness planning to ensure that trauma system resources are integrated into the state, Regional, and local disaster response plans. Acute care facilities (sometimes including one or more trauma centers) within an affected community are the first line of response to an MCI. However, an MCI may result in more casualties than the local acute care facilities can handle, requiring the activation of a larger emergency response plan with support provided by state and Regional assets.

For this reason, the trauma system and its trauma centers must conduct a resource assessment of its surge capacity to respond to MCIs. The resource assessment should build on and be coupled to a hazard vulnerability analysis. An assessment of the trauma system's response to simulated incident or tabletop drills must be conducted to determine the trauma system's ability to respond to MCIs. Following these assessments, a gap analysis should be conducted to develop state-wide MCI response resource standards. This information is essential for the development of an emergency management plan that includes the trauma system.

Planning and integration of the trauma system with plans of related systems (public health, EMS, and emergency management) are important because of the extensive impact disasters have on the trauma system and the value of the trauma system in providing care. Relationships and working cooperation between the trauma system and public health, EMS, and emergency management agencies support the provision of assets that enable a more rapid and organized disaster response when an event occurs. For example, the EMS emergency preparedness plan needs to include the distribution of severely injured patients to trauma centers, when possible, to make optimal use of trauma center resources. This plan could optimize triage through directing less severely injured patients to lower Level trauma centers or non-designated facilities, thus allowing resources in trauma centers to be spared for patients with the most severe injuries. In addition, the trauma system and its trauma centers will be targeted to receive additional resources (personnel, equipment, and supplies) during major MCIs.

Mass casualty events and disasters are chaotic, and only with planning and drills will a more organized response be possible. Simulation or tabletop drills provide an opportunity to test the emergency preparedness response plans for the trauma system and other systems and to train the teams that will respond. Exercises must be jointly conducted with other agencies to ensure that all aspects of the response plan have the trauma system integrated.

Optimal Elements

I. An assessment of the trauma system's emergency preparedness has been completed, including coordination with the public health agency, EMS system, and the emergency management agency. **(B-104)**

a. There is a resource assessment of the trauma system's ability to expand its capacity to respond to MCIs in an all-hazards approach. **(I-104.1)**

b. There has been a consultation by external experts to assist in identifying current status and needs of the trauma system to be able to respond to MCIs. **(I-104.2)**

c. The trauma system has completed a gap analysis based on the resource assessment for trauma emergency preparedness. **(I-104.3)**

II. The Lead Agency ensures that its trauma system plan is integrated with, and complementary to, the comprehensive mass casualty plan for natural and manmade incidents, including an all-hazards approach to planning and operations. **(B-305)**

a. The EMS, the trauma system, and the all-hazards medical response system have operational trauma and all-hazards response plans and have established an ongoing cooperative working relationship to ensure trauma system readiness for all-hazards events. **(I-305.1)**

b. All-hazards events routinely include situations involving natural (for example, earthquake), unintentional (for example, school bus crash), and intentional (for example, terrorist explosion) trauma-producing events that test the expanded response capabilities and surge capacity of the trauma system. **(I-305-2)**

c. The trauma system, through the Lead Agency, has access to additional equipment, materials, and personnel for large-scale traumatic events.   **(I-305.3)**

Current Status

Two-thirds of the State is without roads and many Alaskans are dependent on air travel for routine travel and medical evacuation. Communication is challenging as many areas have limited cell phone and internet coverage. Culturally, 229 different tribes reside within the State.

The Department of Military and Veterans Affairs, Division of Homeland Security and Emergency Management is designated by the Alaska Emergency Operations Plan as the Lead Agency for coordination of State efforts in disaster and emergency preparation and response. The Department of Health and Social Services (DHSS) has primary functional responsibility in mass casualty events and performs this duty through their Division of Public Health, Section of Rural and Community Health Systems (RCHS). It performs these duties through its four program units: Public Health Emergency Response Operations (HERO), Emergency Medical Services, Trauma Systems Program, and Office of Healthcare Access.

HERO works with local communities, healthcare facilities, state and federal agencies, and other private partners to address preparedness, planning, and response to an emergency or disaster impacting the health of Alaskans. The unit develops plans, coordinates with partners, conducts training and exercises, and distributes grant funds to eligible healthcare facilities and other critical stakeholders for disaster preparedness activities. The unit also manages the DHSS Emergency Operations Center (EOC). The Trauma Program employees are deployed to the EOC during its activation.

DHSS has a robust disaster preparedness plan that incorporates multiple agency collaboration. The Planner maintains a wealth of knowledge, and provides a high level of collaboration to the HERO team and the Trauma System.

Multiple regularly scheduled comprehensive full-scale exercises have been conducted (most recently 2014, 2016, 2017) and response to real events have provided additional opportunities to test disaster plans, applying real "lessons learned" for improved future response. These recent exercises addressed prior shortfalls and incorporated trauma centers, air hubs, unified command and extensive broad military involvement. The Municipality of Anchorage, through the local Joint Medical Emergency Preparedness Group, which includes representation from Matanuska-Susitna Borough, appears to be working collaboratively using a well-coordinated process that includes non-designated facilities such as Alaska Regional Hospital.

HERO utilized the Alaska Tracking Resources, Alerts and Communications System (AKTRACS) that provided web-based, simplified information sharing during the response for any state-wide incident enabling medical surge coordination as well as patient and bed tracking. Recognizing that there are numerous communication deserts, with isolated or remote areas within the state, the HERO operation plan provides redundant communication capability to include two mobile communication trailers (stored in Anchorage for cost and maintenance purposes). Clinical health documentation, during a disaster response, would rely on written health record.

The State owns and maintains additional preparedness medical assets that are stored in Anchorage and at the Joint Base Elmendorf-Richardson (JBER) which can be readily deployed. These include numerous tents (Western Shelter System) and a modular deployable medical facility (up to 250 beds in multiple smaller configurations).

In addition, there is a recognized Level I National Disaster Medical System (NDMS) Disaster Medical Assistance Team (DMAT), which is prepared to operate independently without re-supply for up to 72 hours and deploy within eight hours of notification.

Local Emergency Planning Committees are combined voluntary civilian and government groups and function in the local communities. These are coordinated with the State of Alaska in collaboration with the Division of Homeland Security and Emergency Management. Due to the strong possibility of a delayed response given environmental issues and long distances, local and Regional disaster preparedness capability and capacity is of great importance in Alaska.

The State has developed a coordinated volunteer program known as Alaska Respond, which is part of the national emergency system for Advanced Registration of Volunteer Health Professionals. This program manages responders in disasters and public health emergencies. This program covers a multifaceted set of volunteers to include any medical professional licensed within the State. The creation of this program addressed an earlier deficiency noted in the 2008 Trauma System Consultation.

The Trauma System Plan does not include disaster recommendations. The Alaska State Hazard Vulnerability Assessment (HVA) would include volcano eruption, earthquake, tsunami, avalanche, flooding, aircraft mishap, and tourist industry mishap (bus and cruise ship).

HVAs are reportedly done locally and by the individual facilities but may not be consolidated into Regional or state-wide HVAs. It has also been identified that a single consistent tool should be utilized for the process. Additionally, domestic and international terrorism should be considered for inclusion in the HVAs.

Funding for state-wide disaster training and exercises is available and utilized.

The TSC Review Team noted that there was a great deal of preparedness activity even prior to the 2008 Trauma System Consultation. All-hazards disaster planning and training is ongoing. The State has engaged multiple aspects of the DoD, to include active duty units, National Guard and Reserves, and NGOs (Samaritans Purse) as part of the disaster response. Additionally, disaster exercise "after action" deficits are being systematically addressed by the State.

Recommendations

- Include clinical representation from all trauma center levels in emergency disaster/response planning to support a comprehensive and inclusive response to disasters, both man-made and natural

- Develop a state-wide Hazards Vulnerability Assessment (HVA) with the incorporation of the Regional and facility HVAs

- Create a sub-committee of the Trauma System Review Committee (TSRC) to update the state-wide Disaster Plan to include trauma system elements (see specific recommendations in Appendix A: Additional Disaster Preparedness Recommendations)

- Further the integration of all components of the trauma system into state, Regional and local Disaster Plans. This should include the addition of disaster preparedness capacity and capability to the Trauma System Plan

- Generate a State Hazards Vulnerability Assessment (HVA) that incorporates all state-wide HVAs

- Continue to strengthen the local and Regional disaster preparedness capability and capacity

System-wide Evaluation and Quality Assurance

Purpose and Rationale

The trauma Lead Agency has responsibility for instituting processes to evaluate the performance of all aspects of the trauma system. Key aspects of system-wide effectiveness include the outcomes of population based injury prevention initiatives, access to care, as well as the availability of services, the quality of services provided within the trauma care continuum from prehospital and acute care management phases through rehabilitation and community reintegration, and financial impact or cost. Intrinsic to this function is the delineation of valid, objective metrics for the ongoing quality audit of system performance and patient outcomes based on sound benchmarks and available clinical evidence. Trauma management information systems (MISs) must be available to support data collection and analysis.

The Lead Agency should establish forums that promote inclusive multidisciplinary and multiagency review of cases, events, concerns, regulatory issues, policies, procedures, and standards that pertain to the trauma system. The evaluation of system effectiveness must take into account the integration of these various components of the trauma care continuum and review how well personnel, agencies, and facilities perform together to achieve the desired goals and objectives. Results of customer satisfaction (patient, provider, and facility) appraisals and data indicative of community and population needs should be considered in strategic planning for system development. System improvements derived through evaluation and quality assurance activities may encompass enhancements in technology, legislative or regulatory infrastructure, clinical care, and critical resource availability.

To promote participation and sustainability, the Lead Agency should associate accountability for achieving defined goals and trauma system performance indicators with meaningful incentives that will act to cement the support of key constituents in the health care community and general population. For example, the costs and benefits of the trauma system as they relate to reducing mortality or decreasing years of productive life lost may make the value of promoting trauma system development more tangible. A facility that achieves trauma center verification/designation may be rewarded with monetary compensation (for example, ability to bill for trauma activation fees) and the ability to serve as a receiving center for trauma patients. The trauma Lead Agency should promote ongoing dialog with key stakeholders to ensure that incentives remain aligned with system needs.

Optimal Elements

I. The trauma MIS is used to facilitate ongoing assessment and assurance of system performance and outcomes and provides a basis for continuously improving the trauma system, including a cost-benefit analysis. **(B-301)**

   a. The lead trauma authority ensures that each member hospital of the trauma system collects and uses patient data, as well as provider data, to assess system performance and to improve quality of care. Assessment data are routinely submitted to the lead trauma authority. **(I-301.1)**

II. The jurisdictional Lead Agency, in cooperation with other agencies and organizations, uses analytic tools to monitor the performance of population based prevention and trauma care services. **(B-304)**

III. The financial aspects of the trauma system are integrated into the overall performance improvement system to ensure ongoing fine tuning and cost-effectiveness. **(B-309)**

   a. Financial data are combined with other cost, outcome, or surrogate measures, for example, years of potential life lost, quality-adjusted life years, and disability adjusted life years; length of stay; length of intensive care unit stay; number of ventilator days; and others, to estimate and track true system costs and cost- benefits. **(I-309.4)**

Current Status

The TSRC is responsible for the ongoing monitoring and evaluation of the Trauma System. The committee consists of eighteen individuals with various backgrounds and geographic diversity that are appointed to the committee. This committee reports its activities and findings to the Trauma System Program, Trauma Medical Directors and Trauma Program Managers, stakeholders, ASHNA, ACEMS, EMS, and liaisons. The TSRC members also serve as advocates for the Trauma System.

The TSRC defines the priorities for the system performance improvement and has the authority to define reports needed to evaluate the system performance. This is done by committee consensus. System performance improvement efforts include the following:

- Dispatch center and trauma destination and trauma diversion protocol compliance
- EMS PI indicators for on-site medical providers, EMS medical directors, and trauma patient destination
- Trauma center guidelines for management and transfer of head injured patients; rural and pediatric guidelines
- Burn guidelines
- Specific State events
    1. Trauma patients that die in hospital between 2-24 hours of hospital arrival, stratified by hospital Level
    2. Trauma patients with two or more transfers prior to definitive care
    3. Trauma patients with EMS times greater than 20 minutes
    4. Transferred trauma patients with an ISS greater than 15 and transfer time greater than 6 hours
    5. Trauma patients with an ISS greater than 15 and an ED disposition time of greater than 2 hours
    6. Trauma patients who die with a probability of survival >50%
    7. Trauma patients who live with a probability of survival <50%
    8. Trauma patients with an ISS greater than 15 who are discharged from non-trauma centers
    9. Trauma patients less than 13 years of age who either had an ED GCS less than or equal to 8, intubation, or ISS greater than 15 and not transferred to a Regional pediatric trauma center
- ACS filters
- EMS filters

1. Unstable patients on scene greater than 10 minutes
2. EMS activated trauma alert on unstable prehospital patient
3. Was the patient status appropriately triaged (under/over triage)
4. Was tourniquet applied prehospital for uncontrolled hemorrhage?
5. Was cervical spine immobilization applied in the ED?
6. EMS administered oxygen to patient when O2 saturation <94
7. Definitive airway applied by prehospital
8. Definitive airway applied by ED
- Over and under triage are reviewed at the trauma center level

The trauma centers provide a fairly comprehensive list of performance improvement data that is available for summary and analysis. There is no evidence that this data has been reviewed or that an analysis of this data has been completed at a State or Regional level to define opportunities for improvement.

There are multiple reports reflecting data but there is little evidence of a review process with defined goals, outcomes, and action plans. This evidence may be available in the TSRC's Annual Report but that report has not been made available to-date. There is currently no approved Trauma System Performance Improvement Plan in place. The Trauma System Plan defines that Trauma System performance improvement is a Regional responsibility. There is no evidence that a Regional trauma system performance process has been implemented.

An established Trauma System performance improvement sub-committee of the TSRC provides an opportunity to align and organize the fragmented elements of review that are currently in place. This sub-committee's goals and priorities include the development of a Trauma System Performance Improvement Plan, event data definitions, and desired outcomes. The System performance improvement outcomes should be included in the TSRC's Annual Report.

A dedicated Trauma System Performance Improvement Manager is needed to oversee these activities. This would require additional funding allocation to support the function and further Trauma System development.

Recommendations

- **Develop a performance improvement sub-committee of the Trauma System Review Committee (TSRC) to define a Trauma System Performance Improvement Plan with processes evaluate outcomes**

- Establish and standardize performance improvement event definitions for the Trauma System to include the trauma centers, transfer process, and pre-hospital providers

- Implement processes for data analysis and data review that assist in identifying performance improvement opportunities for the Regional areas and State

- **Establish accountable score-cards with defined targets for the Regions and State**

- **Establish a regular reporting structure that facilitates a data-driven decision making process for the Trauma System Review Committee (TSRC) and State. Begin with process measures already being captured**

- Include the associated costs linked to outcomes in the Trauma System Performance Reports

- Include the summary reports with the Annual Trauma Reports

- Provide stakeholder education to build performance improvement skill

Trauma Management Information Systems

Purpose and Rationale

Hospital-based trauma registries developed from the idea that aggregating data from similar cases may reveal variations in care and ultimately result in a better understanding of the underlying injury and its treatment. Hospital-based registries have proven very effective in improving trauma care within an institution but provide limited information regarding how interactions with other phases of health care influence the outcome of an injured patient. To address this limitation, data from hospital-based registries should be collated into a Regional registry and linked such that data from all phases of care (prehospital, hospital, and rehabilitation) are accessible in 1 data set. When possible, these data should be further linked to law enforcement, crash incident reports, ED records, administrative discharge data, medical examiner records, vital statistics data (death certificates), and financial data. The information system should be designed to provide system-wide data that allow and facilitate evaluation of the structure, process, and outcomes of the entire system; all phases of care; and their interactions. This information should be used to develop, implement, and influence public policy.

The Lead Agency should maintain oversight of the information system. In doing so, it must define the roles and responsibilities for agencies and institutions regarding data collection and outline processes to evaluate the quality, timeliness, and completeness of data. There must be some means to ensure patient and provider confidentiality is in keeping with federal regulations. The agency must also develop policies and procedures to facilitate and encourage injury surveillance and trauma care research using data derived from the trauma MIS. There are key features of Regional trauma MISs that enhance their usefulness as a means to evaluate the quality of care provided within a system. Patient information collected within the management system must be standardized to ensure that noted variations in care can be characterized in a similar manner across differing geographic Regions, facilities, and EMS agencies. The composition of patients and injuries included in local registries (inclusion criteria) should be consistent across centers, allowing for the evaluation of processes and outcomes among similar patient groups. Many Regions limit their information systems to trauma centers. However, the optimal approach is to collect data from all acute care facilities within the Region. Limiting required data submission to hospitals designated as trauma centers allows one to evaluate systems issues only among patients transported to appropriate facilities. It is also important to have protocols in place to ensure a uniform approach to data abstraction and collection. Research suggests that if the process of case abstraction is not routinely calibrated, practices used by abstractors begin to drift.

Finally, every effort should be made to conform to national standards defining processes for case acquisition, case definition (that is, inclusion criteria), and registry coding conventions. Two such national standards include the National Highway Traffic Safety Administration's National Emergency Medical Services Information System (NEMSIS), which standardizes EMS data collection, and the American College of Surgeons National Trauma Data Standard, which addresses the standardization of hospital registry data collection. Strictly adhering to national standards markedly increases the value of state trauma MISs by providing national benchmarks and allowing for the use of software solutions that link data sets to enable a review of the entire injury and health care event for an injured patient.

To derive value from the tremendous amount of effort that goes into data collection, it is important that a similar focus address the process of data reporting. Dedicated staff and resources should be available to ensure rapid and consistent reporting of information to vested parties with the authority and vision to prevent injuries and improve the care of patients with injuries. An optimal information reporting process will include standardized reporting tools that allow for the assessment of temporal and/or system changes and a dynamic reporting tool, permitting anyone to tailor specific "views" of the information.

Optimal Elements

I.   There is an established trauma MIS for ongoing injury surveillance and system performance assessment. **(B-102)**

    a.   There is an established injury surveillance process that can, in part, be used as an MIS performance measure. **(I-102.1)**

    b.   Injury surveillance is coordinated with state-wide and local community health surveillance. **(I-102.2)**

    c.   There is a process to evaluate the quality, timeliness, completeness, and confidentiality of data. **(I-102.4)**

    d.   There is an established method of collecting trauma financial data from all health care facilities and trauma agencies, including patient charges and administrative and system costs. **(I-102.5)**

II. The trauma MIS is used to facilitate ongoing assessment and assurance of system performance and outcomes and provides a basis for continuously improving the trauma system, including a cost-benefit analysis. **(B-301)**

    a.   The lead trauma authority ensures that each member hospital of the trauma system collects and uses patient data, as well as provider data, to assess system performance and to improve quality of care. Assessment data are routinely submitted to the lead trauma authority. **(I-301.1)**

    b.   Prehospital care providers collect patient care and administrative data for each episode of care and not only provide these data to the hospital, but also have a mechanism to evaluate the data within their own agency, including monitoring trends and identifying outliers. **(I-301.2)**

    c.   Trauma registry, ED, prehospital, rehabilitation, and other databases are linked or combined to create a trauma system registry. **(I-301.3)**

    d.   The Lead Agency has available for use the latest in computer/technology advances and analytic tools for monitoring injury prevention and control components of the trauma system. There is reporting on the outcome of implemented strategies for injury prevention and control programs within the trauma system. **(I-301.4)**

Current Status

All twenty-four hospitals, including the two military facilities, submit data to the state trauma registry. The two military facilities do not submit to the NTDB or to TQIP. The State has a robust

and consistent approach to data validation, in which 10% of cases submitted per facility are reviewed and validated by the ATR Consultant each year. Hospitals are required to correct issues that are found through this process. In addition, the State holds registrar trainings on a quarterly basis to review items found in monthly validation checks and to discuss changes in the registry.

The State has recently accomplished linkage of trauma and EMS data that can be conducted at each hospital. The TSC Review Team noted this as commendable and recommended that it should be used to evaluate patient outcomes across the EMS/ trauma continuum.

The Lead Agency maintains a full-time trauma registrar, primarily supported through General Funds and federal grants. The State employs a part-time ATR consultant who conducts data validation and Registry training. In addition, the State has contracted with consultants for additional services, such as ICD-10 training.

The State of Alaska has a strong foundation for their registry and has put in place many important components and practices. However, there is now a crucial need to use data to advance trauma care through system development and performance improvement, and to ensure that consistent resources are in place to maintain and advance the registry, so it can be a resource for improving the care of injured patients.

Recommendations

- **Invest in cross-training and/or acquire additional staff to ensure ongoing functionality of the Registry during periods of absence of the primary Registrar**

- **Develop and implement a plan and processes to ensure that Trauma Registry data are used systematically for Trauma System development, evaluation, and performance improvement**

- Maintain a current, relevant, and accessible data dictionary for the State Trauma Registry, consistent with National Trauma Data Standard (NTDS), to ensure consistent data collection across facilities

- Conduct regular review of State Registry data elements to ensure that the dataset continues to meet the needs of the Trauma System and to minimize the data collection burden on trauma centers

- Establish a Trauma Registry sub-committee of the Trauma System Review Committee (TSRC) composed of trauma program managers, registry coordinators, registrars, and other stakeholders across the System to optimize Registry data quality and establish best practices for Registry management and usage

- Establish standard procedures and a quality Assurance (QA) process to guide the EMS/ trauma data linkage effort to ensure accurate and consistent linkage across facilities

Research

Purpose and Rationale

Overview of Research Activity

Trauma systems are remarkably diverse. This diversity is simply a reflection of authorities tailoring the system to meet the needs of the Region based on the unique combination of geographic, economic, and population characteristics within their jurisdiction. In addition, trauma systems are not fixed in their organization or operation. The system evolves over years in response to lessons learned, critical review, and changes in population demographics. Given the diversity of organization and the dynamic nature of any particular system, it is valuable when research can be conducted that evaluates the effectiveness of the Regional or state-wide system. Research drives the system and will provide the foundation for system development and performance improvement. Research findings provide value in defining best practices and might alter system development. Thus, the system should facilitate and encourage trauma-related research through processes designed to make data available to investigators. Competitive grants or contracts made available through lead authorities or constituencies should provide funds to support research activities. All system components should contribute to the research agenda. The extent to which research activities are required should be clearly outlined in the trauma system plan and/or the criteria for trauma center designation.

The sources of data used for research might be institutional and Regional trauma registries. As an alternative, population-based research might provide a broader view of trauma care within the Region. Primary data collection, although desirable, is expensive but might provide insights into system performance that might not be otherwise available.

Trauma Registry–based Research

Investigators examining trauma systems can use the information recorded in trauma registries to great advantage to determine the prevalence and annual incidence rate of injuries, patterns of care that occur to injured patients in the system's Region, and outcomes for the patients. These data can be compared with standards available from other trauma registries, such as the NTDB. Such comparisons can then enable investigators to determine if care within their Region is within standards and can allow for benchmarking. Initiating and sustaining injury prevention initiatives is a vital goal in mature trauma systems. Investigators can take a leadership role in performing research using trauma registry data that identify emerging threats and instituting public health measures to mitigate the threats. For example, a recent surge in death and disability related to off -road vehicles can be identified and the scope of the problem defined in terms of who, where, and how riders are injured, and then, through presentations and publications, the public can be informed of a new threat.

Trauma system administrators have a responsibility to control investigators' access to the registry. The integrity and reliability of data in a trauma systems registry are essential if accurate research and valid conclusions are to be reached using the data. Trauma system administrators should have a process that screens data entered into the system's composite registry from individual institutions. There should be a mechanism that ensures that the information is stored in a secure manner. Investigators who seek access to the trauma registry must follow a written

policy and procedure that includes approval by an authorized institutional review board. Trauma registry data may include unique identifiers, and system administrators must ensure that patient confidentiality is respected, consistent with state and federal regulations.

Population-based Trauma System Research

A major disadvantage of using only trauma registry data to conduct research that evaluates injured patients in a Region is the bias resulting from missing data on patients not treated at trauma centers. Specifically, most registry data are restricted to information from hospitals that participate in the trauma system. Although ideally all facilities participate in the form of an inclusive system, many systems do not attain this goal. Thus, a population-based data set provides investigators with the full spectrum of patients, irrespective of whether they have been treated in trauma centers or non-designated centers or were never admitted to the hospital owing to death at the scene of incident or because their injuries were insufficiently severe to require admission. The state and national hospital discharge databases are examples of population-based data. These discharge databases contain information that was abstracted from medical records for billing purposes by hospital employees who enter these data into an electronic database. For investigators seeking a wider perspective on the care of injured patients in their Region, these more inclusive data sets, compared with registries, are essential tools. Other population-based data that may be of help include mortality vital statistics data recorded in death certificates. Selected Regions might have outpatient data to capture patients who are assessed in the ED and then released.

Investigators can use these population-based data to study the influence of a Regional trauma system on the entire spectrum of patients within its catchment area.

Participation in Research Projects and Primary Data Collection

Multi-institutional research projects are important mechanisms for learning new knowledge that can guide the care of injured patients. Investigators within trauma systems can participate as coinvestigators in these projects. Investigators can participate by recruiting patients into prospective studies, being leaders in the design and administration of grants, and preparing manuscripts and reports. Evidence of this collaboration is that investigators within a trauma system are recognized in announcements of grants or awards. Lead Agency personnel should identify and reach out to resources within the system with research expertise. These include academic centers and public health agencies.

Measures of Research Activity

Research can be broadly defined as hypothesis-driven data analysis. This analysis leads the investigators to a conclusion, which might become a recommendation for system change. Full manuscripts published in peer reviewed research journals are an exemplary form of research activity. Research reported in annual reviews or in public information formats intended to inform the trauma system's constituency can also be considered legitimate research activity.

Optimal Elements

I. The trauma MIS is used to facilitate ongoing assessment and assurance of system performance and outcomes and provides a basis for continuously improving the trauma system, including a cost-benefit analysis. **(B-301)**

a. The Lead Agency has available for use the latest in computer/technology advances and analytic tools for monitoring injury prevention and control components of the trauma system. There is reporting on the outcome of implemented strategies for injury prevention and control programs within the trauma system. **(I-301.4)**

II. The Lead Agency ensures that the trauma system demonstrates prevention and medical outreach activities within its defined service area. **(B-306)**

a. The trauma system has developed mechanisms to engage the general medical community and other system participants in their research findings and performance improvement efforts. **(I-306.1)**

b. The effect or impact of outreach programs (medical community training/support and prevention activities) is evaluated as part of a system performance improvement process. **(I-306.3)**

III. To maintain its state, Regional, or local designation, each hospital will continually work to improve the trauma care as measured by patient outcomes. **(B-307)**

a. The trauma system implements and regularly reviews a standardized report on patient care outcomes as measured against national norms. **(I-307.2)**

Current Status

The TSC Review Team noted minimal attention towards conducting research within the State and the Trauma Program. Several unfunded, local research projects provided useful input to the Trauma System and trauma care. An example of such a project is the review of three years of burn patient data that showed minor burns were being transferred out-of-state that could have stayed in Alaska, at one of the Level II trauma centers. Another looked at delays in transfers from Level V trauma receiving facilities.

Appropriate funding and more dedicated effort towards conducting research using valuable data would help produce additional research projects to the benefit of the patients, as well as the Trauma System. Individuals interested in research could make significant novel advances in trauma care in Alaska with only a modicum of funding.

Recommendations

- Identify unique research questions that directly impact trauma care in Alaska

- Identify opportunities for collaboration and partnership with academic institutions already active within the Region, including University of Alaska and University of Washington

- Form a research sub-committee of the Trauma System Review Committee (TSRC) to lead research efforts

APPENDIX A: Additional Disaster Preparedness Recommendations

- Develop a training plan for the Alaska 1 Disaster Medical Team (AK1-DMAT) response team to optimize the set-up, organization, and utilization of all components of response equipment to increase efficiency
  - Consider the addition of a combined military-civilian forward surgical team

- Create a disaster reintegration model and repatriation plan
  - Consider collaboration with military behavioral health services to augment on-site services to improve post disaster recovery and resiliency

- Increase state-wide surgical disaster preparedness by incorporating surgical care into exercises. Ensure that these exercises incorporate the trauma center components

- Adopt, implement and train a state-wide disaster triage system to improve patient prioritization, flow and patient tracking

- Develop or adopt a web-based, secure, simple clinical documentation system that could be utilized by all Levels of care within a disaster as patients pass through the trauma system (i.e. the DoD Joint Patient Tracking Application)

- Continue to develop local disaster response due to the probability of a prolonged local-only care phase

APPENDIX B: Needs-Based Assessment of Trauma Systems (NBATS)

ACS COT NBATS Tool (v2015)

The ACS NBATS Tool was developed by the Needs Based Trauma Center Designation Consensus Conference, convened by the American College of Surgeons Committee on Trauma.
- Held in Chicago on August 24–25, 2015
- The participants in the conference are listed in Appendix 1

Introductory Notes

The Needs-Based Trauma Center Designation Consensus Conference was held in Chicago on August 24–25, 2015. The conference was convened by the American College of Surgeons Committee on Trauma, and was comprised of a broad group of people involved in the process of trauma center designation in the context of an inclusive Regional Trauma System. The conference participants are listed in Appendix 1. The group was unanimous in support of the principle that trauma center designation within a Regional Trauma System should be based upon the needs of the population served, as outlined in the recent position statement put forward by the American College of Surgeons Committee on Trauma. The group was also unanimous in its opinion that there is immediate need for a practical tool, based upon data that is currently available, that can be used to assist Regions currently struggling with this issue of new trauma center designation.

The group worked to develop such a model tool to assist Regions in the performance of an assessment and the determination of the number of trauma centers needed in a Region. The conference workgroup was fully cognizant of the challenges involved in this process, not the least of which is a lack of proven metrics of need. The goal was to produce a pragmatic and relatively simple tool that could be used based upon data currently available, while also starting the process that would lead to future improvements and refinements in the approach. This was constructed to aid in the performance of an assessment of the number of trauma centers needed in a specified geographical Region, which will be called a Trauma Service Areas (TSA). This tool presumes that the TSA to be evaluated has already been defined, and could range in size from a small county to a multi-state Region. The tool is designed to evaluate the number of centers needed within the TSA, starting from a clean slate and then making adjustments for existing trauma centers (Level I, II, and III) in the TSA. This tool does not attempt to specifically assess the impact of adding an additional center to a TSA, nor does it attempt to determine the relative merit of a particular facility becoming a trauma center within the TSA.

The tool assigns points based upon four elements: population, transport time, community support, and number of severely injured patients (ISS > 15) discharged from centers in the TSA that are not Level I, Level II, or Level III trauma centers. This raw score is then adjusted based upon the number of existing Level I, Level II, and Level III centers, and based upon the volume of severely injury patients seen at those existing centers. The final score provides a guideline for the number of trauma centers needed in the TSA.

The conference working group acknowledges that there is no clear evidence to support the use of any of the specific measures proposed, and as a result all recommendations reflect the expert opinion of the convened group, derived through a deliberative group process. The tool itself, along with point assignments for each element, and the point totals to determine trauma center need in this draft are for initial evaluation purposes only. It is anticipated that both the individual element scores as well as the final target ranges will vary depending upon the demographics of the particular TSA (e.g. population, population density, size, geography) and will also reflect the balance of priorities within the specific Trauma System. The tool is being circulated to a larger audience of people and groups involved in the trauma center designation process for comment and for initial testing in a range of existing systems; as proof of concept and to begin to collect data that can be used to improve and refine the tool.

Please review the tool and try it out in your particular circumstances. You may modify any of the parameters used if you feel this will improve the accuracy of the model in your Region. Please feel free to submit any comments, as well as any trial data generated, to the conference working group through the Feedback Form. Please also feel free to contact Maria Alvi, Manager, Trauma Systems and Quality Programs (malvi@facs.org) with any additional questions or concerns.

Thank you for your interest and your willingness to participate in this important project.

Robert J. Winchell, MD, FACS   Ronald M. Stewart, MD, FACS
Chairman   Chairman
Trauma Systems Evaluation and Planning Committee   Committee on Trauma

On behalf of the Needs-Based Trauma Center Designation Consensus Conference working group

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ACS COT NBATS Tool (v2015)

Preliminary Draft 1–September 4, 2015

1. Population
- Total TSA population of less than 600,000 received 2 points
- Total TSA population of 600,000–1,200,000 received 4 points
- Total TSA population of 1,200,000–1,800,000 received 6 points
- Total TSA population of 1,800,000–2,400,000 received 8 points
- Total TSA population of greater than 2,400,000 received 10 points

Points Assigned: _____

2. Median Transport Times (combined air and ground–scene only no transfer)
- Median transport time of less than 10 minutes received 0 points
- Median transport time of 10–20 minutes receives 1 point
- Median transport time of 21–30 minutes receives 2 points
- Median transport time of 31–40 minutes receives 3 points
- Median transport time of greater than 41 minutes receives 4 points

Points Assigned: _____

3. Lead Agency/System Stakeholder/Community Support
- Lead Agency support for a trauma center (if none exist) or an additional trauma center in the TSA – 5 points
- Trauma System Advisory Committee (or equivalent body) statement of support for a trauma center (if none exist) or an additional trauma center in the TSA – 5 points
- Community support demonstrated by letters of support from 25–50% of city and county governing bodies within the TSA – 1 point
- Community support demonstrated by letters of support from over 50% of city and county governing bodies within the TSA – 2 points

Points Assigned: _____

4. Severely injured patients (ISS > 15) discharged from acute care facilities not designated as Level I, II, or III trauma centers.
- Discharges of 0-200 severely injured patients receives 0 points
- Discharges of 201–400 severely injured patients receives 1 point
- Discharges of 401–600 severely injured patients receives 2 points
- Discharges of 601–800 severely injured patients receives 3 points

- Discharges of greater than 800 severely injured patients receives 4 points

Points Assigned: _____

5. Level I Trauma Centers
- For the existence of each verified Level I trauma center already in the TSA assign 1 negative point
- For the existence of each verified Level II trauma center already in the TSA assign 1 negative point
- For the existence of each verified Level III trauma center already in the TSA assign 0.5 negative points

Points Assigned: _____

6. Numbers of severely injured patients (ISS > 15) seen in trauma centers (Level I and II) already in the TSA

The expected number of high-ISS patients is calculated as:

500 x (# of Level I and Level II centers in the TSA) = _____
- If the TSA has more than 500 severely injured patients above the expected number assign 2 points
- If the TSA has 0-500 severely injured patients above the expected number assign 1 point
- If the TSA has 0-500 fewer severely injury patients than the expected number assign 1 negative point
- If the TSA has more than 500 fewer severely injured patients than the expected number assign 2 negative points

Points Assigned: _____

The following scoring system shall be used to allocate trauma centers within the TSAs:
- TSAs with scores of 5 points or less shall be allocated 1 trauma center
- TSAs with scores of 6-10 points shall be allocated 2 trauma centers
- TSAs with score of 11-15 points shall be allocated 3 trauma centers
- TSAs with scores of 16-20 points shall be allocated 4 trauma centers

If the number of trauma centers allocated by the model is greater than the existing number of trauma centers in the TSA, efforts should be undertaken to recruit and designate additional trauma centers.

If the number of trauma centers allocated by the model is greater than the number allocated by the model, the Lead Agency should not designate additional trauma centers in the TSA.

State of Alaska NBATS Submission

The Committee on Trauma

ACS NBATS Tool
Preliminary Draft 1 – September 4, 2015

1. Population

a. total TSA population of less than 600,000 received 2 point
b. total TSA population of 600,000 to 1,200,000 received 4 points
c. total TSA population of 1,200,000 to 1,800,000 received 6 points
d. total TSA population of 1,800,000 to 2,400,000 received 8 points
e. total TSA population of greater than 2,400,000 received 10 points

Points Assigned: 2____

2. Median Transport Times (combined air and ground – scene only no transfer)

a. Median transport time of less than 10 minutes received 0 points
b. Median transport time of 10 – 20 minutes receives 1 points
c. Median transport time of 21- 30 minutes receives 2 points
d. Median transport time of 31 – 40 minutes receives 3 points
e. Median transport time of greater than 41 minutes receives 4 points

Points Assigned: 1___

3. Lead Agency/System Stakeholder/Community Support

Lead agency support for a trauma center (if none exist) or an additional trauma center in the TSA – 5 points.

Trauma System Advisory Committee (or equivalent body) statement of support for a trauma center (if none exist) or an additional trauma center in the TSA – 5 points.

Community support demonstrated by letters of support from 25- 50% of city and county governing bodies within the TSA – 1 points

Community support demonstrated by letters of support from over 50% of city and county governing bodies within the TSA – 2points

Points Assigned: 5___

4. Severely injured patients (ISS > 15) discharged from acute care facilities not designated as Level I, II, or III trauma centers.

a. Discharges of 0-200 severely injured patients receives 0 points
b. Discharges of 201 – 400 severely injured patients receives 1 points
c. Discharges of 401 – 600 severely injured patients receives 2 points
d. Discharges of 601- 800 severely injured patients receives 3 points
e. Discharges of greater than 800 severely injured patients receives 4 points

Points Assigned: 0

5. Level I Trauma Centers

a.   For the existence of each verified Level I trauma center already in the TSA assign 1 negative point
b.   For the existence of each verified Level II trauma center already in the TSA assign 1 negative point
c.   For the existence of each verified Level III trauma center already in the TSA assign 0.5 negative points

Points Assigned: -2

6. Numbers of severely injured patients (ISS > 15) seen in trauma centers (Level I and II) already in the TSA

The expected number of high-ISS patients is calculated as:

500 x (# of Level I and Level II centers in the TSA) = 1,000

a.   If the TSA has more than 500 severely injured patients above the expected number assign 2 points
b.   If the TSA has 0-500 severely injured patients above the expected number assign 1 point
c.   If the TSA has 0-500 fewer severely injury patients than the expected number assign 1 negative point
d.   If the TSA has more than 500 fewer severely injured patients than the expected number assign 2 negative points

Points Assigned: -1

Total = 5

The following scoring system shall be used to allocate trauma centers within the TSAs:

1. TSAs with scores of 5 points or less shall be allocated 1 trauma center
2. TSAs with scores of 6-10 points shall be allocated 2 trauma centers
3. TSAs with score of 11-15 points shall be allocated 3 trauma centers
4. TSAs with scores of 16-20 points shall be allocated 4 trauma centers

If the number of trauma centers allocated by the model is greater than the existing number of trauma centers in the TSA, efforts should be undertaken to recruit and designate additional trauma centers.

If the number of trauma centers allocated by the model is greater than the number allocated by the model, the lead agency should not designate additional trauma centers in the TSA.

TSC Review Team NBATS Discussion

The State of Alaska has twenty-four acute care facilities, seventeen of which are trauma centers. Two of those centers, both in Anchorage, are ACS-verified Level II adult and pediatric centers. The remaining fifteen centers are state designated Level IV centers. All centers are designated by the State. Re-verification review occurs on a three year cycle. Unique to Alaska, is the highly integrated Alaskan Native Health Care System. Of the fifteen Level IV centers, six are remote Regional Hospitals within the Tribal System, and one of the Anchorage Level II centers, Alaskan Native Medical Center, is the tertiary care facility within the Native System. While their primary mission is the care of native populations, the system also cares for non-natives, particularly in remote areas, where it serves as the only medical facility available.

Trauma care in much of the State is challenged by geography, poorly developed transportation systems, and low population density.

The nature of decisions regarding number and location of trauma centers is different for higher level (Level I or Level II) trauma centers, and the lower level (Level III or Level IV) trauma centers. The higher level trauma centers are costly, resource-intensive facilities that provide definitive care for the most seriously injured patient populations; whereas, the lower level trauma centers primarily treat less severe injuries, and serve as entry points to the rest of the Trauma System. This difference is even more pronounced in the unique circumstances of the State of Alaska. Thus, the question regarding the optimum number and location of centers will be addressed in two separate sections, as presented below.

Higher Level Trauma Centers: Level Is and Level IIs

The Southwest Region is the only area in Alaska with sufficient population to support even a single higher level trauma center. Based on geography, the Fairbanks area should be looked at separately, leaving two potential service areas, Anchorage and Matanuska-Susitna Boroughs with a combined population of about 400,000, and Fairbanks, with a population of about 100,000. Looking across the spectrum, a higher level trauma center in the US typically serves a population of 1 million, though the population basis ranges from about 250,000 in some urban or suburban areas, to several million in others. Using this experience as a rough guide, provides an estimate of one or perhaps two higher level trauma centers in the Anchorage/Mat-Su area, and suggests that the Fairbanks area may have difficulty sustaining a single higher level center.

Prior to the 2018 ACS TSC visit, the State of Alaska used the 2015 draft Needs Based Assessment of Trauma Systems (NBATS) Tool to estimate the number of trauma centers needed in the Anchorage/Mat-Su boroughs. The Tool estimated that a single higher level trauma center was needed.

Application of the geospatial modeling approach adopted in the 2017 revision of the NBATS Tool reaches the same conclusion. Addition of a third level II center in the city of Anchorage does not improve population coverage within 60 minutes, nor does it meaningfully change estimated driving time to a facility. As outlined above, the existing volume is also insufficient to require a third higher level trauma center. The geospatial analysis indicates that *future* population growth would suggest the need for a third level II center, and that placement of this new trauma center in the Wasilla area would be the most effective way to improving access. The existing geospatial spread is presented in Figures 1 and 2, below, while the *potential* geospatial coverage is presented in Figure 3.
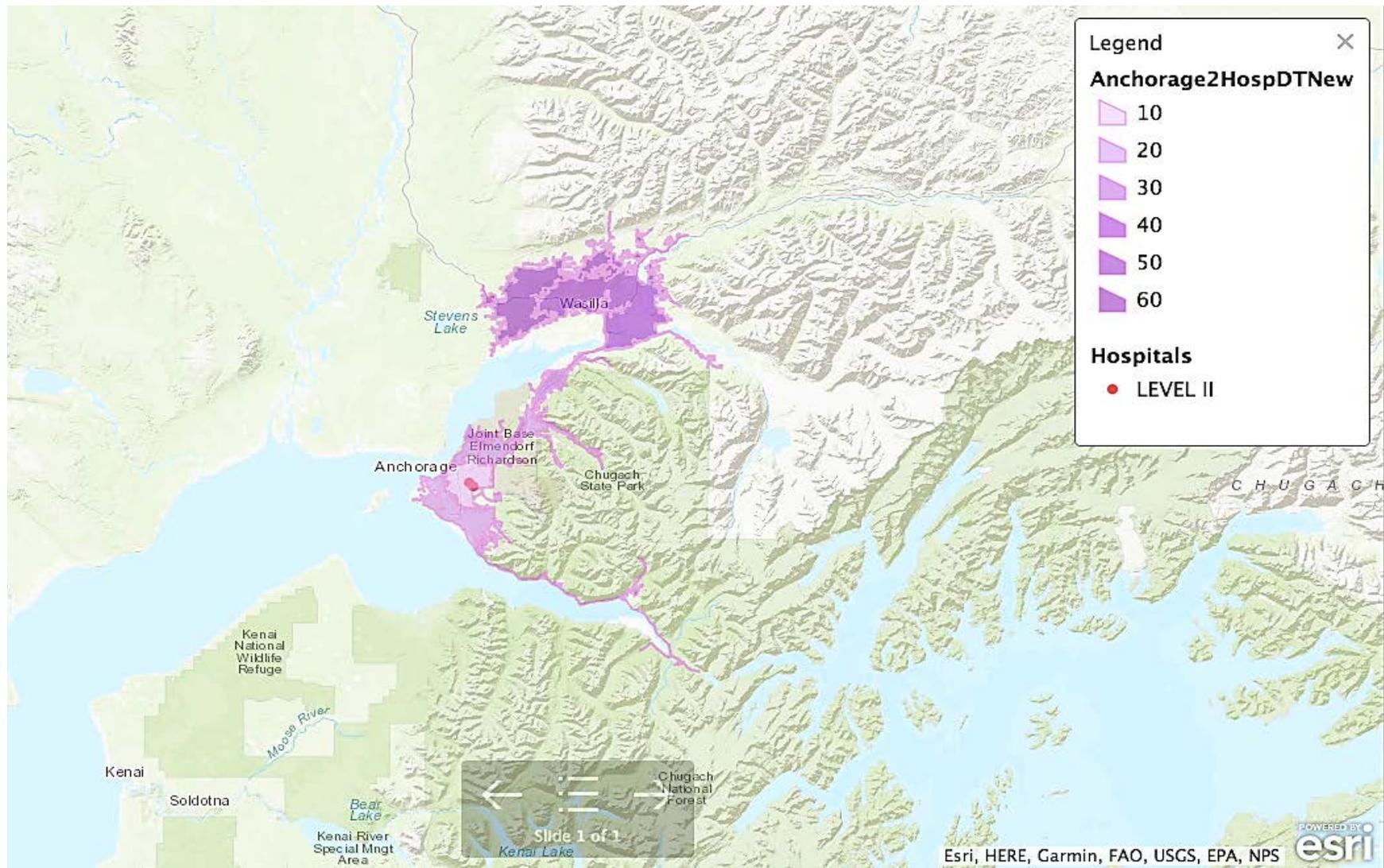
Geospatial Analysis

Figure 1. Existing model with 2 Level II trauma centers. Estimated ground transport time to nearest Level II center, in 10 minute increments.
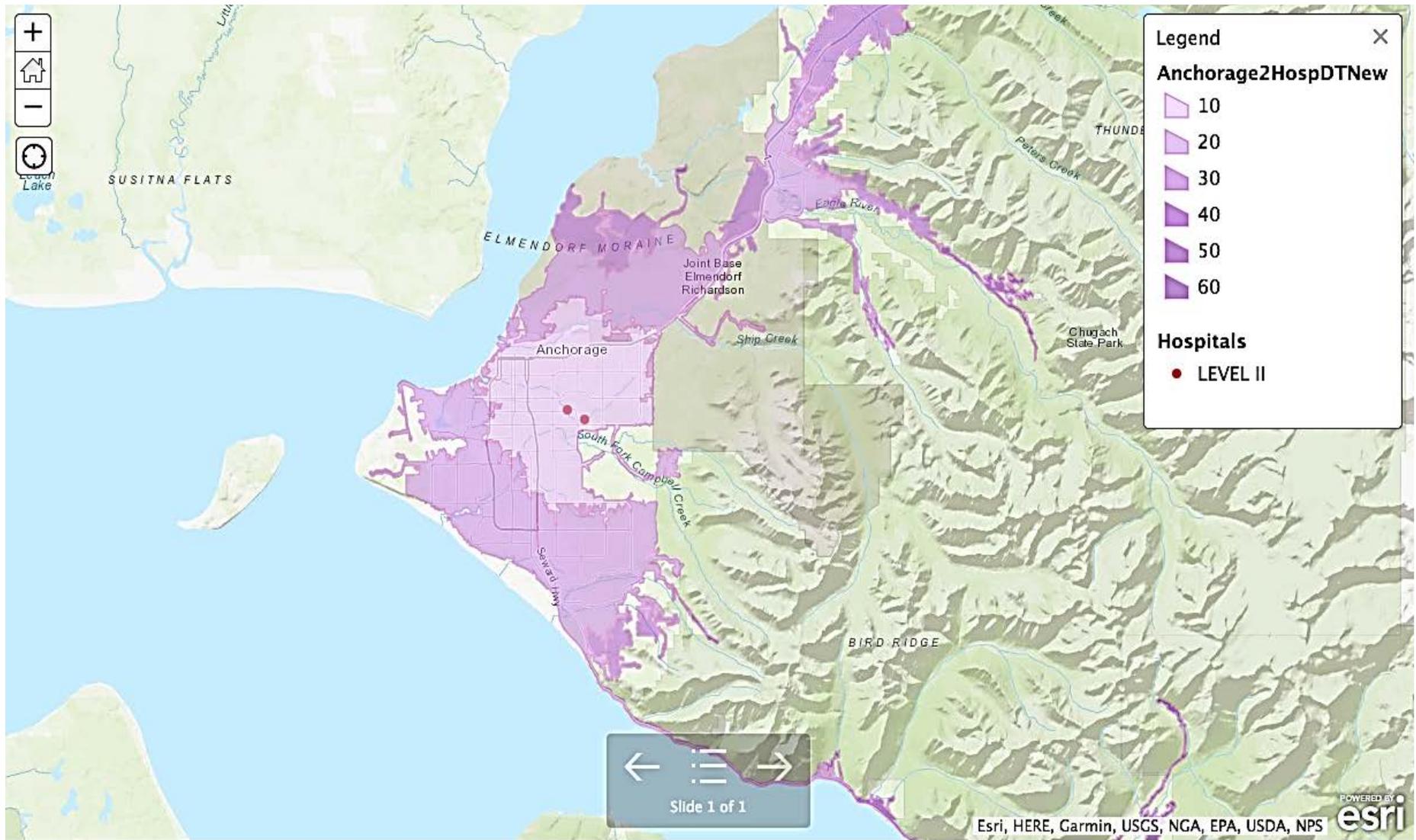
Figure 2. Map scale modified from Figure 1 to show detail in city of Anchorage. Estimated ground transport time to nearest level II center, in 10 minute increments.
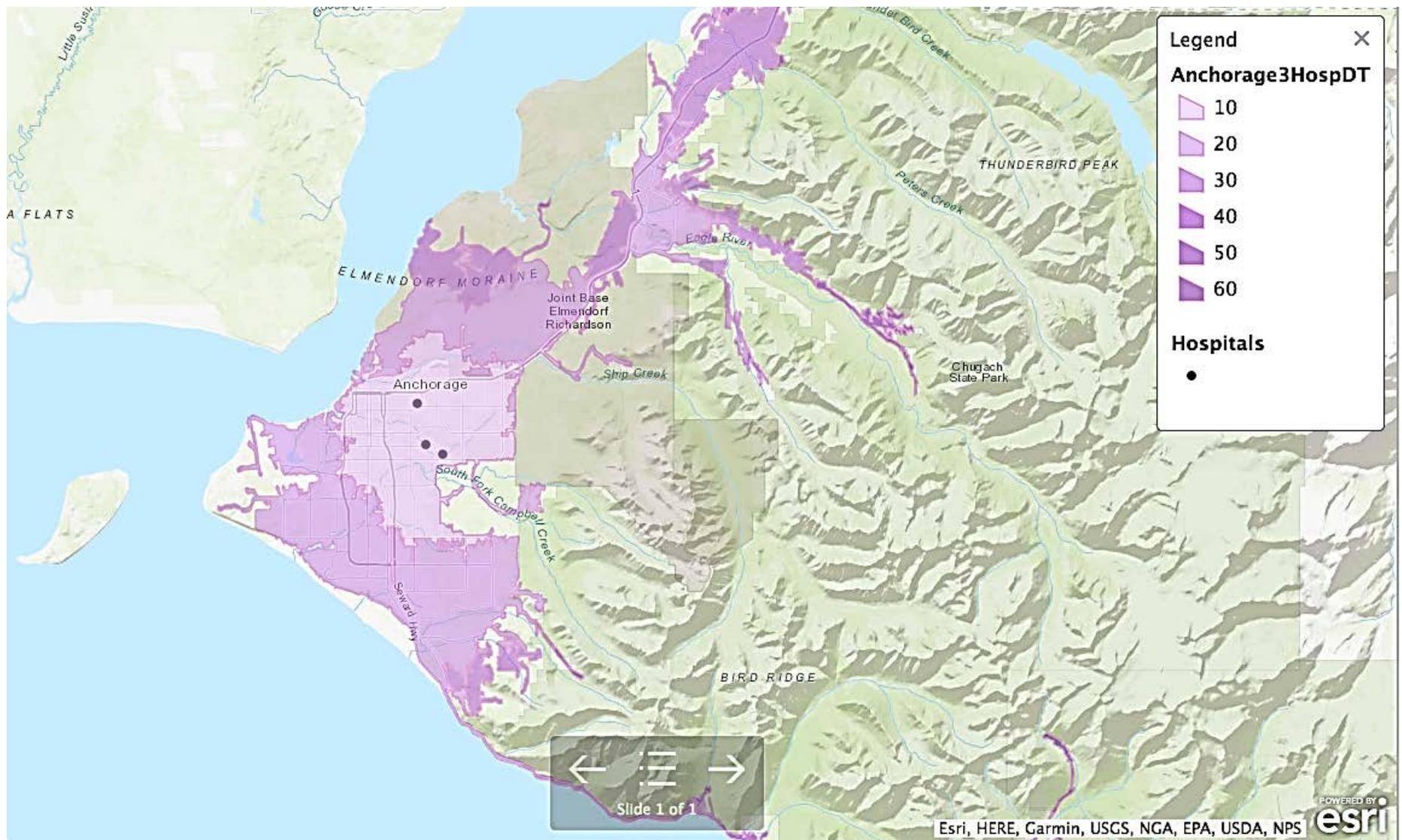
Figure 3. Potential model with 3 Level II trauma centers. Estimated ground transport time to nearest Level II center, in 10 minute increments.

Lower Level Trauma Centers: Level IIIs, Level IVs, or other similar designations

Trauma centers designated at Level III or lower are, by definition, not intended to provide comprehensive care across all specialties. Instead, such trauma centers serve the critical purpose of improving timely access to the Trauma System, and providing needed emergency care for control of immediate threats to life. Such trauma centers may also provide definitive care for patients with less severe injuries who do not require the resources available at a higher level (Level I or Level II) trauma center. Seen in this light, the process for selection and designation of lower level trauma centers should be focused primarily on building capacity to provide these crucial functions. This is in contrast to the process used for Level I and Level II trauma centers, which is focused on ensuring that specific standards are met and that each trauma center treats a sufficient volume of patients to maintain experience across the spectrum of injury. The commitment of a hospital to achieve and maintain Level III status, which is marked primarily by the availability of general surgical and orthopedic capabilities, has the potential to greatly improve care for the local population, even if the overall number of injured patients treated by the hospital is low. Given the challenges to patient transport across the State of Alaska, especially in the Bush Regions, these lower level trauma centers play a key role. Furthermore, with the exception of specific areas within the Southwest Region, lower level trauma centers in Alaska do not pose a financial or volume-based threat to higher level trauma centers.

It is probable that adding new Level III and Level IV trauma centers in more remote locations could further improve System access, and the Alaska System should continue to actively assist centers that desire to develop in this capacity. Given that Level III or Level IV designation, even for low volume centers, probably improves patient care, the Lead Agency should monitor all applications for new Level III and Level IV trauma centers, but having a strict needs-based process, or a limit on the absolute number of Level III and Level IV trauma centers is probably not necessary. The exception to this statement is in the immediate catchment area (defined by a reliable transport time likely in the range of 30-60 minutes) of higher level trauma centers. In such areas, the addition of Level III trauma centers is not likely to improve access and may threaten stability of the higher level trauma center, so a careful assessment of the System need should be undertaken before designating new lower level trauma centers. Currently, this situation is only applicable in and around the city of Anchorage.

Recommendations

- There does not appear to be sufficient need to establish a third Level II center in the city of Anchorage

- Encourage development of new Level III and Level IV trauma centers in underserved areas of the State in order to improve System access

- Encourage facilities to seek Level III designation as a means of building System capacity, except within the immediate catchment area of existing higher Level trauma centers. A careful assessment of Trauma System need should be completed prior to designating new Level III trauma centers within the immediate catchment area of existing higher Level trauma centers

APPENDIX C: Acronyms

ACS – American College of Surgeons
ACEMS – Alaska Council on Emergency Medical Services
AED – Automated External Defibrillator
AIPC – Alaska Injury Prevention Center
AK1-DMAT – Alaska 1 Disaster Medical Team
AKTRACS – Alaska Tracking Resources, Alerts and Communications System
ALS – Advanced Life Support
ASPR – Assistant Secretary for Preparedness and Response
ASHNA – Alaska State Hospital and Nursing Association

BIS – Benchmarks, Indicators and Scoring
BLS – Basic Life Support

CAAHEP – Commission on Accreditation of Allied Health Education Professions
CAAS – Commission on Accreditation of Ambulance Services
CAMTS – Commission on Accreditation of Medical Transport Services
CARF – Commission on Accreditation of Rehabilitation Facilities
CDC – Centers for Disease Control and Prevention
CDPHP – Chronic Disease Prevention and Health Promotion
CHA – Community Health Aides
CME – Continuing Medical Education
COT – Committee on Trauma
CPR – Cardiopulmonary Resuscitation

DHSS – Department of Health and Social Services
DOD – Department of Defense

EMD – Emergency Medical Dispatch
EMS – Emergency Medical Services
EMT – Emergency Medical Technician
EMT-1 – Emergency Medical Technician 1
EMT-2 – Emergency Medical Technician 2
EMT-3 – Emergency Medical Technician 3
EOC – Emergency Operations Center
ETT – Emergency Trauma Technician

FTE – Full-time Equivalent
FACE – Fatality Assessment and Control Evaluation

GIS – Geographical Information System

HERO – Health Emergency Response Operations
H&SC – Health and Safety Code
HICS – Hospital Incident Command System
HPP – Hospital Preparedness Program
HRSA – Health Resources and Services Administration
HVA – Hazard Vulnerability Assessment

ICD-9 – International Classification of Diseases, 9th edition
ICD-10 – International Classification of Diseases, 10th edition
ISS – Injury Severity Score

LTAC – Long Term Acute Care

MICP – Mobile Intensive Care Paramedic
MHOAC – Medical Health Operational Area Coordinators
MTSPE – Model Trauma System Planning and Evaluation

NBATS – Needs Based Assessment of Trauma Systems
NEMSIS – National Emergency Medical Services Information System
NHTSA – National Highway Traffic Safety Administration
NIMS – National Incident Management System
NREMT – National Registry for Emergency Medical Technicians
NTDB – National Trauma Data Bank
NTDS – National Trauma Data Standard

PECARN – Pediatric EMS Care Applied Research Network
PI – Performance Improvement
PIPS – Performance Improvement and Patient Safety
PRQ – Pre-Review Questionnaire
PSAP – Public Safety Answering Point

QA – Quality Assurance

RDMHC – Regional Disaster Medical Health Coordinator
RDMHS – Regional Disaster Medical Health Specialist
REBOA – Resuscitative Endovascular Balloon Occlusion of the Aorta
RTCC – Regional Trauma Coordinating Committee
RTTDC – Rural Trauma Team Development Course

SAC – Safe and Active Communities
SCI – Spinal Cord Injury
SEMS – Standardized Emergency Management System
SHSP – State Highway Safety Plan
STAC – State Trauma Advisory Committee
STB – Stop the Bleed®
STEMI – ST Elevation Myocardial Infarction

TBI – Traumatic Brain Injury
TMA – Trauma Managers Association
TPM – Trauma Program Manager
TQIP – Trauma Quality Improvement Program
TSA – Trauma Service Area
TSC – Trauma System Consultation
TSEPC – Trauma Systems Evaluation and Planning Committee
TSP – Trauma System Plan
TSRC – Trauma System Review Committee

USDOT – United States Department of Transportation

APPENDIX D: Methodology

The State of Alaska Department of Health and Social Services, Division of Public Health, requested this consultative review of the Alaska Trauma System, which was conducted under the auspices of the Trauma Systems Consultation (TSC) Program of the American College of Surgeons (ACS) Committee on Trauma (COT). The multidisciplinary TSC Review Team consisted of 9 nationally recognized industry experts and 3 ACS staff, including: four trauma surgeons, an emergency medicine physician, a state emergency medical services director, a trauma program manager, and two trauma systems specialty reviewers. Biographical information about the 12 TSC Review Team Members is provided in Appendix C.

The primary objective of the ACS Trauma System Consultation for the State of Alaska was to guide and promote a sustainable effort in the graduated development of an inclusive and integrated system of care within the State. The format of this TSC Report correlates with the public health framework of assessment, policy development, and assurance outlined in the ACS *Regional Trauma Systems Optimal Elements, Integration, and Assessment: System Consultation Guide*. Prior to the visit, the TSC Review Team studied the ACS Pre-Review Questionnaire (PRQ) and additional supporting documents, submitted by the State of Alaska DHSS. Other information publicly available on government and official websites was also assessed.

The TSC Review Team convened from April 23 to April 27, 2018 in Anchorage, AK. The five-day visit consisted of several plenary sessions during which the TSC Review Team engaged with a broad range of representatives from the State Trauma System, with the opportunity for more informal discussions to take place in between. The TSC Reviewers also sequestered to private Team meetings for more detailed reviews of the State of Alaska data, to establish consensus on essential elements regarding the Trauma System, to develop Recommendations for system improvement, and to prepare the TSC Report.

This TSC Report for the State of Alaska was developed independently of any other consultative review completed by the ACS COT Trauma Systems Consultation (TSC) Program.

APPENDIX E: Reviewer Biographies

<u>ROBERT J. WINCHELL, MD FACS</u>
Role: Trauma Surgeon, Team Lead

Dr. Winchell received his undergraduate degree from the California Institute of Technology, his M.D. from Yale University, and did his internship, General Surgery residency, and Trauma and Critical Care Fellowship at the University of California, San Diego, where he remained on the faculty as Associate Professor of Clinical Surgery in the Division of Trauma through 1999. After leaving the University of California, Dr. Winchell established and subsequently directed the Tacoma Trauma Center in Tacoma, Washington, which continues to operate successfully as a joint venture between two previously competing hospitals. In 2001, Dr. Winchell moved to the Maine Medical Center and assumed the role of Head of the Division of Trauma and Burn Surgery in 2004. He remained in that position for 10 years, also serving as an Associate Professor of Surgery at the Tufts University School of Medicine. Under his direction, Maine Medical Center became a verified Level I trauma center for the first time in 2007. After leaving Maine, Dr. Winchell served as Chief of Trauma and Visiting Professor of Surgery at the University of Texas Health Science Center at Houston and Chief of Trauma at Memorial Hermann -Texas Medical Center until assuming his current post. In July 2015, Dr. Winchell joined the faculty of Weill Cornell Medicine as Professor of Surgery, Chief of the Division of Trauma, Burns, Acute and Critical Care and Director of the Trauma Center at New York-Presbyterian Weill Cornell Medical Center.

Dr. Winchell has been deeply interested and involved in the development and evolution of trauma systems for his entire career. He has been involved in trauma center and trauma systems design and operation in a wide variety of settings covering the spectrum of system development. He was instrumentally involved in leadership roles with both the day-to-day operations and ongoing development of the San Diego County trauma system for over ten years and served as chair of the San Diego and Imperial County Committee on Trauma. He participated in the leadership, operation and ongoing development of the Washington state trauma system, serving on the state advisory board, and as chair of the Southwest EMS Region. During Dr. Winchell's tenure in Maine, he helped to develop the Maine state system, serving as a member of the state advisory board and as a chairman of the Maine State Committee on Trauma. In Texas, he served on the Trauma Systems subcommittee of the Governor's EMS and Trauma Advisory Council. Dr. Winchell is a leader in international trauma systems development, and the founding representative from the American College of Surgeons to the World Health Organization's Global Alliance for the Care of the Injured.

In parallel to his clinical and research work, Dr. Winchell has had the honor to serve the American College of Surgeons Committee on Trauma for almost 20 years, first as a State Chair for San Diego County and for Maine, and currently as a member and part of the Executive Committee. His leadership and forethought have been instrumental to the Trauma Systems Consultation Program of the COT since 2006, and he currently serves as Chair of the Trauma Systems Evaluation and Planning Committee. In that role, he has conducted expert consultation in 18 states and Regions, serving as team leader for 14 of these, and has also participated in trauma systems work internationally. Dr. Winchell is also a senior reviewer for the Trauma Center Verification Program of the College.

Dr. Winchell has dedicated almost two decades to the advancement care of the injured as a part of national public health policy, and the implementation of state and Regional trauma systems based upon and supported by that policy.

Dr. Winchell is Board certified in General Surgery, with added qualifications in Surgical Critical Care. He is a Fellow of the American College of Surgeons as well as a member of the American Association for the Surgery of Trauma, the Association for Academic Surgery, the Southwest Surgical Congress, the Society of Critical Care Medicine and the New England Surgical Society. Dr. Winchell is author of more than 50 scientific papers and book chapters, and has given over 100 Regional, national and international

presentations. He is an ad hoc reviewer for the Journal of Trauma and Acute Care Surgery, the Archives of Surgery and the World Journal of Surgery.

COL. BRIAN J. EASTRIDGE, MD FACS
Role: Trauma Surgeon

Dr. Eastridge received his BS in biochemistry from Virginia Tech in 1985 and his MD from the University of Maryland School of Medicine in 1989. He entered the US Army Reserve as a second lieutenant Medical Service Corps officer in 1988. Dr. Eastridge did his residency in general surgery at the University of Maryland Medical System and then pursued fellowship training in surgical critical care at the University of Texas Southwestern Medical Center in Dallas, TX. During his tenure on the academic faculty at UTSW, Dr. Eastridge was deployed three times in support of combat operations Operation Enduring Freedom and Operation Iraqi Freedom as a U.S Army Reserve surgeon in 2002, 2003, and 2004. During his deployment in 2004, he was appointed as the first Joint Theater Trauma System Director.

Dr. Eastridge matriculated to active duty U.S Army in 2005 and served as Trauma Medical Director for the Brooke Army Medical Center, Surgical Critical Care Program Director for SAUSHEC, Director of the Joint Trauma System (U.S. Army Institute of Surgical Research of the U.S. Army's Medical Research and Material Command (MRMC), and Trauma Consultant to the US Army Surgeon General. During his active duty service, he was deployed two more times to combat in Southwest Asia during which time he lead the development and implementation of the military trauma system.

During his career, Dr. Eastridge has published extensively in the peer reviewed literature and edited three books focused upon improving the military trauma system and improving combat casualty care outcomes for our Wounded Warriors. Dr. Eastridge left active service and returned to the active US Army Reserves in late 2012 and is currently the DCCS of the 228th Combat Support Hospital. His military awards and decorations include the Combat Medical Badge, Combat Action Badge, Legion of Merit, Bronze Star Medal, Defense Meritorious Service Medal, and the Joint Service Commendation Medal. He is a member of Order of Military Medical Merit. For his military service, he has been awarded the American Association for the Surgery of Trauma Honorary Medal for Combat Surgical Care in 2004 and the US Army Medical Research and Materiel Command Combat Casualty Care Program Award for Excellence in 2011.

Currently, he is Professor of Surgery at the University of Texas Health Science Center and was appointed as the Trauma Medical Director of the University Health System in San Antonio, TX. He holds the Jocelyn and Joe Straus Endowed Chair in Trauma Research. His current research interests are focused on trauma system development, including development of the Regional trauma system performance improvement initiatives, predictive modeling of injury outcomes, and improved pre-hospital resuscitation strategies for casualties. Dr. Eastridge also serves as an active member on the American College of Surgeons Committee on Trauma, and was recently appointed Chair-Elect of the Trauma Systems Evaluation and Planning Committee, with his leadership tenure due to begin in March 2018.

BARBARA A. GAINES, MD FACS
Role: Trauma Surgeon

Dr. Gaines is a Professor of Surgery at the University of Pittsburgh School of Medicine and an attending surgeon at the Children's Hospital of Pittsburgh of UPMC, a Level I pediatric trauma center. She serves as the Director of the Benedum Pediatric Trauma and Injury Prevention Programs, Clinical Director of Pediatric General and Thoracic Surgery, and the Program Director of the Pediatric Surgery Training Program. She is triple board certified in pediatric surgery, general surgery and surgical critical care.
Dr. Gaines is currently serving as the Chair of the American Association for the Surgery of Trauma (AAST) Pediatric Committee, a member of the American College of Surgeons Committee on Trauma (ACS-COT), and the Secretary/Treasurer of the Association of Pediatric Surgery Training Directors (APSTD). She is a past president and founding member of the Pediatric Trauma Society (PTS) and a past board president of the Injury Free Coalition for Kids. Her current research interests include the role of

post-traumatic coagulopathy in pediatric trauma, as well as outcomes and quality of life after pediatric injury and the prevention of childhood injury.

COL. (Ret.) WARREN C. DORLAC, MD FACS
Role: Trauma Surgeon (Observer)

Dr. Dorlac is a trauma and acute care surgeon and Medical Director of the Trauma/Acute Care Surgery Service at Medical Center of the Rockies in Loveland, part of the University of Colorado Health. He is a member of the American College of Surgeons Committee on Trauma and serves on the EMS committee and the Trauma Systems committee. He has worked with the Tactical Combat Casualty Care Committee on military prehospital care since 2008. He has also recently assumed the position as Tactical Medical Director for the NAEMT Prehospital Trauma Committee.

He has an interest in prehospital care, aeromedical transport and trauma care research. Dr. Dorlac served on active duty with the USAF for 26 years, retiring in Oct 2011. Military assignments and duties included: Trauma Medical Director at Landstuhl Regional Medical Center in Germany 2004-2007, Director of the advanced Critical Care Air Transport Team program, 2007-2011, Trauma Consultant to the USAF Surgeon General 2008-2011, Central Command (CENTCOM) Joint Theater Trauma System Director in Iraq and Afghanistan in 2009.

JAMES D. UPCHURCH, MD MA FAAFP FACEP
Role: ED Physician

Dr. Upchurch began his medical career in 1971 as a Special Forces Medic courtesy of the US Army. He graduated from the University of Texas Medical Branch at Galveston in 1982 and completed a Family Practice residency from the University of Oklahoma in 1985. From 1985 until 2015, he has served as an Indian Health Service (IHS) Physician on the Crow Indian Reservation in Montana. During that time the majority of his clinical practice involved emergency medicine (EM), Emergency Medical Services (EMS), surgery and obstetrics. In 2003, he completed a Master's Degree in educational technology from George Washington University. His current practice includes emergency services for a local rural hospital.

Dr. Upchurch is a long-standing member of the National Association of EMS Physicians, and the American College of Emergency Physicians. Since 1986, he has functioned as EMS medical director for Big Horn County in Montana and guided their basic care program to the advanced life support Level, including critical care inter-facility transport. He also provides EMS medical direction for the Incident Medical Specialist Program and Missoula Smoke Jumpers, US Forest Service, Region I.

Dr. Upchurch is director of a small non-profit organization, EMS Education & Training. They offer distance and face-to-face educational opportunities to rural and frontier EMS personnel in Montana who desire to advance their Level of care. He is an active ACLS, ACLS EP, ATLS, PALS, PHTLS and CALS instructor.

Dr. Upchurch served many years as the volunteer state EMS medical director for Montana and represented Montana on the National Council of State EMS Medical Directors of the National Association of State EMS Officials. Until recently he functioned at the IHS national Level as a consultant on EM and EMS issues. He is a member of the Montana Board of Medical Examiners who license physicians and EMTs.

FERGUS LAUGHRIDGE, Captain, ASM CPM CACO
Role: State EMS Director

Mr. Laughridge is currently employed by Humboldt General Hospital EMS Rescue in Winnemucca, Nevada. Mr. Laughridge has the responsibility of assuring regulatory compliance for a high performance

and dynamic emergency medical system. Mr. Laughridge is also responsible for coordination of public health preparedness for Humboldt General Hospital and surrounding county.

Mr. Laughridge has a diverse professional background as a police officer, firefighter, paramedic, disaster response coordinator, and manager of EMS systems and operations. Mr. Laughridge has served as the Director of Nevada State Health Division, Emergency Medical Systems and Trauma program where he was responsible for assuring the quality of out of hospital emergency medical and trauma services throughout Nevada. As State Director, he was involved with numerous federal, state, and community activities relating to emergency preparedness and response.

Mr. Laughridge is continually engaged on various committees and workgroups centered on quality patient care, trauma systems, public health preparedness, and credentialing of EMS systems.

JORIE KLEIN, BSN RN
Role: Observer - Trauma Program Manager/Technical Advisor

Ms. Klein is the current director of nursing for the trauma program at the Rees-Jones Trauma Center at Parkland. In this role she is responsible for the oversight and authority for the trauma nurse clinician program, trauma registry, trauma performance improvement process, injury prevention and outreach education in conjunction with the trauma medical director.

She is the past director of disaster management at Parkland. Ms. Klein is the current chair of the Governor's EMS, Trauma Advisory Council's Trauma System Committee. In addition, Ms. Klein is the vice-chair of the North Central Texas Trauma Advisory Council. Ms. Klein is a past president of the Society of Trauma Nurses and is a current member of the STN TOPIC committee and ATCN committee. Ms. Klein is also an instructor for the TOPIC Course and the ATCN course and Regional VI chair for STN. In addition, she is an instructor for the Disaster Management Emergency Preparedness Course sponsored by the American College of Surgeons. Additionally, Ms. Klein is the course director for the Trauma Center Leadership Course and the Trauma System Leadership Course, which she developed. She is the founding member of the Texas Trauma Coordinators Forum.

Ms. Klein was recently appointed to the ACS Committee on Trauma's Performance Improvement Patient Safety Committee as a STN Nurse Liaison. In this capacity she is working in collaboration with the Best Practice Workgroup.

MELANIE NEAL, MS
Role: ACS Staff – Specialty Reviewer

Ms. Neal has been with the American College of Surgeons for fourteen years, and is the Senior Manager of Trauma Quality Programs, as well as the Manager of the National Trauma Data Bank (NTDB) and the Trauma Quality Improvement Program (TQIP). In this position, she provides strategic direction and high Level management for scientific, business, and product operations areas.

In addition, Ms. Neal works with a variety of data and quality initiatives of the Committee on Trauma, that support the mission of the COT to improve care for the injured patient. She represents the COT programs of the ACS on this consultation.

Ms. Neal has a Master's degree in Social Science Research Methods.

JIMM DODD, MS MA
Role: ACS Staff – Specialty Reviewer

Mr. Dodd joined the American College of Surgeons (ACS) Trauma Department as the Trauma Quality Improvement Programs Manager in July 2015. In this role he was responsible for Performance Improvement and Patient Safety for TQIP facilities. He currently serves as the Manager of the Trauma Systems Programs, and is a key leader within the ACS Stop the Bleed initiative.

Prior to joining the ACS, Mr. Dodd served in the US Army and US Army Reserves as a medical officer commanding hospitals in support of Operation Iraqi Freedom and Operation Enduring Freedom. He was selected to work on a special task force developing procedures and policies for the integration of Army medicine into State and Local disaster planning and response. He also served on various committees developing initiatives for returning Veterans who were transitioning into civilian careers, creating programming to facilitate their transition. During his time in the military Jimm served as a flight paramedic and an independent duty medic. Mr. Dodd still serves in the Army Reserves as a staff officer with CEMARS-G at Fort Sheridan, Illinois.

Mr. Dodd graduated from Western Carolina University, in Cullowhee North Carolina, with a Bachelor's degree in Emergency Medical Care. He has completed his Masters in Organizational Leadership with a concentration in Servant Leadership from Gonzaga University, in Spokane Washington. Mr. Dodd served as a NREMT- P within the EMS community at various systems during his time in the Army. With his education, Mr. Dodd has had the opportunity to teach future leaders in Army medicine and apply combat experience to help shape the Army healthcare system.

Mr. Dodd was recognized for his combat duty while serving by being awarded the Bronze Star Medal, Meritorious Service Medal and Army Commendation Medals.

HOLLY MICHAELS, MPH
Role: ACS Staff – Team Discussion Facilitator

Ms. Michaels joined the American College of Surgeons (ACS) in January 2007, and has served in several key areas of the Trauma Quality Programs during her tenure at the ACS. As the Program Administrator for the Trauma Systems Consultation Program, Ms. Michaels managed over 30 state and Regional system reviews, bringing together multidisciplinary teams of industry experts to assess, evaluate, and recommend strategic improvements for state and Regional trauma systems. Following several years facilitating the growth and development of this program, she transitioned into a Program Manager role, leading the development of new programs including piloting the Level III Trauma Quality Improvement Program (TQIP) and expanding the TQIP Collaborative Program. In her role as Program Manager, her responsibilities continue to evolve to match the growth of programs and needs of stakeholders.

Having received her Bachelor of Arts in English from the University of South Florida in 2001, Ms. Michaels began her career in public health at the non-profit organization, 2-1-1 Tampa Bay Cares, providing the Clearwater, FL community with access to critical resources, such as health and social services. In August 2014, Ms. Michaels earned a Master of Public Health from the University of Illinois at Chicago.

MARIA ALVI, MHA
Role: ACS Staff – Logistics Manager & Report Editor

Ms. Alvi joined the American College of Surgeons (ACS) Trauma Department as the Trauma Systems and Quality Programs Manager in May 2015. In this role, Ms. Alvi provides administrative support to the COT subcommittees of Trauma Systems Evaluation and Planning, Advocacy and Injury Prevention and Control. She also serves as the program manager for the Trauma Systems Consultation Program, the BIS Facilitation Program, and other Trauma Systems and Quality initiatives.

Prior to joining the ACS, Ms. Alvi worked as a healthcare consultant at Truven Health Analytics for 2 years, providing data reporting support to US clients, through the company's trademarked financial, marketing and clinical programs. Her focus at Truven also allowed her to assist with critical analysis and

assessment of client data towards improving health outcomes in their patients, and better management of their healthcare programs.

In December 2013, Ms. Alvi earned her Masters of Healthcare Administration (MHA) from UIC School of Public Health in Chicago. As part of her curriculum, she also completed a Preceptorship at Cook County Health and Hospitals System (CCHHS). Through this opportunity, Ms. Alvi employed her strategic planning and program management skills to clinical programs and non-clinical initiatives at John H Stroger Hospital of Cook County and CCHHS.

Although interested in clinical sciences (pre-med curriculum), and licensed as an EMT-B for the State of Illinois until June 2012, Ms. Alvi found her passions truly lay within healthcare management. Ms. Alvi serves as a volunteer member on the ACHE CHEF Communications Committee, is a Young Professional member for the Chicago Council on Global Affairs, and partakes in various early careerist, networking and charitable events throughout the greater Chicago area.

TAMARA KOZYCKYJ, MPH
Role: ACS Staff – Logistics Manager (Observer)

Ms. Kozyckyj joined the American College of Surgeons (ACS) in October 2015, as the Program Coordinator for Trauma Quality Programs. In this role, Ms. Kozyckyj supported the launch of the Level III Trauma Quality Improvement Program (TQIP) and helps manage the TQIP Collaboratives Program and the Committee on Trauma Injury Prevention and Control Committee initiatives. She also provides logistical support on Trauma System Consultations.

Ms. Kozyckyj earned a Masters of Public Health in Community Health Sciences with dual concentrations in Maternal and Child Health and Global Health at the University of Illinois at Chicago (UIC). She graduated with a B.S. in Gender and Women's Studies and Global Health at the University of Wisconsin-Madison.

Ms. Kozyckyj has worked in a variety of public health settings both domestically and internationally on issues including environmental and occupational health, maternal health, and disability. She spent time in Kyiv, Ukraine strengthening stakeholder partnerships to establish a grant-funded global health international research consortium and analyzing the impact of environmental hazards on pregnancy outcomes. Before coming to the College, Ms. Kozyckyj worked as a qualitative research associate at the Asians with Disabilities Outreach Project Think-Tank at UIC, a community-based initiative focused on building the capacity of state vocational rehabilitation services for multicultural customers.

APPENDIX F: State Participants List

Name	Organization
Dr. Alan McPhersan	Capital City Fire and Rescue
Allison Natcher	DHSS
Angeline Washington, RN	ANMC Trauma Program
Dr. Ann Nora Ehret	Iliuliuk Family Health Services
Dr. Anne Zenk	MSRMC
Bobbi Leichty	SEREMS
Dale Rambo, RN	St. Elias Hospital
Bonita Rambo, RN	Alaska Regional Hospital
Cary Van Dyke, RN	PAMC
Catherine Miller, RN	Fairbanks Memorial Hospital
Chailly Clayton, RN	Bartlett Regional Hospital
Chaundell Pilburn	Prince of Wales Island, Craig
Christina Miller	Alaska Regional Hospital
Dr. Danita Koehler	Eastern Aleutian Tribes
David Rockney	Interior Region EMS, IREMS
Deanna Jackson, RN	Bering Strait Region, Norton Sound Health Corporation
Doug Dipple	Providence Alaska Medical Center
Dr. Roger	Sitka Community Hospital
Dr. Elisha Brownson	ANMC
Erich Scheunemann	Anchorage Fire Department EMS
Dr. Frank Sacco	TSRC/ ANMC
Heidi Hedberg	DHSS
Jamie Fischer, RN	Providence Seward Medical Center
Dr. Jay Butler	DHSS
Dr. Jennifer Dow	Alaska Regional Hospital
Jessica Gould	DHSS
John Hall	Beacon Occupational Health and Safety Services

Joseph Simpson	St. Elias Hospital
Julie Rabeau, RN	State Trauma Program Manager
Kat Richards, RN	Sitka Community Hospital
Kerrie Bossard	Alaska Regional Hospital
Lynn Prysunka	Wrangell Volunteer EMS/Fire Department
Mark Johnson	AK Trauma System Review Committee
Mary Stayley	St. Elias Hospital
Dr. Michael Levy	State EMS Director
Michael Moore	Ambulance, EMS Services, Seward
Dr. Nobel Anderson	Haines Volunteer FD and Hoonah EMS
Renee Escamilla	EMSC Manager
Richard Hennessy, RN	Samuel Simmonds Memorial Hospital
Dr. Rick Utarnachitt	Based in Southeast AK, Airlift Northwest
Rob Janik	Sitka Fire Department
Rose Lawthorne, RN	Bartlett Regional Hospital
Sharon Hunt, RN	Samuel Simmonds Memorial Hospital
Shelly Quateman	Capital City Fire and Rescue
Sondra LeClair	SOA-DHSS
Thomas Check	Mat-Su Regional Medical Center
Dr. Thomas Knolmayer	State COT Chair
Thomas Price	Alaska Regional Hospital
Todd McDowell	EMS Unit Manager
Wendy Allen, RN	PAMC
Wilma Bennett	Interior EMS Manager