

**American College of Surgeons
Committee on Trauma
Trauma System Consultation**

**State of Wisconsin
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AMERICAN COLLEGE OF SURGEONS

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Executive Summary

Overview

Wisconsin is the 23rd most populous state in the country with a population of approximately 5.69 million spread over a total area of 65,503 square miles. Wisconsin has a population density of 104.7 people per square mile and ranks 18th in population density in the United States. Wide variability in population density is found among Wisconsin's 72 counties.

Wisconsin, known as the Badger State, has the following state motto -- "Forward." This motto reflects Wisconsin's continuous drive to be a national leader.

Wisconsin has 127 acute care hospitals, 58 of which are critical access hospitals. These hospitals appear to be well dispersed across the state. A total of 122 hospitals are classified as a trauma care facility, either Level I, II, III, or IV. Level I and II classified trauma facilities are verified by the American College of Surgeons (ACS). Level III and IV classified trauma facilities are verified by the state.

The emergency medical services (EMS) system has 18,158 licensed providers (3718 first responders, 8253 emergency medical technician (EMT) basics, 2633 intravenous technicians, 225 intermediate EMTs, and 3329 paramedics). The state has 785 licensed ambulance services, 486 are basic life support and 290 are advanced life support. These services and providers respond to 523,909 calls per year.

Unintentional injury is the leading cause of death for Wisconsin residents between 1 and 44 years of age and the 4th leading cause of injury for all age groups. Injury was responsible for 45,000 hospitalizations among Wisconsin residents in 2009, with hospital charges exceeding \$1.379 billion, a significant public health problem for the state.

Trauma System Development

Trauma system development in Wisconsin began in 1990 with a National Highway Traffic Safety Administration (NHTSA) assessment. Based on this report's recommendations, a special legislative study committee on emergency medical services (EMS) was established. The committee recommended that legislation be drafted to address many of the issues identified in the NHTSA review. Completion of the committee work involved passing legislation which assigned several new responsibilities to the lead agency, which at that time was the Department of Health and Family Services, and to the newly appointed EMS

Advisory Board. Among these responsibilities was the preparation of a legislative report entitled *Recommendations for a Trauma System*. This report sets forth recommendations, including any necessary proposed legislation, for development of a statewide trauma system. The trauma report was delivered to the state legislature in December, 1996.

The trauma report was the impetus for passage of Act 154 in 1997 which created the State Trauma Advisory Council (STAC). The STAC was appointed in 1999 and began meeting in 2000 with support from the Wisconsin Hospital Association. The charge to the STAC was to develop and implement a statewide trauma care system, including rules for the system, classification of all hospitals, and a written report for the legislature. This report was approved in 2001 and to this day serves as the primary trauma system plan. Over the course of 2000 and 2001, the Regional Trauma Advisory Council (RTAC) structure was developed and nine RTACs were formed. Administrative rules were written and promulgated in 2005. In 2006, the hospital classification and site review process began.

The trauma system development process has continued, but with variable progress. Many aspects of the trauma system's structure developed appropriately, but other aspects have stagnated. Over time, the title and organizational structure of the lead agency has changed with staffing and funding becoming unstable. An increasing physical, philosophical, organizational, and operational separation has occurred between the EMS and trauma system programs. The 1997 legislation remains unchanged since its passage, which potentially hinders progress towards full trauma system development.

A strategic operational plan was produced by STAC in 2009 which could be considered an update of the 2001 plan. This plan was developed during a period when the State Trauma Coordinator position was vacant to provide guidance for system development. The strategic plan includes goals and time lines, but once again, progress has been hampered in several areas. Those goals beyond the control of the STAC have largely not been met. The American College of Surgeons trauma system consultation is intended to help the state trauma stakeholders to refocus and obtain direction for future trauma system development efforts.

Advantages and Assets of the Wisconsin Trauma System

- The state has existing trauma and EMS legislation.
- The Department of Health Services is the designated lead agency.
- The State Trauma Coordinator is experienced, energetic, and enthusiastic.
- Patient confidentiality and peer review is protected by statute.
- The state has dedicated volunteer EMS providers and ambulance services.

- The Executive Assistant to the Secretary of the Department of Health Services is engaged in the trauma system review.
- The Regional Trauma Advisory Council structure and operational function is effective.
- The American College of Surgeons Verification Review process is used for the classification of Level I and Level II trauma centers.
- The Medical College of Wisconsin's Injury Research Center is a valuable asset and is contracted to perform analysis of the current trauma registry.
- The University of Wisconsin, Madison Crash Outcomes Data Evaluation System provides valuable injury data.
- The state has consistently planned for an inclusive trauma system.
- An established facility classification scheme and site review process exists.
- The trauma registry is National Trauma Data Standard compliant and has contributions from 122 hospitals.
- The EMS system has the Wisconsin Ambulance Reporting Data System that is National EMS Information System compliant.
- Many useful databases exist and are available for analysis and performance improvement activities.
- The state has an established Injury and Violence Prevention Program.
- Wisconsin's Emergency Medical Services for Children program is based in the Hospital Preparedness Section.
- A statewide trauma triage protocol has been developed.
- The disaster preparedness program is well funded and organized.

Challenges and Vulnerabilities of the Wisconsin Trauma System

- The trauma rules are outdated, with restrictions to the use of an earlier version of standards and guidance provided by the American College of Surgeons for hospital classification.
- Little political will exists to open rules for revision and improvement of the trauma system.
- The lead agency is not functioning as an effective agent for change. It fails to formally respond to recommendations of the State Trauma Advisory Council.
- The trauma system program has one dedicated staff member at the state level, the State Trauma Coordinator, which is inadequate for development and implementation of the trauma system.
- The state's trauma system plan is outdated.
- A lack of dedicated trauma system funding is impairing the state's ability to fully develop the trauma system.
- The current state budgetary crisis will likely have an impact on state funds provided to the trauma system.
- The trauma system lacks a legislative champion or advocate.
- The trauma stakeholders have not developed public information and education resources to garner public support for the trauma system.

- An effective communication mechanism does not exist for the trauma stakeholders.
- The “Home rule” culture leads to variability in care and compliance with administrative and clinical policies and practices.
- Facility classification criteria are based on structure and process rather than outcome.
- Organizational and operational separation exists between the EMS and trauma programs.
- The State EMS/Trauma Medical Director’s contracted time is inadequate for important responsibilities, and a disproportionate allocation of this individual’s time and attention is spent with the EMS system compared to the trauma program.
- The composition of the State Trauma Advisory Council as described in statute is limited and does not include key representatives of injury prevention, rehabilitation, and professional organizations.
- The State Trauma Advisory Council and EMS Advisory Board meeting schedules and logistics prevent effective collaboration.
- The state does not have a statewide trauma system performance improvement plan.

Priority Recommendations

- Revise the current trauma system rules.
 - Use this as an opportunity to eliminate language that will become outdated in the foreseeable future and correct problems that have been identified over time.
- Strengthen the Department of Health Service’s enforcement of existing and future statutes and rules.
- Realign the Department of Health Services (DHS) organizational structure to create a new Bureau of Emergency Health Care and Preparedness, which encompasses and administers, under one umbrella, the trauma and Emergency Medical Services (EMS) systems, the developing stroke and ST Elevation Myocardial Infarction (STEM I) systems, and disaster preparedness.
- Create an executive board with representation from the State Trauma Advisory Council (STAC), EMS Advisory Board, and the Hospital Preparedness program to facilitate joint planning and policy development.
- Identify and provide the Department of Health Service staffing resources necessary to accomplish the objectives in the trauma system plan.
 - Reassign existing staff, hire additional staff, or use contractors to supplement existing staff to implement the trauma system plan.
- Develop a trauma system plan.

- Develop a trauma system plan.
 - Convene the stakeholders under the leadership of an experienced facilitator and the leadership group.
 - Use the Wisconsin *Statewide Trauma Care System Report (2001)*, the *STAC Strategic Operational Plan (2009)*, the HRSA (2006) *Model Trauma System Development and Evaluation* document, and the appropriate sections of this American College of Surgeons Trauma System Consultation report as references.
 - Ensure that the plan is reviewed by the broadest possible stakeholder group, including all appropriate professional organizations or associations.
 - Ensure that the trauma system plan includes a specific timetable for completion of goals and objectives, and identifies responsible individuals, groups, or agencies for each goal and objective.
- Establish dedicated funding for the trauma system.
 - Determine the amount of funding needed for the trauma system infrastructure.
 - Engage legislative and administrative leaders of state government, along with trauma system stakeholders, to establish a dedicated funding source.
- Increase the State EMS Medical/Trauma Director position to half time (0.5 full time equivalent).
 - Increase the interface with and support of local EMS medical directors.
 - Attend each State Trauma Advisory Council and EMS Advisory Council meeting
 - Participate at least yearly in Regional Trauma Advisory Council (RTAC) meetings
 - Engage fully in trauma system and disaster preparedness activities
- Clearly define criteria for acceptable injury admissions to Level III and Level IV facilities.
- Monitor and enforce criteria for all trauma facility classifications.
- Develop and disseminate clinical criteria for inter-facility transfer of injured patients to the appropriate level of care.
- Develop a plan for trauma system performance improvement with collaboration of the Department of Health Services, the State Trauma

Advisory Council, the State Emergency Medical Services (EMS)/Trauma Medical Director, and the EMS Advisory Board

- Establish an oversight committee responsible for performance improvement coordination.
- Establish process and outcome indicators/filters used for system evaluation.
- Identify and educate participating members about the performance improvement process.
- Define the process to disseminate performance improvement initiatives and educational opportunities to all trauma system participants.
- Explore existing datasets to support and evaluate trauma system functions.
 - Describe the pattern of injury and injury cost (Crash Outcome Data Evaluation System)
 - Use available datasets (e.g., Hospital discharge [UB 04], emergency department discharge, vital statistics) for performance improvement
 - Begin this process without waiting for the Wisconsin Trauma Registry or Wisconsin Ambulance Reporting Data System databases to become fully functional or reliable.

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, statewide, 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

Wisconsin has a wealth of resources for injury epidemiology. By statute, the state is mandated to have an injury prevention program; however, this is an unfunded mandate. Fortunately, the state has been successful in obtaining federal grant funding to support its injury epidemiology and injury prevention program efforts.

The Injury Prevention Program is associated with the Maternal and Child Health program in the Bureau of Community Health Promotion. However, this program addresses injury issues for all age groups. This program formerly had a dedicated injury epidemiologist who served as the Injury Surveillance Coordinator. It is not known if or when this position will be refilled, however, other epidemiology resources do exist within the Department of Health Services (DHS).

Numerous injury databases are available for exploration of the injury problem that can be used to describe injury mortality and morbidity, including the following: death certificates, hospital discharge data (UB-04), emergency department discharge data, the Behavioral Risk Factor Surveillance System, and motor vehicle crash data. An additional dataset includes the Wisconsin Violent Death Reporting System (WVDRS). Clinical datasets that should soon be able to offer additional injury information include the trauma registry and the Wisconsin Ambulance Run Data System (WARDS).

The state has produced several reports about the burden of injury, both a general overview and some reports addressing specific issues, such as suicide and falls. The 2006 *Burden of Injury in Wisconsin* is being revised with a planned 2011 publication date. This report provides frequencies of the five leading causes of injury mortality, hospitalizations, and emergency department visits by age group for the state's population, and then similar injury frequencies for each of the

state's 72 counties, contrasting the county's rates with the state's injury rates. In addition, the cost of injury is also described for emergency department visits and hospitalizations, both at the state and county level. This report provides a great basic overview of the injury problem, but additional narrative interpretation of the statistical information would be of value to many users and injury prevention advocates who lack knowledge or experience in reviewing statistical tables. For example, the specialized *Burden of Suicide in Wisconsin* provides additional information related to potential causes of increased suicide, suicide mechanisms, special populations involved, and other associated factors. This additional detail is essential for advocates interested in developing an effective injury prevention strategy.

The Wisconsin Interactive Statistics on Health (WISH) is a terrific resource for the injury prevention community, allowing users to investigate specific mechanisms of injury by age group and by county or region. While this is a terrific resource, its query system is not intuitive for inexperienced users seeking to obtain the answers to questions. It was reported that a tutorial is available on the WISH website, but it is not listed on the website's navigation bar, so potential users may become frustrated when trying to use this valuable resource. Additionally, stakeholders present during the trauma system consultation (TSC) reported being unaware that such a resource existed.

Wisconsin also has other outstanding resources to potentially support its injury programs, such as the Injury Research Center (IRC) located at the Medical College of Wisconsin. Numerous publications are available on the IRC website (<http://www.mcw.edu/injuryresearchcenter.htm>). For example, the 2010 report, *A Window into Prevention*, provides findings from the Wisconsin Child Death Review process (<http://www.chawisconsin.org/documents/CDRdataReportSummary11.10.pdf>).

Additionally the Wisconsin Crash Outcomes Data Evaluation System (CODES) is active and located at the Center for Health Systems Research and Analysis at the University of Wisconsin – Madison (<http://www.chsra.wisc.edu/codes/>). Extensive annual injury data by mechanism, rate, length of hospitalization, and cost are available, with 2009 being the most current information published. Detailed motor vehicle-related crash data are also available as well as costs associated by the use of alcohol, seatbelts, and motorcycle helmets. Unfortunately, the injury community and participants of the TSC are unaware of these valuable resources.

RECOMMENDATIONS

- Update and maintain the state's Injury Prevention Data website with links to key external injury data resources
 - Ensure that the trauma program website has a link to this resource.

- Raise awareness about the existence of injury data resources among the trauma community (trauma centers, trauma hospitals, regional trauma advisory committees, and injury prevention coordinators).
 - Communicate the release of new resources to the regional trauma advisory councils and other trauma stakeholders.
- Ensure that the tutorial for the Wisconsin Interactive Statistics on Health is easy to find on the website.
- Produce additional specialized reports by mechanism of injury to add to the Burden of Injury series.
- Identify mechanisms to increase awareness of the cost of injury for public and policymaker education.
- Review the hospital discharge data from unclassified hospitals to identify trauma patients not otherwise reported to the trauma registry.

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 substate (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

A core group of trauma program managers, DHS staff, and others completed the sixteen benchmark, indicators, and scoring (BIS) criteria required as part of the preparation for the American College of Surgeons (ACS) trauma system consultation process. This was reported to be the first organized attempt to use the BIS process.

Few participants indicated awareness of the Health Resources and Services Administration's (HRSA) 2006 *Model Trauma System Planning and Evaluation* document or the BIS tool included in the document. The BIS tool contains 113 indicators that can be used by a state or regional trauma system to perform a self-evaluation about the status or progress in its trauma system development. These indicators are organized by key trauma system benchmarks, so the tool could be used in its entirety, or as a method to evaluate specific system attributes.

When inquiring about how a self-assessment would potentially be conducted using the BIS tool and who would be invited to participate, little consensus emerged from the participants.

RECOMMENDATIONS

- Determine the composition of a group of key stakeholders (members of the State Trauma Advisory Council plus others) who would provide unique perspectives on various attributes of the trauma system.
- Complete a BIS process within the next 18 months.
 - Engage a qualified facilitator to assist.
 - Encourage stakeholders to score the indicators individually, and then average the scores for each indicator
- Facilitate a stakeholder discussion of the BIS mean scores for each indicator and then establish priorities for the next phase of trauma system development.
 - Establish benchmarks for focused efforts to improve future scores.
- Rescore the BIS at least every two to three years to monitor progress in achieving benchmarks.
- Disseminate the findings from the initial and subsequent BIS assessments to all trauma system stakeholders.

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 prescribed 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 postinjury 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

Wisconsin has had trauma system legislation since 1997. The statute (1997 Wisconsin ACT 154) specifically charged the Department of Health and Family Services, now the Department of Health Services (DHS), with responsibility for developing and implementing a statewide trauma care system by July 1, 2001. The statute led to the *Wisconsin Statewide Trauma Care System Report* (January 2001) that served as the state's original trauma care system plan.

The ACT 154 statute accomplished several important steps necessary to implement the trauma system, including the following:

- Clear designation of a lead agency for planning and implementation of the system.
- Authority to promulgate rules necessary to implement the trauma system.
- Establishment of the State Trauma Advisory Council (STAC) and regional trauma advisory councils (RTAC)
- Authority to implement a trauma registry
- Responsibility to develop a method for classification of hospitals. While not using the term "inclusive system" the statute suggests that all hospitals should be classified.

ACT 154 does not specifically include provisions for integrating trauma system development with emergency medical services (EMS), including EMS for Children (EMSC), or with emergency preparedness management. Another notable absence in the legislation is any provision for a stable source of funding for infrastructure or operations of the trauma system. The lack of identified funding has the effect of an unfunded mandate on DHS and other participants in the trauma system. Insufficient financial support for the trauma system is a limiting factor in achieving the vision of a fully functional system. While ACT 154 has concerning gaps in its language, it does establish the authority of the state and DHS to develop a trauma system.

Since ACT 154 was passed by the legislature, rules for establishing the trauma system have been promulgated. These rules provide additional detail for the development and operation of the trauma system. For example, the rules added specificity for the collection and protection of trauma registry data and performance improvement; however the rules do not specifically protect individual hospital activities related to hospital trauma performance improvement. While Wisconsin has accomplished some important initial steps in the area of statutory authority and administrative rules, some challenges exist that are hindering further system development.

Wisconsin is a “home rule” state. The concept of home rule is admirable in terms of affording significant control at local levels that can accommodate local needs, preferences, and circumstances. Unfortunately, home rule appears to be working against the vision of a statewide trauma system that is intended to deliver the right care to the right patient in the right amount of time on a consistent basis.

Since the establishment of the trauma system rules, a number of challenges have been made to various provisions, as well as to policy interpretation, related to recommendations that originated with the STAC, but were never formally acted upon by DHS. These missteps have served to erode confidence in the ability of the lead agency to enforce clear, consistent trauma system standards. A similar lack of follow through between the EMS Advisory Board and DHS was also reported. Correcting this problem appears to be a matter that is fully achievable by establishing clear and consistent procedures for communication and documentation between DHS and the advisory boards.

Some decisions made during the construction of the trauma system rules have not served the system well over time. An example is the reference to the 1999 version of the ACS *Resources for Optimal Care of the Injured Patient* document which establishes criteria for different classifications of trauma centers. The ACS document has since been updated; however Wisconsin continues to use the older guidance because it is specifically identified in the rules.

While Wisconsin’s trauma system would be well served by an update to the rules, DHS is hesitant to undertake an update reportedly due to the commitment of time, resources, and consensus building that would be necessary. The failure to do an update has left DHS and its many trauma system partners in a situation in which the rules have become largely unenforceable and trauma system participants unaccountable to the legitimate authority of the lead agency. Achieving a rule update in a reasonable time period will require the initial steps of building both trauma system stakeholder support and legislative support. Spending some time to educate and build consensus for the needed changes will make the formal rule revision process go more quickly and smoothly.

RECOMMENDATIONS

- **Revise the current trauma system rules.**
 - **Use this as an opportunity to eliminate language that will become outdated in the foreseeable future (e.g., a specific publication edition) and correct problems that have been identified over time.**
- **Strengthen the Department of Health Service's enforcement of existing and future statutes and rules.**
- Identify a source of funding that could be introduced in legislation to support the trauma system.
 - Consider revenue sources that have a direct link to trauma such as moving traffic violation fines, alcohol sales, or other fees that the public can see as relevant to trauma care.
- Ensure a process for the formal review, response, and implementation when appropriate of recommendations from the State Trauma Advisory Council (STAC) and the Emergency Medical Services Advisory Board to the Secretary of the Department of Health Services (DHS).
 - Direct the STAC chairperson to formally submit written recommendations and findings to the Secretary of the DHS.
 - Ensure that the trauma program retains a record of all recommendations submitted and responses from the leadership in the DHS.
- Rebuild the legislature's understanding and support for the trauma system.
- Identify and embrace legislative champions to serve as an advocate for the trauma system and DHS.

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 a finely tuned 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 statewide multidisciplinary, multiagency advisory committee, regularly review system performance reports. **(B-206)**
- IV. The lead 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 lead agency for the Wisconsin trauma system is the DHS Division of Public Health. The Division is led by an Administrator and Deputy Administrator. Trauma system oversight falls under the purview of the Bureau of Communicable Diseases and Emergency Response, Section of Public Health and Hospital Preparedness. It was apparent that interest and concern exists for the well-being of the trauma system at the highest levels of DHS leadership, evidenced by the engaged presence of the Executive Assistant to the Secretary of the DHS at the TSC site visit. However, no current legislative “champion” was identified who serves as a strong advocate of the trauma system in the legislature and with the Governor.

The DHS has a large, cumbersome organizational structure with numerous programs housed within various bureaus and sections. The rationale for the placement of some programs within the organizational structure was not immediately evident or logical to the TSC team, including the EMS and the trauma system programs.

The Section where the trauma system program is placed has only one fulltime staff member dedicated to trauma system operations. The State Trauma Coordinator is dedicated and hardworking, but significantly overextended. This contributes to challenges in the daily management and delays in the progress toward further development of the trauma system. Assistance to the State Trauma Coordinator was reportedly available from staff in other areas of DHS who may volunteer to assist, such as the EMSC coordinator, or have small portions of their position allocated to trauma system activities, such as the Bureau Director and staff member at the help desk who provides trauma registry user support.

DHS is advised on trauma system issues by the 13 member STAC, however more than half of the positions allotted for representation of various aspects of the trauma system were vacant at the time of the site visit. The explanation provided to the TSC team for the large number of STAC vacancies was that many members had served for numerous years when no term limits existed. While ACT 154 and the trauma system rules do not specify term limits for STAC members, a STAC recommendation regarding term limits was acted upon by a prior trauma system coordinator. This appears to be one of the few recommendations made by STAC that seems to have reached the Secretary of DHS and been formally acted upon.

It was reported that letters of appointment to the STAC were recently sent to six individuals by the Secretary of DHS. These 6 individuals were recommended by the trauma system coordinator from a list of 13 self-nominated applicants who met the criteria stated in ACT 154.

The current composition of the STAC does not appear to be broad-based and inclusive of all key stakeholders. Representation includes the following:

- 4 physicians who represent urban and rural areas
- 2 registered nurses
- 2 prehospital emergency medical services providers, including one from a municipality
- 2 representatives from a rural hospital
- 2 representatives from an urban hospital
- 1 member from the EMS Advisory Board

Standing positions for representatives from significant professional organizations, such as the state chairperson of the ACS Committee on Trauma (COT), the Wisconsin Hospital Association, state chapter of the Emergency Nurses Association, and the state EMS provider organization, etc. do not exist. In addition, the STAC has no consumer representative or specific representative for pediatric trauma care.

The STAC and its subcommittees meet five times per year. The STAC meetings were reported to be well attended by non-member trauma stakeholders, likely because the subcommittees meet during the same 2-day meeting period associated with the STAC. It was not clear to the TSC team that the STAC has a well-defined charge or that STAC meetings have an organized agenda to advance the trauma system. Very few minutes from prior STAC meetings were available for the TSC team to review. Much of the documentation from the STAC meetings was reported to be missing or difficult to find in the time allotted.

STAC subcommittees include a trauma coordinators subcommittee, a data management subcommittee, a hospital classification review subcommittee, and an RTAC coordinators subcommittee. It is unclear how the subcommittees relate to one another and to the STAC. The prereview questionnaire (PRQ) described the subcommittee structure as “serving as a platform for review and monitoring of each phase of care.” This was not immediately evident to reviewers nor was the ongoing role of the STAC in performance improvement.

The STAC and its subcommittee meetings were reported to overlap with the EMS Advisory Board and committee meetings, often limiting the representation of EMS providers at STAC meetings and trauma providers at EMS Advisory Board meetings. It was not clear to the TSC team why a more coordinated schedule had not been developed by the EMS and trauma system programs so that more optimal representation of the programs at both sets of meeting could occur.

The State Trauma Coordinator attends all STAC meetings as the DHS representative and collaborates with the STAC chairperson. The State Trauma Coordinator serves as the liaison between STAC and the DHS, discussing recommendations made with the Bureau Director who then decides which recommendations to carry forward to the next level of DHS leadership. The lines of communication, authority, feedback, responsibility, and accountability between DHS and the STAC only became clear to the members of STAC as recently as last year. STAC members are acknowledged as the clinical and trauma system issue content experts, but they are advisory to DHS. When STAC makes a recommendation, little documentation exists indicating that the DHS formally approved that recommendation, and few, if any, recommendations are reported back to the STAC as being rejected. Loop closure regarding STAC recommendations is a significant issue. It remains unclear to the consulting team exactly who decides which issues that STAC discusses need approval and from which level within the DHS. Further, no process exists for documenting the DHS approval of STAC recommendations and initiatives.

Finally, little evidence was found by the TSC team of DHS leadership and support for the STAC's attempts to operate and improve the trauma system, either by incentive or disincentive strategies to assure uniform compliance and implementation at the regional or local level. This reticence or inability by DHS to exercise its regulatory and leadership responsibilities with regard to trauma system operations essentially renders the STAC impotent, and it has stagnated trauma system development. Other explanations offered for variability, delay, or failure to implement STAC recommendations included limitations by statute and rules. Another confounding factor for trauma system development is the strong "home rule" culture, which has created challenges to the uniform adoption of the few changes and initiatives that have been promulgated by DHS, STAC and the RTACs, e.g., the prehospital trauma triage protocols.

Most of the progress made toward maturing the trauma system was credited to efforts at the RTAC level. The RTACs were uniformly considered to be more effective than the STAC. Their roles and responsibilities are more clearly and extensively described in rule than those of the STAC. RTACs have a contractual agreement with DHS, and they function primarily in an operational capacity. Each RTAC is modestly supported through a \$50,000 allocation from DHS which is predominantly used to cover administrative costs. RTACs report directly to DHS. They are not subordinate to the STAC, even though an RTAC coordinators subcommittee exists, and RTACs do not necessarily take direction from the STAC. This presents another impediment to the seamless and uniform institution of changes according to a recognized chain of command.

Minimal integration of the EMS and trauma systems was apparent to the TSC team. A state medical director has responsibilities associated with both the trauma and EMS systems. His passion and efforts appeared to be directed more toward EMS than trauma. The EMS program resides in a separate and distinct Section within the Bureau which, likely, reduces integration and cooperation between the two programs. It was reported that the two programs were recently re-located into the same physical space to encourage personal communication and cooperation. Dissociation between the EMS and trauma system program was acknowledged by participants. Participants reported that this dissociation was attributed to a prior EMS program strategy to obtain dedicated funding in a manner unacceptable to trauma system stakeholders

The State Trauma Coordinator, the EMSS Chief, State EMS Medical/Trauma Director, and Bureau Director reported that they work well together, and they are committed to better integration of the trauma system and EMS programs. The TSC team identified some subtle signals that mutual trust has eroded over time. Trust between the trauma system and EMS programs is essential to the success of the trauma system, and efforts must be made to rebuild this trust. Clearly, the degree of integration and mutual cooperation between the EMS and trauma system programs is currently dependent on individuals, and their ability to work together collegially, rather than being grounded in well defined, established

organizational relationships that transcend personalities and politics. Additionally, it was not clear to the TSC team that the EMS Advisory Board embraces and desires to reintegrate with the trauma system program. The absence of the EMS Advisory Board's members (other than the liaison to the STAC) at the Trauma Systems Consultation, despite the stated explicit invitation of the EMS Medical Director, was revealing in this regard. The EMS and trauma system relationships are apparently closest at the RTAC level, but likely they are not optimal even there.

RECOMMENDATIONS

- **Realign the Department of Health Services (DHS) organizational structure to create a new Bureau of Emergency Health Care and Preparedness, which encompasses and administers, under one umbrella, the trauma and Emergency Medical Services (EMS) systems, the developing stroke and ST Elevation Myocardial Infarction (STEM I) systems, and disaster preparedness.**
- **Create an executive board with representation from the State Trauma Advisory Council (STAC), EMS Advisory Board, and the Hospital Preparedness program to facilitate joint planning and policy development.**
- Produce an operations document which clearly defines roles, responsibilities, accountabilities, reporting structure, and organizational relationships between the DHS leadership and staff, STAC, Regional Trauma Advisory Committees, EMS Medical/Trauma Director, EMS Advisory Board, and other stakeholders involved in the management and operations of the trauma system.
- Increase the full time equivalent (FTE) allocation of the State EMS Medical/Trauma Director or alternatively hire a separate State Trauma Medical Director to ensure adequate medical oversight and a liaison for the trauma system.
- Task the STAC to establish a clear set of short and long term goals for development of the trauma system plan, the performance improvement plan, and to address current administrative and operational aspects of the trauma system,
 - Establish timelines, action plans, milestones, and specific parties accountable for each task.

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

Wisconsin historically had an active coalition of stakeholders that rallied around development of the trauma system. Many stakeholders remain interested in the trauma system as evidenced by active RTACs and a large number of stakeholders who attend the STAC meetings. Additionally, active injury prevention coalitions were reported to exist within the regions. Coalitions of trauma stakeholders within the regions were reported to be more active than at the state level.

Growth of the state's trauma coalition is stagnant, in large part due to the recent 3 year period during which the trauma coordinator position was vacant or filled by 3 different individuals. The current trauma coordinator has been in the position for 6 months, and has had inadequate time to address the issue of rebuilding the trauma coalition. However, this experienced state trauma coordinator is knowledgeable about key individuals and organizations that should be approached to rebuild and re-energize the state's trauma coalition.

Communication mechanisms to keep stakeholders informed about the state's trauma program either do not exist or have not been used recently. An electronic listserv was reported to exist, but it has not been activated or updated. Minutes of STAC meetings have not been posted on the trauma program website to inform stakeholders of trauma program activities and trauma system issues. Stakeholders have limited opportunities to meet as a group, such as through an annual state trauma conference. Opportunities for stakeholders to be engaged at the state level are limited as they must travel to Madison for meetings. The infrastructure for web-based meetings was reported to exist for state use.

Limited evidence was provided about the engagement of state chapters of professional organizations, such as the ACS Committee on Trauma, American College of Emergency Physicians (ACEP), National Association of EMS Physicians (NAEMSP), and the Emergency Nurses Association (ENA). Other important organizations, such as the state's EMS provider organization, air medical groups, the state medical society, the Wisconsin Hospital Association, injury prevention advocates, and rehabilitation professionals do not appear to be engaged. Engagement of many of these organizations will be essential to promote system change and future development.

Education for stakeholders, particularly those at trauma facilities, is not readily available at the state level, such as training new trauma coordinators how to submit charges for the trauma activation fee or to accurately abstract data for the trauma registry. Members of the STAC Trauma Coordinator Subcommittee and the Data Management Subcommittee could potentially support this training effort.

Limited public education has been developed that could be helpful in promoting awareness of the state's injury problem, its economic impact, and the trauma system. Such education will be essential in the future to engage new stakeholders in efforts to revise regulations and seek funding for the trauma system.

RECOMMENDATIONS

- Identify a group of volunteers, such as members of the Trauma Coordinator Subcommittee or the Data Management Subcommittee, and charge them with the development and dissemination of educational materials, e.g., a tutorial for trauma activation charges, data abstraction training, public education about the trauma system, and other identified training needs of trauma system partners.
- Commit to the use of an electronic web-based meeting of the State Trauma Advisory Council (STAC) that is open to the nonmember stakeholders.
 - Notify stakeholders about the planned meeting and provide information about how to access the meeting.
 - In collaboration with the STAC, identify the issue that will be discussed and resolved during the meeting, and plan the agenda to match a short timeline, such as 1 hour.
 - Evaluate the meeting format and accomplishments, number of participants, and identify opportunities to improve the meeting effectiveness.
 - Plan to conduct at least 2 future meetings per year using an electronic web-based meeting format for the STAC and STAC subcommittees.
- Engage professional organizations in the selection of future STAC members.
 - Request nominations from professional organizations for the mandated categories of STAC positions as they become vacant.
 - Recommend candidates for STAC membership to the Secretary of the Department of Health Services from the nominees submitted by professional organizations so these organizations become engaged in the STAC while fulfilling legislatively mandated membership.
 - Continue to expand the number of professional organizations with official representation on the STAC during each cycle of appointments.
- Identify important ex-officio members to be added to the STAC to represent aspects of trauma system development, including representatives of injury prevention, rehabilitation, disaster preparedness, pediatric professionals, the general public, the media, a legislator, and affiliated government agencies.

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

DHS is identified in ACT 154 as the lead agency for trauma system development and implementation. One FTE state trauma coordinator is the single staff resource committed to trauma system activities. In addition to the state trauma coordinator, DHS also commits relatively small portions (5% in some cases) of time from other staff to support this individual with specific technical assistance with the trauma registry to trouble-shooting user needs (e.g., resetting passwords).

The state trauma coordinator position is established within the Division of Public Health, Bureau of Communicable Diseases and Emergency Response, Hospital Preparedness Section. Other staff members within DHS but outside of the Public Health and Hospital Preparedness Section play important roles related to trauma system development. The EMSS is also under the Bureau of Communicable Diseases and Emergency Response. An Injury and Violence Prevention program is also within DHS but under the Bureau of Community Health Promotion.

DHS has extended its limited internal staffing to support the trauma system through a number of contractual relationships. Nine RTACs support regional and local trauma system activities through the support of part-time coordinators. The Medical College of Wisconsin's Injury Research Center has a contract for analysis of trauma registry data. The trauma registry itself is managed through a contract with Digital Innovations. An emergency physician is contracted for a limited amount of time as the State EMS/Trauma Medical Director; however, most of the work for this position relates to EMS rather than trauma. In each of these contracts, DHS is making relatively modest investments that appear to be supporting competent and committed partners in essential trauma system components.

Funding support for DHS staff and activities related to trauma system development comes from a combination of Department of Transportation (DOT) funding, Assistant Secretary for Preparedness and Response (ASPR) funding, and General Purpose Revenue (GPR) funds. Given the current status of the state's economy and budget, DHS should be commended for its ability to maintain the level of support it is providing. The lack of a dedicated and stable source of trauma system funding is an unfortunate omission from the original ACT 154 legislation. It does not appear that DHS has reconciled its staffing with its responsibilities in statute and the trauma system plan.

The STAC is advisory to the DHS and comprises persons appointed by the Secretary of DHS. STAC members serve without compensation by DHS for their professional services. Similarly, the RTACs membership receives no direct support for their participation in trauma system activities beyond what is provided for the part-time coordinators. It was reported that many of the local physician EMS medical directors also serve voluntarily. The majority of ambulance services in the state are volunteer agencies. Taking all of this service in total, it is important to recognize how extensively the Wisconsin trauma system relies on the contributed time and energy of people that participate simply because they believe in the system and what it can do to reduce the effects of injury.

Given the trauma system work that needs to be done, DHS is objectively understaffed to accomplish it. It was reported that the state trauma coordinator will be participating in 35-40 hospital site visits during the next 12 months. This activity alone is easily a fulltime job for one person to coordinate the applications, schedule the team members, arrange on-site activities, assemble findings, and inform the DHS about the hospital classification recommendations.

In other states, the position of state trauma registrar is usually a fulltime position. Making useful information from submitted data and supporting the hospitals that are providing data to the registry takes time and focus.

Many direct and indirect references were made during the TSC site visit to the chasm that exists between the EMS and trauma programs. It also became apparent during the TSC visit that many of the key trauma system partners were unaware of good and important work being done by the DHS Injury and Violence Prevention program. DHS can ill afford internal inefficiencies and less than collaborative relationships between internal programs. It was also apparent to the TSC team that Wisconsin's new law eliminating collective bargaining for public employees is creating challenges in recruiting and retaining qualified employees throughout state service. The net effect of these issues is to raise the question of whether DHS continues to have the political will, focus, and commitment to effectively function as the trauma system's lead agency.

RECOMMENDATIONS

- **Identify and provide the DHS staffing resources necessary to accomplish the objectives in the trauma system plan.**
 - **Reassign existing staff, hire additional staff, or use contractors to supplement existing staff to implement the trauma system plan.**
- Identify, build support for, and implement a stable source of trauma system funding.
- Review the State Trauma Coordinator's job description and revise it to reflect what is realistically possible to accomplish, while maintaining the appropriate position classification.

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

The Wisconsin ACT 154, passed in 1997 charged the following: “The Department of Health and Family Services and the Statewide Trauma Advisory Council shall prepare a joint report on the development and implementation of a statewide trauma care system. The report shall make recommendations on issues that need to be resolved in developing and implementing the system...” That report was completed, on schedule, in January, 2001, and it has served as the de facto trauma system plan since that time. Since the document was originally framed as a legislative report, it is more informative than strategic.

In 2008, the STAC developed a Strategic Operational Plan. That document is well conceived with a mission and vision statement for the Wisconsin trauma system, and the STAC is to be complimented for taking the initiative to develop the document. The Strategic Operational Plan identified six broad goals and a number of supporting objectives and associated strategies, the responsible agency, and a timeline for the completion of the objectives. The appointed completion time for many of these objectives has passed or is imminently pending. Many of the objectives have been met while others have not.

When asked who would be responsible for the development of a trauma system plan (e.g., STAC, stakeholders, DHS, or a combination of all three groups), a clear consensus did not emerge from the TSC participants. The TSC participants were also, largely, unaware of the HRSA (2006) *Model Trauma System Planning and Evaluation* document which is a significant resource for a strategic planning development process.

In the absence of a true guiding and foundational document, the Wisconsin trauma system is unable to effectively marshal its limited resources in a manner that optimally supports trauma system development. The need for such a plan provides a significant opportunity to develop a consensus-based document and to engage the DHS and the stakeholders in a thought-provoking planning effort.

Without a trauma system plan, it is the TSC team's concern that the trauma system will fail to meet its important mission.

RECOMMENDATIONS

- **Develop a trauma system plan.**
 - **Convene the stakeholders under the leadership of an experienced facilitator and the leadership group.**
 - **Use the Wisconsin *Statewide Trauma Care System Report (2001)*, the *STAC Strategic Operational Plan (2009)*, the HRSA (2006) *Model Trauma System Development and Evaluation* document, and the appropriate sections of this American College of Surgeons Trauma System Consultation report as references.**
 - **Ensure that the plan is reviewed by the broadest possible stakeholder group, including all appropriate professional organizations or associations.**
 - **Ensure that the trauma system plan includes a specific timetable for completion of goals and objectives, and identifies responsible individuals, groups, or agencies for each goal and objective.**
- Develop a strategy for the completion of a formal Wisconsin Trauma System Plan.
 - Engage a qualified facilitator (either internally or externally).
 - Convene and empower the State Trauma Advisory Council (STAC) as the core leadership group to undertake the developmental process.
 - Identify the appropriate broad stakeholder group, as well as the process and venue for the timely completion of the trauma system plan.
 - Provide sufficient fiscal and personnel resources to complete the strategic planning process.
- Ensure the Department of Health Services' participation in, commitment to, and execution of the trauma system plan.
- Implement the plan.
 - Monitor progress annually.
 - Adjust priorities to meet changing challenges and opportunities.

- Establish a schedule, e.g. every five years, for revision of the trauma system plan.
 - Establish who is responsible for initiating the revision process and how it will be completed in the initial plan.

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 EMS and Trauma systems are both located in the administrative structure of the Bureau of Communicable Diseases and Emergency Response. However, they are separate. EMS has its own section, and Trauma is simply a program of the Public Health and Hospital Preparedness Section. This organization interferes with effective collaboration between the State Trauma Coordinator and the EMSS Chief. The STAC and EMS Advisory Board are unable to meet with each other throughout the year due to issues related to how the two groups and their subcommittees are scheduled. The relationship between the two entities was reported to be strained to the TSC team.

The State Trauma Coordinator has been invited to attend the steering committee for the Injury and Violence Prevention Program (IVPP); the IVPP has not been integrated into the trauma system programs within the DHS. Additionally, at the state level, the trauma program is not integrated with mental health, social services, child protective services, law enforcement, or public safety officials. Although collaborative efforts with the IRC at the Medical College of Wisconsin have been productive, no engagement has occurred with the School of Public Health at the University of Wisconsin.

System integration is significantly more successful at the regional and local levels. Although somewhat variable, the RTAC executive councils are comprised of trauma providers, EMS leaders, emergency preparedness staff, law enforcement, and public safety officials. An effective integration was reported between the IVPP and the injury prevention staff in the regions. Within the scope of child protective services, the trauma system personnel participate in mortality reviews, including examining the timeliness and appropriateness of trauma care. Perhaps most important, productive integration between the RTACS was apparent to the TSC team – the RTAC coordinators meet bimonthly to share best practices in areas of education and performance improvement. Examples include collaboration with emergency preparedness for 911 and mass casualty incident (MCI) dispatch training, and disseminating the Trauma Basics course for EMS providers.

RECOMMENDATIONS

- Cultivate a productive relationship between State Trauma Advisory Council (STAC) and the EMS Advisory Board by adjusting meeting schedules to allow the two entities to meet together on a regular basis (see Focus Question #1 for additional information).
- Include the Injury and Violence Prevention Program in the regularly scheduled joint staff meetings of the trauma system, emergency medical services, emergency medical services for children, and disaster preparedness programs.
- Engage mental health, social services, child protective services, as well as law enforcement and public safety services in the development of the trauma system.
- Continue the collaboration between the Regional Trauma Advisory Councils to promote trauma system integration.
- Explore opportunities to integrate the School of Public Health at the University of Wisconsin with the trauma system.

Financing

Purpose and Rationale

Trauma systems need sufficient funding to plan, implement, and evaluate a statewide 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 2009 cost of hospital charges for injuries in Wisconsin related to all major mechanisms is reported to be \$1.379 billion on the following website: <http://www.chsra.wisc.edu/codes/hospital/2009/statewide.pdf>. Falls account for nearly half of this amount. This figure alone is a staggering amount of money that provides strong support for the development of a trauma system that can serve to both prevent injuries and assure that injured patients are cared for within a trauma system that matches the hospital capabilities for care with the specific needs of injured patients.

A detailed understanding of the cost of injury in Wisconsin is important knowledge needed to take the steps necessary to identify and implement a source of stable funding for the trauma system. Research in other settings has shown that an organized trauma system can reduce mortality by 15% or more. In Wisconsin, that change would represent at least 485 lives saved each year. The economic benefit of reducing productive years of life lost for 485 people provides a strong incentive to make the necessary investment in the trauma system. Gathering and publically reporting information over time about the costs of injury, investments in the trauma system, and the results of those investments are important activities for building and achieving stakeholder and public support for the trauma system.

Currently, DHS spends about \$700,000 annually in support of the trauma system. Specific expenditures include:

- \$80,000 from DOT funds to support the trauma registry
- \$449,200 of GPR funds to support the RTACs and their coordinators
- \$94,300 of GPR funds to support the hospital classification reviewers
- \$65,000 of federal ASPR funds to support the State Trauma Coordinator position

Taken collectively, this amount of money represents an initial investment by the state lead agency to the trauma system's infrastructure support. In addition to these directly identifiable costs for DHS, other funding is supporting related programs such as the IVPP. It is not clear that the level of expenditure by DHS today is commensurate with the obligations it has accepted as the lead agency in ACT 154. An ominous sign of budget problems at the state level is the 10% reduction of GPR funds to support the trauma system in the current fiscal year. Given the status of the Wisconsin's overall budget, the TSC team is concerned that further reductions to funds available for the trauma system program will become necessary in future years.

On a positive note, DHS has been successful in seeking and receiving federal grants to support various components of its trauma system and EMS programs. DHS has done well in terms of leveraging funding from ASPR and other related grant programs to accomplish work that benefits the trauma system program while fulfilling the purposes of the federal resources. Even though opportunities to use federally available funds exist, DHS should continue pursuing all possible funding sources including National Highway Traffic Safety Administration (NHTSA) and the Rural Hospital Flexibility (FLEX) Program funding that are not being applied to trauma system needs today. The one downside to reliance upon federal funding is that it frequently is not stable over the long term.

Many costs related to the development and operation of the trauma system are often voluntarily contributed and not well accounted for. A few examples include:

- The contributed time of STAC members
- The contributed time of RTAC members
- Hospital trauma coordinators and trauma registrars
- Local EMS medical directors who often serve uncompensated
- Volunteer EMS personnel

While all of these people and often their employing institutions provide willing service to the trauma system for the benefit of patients, it is important to ensure that the real financial value of these contributions not be overlooked.

Wisconsin cannot afford to leave available trauma funding "on the table". During the TSC site visit, it was reported that some classified hospitals are not charging trauma team activation fees. This represents an opportunity to recover the institution's legitimate cost of participation in the trauma system including trauma registrar costs and trauma coordinator costs. Steps should be taken to ensure that all eligible hospitals know how to bill for trauma activations and begin doing so.

Most hospitals represented during the TSC site visit indicated that their trauma revenues were at least covering their costs of providing acute care trauma services. This is likely due to a combination of factors, including the predominance of blunt motor vehicle trauma within the state. Trauma charge data are reported to the State Trauma Registry by Level I and II classified hospitals, but not Level III and IV hospitals (however charge data are available through the Hospital Discharge database). No analysis of the charge data has yet occurred.

Wisconsin does not have a dedicated revenue source that is stable and reliable to support trauma system costs. Many other states sought trauma system funding by accessing a variety of fees, surcharges, fines, or other funding sources with some trauma relationship. Examples include safety belt fines, motor vehicle registrations, driver's license fees, moving traffic violation fines, or similar fees and charges. Implementing a dedicated revenue source usually takes a combination of legislative and administrative champions along with clear and unambiguous messaging about the need for the funds and how they will be used. The buy-in and understanding of all trauma stakeholders must be assured for such an initiative to succeed. Reaching an understanding on what costs should be covered and arranging the distribution of funds in a way that benefits all stakeholders who will be asked to support establishing trauma system funding are two essential steps.

RECOMMENDATIONS

- **Establish dedicated funding for the trauma system.**
 - **Determine the amount of funding needed for the trauma system infrastructure.**
 - **Engage legislative and administrative leaders of state government, along with trauma system stakeholders, to establish a dedicated funding source.**
- Ensure that all classified hospitals charge and receive trauma activation fees.
- Assure that financial information about the costs of injury and the contributions of the trauma system in reducing those costs are being captured, analyzed, and publically reported.
- Explore and secure additional sources of federal revenue from programs such as the Rural Hospital Flexibility Grant Program, National Highway Traffic Safety Administration 402 and 408 funds, and various disaster preparedness sources.
 - Encourage the Wisconsin Hospital Association to conduct a study of charge/capture practices and the generation of revenue for trauma care to assess its actual value as an incentive for hospitals to seek and retain trauma facility classification.

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

Wisconsin is poised to become a leader in injury surveillance and prevention. The IVPP is located within the DHS, Division of Public Health. The program is 100% federally funded, largely by the Maternal and Child Health (MCH) Block Grant and Centers for Disease Control (CDC) funding for sexual assault prevention programs. The IVPP staff previously included both the Injury Prevention Coordinator and an Injury Surveillance Coordinator (contracted through the IRC at the Medical College of Wisconsin); however, funding for the Injury Surveillance Coordinator expired and that position is no longer available to the program. The Injury Prevention Coordinator has assumed responsibility for the surveillance activities, but it was stated that the IRC and DHS epidemiologists are potential resources to assist and provide support for injury surveillance and data analysis.

Data collection and surveillance activities are completed by the IVPP. The robust datasets available for injury surveillance are those that would be envied by most states (see the Injury Epidemiology Section). Multiple reports have been created identifying the leading causes of injury morbidity and mortality in specific age groups, as well as the cost of injury. *The Burden of Injury in Wisconsin* (2006) report identifies the five top injury mechanisms for prevention program priorities. A revision of this report is expected in 2011. Three special reports were developed specifically on fall prevention, suicides, and the role of sleeping patterns in the suffocation deaths of children. *The Burden of Falls in Wisconsin* report is to be commended for identifying evidence-based programs and practices to be used in the development of fall prevention programs. This report can serve as a model for reports that may be developed in the future.

The IVPP is to be commended for completing a program assessment conducted by the State and Territorial Injury Prevention Directors Association (STIPDA) (now Safe States Alliance) in 2009. Subsequently, the IVPP initiated the process of writing a state injury prevention plan. While a draft was not available for the TSC team to review, it was reported that the plan is data driven and contains infrastructure and specific injury mechanism strategies.

Currently, minimal evaluation of injury prevention efforts occurs, and most evaluations that have been conducted were process oriented rather than outcome oriented. Plans for evaluation will be included in the new state injury prevention plan. The state deserves special recognition for the documented decrease in motor vehicle mortality and achievement of its Healthy Wisconsin 2010 goal, in large part associated with passage of primary seatbelt and graduated driver's licensure laws.

The Wisconsin State Injury Prevention and Control Statute (255.20) directs the DHS to maintain an injury prevention program that includes the following:

- data collection, surveillance, education, and the promotion of intervention;
- provision of technical assistance to local agencies for effective program development and evaluation; and
- collaboration with other state agencies to reduce intentional and unintentional injuries.

Unfortunately this is an unfunded mandate; however the state has been successful in obtaining grant funding for its program.

Integration of injury prevention with the trauma program is incomplete at the state level. The nine RTAC regions are required to include injury prevention within their regional plans. A small amount of MCH funding is available to local public health departments for injury prevention activities. The injury prevention coordinator demonstrated a strong passion and interest in providing injury prevention education and outreach by attending RTAC meetings. The state trauma coordinator participates on the IVPP steering committee, but to date, injury prevention representation on the STAC has not been facilitated, even as an ex-officio member.

The Level I and II trauma centers and RTACs are actively engaged in injury prevention, as evidenced by the list of injury prevention activities included in the PRQ. The chairperson of the RTAC Coordinator Subcommittee stated that RTAC injury prevention activities are not based on evidence or greatest injury prevention priorities in the region. Rather, injury prevention programs are selected and implemented based upon individual member interests and known resources available, such as initiatives of the Safe Kids and Safe Routes to School organizations and the child passenger safety and car seat technician programs.

No needs assessment or gap analysis has been conducted to identify resources needed or available for injury prevention programming. The individualized approach for selection of injury prevention programs by trauma facilities, RTACs, and other injury prevention leaders increases the possibility of duplication of efforts, failure to address the most significant injury issues on a statewide basis, and selection of injury interventions without proven efficacy.

Minimal efforts have been made to conduct media campaigns or to distribute publications to the public and constituents. The lack of awareness and accessibility to injury prevention resources and guidance toward implementation of programs to address significant injuries was clearly expressed by TSC participants. A potential organization that could assist with centralizing and disseminating injury prevention resources is the Children's Health Alliance of Wisconsin <http://www.chawisconsin.org>. This organization has a website with many resources for public awareness and best practices for injured children in Wisconsin. Alternatively, the IVPP could enhance resource sharing and awareness by developing a web-based resource center for all injury prevention and trauma system stakeholders.

RECOMMENDATIONS

- Develop and implement a statewide injury prevention and outreach plan.
- Conduct a needs assessment and gap analysis to identify resources available and needed for injury prevention programming.
- Establish a web-based resource center to enhance communication and collaboration among all stakeholders and cultivate the use of evidence-based injury prevention strategies.
- Establish a statewide injury prevention coalition to address priority injuries, implement recommended evidence-based injury interventions, and evaluate outcomes.
- Secure funding for the Injury and Violence Prevention Program Injury Surveillance Coordinator.
- Strengthen relationships between the Injury Research Center, the Crash Outcomes Data Evaluation System (CODES) project staff, and Department of Health Services epidemiologists to support future injury surveillance, data analysis, cost analysis, and injury intervention evaluation.
- Educate policy makers and the public about the burden of injury and the value of an inclusive trauma system as part of an overall injury prevention and control strategy.

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, interfacility 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, airground coordination, early notification of the trauma care facility, prearrival 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, interfacility 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

Wisconsin's EMS system is a robust system with a mixture of Advanced Life Support (ALS) and Basic Life Support (BLS) and fulltime paid and volunteer agencies distributed throughout the state. These agencies, mirroring the population, are distributed more densely in the southern part of the state, less so in the north. A total of 18,000 EMS providers are licensed in the state by the Emergency Medical Services Section (EMSS) of the Bureau of Communicable Diseases and Emergency Response in DHS. Statewide, over 500,000 EMS calls are responded to yearly. Nine air medical transport agencies service the state. Specialized pediatric ground and air transport services are available.

Wisconsin has a mixture of local medical control and oversight with an underlying structural framework provided by the EMSS. State-level oversight and guidance are provided by the EMS Advisory Board, its Physician Advisory Board, and the State EMS/Trauma Medical Director. While scope of practice (both prehospital and inter-hospital) of the EMS providers is regulated at the state level, local medical directors have ultimate responsibility for on- and off-line medical control, treatment and transport protocols, and destination decisions. Regularly updated state protocol guidelines are provided by the EMSS, which may be utilized by local medical directors. To date, approximately 1/3 of agencies statewide utilize the state guidelines. In addition, the STAC has provided a Trauma Field Triage Protocol to guide transportation decisions by local EMS agencies. This protocol has been disseminated statewide but implementation is voluntary and each local medical director ultimately dictates destination decisions.

Wisconsin employs the services of a part-time State EMS/Trauma Medical Director who, to date, has been more actively involved in the EMS program than the trauma program. He is contracted for a very limited amount of work yearly, thus limiting his effectiveness as a leader and a resource for local agency medical directors statewide. Conflicts in meeting scheduling between the EMS Advisory Board and the STAC have also limited his involvement in the trauma program.

The State EMS/Trauma Medical Director must be a vital and integral component of the EMS and trauma systems. However, by contract, this position is limited to a very small amount of work time. This position should be expanded to half-time (0.5 FTE) with proportionate reimbursement provided. This would enable the State EMS/Trauma Medical Director to become more actively involved in state level EMS and trauma oversight and strategic planning, and to participate more actively at the regional level with the local medical directors. This would greatly facilitate the acceptance and implementation of state EMS and trauma initiatives statewide. The State EMS/Trauma Medical Director should attend all STAC, EMS Advisory Board, and Physician Advisory Board meetings, as well as each region's RTAC meeting at least once per year.

One of the most critical functions of the State EMS/Trauma Medical Director is to act as the state's representative and liaison with the local agency medical directors. This ensures that the concerns, challenges, and successes of the local medical directors are addressed at the state level. Expanding the position of the State EMS/Trauma Medical Director would allow more time to interface with and support the local medical directors as they confront the challenges of implementing the recommended state initiatives (e.g., Trauma Field Triage Protocol) in their local systems. Such support can be especially critical when the local medical director is caught in a "tug of war" between patient-centered and evidence-based state initiatives and the political allegiances of the local medical community. The state, via the State EMS/Trauma Medical Director, can provide vital "cover" for the local medical director to implement difficult or locally unpopular state policies or protocols.

Although the EMS Advisory Board and the Physician Advisory Board are very active and effective, they are separate and distinct from the STAC, with very little "cross talk". Arranging a schedule for these groups that would allow the State EMS/Trauma Medical Director and the State Trauma Coordinator to actively participate in both EMS and Trauma advisory group meetings would provide a means for executive-level input into all groups. This would facilitate better integration of the EMS and Trauma programs.

Similarly, to further enhance communication between the EMS and trauma programs, the RTAC Coordinators Subcommittee chairperson should be an ex-officio member of the EMS Advisory Board or, at a minimum, be given dedicated time on the agenda of each EMS Advisory Board meeting.

The STAC and EMS Advisory Board must develop regular strategic, well defined, performance improvement (PI) goals and initiatives for both the trauma and EMS programs. These advisory groups, facilitated by the State EMS/Trauma Medical Director and the State Trauma Coordinator, should develop these PI projects jointly. These unified projects can then be dispatched to the RTACs for implementation, the ideal mechanism to implement these programs. After implementation, the results of these initiatives should be collected and reported back to the STAC and EMS Advisory Board for review and to be used in ongoing state system refinement. See the System Evaluation and Quality Improvement Section for more detailed PI recommendations.

Wisconsin has developed and fielded a prehospital data collection system, WARDS. The EMSS mandates timely entry of prehospital run data into the WARDS by all EMS agencies. A 98% compliance rate was reported. Each agency may access its own data for on-line review and PI purposes.

The WARDS is a comprehensive EMS data collection system with an impressive degree of participation by EMS agencies statewide. However, like the new state trauma registry, its full utilization as a tool for effective PI and system development is severely limited by a lack of a dedicated data registrar/analyst. Such a fulltime analyst should be hired or contracted (perhaps from the IRC) by DHS. This person could serve as the data system expert for both the WARDS and the Trauma Registry, again enhancing the integration of the EMS and trauma programs. Such an individual could also leverage the resources of other existing databases, such as CODES, ED discharge data, and hospital discharge data, in order to maximize the utility of such data for PI, public education, legislative initiatives, and other support to the EMS and trauma programs.

This PI process should begin immediately, utilizing currently available data (WARDS, CODES, ED/hospital discharge data) and adding trauma registry data when eventually available. The substantial technical resources available at the IRC should be leveraged to this end.

Standard initial training programs for EMS providers at all levels incorporate trauma training. Continuing education requirements require trauma training including recommended Prehospital Trauma Life Support (PHTLS) or Basic Trauma Life Support (BTLS) courses. Pediatric training is also required at the initial certification and recertification, including Pediatric Advanced Life Support (PALS) or Pediatric Education for Prehospital Providers (PEPP). The trauma program also provides a Trauma Basics course for EMS providers. This course is tailored to each trauma region by its RTAC, which also facilitates and organizes this training for the EMS providers in the region. This is an excellent venue for the state to disseminate standardized trauma protocols and information from the STAC out to the EMS community.

The EMSC program in Wisconsin has been an active participant in both the EMS and trauma systems, ensuring that pediatric-specific training and equipment are incorporated therein. Although ground ambulances carry (on average) over 90% of the recommended pediatric equipment, only 25% of EMS agencies statewide carry ALL of the recommended pediatric equipment.

The passion for and dedication to emergency care in Wisconsin is evident from the high degree of volunteerism among EMS providers. At the regional level, EMS providers actively participate in the RTACs. PI, public education, and trauma prevention activities are developed and implemented by the RTACs.

Because of the demonstrated success of this regionalized approach to trauma administration through the RTACs, it is recommended that EMS similarly regionalize its administration, utilizing the same regions and, if possible, the current RTACs for this purpose. This would greatly facilitate the coordination between the EMS and trauma programs. It would also streamline the lines of communication from the state to the local EMS agencies for both trauma and EMS issues.

RECOMMENDATIONS

- **Increase the State Emergency Medical Services (EMS)/Trauma Medical Director position to half time (0.5 FTE).**
 - **Increase the interface with and support of local EMS medical directors.**
 - **Attend each State Trauma Advisory Council and EMS Advisory Council meeting.**
 - **Participate at least yearly in Regional Trauma Advisory Council (RTAC) meetings.**
 - **Engage fully in trauma system and disaster preparedness activities.**
- Regionalize EMS to be consistent with the RTAC boundaries.
- Use RTACs to implement trauma system *and* EMS initiatives.
- Provide ex-officio RTAC representation to the EMS Advisory Board.
- Hire or contract a full-time registrar or data analyst.
- Develop joint trauma and EMS state-level performance improvement initiatives.
 - Begin joint EMS and trauma performance improvement activities immediately.
- Pursue 100% compliance with Emergency Medical Services for Children-recommended pediatric training and equipment for ambulances.

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 interfacility 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 dedesignation.

Designation by the lead agency should be restricted to facilities meeting criteria or statewide 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 nondesignated 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

The number and distribution of acute care hospitals seems to be acceptable to the trauma stakeholders present at the TSC visit. However, no information is currently available for the TSC team or DHS to objectively verify that impression. Data on the volume distribution and patient flow is essential for determination of appropriate location and level of classified hospitals and the trauma services they provide. Absence of these data jeopardizes the ability to initially and subsequently evaluate whether the right services are available in the right location and whether the right patient is getting to the right place in the right amount of time – the fundamental goal of a trauma system. Such data may, or may not, be available from a trauma registry database. Initially, it may require analysis of hospital discharge dataset which contains diagnosis and procedure codes along with discharge disposition.

The Wisconsin Trauma System is well on its way to developing and operating an inclusive trauma system. At this time 122 of 127 acute care facilities have agreed to be classified as Level I, II, III, or IV trauma care facilities. Classification as a Level I or II is contingent upon verification of that level by the ACS. Level III and IV hospitals will be classified through a DHS administered process utilizing 19 in-state physician reviewers who have recently been trained by ACS Verification Review Committee (VRC) staff. DHS classification criteria are based on the 1999 version of the ACS *COT Resources for the Optimal Care of the Injured Patient*, and do not reflect the most current recommendations for Level III and IV centers. The site review process conducted to classify hospitals mimics the process used by the VRC, and it is heavily focused on structure and process rather than outcome. The classification review process in Wisconsin should, over time, evolve to a predominantly outcomes-based exercise utilizing benchmarked

data and template performance metrics that can be generated from the trauma registry and other sources.

Wisconsin has a goal of 35 Level III and IV hospital classification site visits set for the coming year. The proposed classification and re-classification process is too ambitious and unrealistic in the opinion of the reviewers. A review of applications is planned to determine whether a site visit is required. However, the application review process, including who would make the determination of need for a site visit, was not reported to the TSC team. Regardless, it may be ill advised to omit an on-site visit to reclassify the hospitals since this will be the first reclassification for the hospitals. Given the intent to have two reviewers and the State Trauma Coordinator travel to the on-site reviews, the logistics of coordinating busy schedules of the physicians, preparation for a visit, travel time, and post-visit report preparation limit the number of on-site visits in which the State Trauma Coordinator can participate and still have some time to fulfill her other responsibilities.

The current classification scheme is best described as “open”. For example, each facility may voluntarily elect to apply for classification at any level, regardless of the need for service in that catchment area (e.g., associated with the proximity of other trauma hospitals, patient volume, demographics, geography, or injury epidemiology). Further, the strict adherence to criteria in the *Resources for the Optimal Care of the Injured Patient* may cause some hospitals to “over classify” and possibly attempt to utilize bypass or obtain “waivers” to avoid being perceived as non-compliant with classification. Wisconsin thus risks having variable services on a regular basis (e.g. Level III by day, Level IV by night or weekend). As a result, EMS providers could potentially transport a patient needing Level III services to a Level III trauma facility that does not have the appropriate resources for the specific injury at that given time. This also hinders appropriate distribution of services. For example, the TSC team heard discussions that the participants at the TSC visit believe that while the distribution of various facilities (particularly Level I and II trauma facilities) may be appropriate, inadequate Level III trauma facilities may exist in the northern part of the state. As already mentioned, there is no objective information available at this time to confirm the appropriate distribution of trauma facilities, and further, to determine whether patient outcome is compromised by the current distribution and levels of classification.

The under- and over-classification of trauma facilities allowed by the open classification system appears to be driven in part by market factors. It was reported that a number of Level III-capable facilities without a true commitment to major trauma care are hesitant to classify as a Level IV due to a concern over for loss of market share (particularly hip fractures incurred by falls from standing) or reputation in the community. These hospitals may apply for Level III classification but may not consistently maintain Level III classification requirements. Other hospitals may choose to under-classify or not participate due to the absence of market share concerns and lack of incentives associated with participation at the optimal level. Once again, this type of organizational behavior reflects the impact and implications of “home rule” and the absence of enforcement of criteria on trauma system uniformity.

There seems to be some ambiguity revolving around the concept of an inclusive trauma system. This can be viewed from two perspectives which inter-relate.

Inclusivity Related to Characteristics of Patient Injury

First, there is inclusivity based on the characteristics of the patient injury, (e.g. minor injury with a sprained ankle, minor laceration, or rib fracture versus a severe injury from a high speed crash with hypotension, a Glasgow Coma Score (GCS) of 12, and a grade IV splenic injury). Modifying or clarifying the definition of a “trauma” patient allows some corresponding modulation of which patient can be treated at which level of classified or unclassified hospital. For example, excluding isolated hip fractures incurred from a standing height fall from the definition of a trauma patient may eliminate the issue of inappropriate over-classification described earlier.

Likewise, some modifications of the policy advocating strict adherence to the ACS criteria for hospital classification based on evidence may help to avoid a “force fit” philosophy and the trauma system controversies that accompany it, e.g., over- and under-triage, and over- and under-classification. For example, some evidence suggests that the physical presence of a neurosurgeon is not necessary to safely care for a patient with a GCS of 12 found to have a small subarachnoid hemorrhage, particularly in the era of tele-radiography and tele-medicine. However, the patient certainly needs an ICU or a close observation unit so a health care provider can closely monitor neurologic status for demise and effect rapid transfer at that time as appropriate.

Regarding the need for the immediate availability of general surgeon at Level III classified facilities; data are needed to determine if this is an appropriate criterion. Trauma registry data could be reviewed to determine the number of trauma laparotomies done at Level III applicant hospitals within an hour of arrival, particularly in patients presenting with hypotension. Does the data analysis justify continuous immediate availability of a general surgeon and or support staff at all times from a cost/benefit or appropriate resource utilization and allocation standpoint? What if appropriate surgical services are available within one hour by some mode of transportation? It may be worth making these types of queries initially and as the system matures and additional data become available.

Inclusivity Related to Hospital Participation

Inclusivity may also be viewed from the perspective of hospital participation, both from a clinical care and an administrative perspective. All hospitals are part of a “de facto” trauma/injury care system in some fashion. Not all necessarily have to provide care to “trauma patients” routinely. Even if not classified and required to submit data or participate in the RTAC process, hospitals will occasionally receive patients who meet trauma patient criteria for various reasons, such as private transportation. The trauma system needs to capture information about these patients, the circumstance of the health care encounter, and their outcome. Trauma must be considered a reportable public health disease or condition. Thus, all patients presenting with the disease – as defined by the trauma system – must be reported to DHS much the same as tuberculosis and child abuse. This would seem to be within the purview and authority of the DHS. This is one way to mandate inclusion of all hospitals, at least from the standpoint of data submission. Obviously, a tailored and minimal dataset would have to be developed for the unclassified hospitals to enter data into the trauma registry.

Incentives and Disincentives to Participate

Few, if any, incentives exist for agreeing to be a classified trauma facility and provide care at the level of classification. Conversely, no meaningful and enforced disincentives exist for noncompliance with classification criteria once classified or for choosing not to be classified. The one viable incentive for classified trauma facilities is the potential to collect trauma activation fees. The current number of hospitals capturing trauma activation fees and their reimbursement rate was unknown, but may be quite variable.

Some states (e.g., Maryland) have set a higher preferred, reimbursement rate for public aid patients treated at designated trauma centers. This provides an incentive for hospitals to be designated and participate in the trauma system. Trauma centers are reported to save lives and money, so it could be in the purview and best interest of state government to consider this type of incentive for trauma system participation. Another alternative is the creation of a dedicated funding source that would potentially make some funds available directly to classified trauma centers (Illinois model). Use of these trauma center allocations

could be restricted (directed toward a specific purpose as directed by DHS) or unrestricted (directed to the general coffers of the hospital).

Disincentives for noncompliance with trauma classification criteria or choosing non-classification or nonparticipation could potentially include loss of hospital licensure (e.g., hospital licensure could be tied to trauma system participation, even if only for data submission). Another disincentive might involve prohibiting EMS transport of injured patients to nonparticipating hospitals.

The state has 59 critical access hospitals, and all are important in the Wisconsin trauma system. Funds are available to support these hospitals to assume their essential role as the initial providers of trauma care and as a major portal of patients into the trauma system. It was unclear to the TSC team whether the Rural Hospital Flexibility (FLEX) grant program funds available from the Office of Rural Health have been considered or used to incentivize trauma system participation by these hospitals.

Little concern was expressed regarding the number, distribution, outcomes, system participation and leadership of Level I and Level II trauma facilities. Their role appeared to be relatively well defined, understood and fulfilled. Some concern was expressed regarding the availability of acute care floor beds; however, it was reported that this does not limit the ability to admit new patients. A theory that this shortage of acute care beds could be caused by over-triage or transfers from Level II, III and IV trauma facilities was refuted, however no data exist to objectively support this denial. The availability of long term acute care and rehabilitation resources was considered to be adequate and did not significantly increase acute care hospital lengths of stay.

Wisconsin patients are transported across state lines for treatment at neighboring trauma centers. The volume of this out-of-state trauma care is not known. Currently out-of-state trauma centers are not formally a part of the Wisconsin classification system, and it is not clear whether they could become integrated at a future date.

RECOMMENDATIONS

- **Clearly define criteria for acceptable injury admissions to Level III and Level IV trauma facilities.**
- **Monitor and enforce criteria for all trauma facility classifications.**
- Consider preferential or increased reimbursement to classified trauma facilities for care of patients covered by Wisconsin public insurance programs as an incentive for hospital participation in the trauma system.
- Restrict the time that a Level III or Level IV trauma facility can be on bypass as a criterion for maintenance of classification status.
 - Monitor percentage of time on by-pass
 - Set a by-pass time threshold
- Consider requiring trauma classification as a condition of Wisconsin hospital licensure.
- Consider contracting a state trauma classification review coordinator to manage the logistics of the site review process.
- Assess the appropriateness of Level III and Level IV classification criteria based on relevant resource need, utilization data, patient volume and flow, and injury epidemiology data.
 - Revise the criteria if indicated.
- Find a mechanism to permit the use of the most current edition of the American College of Surgeon *Resources for the Optimal Care of the Injured Patient* as the primary trauma facility classification guide
- Seek incentives for maintenance of trauma facility classification compliance through Rural Hospital Flexibility Grant Program of critical access hospitals.
- Develop and disseminate an educational tool kit/module to maximize the charge and capture of activation fees by classified hospitals.
- Consider the allocation of some portion of a dedicated trauma fund (if established) to classified facilities as an incentive to maintain classification status at the appropriate level.

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 reimplantation). 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 nondesignated 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 interfacility transfers, the time to transfer, as well as the rates of primary and secondary overtriage 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 interfacility 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, interfacility 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 interfacility 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

The Wisconsin trauma field triage protocol is adapted from the CDC/ACS protocols with the addition of the pediatric triangle, and thus it is consistent with national standards. However, the Wisconsin field triage protocols have been inconsistently adopted by the local EMS agencies. No additional statewide triage criteria exist for special populations, such as children, severe traumatic brain injury (TBI), and spinal cord injury (SCI). Transfer of these populations tends to follow regional referral patterns for all injured patients.

Air medical transport is readily available (weather permitting) throughout the state. Most services are rotor-wing, but one fixed wing service is available. Transportation of severely injured patients from the scene to Level I or Level II trauma centers is sometimes challenging, especially in the northern rural part of the state. The majority of the ground transport agencies in this region are volunteer, and services with advanced scopes of practice (paramedic or critical care) are limited. Long travel distances result in prolonged times to arrival at the initial facility and thus delays to definitive care. The anticipated addition of critical care paramedics to the EMS system may alleviate some of these challenges.

The flow of the injured patient from Level III and Level IV trauma facilities to Level I and Level II trauma centers is expeditious. Transfer agreements between facilities are mandated, and the higher level centers are able to consistently accept patients in transfer. However, although field triage criteria exist, there are no published clinical criteria for inter-facility transfer; and Level III and Level IV trauma facilities may choose to admit patients that might otherwise meet criteria for transfer to a higher level of care. Additionally, Level IV trauma facilities may transfer patients to Level III centers, such as for isolated orthopedic injuries. Currently, the system is unable to examine outcomes of the patients that either remain at, or are transferred to, a Level III trauma facility.

The actual transport of patients between facilities faces the same challenges as the transport of patients from scene to the initial facility. The *Interfacility Transport Guidelines* published in 2006 by the Bureau of Local Health Support and Emergency Medical Services does assign accountability for safe and appropriate transport of patients to the transferring facility; however, it does not cite specific clinical criteria for transfer. The same document briefly highlights the special needs of injured pediatric patients. Unfortunately, state regulations limit the scope of practice of a highly trained individual, such as a registered nurse, to the potentially limited scope of practice of the transporting agency, such as BLS, if that individual is on the EMS agency roster.

No statewide central communications center exists that can facilitate both primary triage and secondary triage (inter-facility transfer). Effective communication is dependent upon institution to institution contact. Repatriation of patients back to their home community does exist for acute care facilities, as well as rehabilitation and nursing care facilities. Additionally, functional relationships were reported to exist with trauma centers in neighboring states, specifically Minnesota.

RECOMMENDATIONS

- **Develop and disseminate clinical criteria for inter-facility transfer of injured patients to the appropriate level of care.**
- Remove limitations that restrict the scope of practice of advanced practitioners to the scope of practice of the transporting agency.
- Link critical care paramedic licensure to Emergency Medical Services agency commitment for regional inter-facility transfer.
- Develop a statewide central communications center to facilitate the flow of injured patients from scene to the most appropriate trauma facility and for inter-facility transfer to definitive care.
 - Use disaster preparedness funds to support the cost of this initiative.

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 of 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 interfacility 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

Rehabilitation is not formally integrated into the state trauma system and rehabilitation specialists are not engaged with trauma system planning. The trauma registry does not collect any elements related to rehabilitation. It is unclear if appropriate rehabilitation resources (overall beds, specialty beds) exist within the state system, and it is unclear if excessive waiting times and delays to transfer to rehabilitation occur secondary to lack of resources. Insurance status continues to be a potential barrier for expeditious transfer.

The urban centers (Milwaukee and Madison) have rehabilitation beds, including specialty beds for pediatric, TBI, and SCI. The availability of SCI beds, especially when ventilator support is required for high level injuries, may be limited at times (e.g., the summer season). The North/Northwest region uses rehabilitation resources in neighboring Minnesota. Other regions have variable numbers of general rehabilitation beds.

The trauma system plan requires that each trauma care facility establish a mechanism to initiate rehabilitation services at the earliest stage possible upon patient admission. Level I and II trauma centers collect and submit functional independence measure (FIM) scores and Level III and Level IV trauma facilities must document early engagement of rehabilitation services during the acute hospitalization as a criterion for classification.

RECOMMENDATIONS

- Engage rehabilitation providers in the trauma system leadership and encourage their presence during the trauma system development.
- Conduct a comprehensive system assessment to evaluate the adequacy of rehabilitation resources including specialty beds (pediatric, traumatic brain injury, spinal cord injury, ventilator dependent patients).
- Add rehabilitation elements such as disposition and functional outcomes to the trauma registry in order to facilitate the evaluation of long term outcomes.

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 statewide 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. **(I-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

Wisconsin has a well-developed and well-funded Disaster Preparedness Program. This program is multi-faceted with separate hospital preparedness, public health preparedness, trauma, and state emergency management components. The system has greatly benefited from engaged and enthusiastic leadership and the resultant participation in and integration with multiple trauma and EMS related committees. This participation and integration has improved state disaster planning overall.

The Wisconsin Hospital Emergency Preparedness Program (WHEPP) is well developed with an emphasis on hospital surge capacity (including off-site emergency triage and alternate care sites) and emergency operations. The WHEPP collects information from all hospital disaster exercises statewide and reviews these reports for trends, opportunities for improvement, and best practices. This information is then disseminated back to all facilities.

On the EMS side, a robust MCI Response Plan Guide has been developed by the EMS Special Operations Committee of the EMS Advisory Board. This provides detailed guidance to EMS response agencies regarding MCI planning and organization, roles in the event of a disaster, and triage guidelines.

Trauma expert opinion was solicited in the development of both plans. This is evident in the quality of their content.

These plans were separately developed and implemented. Preparedness experts from DHS and the Division of Emergency Management should participate in the development of both plans to insure that they are consistent with and complementary to each other. To ensure input from state trauma experts, a STAC liaison should be involved in preparation and planning of the EMS MCI and WHEPP plans. The plans should be reviewed and the medical aspects approved by the STAC prior to dissemination.

Each of these plans should reference the other. They should regularly be revised, preferably simultaneously, to ensure synchronization. Full integration could be achieved by consolidation of the two plans into a single overarching medical and prehospital preparedness plan for the state.

The State EMS/Trauma Medical Director should be actively involved in disaster planning. This individual's active involvement will help ensure consistent medical planning across multiple disciplines (hospital, EMS, trauma).

According to the EMS MCI/disaster plan, the Transportation Group Supervisor at the disaster scene is to contact a pre-designated “base” hospital to report the number, type, and triage severity of the patients at the scene. The base hospital then utilizes the Wisconsin Tracking, Resources, Alerts and Communication (TRAC) system to notify other surrounding facilities and determine the best allocation of patients. This information is then relayed back to the Transportation Group Supervisor and patients are transported accordingly from the scene.

The Division of Emergency Management currently defines six emergency management regions statewide, which are similar, but not the same as the nine trauma regions in the state. A disaster/MCI is most likely to involve multiple trauma victims, therefore, trauma and MCI planning are very closely related. To better facilitate the disaster planning between EMS and hospitals in each region, the Emergency Management regions and trauma regions should be exactly aligned. The hospitals and EMS agencies already share planning and resources related to trauma regions (RTACs). Additional planning and training related to disaster preparedness would further enhance and facilitate these relationships. Further, to the extent possible, required hospital disaster exercises should be combined with planned state and regional disaster exercises to best exercise the entire system simultaneously.

WI TRAC is the communications system that is utilized in the event of a disaster. It is primarily designed to facilitate inter-hospital communication and bed tracking/availability but has the capability to be monitored or used by EMS and dispatch representatives as well. In order to enhance communications during an MCI, EMS and dispatch agencies responding to an MCI should have full WI TRAC net access. This will facilitate smooth integration of the scene and transport staff with the available hospital resources.

RECOMMENDATIONS

- Integrate the Wisconsin Hospital Emergency Preparedness Plan and the Emergency Medical Services (EMS) Mass Casualty Incident Plan.
- Increase State EMS/Trauma Medical Director involvement with state disaster planning.
- Identify a State Trauma Advisory Council liaison to participate in disaster preparedness planning.
- Consider the alignment of emergency management regions and trauma regions.
- Provide WI TRAC net access for EMS Scene Incident Command and dispatch centers.

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 development of a statewide trauma system must include a mechanism to measure, evaluate, and improve the process of care and outcomes. The PI process must involve all components of the trauma system including EMS, hospital care, inter-facility management, and rehabilitative care.

The Wisconsin trauma system leadership and stakeholders expressed the need and a strong desire to implement a systemwide evaluation and PI process. Because the trauma registry has just recently gained momentum by increased participation and the generation of reports, efforts to initiate a systemwide PI process have been hampered.

Currently, the trauma system has no systemwide plan to monitor PI within its facilities and EMS. However, Regional Performance Guidelines with selected process indicators were created to assist the RTACs with their regional PI processes. Participants at the consultation indicated that the guidelines are not used consistently throughout each region due to the lack of data from the state trauma registry.

DHS looks to the STAC for the evaluation of the trauma system. The STAC has charged the Data Management subcommittee, consisting of trauma registrars,

trauma coordinators, and physicians, to develop a state PI plan for system evaluation. Representation on the committee did not include EMS or rehabilitation; however, the subcommittee members are open to including them. The STAC, Data Management subcommittee, and EMS Advisory Board must develop well defined PI goals and initiatives for the trauma and EMS programs.

The trauma registry vendor is Digital Innovations. All classified hospitals are required to submit data to the registry. Limited support is available at the state level to oversee the trauma registry and to assist users with the software and data validation; however, the Medical College of Wisconsin's IRC has recently been contracted to do data analysis of the registry. It is the intent of DHS to begin generating reports; but at this time, it is unclear how valid or reliable the data will be in the short term.

All classified trauma facilities are required to submit data to the trauma registry, have a PI program, and attend the RTAC meetings. Unclassified facilities do not submit data or participate in RTAC meetings. This leads to a lack of oversight for unclassified facilities at the regional and state levels.

As described in the Regional Performance Guidelines, each RTAC is to have a PI process with a PI subcommittee. The TSC team was assured that all RTACs do have a PI subcommittee. This infrastructure makes the RTACs an ideal working group to drive the trauma system PI initiatives.

System issues identified by the RTACs are taken back to the STAC and DHS for resolution. Reports indicating issues and PI opportunities are provided at STAC meetings by the RTAC chair. It is unclear if loop closure is provided by DHS after corrective actions or recommendations for improvement are made by the STAC.

A few Level I and II trauma centers stated that they provide feedback to facilities that transport trauma patients to them. Others stated that they do not provide feedback due to the potential of discoverability. Chapter DHS 118 was found to have strong data and PI process protection within the trauma system, however, individual hospital activities related to hospital trauma care PI are not covered.

RECOMMENDATIONS

- **Develop a plan for trauma system performance improvement with collaboration of the Department of Health Services, the State Trauma Advisory Council, the State Emergency Medical Services (EMS)/Trauma Medical Director, and the EMS Advisory Board.**
 - **Establish an oversight committee responsible for performance improvement coordination.**
 - **Establish process and outcome indicators/filters used for system evaluation.**
 - **Identify and educate participating members about the performance improvement process.**
 - **Define the process to disseminate performance improvement initiatives and educational opportunities to all trauma system participants.**
- Ensure that the evaluation of the state trauma system is ultimately inclusive of the entire continuum of care (dispatch, prehospital, emergency department, trauma care, and rehabilitation) to fully assess the impact of trauma care on mortality, as well as morbidity.
- Ensure that all classified and unclassified facilities submit data to the trauma registry and participate in performance improvement activities.
- Ensure that enabling legislation includes non-discoverability and confidentiality of trauma system performance improvement at the local, regional and state level.
- Build upon the partnership with the Injury Research Center of the Medical College of Wisconsin for system evaluation opportunities.

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 statewide 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

In relative terms, the Wisconsin trauma system is data rich. Unfortunately, at the same time, it is also information poor. The state owns, or has access to, a wealth of critical databases including:

- Vital records
- Hospital discharge data (UB 04)
- Emergency department discharge data
- Wisconsin Violent Death Reporting System
- Crash Data
- The Wisconsin Ambulance Response Data System (WARDS) (in development)
- The Wisconsin Trauma Registry (in development)

The trauma system also has access to a wealth of expertise that could be used to turn these valuable databases into useful information for trauma system planning, promotion, PI, and evaluation. Clearly data analysis and reporting capabilities exist within the DHS (e.g. injury prevention). Additionally, two or more valuable external resources within the state include the Medical College of Wisconsin's IRC and the University of Wisconsin – Madison's CODES project. The former is important for its interest and expertise in trauma and EMS system research. The latter is equally as important for its demonstrated expertise in probabilistic and deterministic data linkage. These institutional assets are further bolstered by the expertise of key trauma leaders in conducting research in their own trauma centers.

The lack of a statewide trauma registry, or at least its reporting functions, has paralyzed the Wisconsin trauma community to one degree or another. Planning, PI, evaluation, and research efforts have been, largely, put on hold in great anticipation of the pending (within 1 week of the completion of the site visit) report writing functions that will be coming on-line.

By the trauma data group's (comprised of trauma registrars from all classifications of trauma facilities) admission, a great deal of work needs to be accomplished in the areas of data quality and standardization. Training programs and tool kits are envisioned as a method for overcoming these deficiencies. Wisconsin has no dedicated trauma registrar to assist with these essential tasks. Access to epidemiological support has been severely hampered by the current vacant position for the injury surveillance coordinator/injury epidemiologist who could work with the trauma and injury prevention programs.

The relationship with the current trauma registry vendor is described as supportive and positive, although staff did suggest that the vendor does need to be reminded from time-to-time about its contractual obligations. The trauma registry data is currently housed off-site on the contractor's server. This is seen as both a strength (data security, registry functioning) and weakness (potential denial of access to existing data).

The Wisconsin trauma registry elements are reportedly to be National Trauma Data Standard (NTDS) compliant. However, Wisconsin does not submit systemwide data to the National Trauma Data Bank (NTDB) although individual Level I and II trauma centers do submit as part of their requirement for verification by the ACS. WARDS is noted to be National EMS Information System (NEMSIS) compliant at the "gold" level. However, these data are not submitted to the NEMSIS national database.

RECOMMENDATIONS

- **Explore existing datasets to support and evaluate trauma system functions.**
 - **Describe the pattern of injury and injury cost (CODES).**
 - **Use available datasets (e.g., Hospital Discharge [UB 04], ED discharge, vital statistics) for performance improvement.**
 - **Begin this process without waiting for the Wisconsin Trauma Registry or Wisconsin Ambulance Reporting Data System databases to become fully functional or reliable.**
- Task the trauma data managers group with the identification and exploration of all existing data sets that could help inform the trauma community.
 - Explore the capabilities and interest of the Medical College of Wisconsin Injury Research Center and the University of Wisconsin, Madison Crash Outcomes Data Evaluation System (CODES) project to provide a supporting role in data analysis and reporting.

- Create a report with recommendations that identify the strengths, limitations, and costs associated with each database.
- Provide the report to the State Trauma Advisory Council and the Department of Health Services (DHS).
- Secure resources to support the efforts of the Trauma Data Managers Subcommittee to develop tools and training that will increase the validity of trauma registry data.
- Secure state trauma registrar and analysis support either through additional personnel at the DHS or through a contract with a qualified agency.
- Secure epidemiology support either through additional personnel at the DHS or through a contract with a qualified agency.

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 statewide 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

Research is occurring at the Level I trauma centers in partial fulfillment of the requirements of the ACS verification. A small portion of that research is noted to be systems-based, e.g. the use of rotor wing aircraft in trauma. Substantial research expertise exists in the state at the trauma centers, and within a variety of academic settings. The Medical College of Wisconsin's IRC is a well-established research entity in EMS and trauma-related issues.

The trauma system stakeholders have not yet developed a list of research questions of interest, nor have they developed a formal research agenda. While it is common for a trauma system at this stage of maturity to not have a strong research agenda, the Wisconsin trauma system is facing many challenges as enumerated in this report that could be informed by quality research.

One of the challenges facing the trauma system has been the absence of a fully functional statewide trauma registry. That hurdle may soon be overcome with the addition of report writing functions to the trauma registry. However, now that the data can be examined, the trauma system program may find that many of the fields of interest are either missing, incomplete, or highly variable. Further delay in planning a research agenda and evaluation of the trauma system while waiting for the "perfect" trauma registry should not occur. The relationship with the IRC should be cultivated and new relationships should be established so that a research agenda can be moved forward concurrent with other system priorities.

RECOMMENDATIONS

- Identify and empower a trauma systems research/evaluation task group.
 - Comprise this task group with representatives of the State Trauma Advisory Council, Regional Trauma Advisory Councils, the Department of Health Services, academic researchers, and key stakeholders.
- Develop a list of trauma system research questions that address key issues limiting the development of an evidence-based Wisconsin Trauma System.
- Develop a formal research agenda.
 - Encourage key researchers with an interest in various aspects of this agenda to secure funding to support the research efforts.

Focus Questions

Focus Question 1: How can Wisconsin strengthen integration and relationships between the trauma and EMS Systems?

An erosion of the working relationship between the trauma and the EMS programs was reported to have occurred over a number of years. During the TSC site visit, one event was identified that may have precipitated this rift – a funding plan that was perceived as biased towards one program. Perceptions become reality and the ability to trust deteriorated between stakeholders in the two programs. It is unclear if the trauma program and EMS program relationship is poor at the state, regional, or local level, or all three. It is essential that the relationship be improved.

The funding discussion may have been a problem in the past. Whatever that specific issue was should become past history. Any fresh start on identifying dedicated funding must meet the needs of multiple stakeholders and advance the Trauma/EMS system as a whole.

An EMS system cannot function effectively unless trauma care is organized. The trauma system will not be successful without a coordinated EMS response. The interest of patients is not well served by competition between programs. Both groups must work together collaboratively.

Some specific suggestions are provided, several of which relate to other areas of this report, and represent opportunities for strengthening or integrating the relationship between EMS and trauma care.

Recommendations

- Reorganize the trauma, emergency medical services, injury and violence prevention, public health preparedness, and other relevant programs within the Department of Health Services (DHS) into a single functioning unit, such as the Bureau of Emergency Health Care and Preparedness.
- Set the tone through the DHS leadership line for all staff reflecting that mutual support and collaboration begins in the lead agency, and it is expected that this priority will be communicated and acted upon with all external contacts.
- Identify the needs of all participants when a dedicated funding source is considered and do not permit one program to benefit at the expense of another.
- Revise the meeting arrangements for the State Trauma Advisory Council (STAC) and the Emergency Medical Services (EMS) Advisory Board to

prevent simultaneous meetings and work to foster effective communication between these groups.

- Obtain the services of an individual who has professional meeting facilitation skills to help both groups examine the conduct, agendas and use of time in their meetings.
- Consider a significant reduction in the length of time spent at the meetings.
- Use valuable face-to-face meeting time to make decisions, set priorities, assign tasks to be completed for the next meeting, etc.
- Create an opportunity for both the STAC and EMS Advisory Board to meet jointly and provide each other with updates about their related work.
- Focus initially on subjects of mutual interest such as assuring statewide compliance with the WI trauma field triage protocol, interfacility critical care transfer capability, etc.
- Ensure that the State EMS/Trauma Medical Director and the State Trauma Coordinator attend all meetings of both groups.
- Expand the support for and responsibilities of the State EMS/Trauma Medical Director.
 - Charge this individual with helping to facilitate communications between EMS, Trauma, Preparedness, and other players related to the overall Emergency Health Care and Preparedness System. This position is essential to rebuilding the relationship between the EMS and trauma communities.
- Enlist the help of the Regional Trauma Advisory Councils (RTACs) in strengthening the relationship between the trauma and EMS communities regionally and locally.
 - Charge the RTACs with assuring that the integration of both EMS and trauma priorities in all RTAC activities.
- Share information as the trauma registry analysis begins and the Wisconsin Ambulance Reporting Data System (WARDS) becomes more robust.
 - Identify what questions EMS has that may come from the registry.
 - Identify how WARDS can be used to inform the trauma community.
- Begin joint EMS and trauma performance improvement initiatives, seeking projects that will benefit and enhance the entire system.

Focus Question 2: Please identify recommendations to attain full participation from hospitals that either do not meet the required criteria to be a classified trauma care facility or choose not to participate.

The challenge confronting the trauma system can be framed in the following ways:

- a facility does not meet classification criteria,
- a facility cannot or will not consistently maintain services to match its classification level,
- a facility does not want to participate, or
- a facility participates at a higher or lower level than it should or could.

Trauma system leadership should be creative and proactive to avoid or reduce the frequency of these issues. Incentives and disincentives as an approach to this issue are also challenging. Some may have been proposed but are limited in their effect, potentially may not be feasible or practical, or may have been unpalatable or uncomfortable for either the trauma system leadership or the participating facility.

One approach that removes the burden of finding incentives or imposing disincentives is defining participation at a minimum level to involve submission of a limited set of data on trauma patients meeting defined criteria. This is predicated on the philosophy that an inclusive system from the hospital perspective does not imply routine provision of clinical trauma care, but it does involve submission of data on all encounters with the index disease or condition. This is a public health strategy that is accepted and followed by hospitals for other conditions of interest to the state health department, such as sexually transmitted infections, H1N1 influenza, West Nile virus, child abuse, etc. Since trauma is acknowledged as a leading public health condition, killing hundreds of people and costing more than a billion dollars every year in Wisconsin, it should arguably be a reportable condition, especially since it has a greater incidence and larger impact on society and the health care system in comparison to other reportable diseases. Declaring trauma a reportable public health condition should be within the purview and authority of the DHS. To adopt this strategy, a minimal dataset would need to be developed for unclassified hospitals along with a process for submission to the trauma registry. Several other states have developed such a minimal dataset that could be modeled. These states can be identified through the ACS or through the National Association of State EMS Officials – Trauma Managers’ Council. Additionally, a method of identifying these records and segregating them as appropriate for the purposes of analysis (e.g., NTDB submission or benchmarking) should also to be developed.

Adoption of such a strategy will not necessarily address other challenges such as the phenomenon of “classification creep” either in an upward direction (over-classification) or in a downward direction (under-classification). Over-classification may be characterized as a hospital classified at a higher level than

it is consistently capable of functioning at, or at a level not necessarily needed in its catchment area. Under-classification is characterized by a hospital being classified below its documented capability, or at a level that is not commensurate with the needs of the catchment area, trauma region, and the trauma system as a whole. Classification creep is generally driven by factors associated with hospital finances, medical staff opinions, and hospital administration commitment.

Recommendations

- Consider implementation of these options to halt classification creep issues.
 - Prohibit waivers for any classification criteria or commitments.
 - Prohibit or restrict trauma facility by-pass policies due to a temporary lack of resources required by a facility's classification level. Implementation of this restriction would require the trauma system to monitor and require reporting of by-pass situations as part of classification criteria and system performance improvement. If by-pass is not totally prohibited, then a threshold level of time on by-pass must be set (e.g. 48 hours/month, 6 days/year, or 5% of the time) and sanctions for facilities above that threshold should be determined.
- Consider the use of disincentives to promote full participation in the trauma system.
 - Link hospital licensure to participation in the trauma system classification and consistent compliance with the classification level assigned.
 - Restrict EMS transport to hospitals not in compliance with trauma system classification criteria requirements, and also place sanctions on the EMS agency that transports trauma patients to those facilities. These sanctions could potentially include but not be limited to suspension or loss of licensure.
- Consider the use of incentives to promote full participation in the trauma system.
 - Consider providing a preferential or increased reimbursement for trauma patient care by public insurance (e.g. Medicaid) when it is delivered at classified trauma facilities. Maryland uses this strategy.
 - Allocate and disburse a portion of a future dedicated source of funding support for the trauma system to each classified trauma facility. A formula taking into account volume, uncompensated care, and injury severity can be created or funds could be allocated in equal amounts to all classified facilities. The funds could be disbursed in a directed fashion for the specific benefit of the trauma program at that facility, or to accomplish system goals and objectives as determined by DHS (Arkansas has taken

this approach). It might also be unrestricted and directed toward the general coffers of the hospital (Illinois has taken this approach).

- Explore opportunities for Critical Access Hospitals to apply for or utilize already acquired FLEX grants and Office of Rural Health Policy funding to provide resources to meet and maintain classification criteria.
- Find creative ways to direct ASPR funds toward hospital efforts to meet and maintain trauma level classification criteria requirements.

Focus Question 3: How should Wisconsin continue to develop a strong trauma system while hospital administration is finding it increasingly difficult for staff to participate as site reviewers or to attend state trauma meetings? Included in your recommendations, please consider the necessity to hold some meetings in person rather than utilize technology available.

The current participation demand of key stakeholders is significant, as STAC members are expected to spend a minimum of ten meeting days annually in the course of their duties. This does not include any additional time devoted to other aspects of trauma system planning and evaluation, such as participating in RTAC meetings and completing assigned STAC responsibilities. Similarly, with a core of 19 reviewers and a projected schedule of 35-40 site visits per year for the next three years, at least some members of the Classification Review Committee (CRC) could be burdened with similar workloads. In some cases, STAC members may also be serving on the CRC which further encumbers their schedule. On top of the actual meeting or classification review time, substantial travel is involved. These dedicated volunteers are to be commended for their commitment to the Wisconsin trauma system.

One of the challenges plaguing these stalwart volunteers is inefficiency and repetitiveness. Both issues are easily correctable. First and foremost each meeting needs to have an established agenda with time limits attached to each topic or business item. Second, an accurate and retrievable record of each meeting needs to be maintained. The first item is the responsibility of the chairperson, in collaboration with staff. The second is, clearly, a staff function. The development of a strategic plan to focus and guide activities (e.g., the development of the Trauma System Plan) will also assist in the prioritization of action items on the agenda.

In the TSC team's collective experience, both the frequency and length of the STAC meetings is much higher than usual. While it is understood that economies of travel are involved in having people stay overnight for a two-day meeting rather than driving back and forth for multiple one day meetings, the burden of the two-day meeting format should be reconsidered. With improved efficiencies in the agenda and record keeping, it may be possible to significantly condense the meeting length. Even if the two day format is retained, consideration needs to be given to reducing the total number of face-to-face meetings each year. Additionally, accommodations should be made so that members can participate in at least two meetings per year by video or web-based teleconferencing.

The burden of site classification visits should also be examined. While the team agrees that on-site visits are necessary for this round of visitations, the process may need to be extended over 4 or 5 years rather than every 3 years. This would allow for the cogent development of a visitation rotation schedule that might involve 15-20 visitations per year, down from the 35-40 estimates. Another option may be to consider doing two on-site visits during the same trip in areas where two facilities are close to each other. Although this make for a long extended day, it may be a more efficient and feasible use of the review team's time. A reduction in individual surveyor expectations may relieve some degree of burden in this area. The implementation of "paper-based" reviews while attractive as a means of reducing the personnel burden for site visits should be formally evaluated to determine the degree of agreement between paper-based and on-site reviews. Additionally, trauma facilities receiving classification through the paper-based process should be subject to unanticipated visits from DHS staff or CRC leadership. This would allow validation and confirmation of paper-based findings at the convenience of staff and volunteers.

Clearly, the technologies exist to reduce the burden as it pertains to travel. While the need and preference for face-to-face meetings is understood, the establishment of processes and resources to support video teleconferencing should be explored. Several states have used such technologies well, not only to conduct the administrative business of state and regional level advisory bodies, but in the performance improvement process as well. While it is true that the technology may limit interaction and discussion at the outset, over time the barriers of remoteness begin to fade. This is particularly true when shared workspaces are used such as those associated with low cost desktop applications such as GoToMyMeeting™.

Recommendations

- Reduce the number and length of State Trauma Advisory Council meetings.
- Increase the efficiency of all meetings by agenda development, persistent adherence to the agenda, and focus on the priorities derived from the trauma system plan.
- Create a site classification scheduling model to determine the actual burden of reviews on each site classification team member.
- Increase the number of site classification reviewers if necessary to ensure no single reviewer is overly burdened by the short term schedule.
- Determine if paper-based reviews are valid and reliable measures of assuring compliance with trauma facility structure and process criteria between on-site visitations.

- Consider staggering paper-based and on-site reviews, or parse the opportunity through a random lottery drawing.
- Conduct an inventory of televideo conferencing options.
 - Test those options to determine their utility and value.
- Invest systemwide in low-cost workspace sharing software to support remote meeting participation.

Acronyms Used in the Report

ACEP – American College of Emergency Physicians

ACS – American College of Surgeons

ALS – advanced life support

ASPR – Assistant Secretary for Preparedness and Response

BIS – benchmarks, indicators, and scoring

BLS – basic life support

BTLS – Basic Trauma Life Support program

CDC – Centers for Disease Control and Prevention

CODES – Crash Outcome Data Evaluation System

CRC – Classification Review Committee

DHS – Department of Health Services

DOT – Department of Transportation

EMS – emergency medical services

EMSC – emergency medical services for children

EMSS – Emergency Medical Services Section

EMT – emergency medical technician

ENA – Emergency Nurses Association

FIM – functional independence measure, uniform data system for medical rehabilitation

FLEX– Rural Hospital Flexibility Program

FTE – full time equivalent

GCS – Glasgow Coma Score

GPR – General Purpose Revenue

HRSA – Health Resources and Services Administration

IRC – Injury Research Center

IVPP – Injury and Violence Prevention Program

MCH – Maternal and Child Health

MCI – mass casualty incident

NAEMSP – National Association of Emergency Medical Services Physicians

NEMSIS – National EMS Information System

NHTSA – National Highway Traffic Safety Administration

NTDB – National Trauma Data Bank

NTDS – National Trauma Data Standard

PALS – Pediatric Advanced Life Support program
PEPP – Pediatric Education for Prehospital Providers program
PHTLS – Prehospital Trauma Life Support program
PI – performance improvement
PRQ – prereview questionnaire

RTAC – regional trauma advisory councils

SCI – spinal cord injury
STAC – State Trauma Advisory Council
STEMI – ST Elevation Myocardial Infarction
STIPDA – State and Territorial Injury Prevention Directors Association

TBI – traumatic brain injury
TRAC - Wisconsin tracking, resources, alerts and communication
TSC – trauma system consultation

UB – uniform billing

VRC – Verification Review Committee

WARDS – Wisconsin Ambulance Run Data System
WHEPP – Wisconsin Hospital Emergency Preparedness Plan
WISH – Wisconsin Interactive Statistics on Health
WVDRS – Wisconsin Violent Death Reporting System

Appendix A: Methodology

The Wisconsin Department of Health Services (DHS) requested this trauma system consultation, which was conducted under the auspices of the American College of Surgeons (ACS), Trauma System Consultation program (TSC). The multi-disciplinary site visit team consisted of: two trauma/general surgeons, one emergency physician, a State EMS director, a trauma program manager, a rural trauma and prehospital specialist, and a public health and injury specialist. Biographical sketches for team members are included as Appendix B of this report.

Prior to the visit, the TSC team reviewed the ACS Pre-Review Questionnaire (PRQ) completed by the State Trauma Coordinator with input from other sources. The format of this 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*. The TSC team also reviewed a number of related supporting documents provided by the DHS and information available on state government websites.

The TSC team convened in Madison, Wisconsin on June 27-30, 2011, to review the State of Wisconsin trauma system. The meetings during the four-day visit consisted of plenary sessions during which the TSC team engaged in interactive dialogue with a broad range of representative trauma system participants. Informal discussions also occurred with the participants, and time was devoted to questions and answers. During the TSC, the review team met in sequestered sessions for more detailed review and discussion, and for the purpose of developing a team consensus on the various issues, preparing a report of their findings, and developing recommendations for future development of the trauma system in Wisconsin. This report was developed independently of any other trauma system consultations or assessments.

The primary objective of this ACS trauma system consultation is to guide and help promote a sustainable effort in the continuing development of an inclusive system of trauma care for the State of Wisconsin.

Appendix B: Biographical Sketches

Review Team Biographical Sketches

THOMAS J. ESPOSITO, MD, MPH, FACS- TEAM LEADER

Thomas J. Esposito, M.D., M.P.H. is a Professor of Surgery at Loyola University, Stritch School of Medicine in Maywood, Illinois. He is the Director of the Division of Trauma, Surgical Critical Care and Burns in the Department of Surgery at Loyola University Medical Center. Additionally, he serves as the Director of Injury Analysis and Prevention Programs at the Loyola University Burn & Shock Trauma Institute. He is an attending surgeon at Loyola University Medical Center.

Dr. Esposito received his medical degree from Georgetown University School of Medicine in Washington, D.C. and a master's degree in Public Health from the University of Washington School of Public Health and Community Medicine in Seattle, Washington. He did his surgical training at St. Elizabeth's Hospital in Boston, Massachusetts. Following his residency, Dr. Esposito completed fellowships in Critical Care and Traumatology at the Maryland Institute for Emergency Medical Services Systems, and in Injury Prevention at Harborview Injury Prevention and Research Center in Seattle.

A Diplomate of the American Board of Surgery, Dr. Esposito has a Certificate of Added Qualifications in Surgical Critical Care. He is a Fellow of the American College of Surgeons and Vice-Chair of the Chicago Committee on Trauma of the ACS. He is also a member of the national ACS/COT.

Dr. Esposito's professional organization memberships include, the American Trauma Society, the American Association for the Surgery of Trauma, the Eastern Association for the Surgery of Trauma, the National Association of EMS Physicians, the Chicago Metropolitan Trauma Society, Society of University Surgeons, the Society for Academic Surgery, Society of Critical Care Medicine, the American Public Health Association and the Illinois Public Health Association, among others.

He has been appointed to the Prevention Committee of the AAST and EAST as well as to both organizations' committees on the Future of Trauma Surgery. He serves as the Chair of the AAST Injury Assessment and Outcome committee as well as the EAST Task Force on Research Related Issues and is a member of the Illinois EMSC Advisory Council. He is a consultant to the US Department of Transportation, and a number of states on trauma care system issues. He has served as a trauma center and trauma system site reviewer for the ACS, NHTSA and the states of Mississippi, Maryland, North Carolina and Pennsylvania. He is active in the governance of the Illinois State Trauma System and is Co-Chair of the Illinois Trauma Advisory Council Sub-Committee on Legislative Affairs. He was a recipient of the NHTSA Public Service Award in 1993 and the Florida Committee on Trauma, David Kreis Visiting Trauma Professor Award in 2005. He serves on the Board of Directors for the Critical Illness and Trauma Foundation in Bozeman, Montana, and the SAFEAMERICA Foundation. He also has served as Medical Director of the Rural Emergency Medical Services and Trauma Technical Assistance Center and is the AAST liaison to the Brain Trauma Foundation.

In addition to clinical and teaching duties, Dr. Esposito is active in many trauma related studies and projects. He is the recipient of over \$2,000,000 in federal and private grants to conduct these activities. He has a particular interest in trauma prevention strategies, trauma systems and their development and evaluation. He also has expertise in the

area of trauma data systems and outcomes research. He has numerous trauma related publications and presentations to this credit.

JANE W. BALL, RN, DRPH

Dr. Jane W. Ball served as the Director of the National Resource Center (NRC) at the Children's National Medical Center in Washington, D.C. from 1991 through 2006. The NRC provided support to two Federal Programs in the U. S. Department of Health and Human Services' Health Services and Resources Administration (HRSA): the Emergency Medical Services for Children (EMSC) Program and the Trauma-Emergency Medical Services Systems Program. As director of the NRC, she coordinated the support provided to the Federal Program Directors as well as the provision of technical assistance to state grantees. Support to the Federal Program Directors often included meeting facilitation, preparation of special reports (such as the Model Trauma Systems Evaluation and Planning document), and consultation on Program issues. Technical assistance often included strategic planning, providing guidance in securing funding, developing and implementing grants, developing injury prevention plans and programs, building coalitions, shaping public policy, conducting training, and producing educational resource materials.

Dr. Ball has authored numerous articles and publications as well as several health care textbooks, including *Mosby's Guide to Physical Examination* (7 editions), *Child Health Nursing* (2 editions), *Pediatric Nursing: Caring for Children* (5 editions), *Maternal and Child Nursing Care* (3 editions), and *Pediatric Emergencies: A Manual for Prehospital Care Providers* (2 editions). One of these texts, *Pediatric Nursing: Caring for Children*, received the 1999 and 2001 Robert Wood Johnson Foundation Last Acts Coalition Outstanding Specialty Book Award. *Child Health Nursing* was recognized as an American Journal of Nursing Book of the Year in 2010. As an expert in the emergency care of children, Dr. Ball has frequently been invited to join committees and professional groups that address the unique needs of children.

Dr. Ball served as the President of the National Academies of Practice, an organization composed of distinguished health care practitioners from 10 disciplines that promote education, research, and public policy related to improving the quality of health care for all through interdisciplinary care.

Dr. Ball graduated from the Johns Hopkins Hospital School of Nursing. She obtained her master's degree and doctorate in Public Health from John Hopkins University School of Hygiene and Public Health. She is a Certified Pediatric Nurse Practitioner. She received the Distinguished Alumni Award from the Johns Hopkins University in 2010.

AMY EBERLE, RN, BSN, EMT

Amy Eberle has worked as the State Trauma Coordinator with the Division of Emergency Medical Services, North Dakota Department of Health for four years. She has also worked at the St. Alexius Medical Center in Bismarck, North Dakota on the Neuro/Surgical floor for the past 8 years.

Amy is the current Director for the State Trauma Manager North Central Region. She is a member of the ND COT, ND EMSC advisory committee, ND EMS advisory committee,

Society of Trauma Nurses, and the ND ENA. She is also a part of the planning committee for the annual ND State Trauma Conferences.

Amy has been a strong advocate for an all-inclusive trauma system within ND. She has been involved in many legislative activities in regards to enhancing the ND trauma system and as a result has been very successful in getting legislature to pass a bill that requires all hospitals in ND to be trauma designated at some level.

Amy is a Registered Nurse with a Bachelor in Science degree. She graduated from the University of Mary, Bismarck ND. She was certified as an EMT-Basic in 2006. She also obtained certification as a TNCC instructor and has attended numerous conferences, courses, and workshops on EMS, Trauma and disaster planning and response. Amy is also a part of the North Dakota Department of Health Emergency Response and Preparedness incident command team.

RAJAN GUPTA, MD, FACS, FCCP

Dr. Rajan Gupta is an Associate Professor of Surgery at Dartmouth Medical School and Chief of the Division of Trauma and Acute Surgical Care at Dartmouth Hitchcock Medical Center. He earned his medical degree at Boston University, and did his general surgical residency at Dartmouth Hitchcock Medical Center. He subsequently did a fellowship in traumatology and surgical critical care at University of Pennsylvania. He is board-certified in Surgery with added qualifications in Surgical Critical Care.

Dr. Gupta is the Director of Trauma at Dartmouth, an ACS verified Level I trauma center. He is a member of the NH Trauma Medical Review Committee, and was actively involved with a major revision of the NH State Trauma System Plan. He is the State Chair for NH for the American College of Surgeons Committee on Trauma, and serves on the Rural Trauma Committee as well as the Trauma Systems Evaluation and Planning Committee for this organization. He is also Chair of the Rural Trauma Committee of the Eastern Association for the Surgery of Trauma. Additionally, he serves on the Trauma Systems Committee for the American Association for the Surgery of Trauma.

Dr. Gupta has presented at national as well as international forums on various topics in traumatology, and has authored numerous manuscripts and chapters on trauma, critical care, and acute care surgery.

W. DANIEL MANZ, BS

W. Daniel Manz is the Director of Emergency Medical Services for the Vermont Department of Health. He has been in emergency medical services (EMS) for more than 30 years and has worked as an emergency medical technician (EMT), volunteer squad leader, hospital communications technician, EMS regional coordinator, EMS trainer, and State EMS Director. Much of his work has been in rural areas including Maine and Saudi Arabia. Mr. Manz has been active in the National Association of State EMS Officials, serving as their President for 2 years, liaison to the American College of Surgeons, and representing the association for several national projects including the EMS Agenda for the Future, the HCFA Negotiated Rule Making process, and the recently released National EMS Scope of Practice Model. He is currently Chairperson of

the National Association of State EMS Officials task force on implementation of the EMS Education Agenda for the Future. He is also working with the CDC on an India-US Joint Working Group for Implementation of a Road Traffic Injury Prevention and Control Project. Mr. Manz remains active as a volunteer EMT-Intermediate with the local ambulance service in his community. Mr. Manz served on the Institute of Medicine's ED Subcommittee for the Future of Emergency Care within the U.S. Health Care System project.

NELS D. SANDDAL, PHDC MS, REMT-B

Mr. Sanddal is currently the Manager of the American College of Surgeons (ACS) Trauma Systems and Verification Programs. Prior to his current position at the (ACS), Mr. Sanddal served in a consultant role for the ACS Trauma Systems program, participating as a reviewer in over 20 consultations. Previously, Nels served as President of the Critical Illness and Trauma Foundation (CIT), in Bozeman, Montana. CIT is a non-profit organization dedicated to improving the outcomes of people who are injured in rural America through programs of prevention, training, and research. He also served as the Director of the Rural EMS and Trauma Technical Assistance Center which was funded by the Department of Health and Human Services, Health Resources and Services Administration. Mr. Sanddal worked as the training coordinator for the EMS and Injury Prevention Section of the Montana Department of Public Health and Human Services in the late 1970's. He has served as the Chairperson of the National Council of State EMS Training Coordinators and as the lead staff member for that organization, as well as the National Association of EMT.

Mr. Sanddal has been a co-investigator for six state or regional rural preventable trauma mortality studies and has conducted research in the area of training for prehospital and nursing personnel as well as in rural injury prevention and control. He is a core faculty member for the NHTSA Development of Trauma Systems course and has conducted several statewide EMS assessments for NHTSA. Mr. Sanddal served on the IOM Committee on the Future of Emergency Care in the U.S.

He received his EMT training in Boulder, Montana, in 1973 and has been an active EMT with numerous volunteer ambulance services since that time. When he is at his home in Montana, Nels responds with the Gallatin River Ranch Volunteer Fire Department where he serves as the Medical Officer and Assistant Chief.

He completed his undergraduate work at Carroll College, received his Master's degree in psychology from Montana State University and is currently completing his doctorate in Health and Human Behavior from Walden University.

PETER P. TAILLAC, MD, FACEP

Dr. Taillac completed medical school at Tulane University School of Medicine in New Orleans, Louisiana. He completed an Emergency Medicine residency at Brooke Army Medical Center. He is Board Certified in Emergency Medicine and is a Diplomate of the American College of Emergency Physicians. He is an Associate Clinical Professor in the Department of Surgery, Division of Emergency Medicine at the University of Utah School of Medicine. He is the Medical Director for the Utah Bureau of Emergency Medical Services and Preparedness and serves as the State EMS Medical Director for the State of Utah. He also is the Medical Director for West Valley City, Utah Fire and EMS. Dr. Taillac has over 20 years of experience in EMS medical direction and as an Emergency Medicine educator. He is an active member of the Medical Directors Council of the National Association of State EMS Officials and the National Association of EMS Physicians. Additionally, he is a member of the Utah Army National Guard, where he holds the rank of Colonel and serves as the State Surgeon. He has served combat medical deployments in Iraq and Afghanistan.

Appendix C: Participant List

American College of Surgeons
Trauma System Consultation
June 27th-30th, 2011
Madison, WI

Participant List

Name	Organization
Alex Hartzman	DPH Preparedness
Amy Eberle RN	ACS
Amy Stacey	UW Hospital
Angie Papenkopf	Grant Regional Lancaster
Anita Jahner	St. Elizabeth Hospital-Appleton
Ankush Gosain	UWHC
Annette Bertelsen, RN	Froedtert
Becky Turpin	DHS, DPH
Bill Bazan	Community Representative, Region 7
Billee Bayou	WIDPH
Bob Millholland	UHWC
Bob Nack	FVRTAC
Bob Smith	GRHC
Brenda Fellenz, RN	Ministry St. Josephs
Brian Litza	DHS, EMS
Brooke Lerner	MCW-Emergency Medicine
Cecile D'Huyvetter, RN	Gundersen Lutheran
Charles Cady, MD	State of WI and Medical College of WI
Cheryl Paar, RN	MCHS-LaCrosse
Cinda Werner, RN	Children's Hospital of Wisconsin
Dan Diamon	LSRTAC

Dan Manz	ACS
Dan Williams	SCRTAC
Danielle Bernacci	WFHC-St. Francis
Dave Taylor	New RTAC
David Schultz, MD	Theda Clark
Deb Martin-Lightfoot, RN	UW Health
Denise Hagen	Aurora Burlington & Kenosha
Dennis Tomczyk	Monticello
Denny L. Thomas	Marshfield/WHEPP
Diane Christen	DPH
Don Neuert	DPH Preparedness
Dr. Anderson	DHS
Dr. Katcher	DHS
Gaby Isklander, MD	Marshfield
Gary Rowland	Aurora Lakeland
Greg Breen	SWRTAC
Holly Michaels	ACS
Jaime Wayne Street	Mayo Health System
Jan Devore	DPH Preparedness
Jane Ball, RN	ACS
Jeff Grimm	Theda Star Air Medical
Jeffrey Davis	DPH
Jennifer Bradford	ACS
Jennifer Ullsvik, JD	DPH OPPA
Jim Austad	Oshkosh Fire/State EMS Board

Judy Jones, RN	NN/WRTAC
Judy Warmuth	Wisconsin Hospital Association
Karen Brasel, MD	MCW, Froedtert
Karen Keys, RN	WMH
Kelly Jung, RN	Theda Clark
Kenneth Yen	Children's Hospital of Wisconsin
Kevin Moore	DHS/ Sec. Office
Lanna Zobel	Community Memorial Menomonee Falls
Laura Cassidy	MCW
Linda Hale	DHS, DPH
Lisa Pentony	DPH-Preparedness
Lois Sater	WHEPP
Lori McKibben, RN	Mercy Hospital- Janesville
LuAnn Reuter	Columbus Hospital
Lynne Sears, RN	UW Hospital
Marianne Peck, RN	State Trauma Coordinator
Marisa Roembke, RN	DHS
Mary Albright	Ohio Medical School
Mary J. Anderson	UW/AFCH
Mary Young	DHS
Melissa Pierce	Aurora Sinai Medical Center
Melody Mulhall	UW/AFCH
Michael Foley, MD	Mercy
Michael Fraley	NCRTAC
Michael Kim	EMSC

Michael Sloan	UW/Meriter
Mike Brenner	Medical Student
Mike Trelow	Ministry St. Joseph-Marshfield
Mollie Ritchie	WFHC-St. Joseph Milwaukee
Nan Turner	
Nels Sanddal	ACS
Nirav Patel	GLMC LaCrosse
Paul Wittkamp	DPH
Peter Taillac, MD	ACS
Rajan Gupta	ACS
Rebecca Jacobs	St. Mary's Sun Prairie Emergency Ctr
Riccardo Galella	MCW
Robb Whinney, MD	Mercy
Shari King	St. Mary's Hospital, Madison
Sheryl Krause	St. Mary's-Madison
Shirley Bostock	DPH
Staci Burns	ST. Mary's Madison
Steven Porter	Johns Hopkins
Susan LaFlash	DPH-Injury Prevention
Terri Kelm	Columbus
Terry Nichols	Ministry St. Joseph's Hospital
Thomas Esposito, MD	ACS
Tim Size	RWHC
Tracey Froiland	WHEPP, Thedacare