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**Mississippi
TRAUMA
System of Care Plan**

Developed by the:

Bureau of Acute Care Systems

Mississippi State Department of Health

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Introduction

Introduction

Legal Authority and Purpose

Section § 41-3-15 of the Mississippi Code 1972 Annotated, as amended, provides the general powers, duties and authority of the State Board of Health and certain powers of the Mississippi State Department of Health. Included in this is the State Board of Health's powers and duties to formulate the policy of the State Department of Health regarding public health matters within the jurisdiction of the department; to adopt, modify, repeal and promulgate, after due notice and hearing, and enforce rules and regulations implementing or effectuating the powers and duties of the department under any and all statutes within the department's jurisdiction, and as the board may deem necessary; to apply for, receive, accept and expend any federal or state funds or contributions, gifts, trusts, devises, bequests, grants, endowments or funds from any other source or transfers of property of any kind; and to enter into, and to authorize the executive officer to execute contracts, grants and cooperative agreements with any federal or state agency or subdivision thereof, or any public or private institution located inside or outside the State of Mississippi, or any person, corporation or association in connection with carrying out the provisions of this chapter, if it finds those actions to be in the public interest and the contracts or agreements do not have a financial cost that exceeds the amounts appropriated for those purposes by the Legislature. The State Board of Health shall have the authority, in its discretion, to establish programs to promote the public health, to be administered by the State Department of Health. Specifically, those programs may include, but shall not be limited to, programs in the areas of chronic disease and other such public health programs and services as may be assigned to the State Board of Health by the Legislature or by executive order.

The system of care approach to public health provides a functional framework for making use of resources to optimize the care of patients. The intent is to address conditions that have a significant impact on mortality and morbidity. This functional framework generally includes hospitals designated based on resources for the care of particular types of patients, destination guidelines for the transport of patients to the appropriate hospital via EMS, criteria for activation and utilization of hospital resources, data collection and data use for improving system performance. In terms of patient care, the system of care framework promotes best practices for caring for patients.

Section 41-59-5 (5), Mississippi Code of 1972, as amended, establishes the Mississippi State Department of Health (MSDH) as the lead agency to develop a uniform, non-fragmented, inclusive statewide Trauma Care system. The intent is to reduce mortality and improve morbidity associated with Trauma. To this end, the primary goal of the Mississippi Trauma Care System is to deliver the *right* patient to the *right* hospital the *first* time. Research shows that this approach decreases mortality. The Trauma Rules and Regulations adopted by the Board of Health provide standards in support of this primary goal of the Trauma System.

System Introduction

Trauma is a national public health concern. It is the fourth leading cause of death in the United States. However, it is the leading cause of death for Americans between the ages of 1 – 44. There were 136,053 deaths from unintentional Trauma in 2014. The two leading causes of unintentional deaths were motor vehicle traffic deaths and fall deaths. While the majority of those who died as a result of motor vehicle traffic were between the ages of 1 – 44, the majority of those who died from falls were aged 65 and greater. The concern associated with trauma is substantial and accounts for significant numbers of deaths each year in the population aged 1 – 44, as well as 65 and older. Elderly persons are less likely to be injured, but they are more likely to die from traumatic injuries. Trauma is also the leading cause of disability across all age groups. Moreover, the costs associated with trauma are substantial. Costs include money spent in trauma care, as well potential economic losses, i.e. lost work days or quality of life changes. The average cost of caring for a single trauma patient has been estimated at \$334,000. The total national economic impact of traumatic brain injuries alone has been estimated at \$76.5 billion dollars.

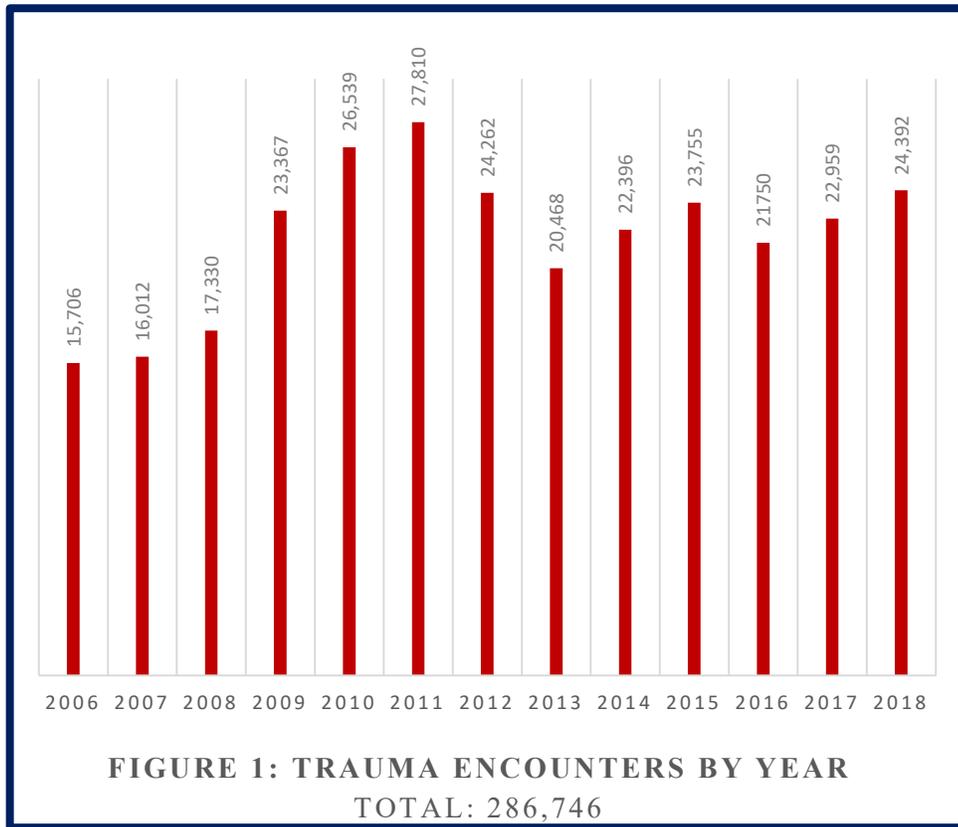
The public health community often refers to trauma as a *surgical disease*. Indeed, patients who sustain traumatic injury require specialized care, including resuscitation and surgery. The probability for a successful outcome associated with trauma is increased when the patient receives initial resuscitation and surgery in a timely manner. Based on national standards, this is facilitated by the designation of appropriate of trauma centers, the use of EMS field destination guidelines and the use of hospital trauma team activation criteria. Trauma center designation ensures hospitals have the resources to provide definitive care for specific types of traumatic injuries. EMS field destination guidelines provide a mechanism for triaging patients for transport to the most appropriate trauma center. Trauma activation criteria categorize patients according to neurological and hemodynamic status, anatomical injury and mechanism of injury and guide the decision making process for activating the hospital trauma team based on injury severity.

Mississippi Facts

According to the Center for Disease Control, unintentional traumatic injury is the leading cause of death in the United States for persons between the age of 1 – 44 (WISQARS, 2018). Mississippi is no exception to this statistic. Moreover, in 2018 there were 33,654 motor vehicle crash fatalities in the United States. 597 of these fatalities occurred as a result of injuries sustained on Mississippi roads (FARS, 2020). Motor vehicle crashes are the leading cause of death among the teenage population in the United States (CDC, Teen Driver, 2019). Mississippi ranks 5th in the nation in terms of the number of teens killed in motor vehicle crashes (“Mississippi Fatalities and Injuries for Youth and Adult Highway Crashes,” 2017). These statistics are widely circulated and well-known, but they reflect the extent to which trauma is a public health concern not only in the United States, generally, but in Mississippi, specifically.

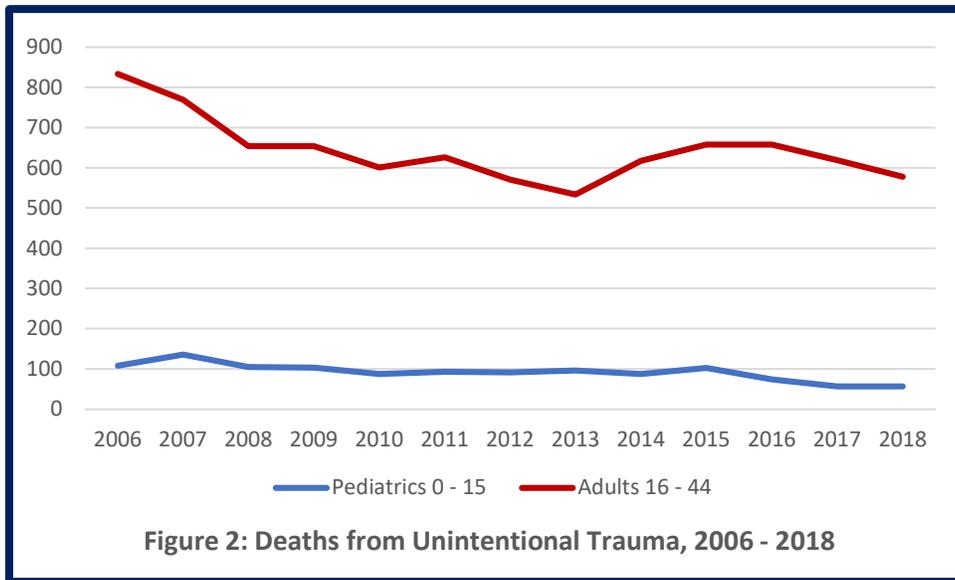
Moreover, data from the Mississippi State Department of Health registries shed further light on the extent to which trauma represents a public health concern and reflects how the Trauma System works to improve outcomes for trauma patients. Figure 1 provides the total numbers of Mississippi

Trauma Registry entries since 2006. Each entry represents an instance of trauma care for a specific patient during this timeframe. As Figure 1 shows, Mississippi’s designated trauma centers logged more than 286,746 entries in the Mississippi Trauma Registry during the period. (MS Trauma Registry, 2020).



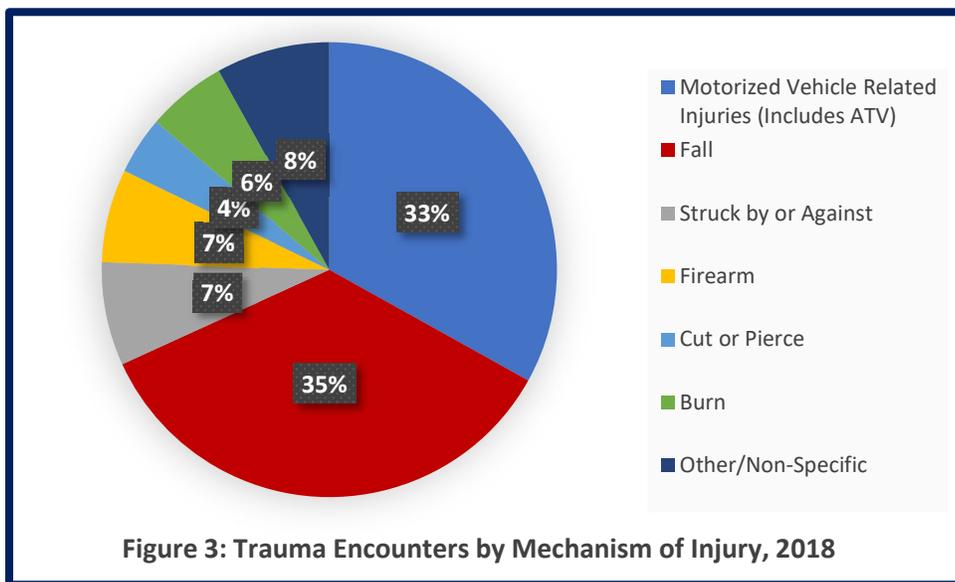
Source: Mississippi Trauma Registry

However, even as total annual numbers of trauma encounters increased since 2006, deaths from unintentional traumatic injuries declined in the population aged 1 – 44 in the same period. Figure 2 shows reductions in mortality by year in the adult and pediatric populations, respectfully. In other words, those who sustained unintentional traumatic injuries were more likely to survive, a fact attributable to the continued development of the Mississippi Trauma System (MSTAHS, 2020).



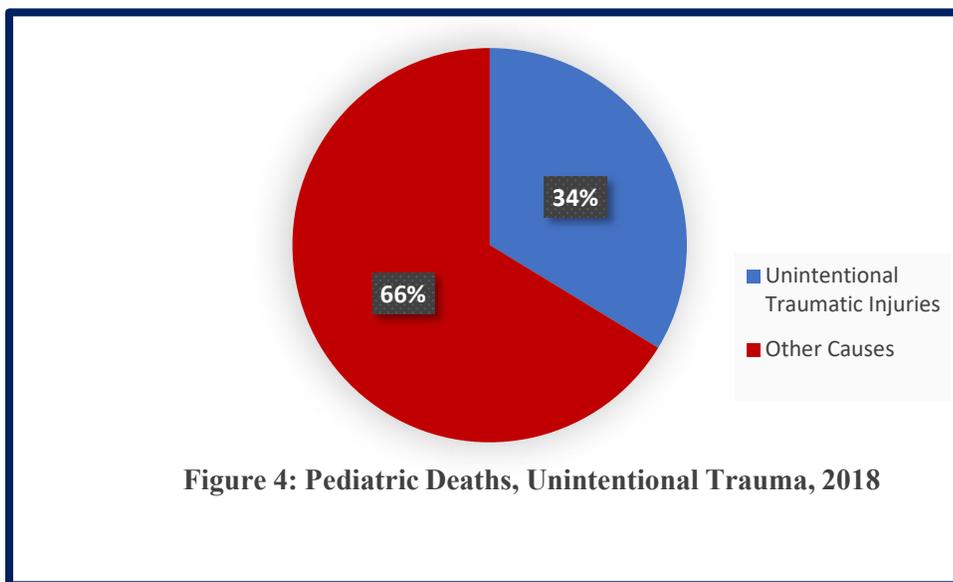
Source: Mississippi Statistically Automated Health Resource System (MSTAHRs)

Figure 3 shows the most common mechanisms of injury in calendar year 2018. Of those listed, motorized vehicle crashes accounted for a significant portion of unintentional traumatic injuries in Mississippi in 2018. Falls accounted for the most in terms of numbers. Burn injuries represent a specific type of trauma and require specialized care. Primary burn injuries accounted for 6% of trauma cases during calendar year 2018.



Source: Mississippi Trauma Registry

Mississippi’s children are particularly at risk when it comes to trauma. Unintentional trauma was the single most significant cause of death in the pediatric population ages 5 – 14, accounting for 34% of all pediatric deaths in this age group in calendar year 2018 (see Figure 4) (MSTAHRS, 2020).



Source: *Mississippi Trauma Care Registry*

Chronology of TRAUMA Care in Mississippi

The State of Mississippi began development of a statewide trauma system in 1991. The Mississippi Legislature charged the Mississippi State Department of Health with the responsibility for oversight of trauma system development. Since that time, the State Board of Health has adopted a Trauma System of Care Plan, promulgated Trauma System Rules and Regulations, designated qualified hospitals as trauma centers, maintained a statewide trauma registry, and distributed funding to trauma centers, physicians, and EMS providers.

The Mississippi Legislature initiated the Trauma Care Trust Fund in 1998. The intent was to fund trauma care by placing fees and fines on high-risk activities and behaviors – activities and behaviors associated with causing traumatic injuries. Thus, the legislature authorized the collection of fees associated with the purchase of ATVs and a portion of the fines associated with moving violations to fund the Trauma Care Trust Fund. The following year the Legislature added \$ 6,000,000 to the Trauma Care Trust Fund. In 2005 the Legislature authorized a \$5 increase per moving violation for the Trauma Care Trust Fund.

The Mississippi Legislature passed House Bill 1405 during the 2007 Regular Session. The intent was to revitalize and increase funding to the Mississippi Trauma System of Care. To this end, the bill moved the trauma system from a voluntary system with indigent care reimbursement to a mandatory system with block grant funding, based on participation, the first trauma system of its type in the United States.

The Mississippi Legislature passed Senate Bill 2362 in 2016. This bill redirected part of the funding to be collected for the Trauma Care Trust Fund in fiscal year 2017 to the State General Fund. The bill specifically redirected fines associated with moving violations to State General Fund. However, fees collected from the purchase of ATVs continued to go directly into the Trauma Care Trust Fund.

The Mississippi Legislature passed House Bill 1511 in the 2017 Regular Session. This bill restored up to \$7,023,197 of fees collected from moving violations to the trauma system, but it reduced the amount the Legislature authorized the Mississippi State Department of Health to spend on trauma from \$ 40,000,000 to \$ 20,000,000. Based on previous years' collections, this equated to an actual cut of more than \$ 2,000,000 for the trauma system for FY 2018.

The Mississippi Legislature passed House Bill 1649 in the 2019 Regular Session. This bill raised the amount the Legislature authorized the Mississippi State Department of Health to spend on trauma to \$ 28,000,000.

Despite financial challenges Mississippi remains one of only eight states in the country, which provides significant financial support to their respective state trauma systems.

Mississippi TRAUMA System of Care Plan

Mississippi Trauma System of Care Plan

This Plan outlines the statewide system for the care of trauma victims in Mississippi. The Plan provides for a mandatory system of care that is inclusive, matching appropriate resources and responses to the needs of trauma patients. The Plan provides a mechanism for enhancing community health through organized systems of injury prevention, acute care, and rehabilitation that is fully integrated with the statewide public health system. Using this plan the system will possess the ability to identify risk factors and related interventions, to prevent injuries in a community, and maximize the delivery of appropriate resources for patients who need acute trauma care. The Trauma System will address the daily demands of trauma and form the basis for disaster preparedness. The resources required for each component of the trauma care system will be clearly identified, deployed, and assessed to ensure that all patients have access to the appropriate level of care in a coordinated and cost-effective manner. Although, burn injury is a form of trauma, care of the burn injured patient often requires a sub-specialized expertise and resources not found in most trauma centers. The plan provides for the transport of burn patients, who do not require resuscitation and stabilization at trauma centers, to be transported directly to burn centers participating in the statewide trauma system.

Vision

The Mississippi Trauma System of Care Plan when fully implemented throughout Mississippi will result in decreased mortality and morbidity from trauma events.

Plan Goals

- To develop and promote awareness of the Mississippi Trauma System of Care
- To designate all Mississippi-licensed acute care hospitals as trauma centers at the appropriate level based on resources
- To designate burn centers based on resources
- To ensure traumatically injured patients are transported to the most appropriate trauma center
- To ensure burn patients meeting specified criteria and not requiring resuscitation and stabilization are transported to the closest burn center
- To ensure that trauma centers make appropriate use of activation criteria for the timely delivery of trauma care services
- To coordinate with other systems of care and inter-agency emergency preparedness programs as it relates to trauma care services

Trauma System Design

The Trauma System of Care is comprised of a number of separate components:

- Emergency Medical Services (Pre-hospital)
 - EMS is a critical part of the Trauma System
 - EMS providers should have a basic knowledge and awareness of system elements and function, specifically knowledge includes:
 - Injury criteria
 - Triage and destination guidelines for trauma (including burns)
 - Communication procedures
 - On-line and off-line medical control physicians will also need to be aware of system elements and function
- Hospital Component
 - Hospital participation in the Mississippi Trauma Care System is required by statute and regulation
 - Hospitals must participate at their assessed capability (conducted annually) or pay the non-participation fee – this process is known as “Play or Pay”
 - The decision to participate in the Trauma System must be made jointly by the hospital administration and medical staff
 - A written commitment in the form of a resolution passed by the appropriate quorum of the governing authority of the hospital, and co-signed by the director of the medical staff, signifies the facility’s desire to participate in the system
 - The Mississippi State Department of Health (MSDH, or the Department through the Bureau of Acute Care Systems (BACS), designates participating hospitals at one of four levels, following the recommendation of the Mississippi Trauma Advisory Committee (MTAC)
 - Level I Trauma Centers – comprehensive facilities, capable of treating the entire range of traumatic injuries
 - Level II Trauma Centers – generally have the same clinical services as Level I Trauma Centers but lack the surgical residency and research capabilities
 - Level III Trauma Centers – have the capabilities to resuscitate and treat the majority of trauma injuries but lack dedicated neurosurgical services

- Level IV Trauma Centers – have the capabilities to stabilize and transfer trauma patients to higher level trauma centers
 - Burn Centers – have the capabilities to provide definitive care for burn patients, and may provide initial care for burn patients who do not require initial stabilization at a higher level trauma center (as provided for by EMS Burn Destination Guidelines)
 - Every hospital designated as an adult trauma center is concurrently designated as a Primary Pediatric Trauma Center; Level II or III Trauma Centers may apply for designation as Secondary Pediatric Trauma Centers; Level I Trauma Centers and dedicated pediatric hospitals may apply to be a Tertiary Pediatric Trauma Center
 - The Mississippi Trauma System of Care Rules and Regulations define the standards for trauma centers in the system
- Administrative and Educational Component(s)
 - Section 41-59-5 (5), Mississippi Code of 1972, as amended, establishes the Mississippi State Department of Health (MSDH) as the lead agency to develop a uniform, non-fragmented, inclusive statewide Trauma System
 - MSDH BACS may utilize a vendor or vendors for administrative and/or educational services as required for the efficacy of the program
 - Any vendor used for said purpose shall function under contract with MSDH
- Communication Component
 - Communications are critical to the function of the Trauma System
 - Communications provide:
 - essential knowledge of the overall status of pre-hospital activities and hospital resource availability on a continual basis
 - access to system organization and function protocols whenever such information is requested by pre-hospital or hospital-based personnel
 - collection of uniform system-wide data for PI activities and development of a statewide trauma registry
- Performance Improvement and Patient Safety Component
 - This component is essential for evaluating and improving system performance and safety considerations
 - The statewide Performance Improvement Committee has developed and maintains the Performance Improvement and Patient Safety (PIPS) Manual
 - PIPS Manual outlines the integrated statewide performance improvement process and local performance improvement processes at all levels of trauma care, including trauma centers,

burn centers, pediatric centers and performance improvement integrated with EMS providers

- performance improvement provides opportunities for the evaluation of MSDH programs including the Mississippi Trauma Registry (MTR)
- PIPS emphasizes a continuous, multidisciplinary, multi-layered effort to monitor, measure, assess, and improve the processes and outcomes of trauma care

Trauma System Function

General function of the system will be as follows:

- trauma event occurs
- 911 is called
- field triage is conducted by EMS personnel
- EMS personnel transport the trauma patient to most appropriate trauma or burn center based on the patient's condition (see Mississippi Guidelines for Field Triage of Injured Patients posted on the MSDH Website)
- EMS will establish contact with the destination trauma or burn center to give advanced notification
- patient is transported to the trauma or burn center, which initiates response protocol based on activation criteria
- patients transported by private vehicle to a trauma center shall be rapidly triaged by the emergency department staff, who shall initiate response protocol based on activation criteria
- patients requiring a higher level of care shall be transferred to a Level I or II trauma center, burn center, or other specialty facility, based on the patient's injury and capability of the receiving facility to definitively treat the condition

Trauma System Operations

System operations refer to the activities that occur after it is determined that a patient meets system entry criteria and communications have been established within the system.

- EMS/Pre-hospital Activities

- EMS/Pre-hospital care will be carried out in compliance with the EMS provider's Medical Control Plan
- Trauma patients are best served by rapid transport to the most appropriate facility
- Field time should be kept to a minimum; however, pre-hospital care should not be sacrificed for less time on scene
- Burn patients who do not require immediate care at a trauma center are best served by rapid transport to the closest burn center
- Hospital Operations
 - Trauma care requires adequate resources (equipment and facilities) and personnel with training and commitment to carry out rapid initial assessment, stabilization, and initial care
 - Trauma centers will be classified into one of four levels of care based on resources available
 - Initial hospital destination will be determined by the closest available hospital appropriate to the patient's condition
 - Burn care requires adequate resources (equipment and facilities) and personnel with training and commitment to carry out rapid initial assessment, stabilization, and initial burn care
 - In the event a patient or family member requests transport to a specific facility, which does not meet system destination guidelines, EMS and/or Medical Control will make a reasonable effort to convince the patient/family member of the proper destination
 - If the patient is unstable (inadequate spontaneous ventilations without a secured airway or in cardiac arrest), the patient should be transported to the nearest hospital, regardless of trauma center level (a secured airway includes any airway device that allows adequate ventilation and oxygenation)
 - Inter-facility transfers – In the event a trauma patient is received by a hospital without current capacity or appropriate resources for the patient, the patient should be transferred to a Level I or II Trauma Center
 - Any hospital designated as a Level I or II Trauma Center agrees to accept inter-facility transfers upon request by a transferring hospital regardless of the patient's race, sex, creed, or ability to pay

Trauma System Finance

The Mississippi State Legislature passed HB 966 in 1998. The bill established the Trauma Care Trust Fund (TCTF). Initially, funded with \$ 6,000,000 from the tobacco expendable fund and an

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assessment placed on fines collected from moving violations, the TCTF has historically funded statewide system administration, development and funding. In 2008, the Legislature increased assessments placed on fines collected from moving violations and added point-of-sales fees for ATVs and motorcycles as funding sources for the TCTF. This same year the distribution formula for the TCTF was changed from the uncompensated trauma services model to a model based on trauma center designation and performance. The first distribution using the new model was made in November 2009.

The Legislature passed Senate Bill 2362 in 2016. This bill redirected part of the funding to be collected for the TCTF in fiscal year 2017 to the State General Fund. The bill specifically redirected fines associated with moving violations to State General Fund. However, fees collected from the purchase of ATVs and motorcycles continued to go directly into the TCTF in fiscal year 2017.

The Legislature passed House Bill 1511 in the 2017 Regular Session. This bill restored up to \$7,023,197 of fees collected from moving violations to the Trauma system, but it reduced the amount the Legislature authorized the Mississippi State Department of Health to spend on Trauma from \$ 40,000,000 to \$ 20,000,000. Based on previous years' collections, this equated to an actual cut of more than \$ 2,000,000 for the Trauma system for FY18.

The Mississippi Legislature passed House Bill 1649 in the 2019 Regular Session. This bill raised the amount the Legislature authorized the Mississippi State Department of Health to spend on trauma to \$ 28,000,000 for FY20.

Trauma Registry

As a condition of hospital licensure, all acute care hospitals with an organized emergency service or department must submit trauma patient information to the state Trauma Registry.

There are four objectives of the Trauma Registry:

- Performance Improvement,
- Enhanced hospital operations,
- Injury prevention, and
- Supporting medical research.

If the registry is utilized appropriately, performance improvement can be done in a much more efficient manner than if done manually. Secondly, the registry can help in managing resource allocation and utilization through daily logs and summaries. Hospitals can use data from the registry to identify areas with the highest incidence of trauma and target those areas for injury prevention programs. Injury control issues can be identified at the local and state levels, thereby providing the basis for developing and implementing injury prevention programs statewide. Finally, standardization of the data allows quality data to be disseminated and used in clinical research and decision making.

The state Trauma Registry is designed primarily to collect data on patients with serious injuries. It is also designed to identify system issues, such as over and under triage. In order to track these patients

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effectively, the Department has identified criteria for a patient to be included in the registry. Facilities must include, as a minimum, all patients that meet said criteria. The Trauma Registry Inclusion Criteria is available online on the MSDH Website.

Mississippi Trauma Advisory Committee (MTAC)

The Mississippi Trauma Advisory Committee (MTAC) is a designated committee of the Emergency Medical Services Advisory Council (EMSAC), which is established by statute. Each member is a gubernatorial appointee. MTAC shall advise the Bureau of Acute Care Systems on the continued development of the Trauma System.

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