

## TIME CRITICAL DIAGNOSIS SYSTEM OVERVIEW AND FACT SHEET

Missourians expect timely and appropriate emergency medical treatment when suffering from an injury, stroke or heart attack. Missouri has launched an exciting new initiative – the Time Critical Diagnosis System – to improve health outcomes for patients who suffer trauma, stroke or heart attacks known as ST-Elevation Myocardial Infarction, or STEMI.

### INJURY-TRAUMA<sup>1</sup>

#### The Problem:

- Trauma is the fourth leading cause of death in Missouri.
- It is the most frequent cause of visits to the emergency department, causing more than half a million visits in 2006.
- Injuries account for the second highest total for inpatient hospital charges – \$2 billion in 2006.
- Compared to the entire United States, Missouri has lower rates of emergency department visits for all three major categories of injuries – accidental, assault and self-inflicted. But it unfortunately has death rates from injuries that exceed the national rates for accidental injuries, suicides, falls, and motor vehicle injuries.
- It is also noteworthy that Missouri's death rates for unintentional injuries have increased 25 percent between 1991 and 2006. Even more alarming, our death rates for unintentional fall injuries have increased 73 percent.
- There are gaps, particularly in rural areas of Missouri, for timely access to a trauma center.

#### The Solution:

- Research clearly shows that an organized, integrated, system based on regional medical resources saves the most lives and decreases permanent injuries.<sup>2</sup>
- Missouri has 29 designated trauma centers that are integrated into the continuum of care, including prevention and rehabilitation and operate as part of a network of trauma-receiving hospitals.<sup>3</sup> The process for designating hospitals as trauma centers has been in place since the early 1990s.
- In order to ensure access for definitive treatment, regardless of where a Missourian is injured, many trauma health care experts and partner groups have joined together to address these gaps as part of the work to create the Time Critical Diagnosis System.

*Trauma is injury to a tissue or organ resulting from the transfer of energy from the environment. Examples of common types of injuries that require trauma care include falls, motor vehicle accidents, assault, abuse, burns, poisoning, and over-exertion.*



## ST-ELEVATION MYOCARDIAL INFARCTION (STEMI)

### The Problem:

- Heart disease, including STEMI, is the leading cause of death in this state.<sup>4</sup>
- Heart and circulation diagnosis caused the highest total of inpatient hospital charges, at \$4.2 billion in 2006.
- In 2004, Missouri's heart disease death rate was an alarming 13.5 percent higher than the national rate.
- Missouri was in the bottom ten (45 out of 52) in coronary heart disease death rates.<sup>5</sup>
- The prevalence of heart disease was higher than the national average, as Missouri ranked 9th among the 50 states in heart disease prevalence in 2005.<sup>6</sup>

### The Solution:

- Specific therapies, administered to STEMI patients within 90 minutes of symptoms, have proven to reduce mortality and disability.<sup>7,8</sup>
- Missouri's organized trauma system provides a model for organizing an integrated and coordinated approach for care of the STEMI patient.
- Recently enacted state laws provide the Department of Health and Senior Services the authority to create designated STEMI centers that meet standards to provide definitive and timely treatment for STEMI patients. (RSMo 190.241)
- The law also stipulates that "patients who suffer a STEMI...shall be transported to a STEMI center."

*A **STEMI** is a type of heart attack, for which impaired blood flow to the patient's heart muscle is shown by the ST-segment elevation, in ECG analysis. A STEMI is one type of heart attack that is a potentially lethal condition for which specific therapies, administered rapidly, reduce mortality and disability. The more time that passes before blood flow is restored, the more damage that is done to the heart muscle.*

## STROKE

### The Problem:

- Stroke is the third leading cause of death in the state.<sup>9</sup>
- In 2004, Missouri's stroke death rate was 11 percent higher than the national rate.
- Unfortunately, Missouri ranked low (40 out of 52) in the comparison of stroke death rate between states.
- Missouri was ranked 7<sup>th</sup> in stroke prevalence.
- For those that experience a new or recurrent stroke each year, approximately 23 percent will die, 15 percent to 30 percent will be permanently disable and 20 percent will require institutionalization during the first three months post-stroke.<sup>10,11</sup>
- Only a small percent of ischemic stroke patients get definitive care within the 3 hour window recommended.

### The Solution:

- Prompt treatment within 3 hours for acute ischemic stroke reduces disability and improves outcomes.
- As is the case for STEMI, recently enacted state laws provide the Department of Health and Senior Services the authority to create designated stroke centers that meet standards to provide definitive and timely treatment for stroke patients. (RSMo 190.241)
- The law also stipulates that "patients who suffer a stroke shall be transported to a stroke center."

***Stroke** is a sudden brain dysfunction due to a disturbance in brain circulation. The resulting impairments include but are not limited to paralysis, slurred speech, and/or vision loss. Ischemic strokes account for over 80-87 percent of all strokes and are typically caused by obstruction of cerebral blood vessels. Hemorrhagic strokes account for the remaining strokes and are typically caused by rupture of a cerebral artery.*

## THE RESPONSE

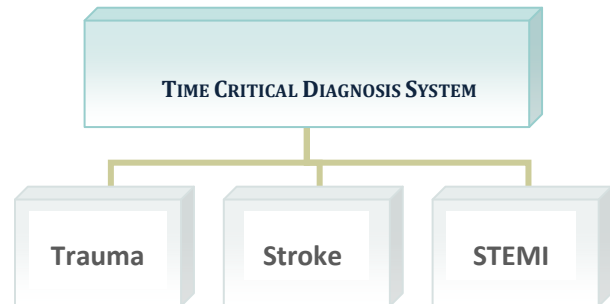
Impressive efforts have combined to improve statewide, coordinated emergency medical services through the Time Critical Diagnosis System.

- Missouri is the first state to integrate common processes for the time critical conditions –trauma, stroke, or the potentially fatal form of heart attack known as STEMI. All of these conditions require quick assessment, diagnosis and treatment by a facility that can provide timely, definitive care to minimize risk for preventable complications and death.
- Missouri enacted laws (RSMo 190.200-190.245)<sup>12</sup> in 2008 that created the Time Critical Diagnosis (TCD) System through which emergency medical care is provided for patients who require time critical diagnosis and care.
- Two statewide task forces were formed and compiled recommendations on how to establish the TCD system and improve emergency medical care for stroke, STEMI and trauma.
- The State Advisory Council for Emergency Care, Trauma Subcommittee and Stroke, and STEMI Implementation Work Groups have been actively engaged in developing the regulations, protocol and guidelines for classification of trauma, stroke and STEMI patients. The groups have established guidelines and protocols governing field triage, emergency medical service, and rules for designated centers. They are also working on professional and public education, quality assurance and performance improvement. More than 500 individuals have participated in these efforts since fall 2008.
- The American College of Surgeons conducted a review of Missouri’s trauma system in 2009 and the National Highway Safety and Traffic Administration will conduct a review of the statewide emergency medical services program in June 2010. These two reviews provide recommendations for improvements within the TCD system.
- Regulations have been drafted to create Stroke and STEMI centers (Levels I-IV) and add Level IV Trauma Centers. Regulations are also drafted to define the transport protocols for TCD patients and provide an approval process for community and regional alternatives to the transport protocol.

- Sources for funding to provide staff and administrative supports to complete the designation process have come from a range of sources, including the State of Missouri, Missouri Foundation for Health, Centers for Disease Control and Prevention and other grants. Funding to upgrade and sustain core infrastructure continues to be sought for this complex system of care.

## THE TCD SYSTEM

The TCD system is a comprehensive, coordinated statewide and regional network that delivers emergency medical care under one banner rather than through three separate systems.



The TCD system represents the continuum of services. It begins with public education about prevention, recognition of signs and symptoms and the need to seek immediate medical care. It circles through the series of system components that emphasize evidence-based best practices for incident recognition, first aid, 911 access, response coordination, pre-hospital response, transport, emergency department care, acute medical care and rehabilitation. Finally, it incorporates quality improvement processes throughout the system. The continuum model is shown below:



### **Current Action to Implement Time Critical Diagnosis System:**

- *Promulgate regulations to 1) designate four levels of stroke and STEMI center, 2) add a fourth level to the existing three levels of trauma centers, 3) establish transport protocols, and 4) establish a process for community and regional plan alternatives. (Target date— 2011)*
- *Begin expanded center designation process. (2011)*
- *Compile professional education guidelines for hospital and out-of-hospital agencies (August 2010 and ongoing)*
- *Expand quality assurance system to support stroke and STEMI systems in addition to trauma (Fall 2010 and ongoing)*
- *Improve data management for performance improvement functions (2010 and ongoing)*
- *Identify supports to expand functionality of Regional EMS Advisory Committees to advise and make recommendations to the region and the Department of Health and Senior Services on how best to coordinate regional emergency resources; improve public and professional education; develop standards, protocols and policies; engage in quality improvement activities; and support cooperative research endeavors to improve emergency medical care in Missouri (Spring 2011)*

The TCD system allows resource sharing and coordination at many different levels to decrease duplication and costs for services similar for each condition. These include 911 and emergency medical dispatch, pre-hospital response and transport and the center designation process for hospitals that meet regulatory criteria. At the same time, the TCD system supports the unique and distinct care required by each condition. This includes assessment, diagnosis and treatment by those hospitals that meet specific care and capacity requirements for specialty center designation. The experiences and results from numerous other states demonstrate both the feasibility of, and actual and potential benefits from, a systemized approach to emergency medical care for trauma, stroke and STEMI. The TCD system in Missouri, however, further advances the concept by creating an umbrella system for the time critical care for stroke, STEMI, trauma and other potential conditions for which future advances will warrant time critical care. While other states have organized responses to each of these conditions, independently, no state has approached them on such an integrated systems level as represented by the Missouri TCD system.

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*For more information please contact:  
Missouri Department of Health and Senior Services  
PO Box 570, 912 Wildwood  
Jefferson City, MO 65102*

*Phone number: 573-526-0723*

*E-mail: [Beverly.Smith@dhss.mo.gov](mailto:Beverly.Smith@dhss.mo.gov)*

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