

Time Critical Diagnosis System

TCD System Task Force Recommendations to Advance Emergency Medical Care for Stroke and STEMI in Missouri

August 2008



Executive Summary

The Missouri Department of Health and Senior Services (DHSS) and the Missouri Foundation for Health committed to work in concert with partners to expand Missouri's emergency medical system in order to improve care for those who suffer from **stroke** and **ST-elevation myocardial infarction (STEMI)**. This expansion for stroke and STEMI care follows the methodology of trauma system development. Over 100 medical experts, leaders and emergency medical care providers from across the state came together to participate in the Time Critical Diagnosis (TCD) System Task Force to formulate recommendations for Missouri's system expansion. A number of issues made the Task Force's mission critically important. Heart disease, including STEMI, is the leading cause of death, and stroke is the third leading cause of death in Missouri; delayed treatment increases a patient's risk for death and disability; the trauma system model has been shown to improve patient outcomes; and improved outcomes for stroke and STEMI patients have been demonstrated in other states and regions using similar advanced approaches for stroke and STEMI care.

The Task Force has compiled the recommendations in this report as a first step toward achievement of the following goal: Improve health outcomes by establishing a TCD system for Missourians who have a stroke or STEMI. These recommendations focus on how a functional system can be created in Missouri to improve the transport, diagnosis and treatment for stroke and STEMI patients. The recommendations put forth an approach to the diagnosis and care of stroke and STEMI patients that integrates these two 'newer' time critical diagnoses with the established trauma care model. The unique and distinct issues inherent to stroke, STEMI and trauma care are each addressed while integrating common processes and approaches in order to improve the effectiveness of the entire system.

The TCD system provides a comprehensive statewide infrastructure with an inclusive approach towards emergency medical care for Missouri. The TCD system offers significant advantages. First, its approach to emergency medical care of STEMI and stroke focuses on timely assessment and transport to a facility that can provide definitive care within the comprehensive system network. Secondly, it gives the TCD system an intrinsic ability to grow and integrate approaches for currently unrecognized time critical conditions in the future beyond

Stroke - Sudden brain dysfunction due to a disturbance of cerebral circulation. The resulting impairments include but are not limited to paralysis, slurred speech, and/or vision loss. Ischemic strokes account for over 80 percent of all strokes and are typically caused by the obstruction of a cerebral blood vessel. Hemorrhagic strokes account for the remaining 20 percent of strokes and are typically caused by rupture of a cerebral artery. This report focuses on ischemic stroke.

ST-Elevation Myocardial Infarction (STEMI) - A myocardial infarction for which the ECG shows ST-segment elevation, usually in association with an acutely blocked coronary artery. 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.



today's accepted diagnoses and care practices for STEMI, stroke and trauma. In addition, the TCD system protocols, practices and infrastructure will evolve as future insights, technology and new practices dictate for continuing improvement in outcomes.

The TCD system represents a continuum of patient care, beginning with public education about prevention efforts, recognition of signs and symptoms and the importance of immediately seeking care. It then circles through the continuum of system components to emphasize evidence-based and best practices for incident recognition, first aid, 911 access, response coordination, pre-hospital response, transport, emergency department care, acute medical care, and rehabilitation. Finally, and equally important, it incorporates quality improvement processes throughout the system. The recommendations in this report address all but the prevention and rehabilitation elements in the continuum model shown below. (Figure 1).

Time Critical Diagnosis Continuum of Care—Emergency Medical Care System (Figure 1)



Time Critical Diagnosis

System - *A coordinated, integrated group providing emergency medical care services using regionalization concepts to treat those diagnoses that are truly time critical. At this time there is clear evidence that severe trauma, acute ischemic stroke and STEMI outcomes can be improved by regionalized care incorporating specialty referral centers that are designated by an accrediting body. These conditions require quick assessment, diagnosis and treatment. The system focuses on timely recognition, assessment and transport to a facility that can provide definitive care within the comprehensive care network. Within the TCD concept, it is more intuitive to coordinate the three arms of the system under one banner rather than have three separate systems. This allows resource sharing and coordination at many different levels that decreases duplication and costs.*

System design for stroke and STEMI is inherently complex and poses challenges. Challenges include: assurance that the system supports the technical and evolving nature of care for stroke and STEMI; understanding and respect for the broad range of experiences, expertise, and perspectives of out-of-hospital and hospital providers represented within the TCD system; consideration of the distribution of, access to, and differing capacities of emergency medical service agencies and hospitals, all of which, are influenced by regional, geographic and economic factors; and the competing interests of autonomous agencies working within an integrated system that may naturally create conflict. In spite of these challenges, the task force members united on the common ground that a system approach results in better health outcomes. To that end, the task force recommends the following for the **Time Critical Diagnosis System** to advance care for those patients with stroke and STEMI in Missouri:

OUT-OF-HOSPITAL SYSTEM COMPONENTS

A. 911-Emergency Medical Dispatch (EMD) and Response Coordination

1. The TCD system has a comprehensive 911 system for EMD that focuses on patient care.
2. The TCD system holds the local EMS agency accountable for the provision of EMD and Pre-Arrival Instructions (PAI) to the caller.

B. Pre-Hospital Response and Transport

3. The TCD system out-of-hospital providers have equipment and technology that is up to date, compatible and links between EMS and hospital services, and supports accurate patient assessment and recognition of stroke and STEMI symptoms.
4. The triage and assessment processes within the TCD system establish consistent state triage protocols and assessment tools that meet core standards and allow modification of state protocols and tools at a regional level to accommodate unique needs and variables within that area as long as core standards are met.
5. The TCD system supports early activation of hospital services, such as the cardiac catheterization laboratory or stroke team, from the field or as soon as personnel (field or hospital emergency department) identifies a patient with a stroke or STEMI.
6. The transport protocols within the TCD system strive to minimize time from symptom onset to definitive care; make transport determination at time of dispatch or first patient contact to minimize out-of-hospital time; determine type of transport (air or land) required based on the: a) condition of the patient, b) location of patient in relation to care facility that can provide definitive care, and c) local conditions (e.g., weather, terrain); employ all resources (e.g., mutual aid, air agreements) so most appropriate unit responds; and develop a process for early launch of helicopter service when needed.
7. The TCD system supports direct admission of stroke and STEMI patients to the hospital for provision of necessary services.

HOSPITAL SYSTEM COMPONENTS

C. Hospital Care for STEMI Patients

8. The TCD system designates different levels of hospital STEMI care and establishes regulations based on agreed-upon state criteria with attention to variables detailed in this report.

D. Hospital Care for Stroke Patients

9. The TCD system designates three different levels of stroke hospital care and establishes state regulations based on agreed-upon criteria addressing the variables detailed in this report for:
 - i. Comprehensive Stroke Centers,
 - ii. Primary Stroke Centers, and
 - iii. Secondary Stroke Centers.
10. The TCD system evaluates incorporation of telemedicine into care of stroke patients for rural areas or regions without a designated stroke center.

E. Small and Rural Hospitals

11. The TCD system defines and maintains the role of small hospitals.

SYSTEM WIDE

F. Quality Improvement

12. The TCD system includes a statewide registry specific for STEMI and stroke with required reporting from out-of-hospital and hospital agencies within the TCD system.
13. DHSS creates and coordinates a congruent registry, database platform, and reporting process that does not cause redundancies or undue hardships on reporting agencies.

14. The TCD system uses nationally recognized data elements to define reporting requirements where available and practical.
15. The data management system supports the processes for quality improvement of the continuum of services and care, as well as patient outcomes for all out-of-hospital (dispatch, response coordination, EMS, transport) and hospital agencies within the TCD system.

G. Professional Education

16. The TCD system supports training and continuing education for out-of-hospital providers (EMD, EMS, transport personnel) to obtain needed competencies and improve current practices for stroke and STEMI care.
17. The TCD system supports training and continuing education of physicians and hospital staff to obtain needed competencies and improve current practices for stroke and STEMI care.
18. The TCD system updates training and continuing education regularly to incorporate changes made due to quality improvements, changes in evidence-based approaches and best practices, or improve areas of weak performance as indicated by quality improvement measures.

H. Public Education

19. The TCD system supports coordinated public education to inform patients about signs and symptoms, the importance of calling 911, the type of care needed, and facilities equipped to provide that care.

I. Payer

20. The TCD partners identify payment issues and problems that impact recommended care and desired outcomes for stroke and STEMI patients within the TCD system and begin discussions with health care plans and other key stakeholders to resolve.

J. System Administration

21. DHSS provides administrative oversight for the TCD system.
22. DHSS establishes an advisory body to guide TCD system implementation and oversight.
23. DHSS promulgates regulations to implement TCD system requirements.
24. DHSS leads efforts to evaluate the TCD system implementation and impact on desired outcomes.
25. DHSS assesses system components, compiles plans to address gaps where needed, and seeks support to fill gaps in a collaborative manner with TCD system partners.

There is much work to be done to implement these recommendations and, as the task force has already done, the broad cross section of partners and stakeholders also need to unite on the same common ground. Improving stroke and STEMI outcomes for Missourians through the TCD system is a unifying principle that supports the partners' respective missions and makes compelling the need to implement these recommendations. A collective investment of time, resources and commitment to systems development and integration from the agencies involved is essential. This investment, coupled with the innovations of the TCD system, will advance emergency medical care for Missourians. Moreover, it will serve as an example for the nation in progressive approaches to emergency medical care of time critical diagnoses.