

Time Critical Incident Responses

RESULTS FROM THE 2016 RURAL EMS SUSTAINABILITY SURVEY

Overview

The approach to medical care for time critical diagnoses such as trauma, stroke, ST- elevation myocardial infarction (STEMI) and sudden cardiac arrest, relies on timely recognition, assessment and transport of patients to facilities that can provide definitive care. Emergency Medical Services (EMS) play a crucial role in identifying and treating time-critical patients and delivering them to the appropriate care in the quickest time possible. EMS also plays a significant role in decreasing the time from event onset to treatment. This is accomplished in several ways:

- training and access to equipment and technology;
- triage and assessment protocols;
- early activation of hospital services;
- transport protocols for time critical diagnoses;

The goal of this survey was to understand how rural EMS agencies are trained and equipped to assess, manage and transport patients experiencing time critical events.

Time Critical Care in Minnesota

Quality measures for time critical diagnoses are defined by national organizations including the National Association of State EMS Officials (NASEMSO). They establish system-wide quality measures to improve patient outcomes by minimizing the time from actual event onset to treatment. It is important for the EMS system in Minnesota to implement changes in technology, best clinical practices, and protocols to optimize patient outcomes for time critical events. In addition to recommended quality measures, Minnesota has statutes for trauma and stroke patient triage and transport, and designating hospitals to receive STEMI patients.¹

Results and discussion

EMS agencies are often the first point of contact with the medical system for individuals experiencing time critical conditions. Providers who adopt, follow, and review guidelines, protocols or

Time Critical Diagnoses

Trauma: the leading cause of death for people between the ages of one and 44, and the third leading cause of death overall. More years of potential life before age 65 are lost due to unintentional injury than due to any other cause.

Stroke: the fifth leading cause of death and a major cause of disability in the state. In 2016, 2,197 people died, representing 5% of all deaths for that year.

STEMI: the deadliest form of heart attack caused when an artery supplying blood supply is completely blocked. STEMI impacts approximately 2,500 people in Minnesota each year. Heart disease, including STEMI, is the second-leading cause of death in Minnesota.

Sudden cardiac arrest: a condition in which the heart suddenly stops, preventing blood from flowing to the brain and other vital organs. It is a leading cause of death among adults over age 40 in the United States.

¹ MN Statute 144.604 Trauma Triage & Transportation, <https://www.revisor.mn.gov/statutes/cite/144.604>. MN Statute 144.4981 St Segment Elevation Myocardial Infarction (STEMI) Receiving Centers, <https://www.revisor.mn.gov/statutes/cite/144.4941>. MN Statute 144.494 Designating Stroke Centers and Stroke Hospitals, <https://www.revisor.mn.gov/statutes/cite/144.493>.

policies can ensure that these patients receive the most appropriate, medically necessary care with improved outcomes.

- Over half of all agencies in each rural EMS region reported that they reviewed Trauma and Triage Transport Guidelines yearly and almost all have a designated Level 3 or 4 Trauma Center within 30 minutes travel time.
- Individual agencies report that they review trauma guidelines but many do not receive patient outcome information from the receiving hospital, nor participate in case reviews.

For stroke patients, protocols for effective administration of IV-alteplase in the emergency department reduces the chance of long-term complications and disability after stroke. Rural EMS provider education and training on agency procedures such as this reinforces recommended treatment protocols.

- Safe transfers of these patients to tertiary care facilities is essential; however, few rural EMS agencies have protocols for transporting inter-facility patients on IV-alteplase. This is likely due to the lower number of advanced life support (ALS) or part-time ALS agencies in rural areas of Minnesota. The lack of EMS agencies that have this type of protocol is a crucial gap to fill as rural hospitals are providing more stroke patients with IV-alteplase than ever.
- Over half of EMS agencies in the Central and Northwest regions reported staff received at least three hours of education in 2015 (59 percent and 76 percent), but the majority of EMS agencies in the remaining rural regions had not received three or more hours of education. Most EMS agencies report they do not receive stroke outcome information from the hospital.

Transferring patients experiencing STEMI and/or sudden cardiac arrest depends on facility and ambulance capabilities. Access to 12-lead echocardiogram (ECG), treatment opportunities such as thrombolytic therapy, or protocols to transfer patients to appropriate facilities with cardiac Catheterization (Cath) Labs can improve survival following a cardiac event.ⁱ In rural Minnesota, protocols that support EMS transfer of patients is important because of the long distances between rural locations and definitive care hospitals.

- Most agencies have 12-lead echocardiogram training to administer an ECG and send the results to the hospital; however, most report that 12-leads are not available in all ambulances. If most ambulances do not have 12-lead ECG capabilities, then too often the ambulance arriving on scene for a STEMI/cardiac arrest transport will not have this life-saving equipment.
- The cardiac Catheterization Labs in Minnesota are located at select large hospitals, often a long distance from rural areas. EMS agencies must have policies to give advanced notice to activate the Cath Labs to receive a confirmed STEMI. Fewer agencies in the southwest have policies for transporting to, and activating a Cath Lab, than elsewhere in Minnesota.
- Thrombolytic therapy uses drugs to dissolve blood clots, restoring blood flow to the heart. Few EMS agencies have protocols for transporting patients that receive thrombolytic therapy between facilities. Again, this is likely due to the lower number of ALS or part time-ALS agencies in rural areas. These protocols are important because of the long distances to Cath Labs.
- From 2015-2017 The Helmsley Foundation provided funds for rural EMS agencies to receive a LUCAS chest compression device. The current percent (post 2017) of full-time ambulances that have an automated CPR device is likely higher than reported in 2016.
- STEMI events can progress into sudden cardiac arrest. Most EMS agencies reported that they received feedback on both STEMI and sudden cardiac arrest events.

Implementing patient protocols and following recommended guidelines for time critical diagnoses is key to providing timely, appropriate care. Overall, the survey results show that most EMS agencies do not receive feedback from the receiving hospital following transport of a patient with a time critical condition other than STEMI and cardiac arrest. This sort of feedback and case reviews are important for

implementing treatment and transport guidelines, and support process and quality improvement for how EMS agencies handle time critical cases.

Figure 1: Time Critical Incident Responses by Rural EMS Region, 2016

EMS agencies responded to a series of questions assessing use of policies and protocols for time critical diagnoses, EMS and hospital feedback processes, continuing education opportunities and the availability of agency resources. Results by diagnosis are shown in Figure 1 and Tables 1, 2 and 3.

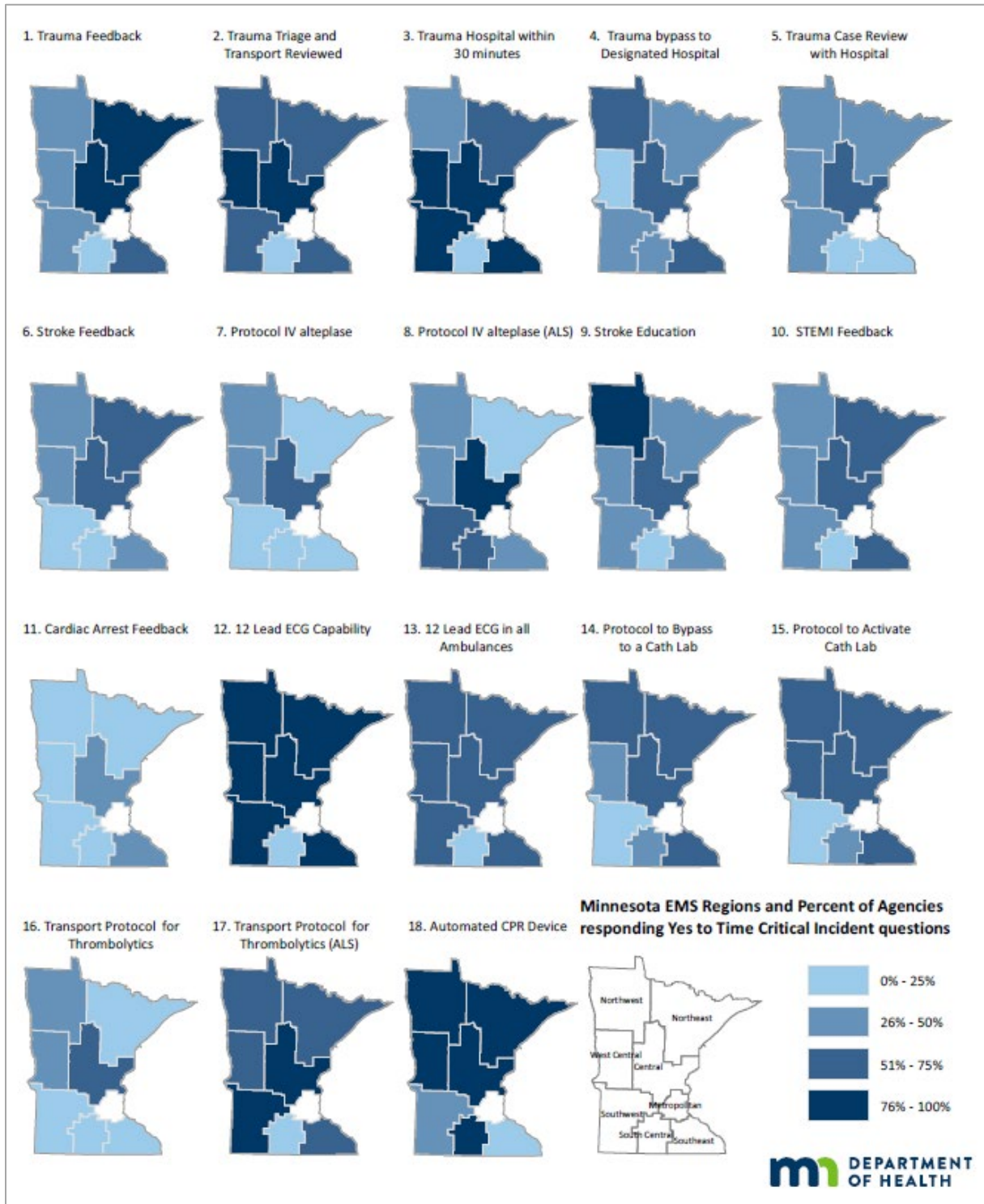


Table 1: Trauma
Time critical incident responses by rural EMS region, 2016

Map Number & Related Trauma Question	Central	Northeast	Northwest	South Central	Southeast	Southwest	West Central
1. Is the trauma patient outcome information provided to your agency by the hospital? (Responses indicate yes.)	77%	85%	29%	26%	54%	38%	47%
2. Did your EMS staff review the agency's Trauma Triage and Transportation Guidelines at least once a year? (Responses indicate yes.)	91%	75%	65%	59%	69%	65%	82%
3. Is there a designated Level 3 or 4 Trauma Hospital within 30 minutes of transport time of the agency's primary service area? (Responses indicate yes.)	100%	75%	65%	63%	92%	90%	82%
4. If a non-trauma hospital is closer, do you routinely bypass it with critical trauma patients? (Responses indicate yes.)	67%	44%	67%	40%	64%	30%	13%
5. Does the hospital to which you routinely transport critical trauma patients invite your agency to participate in the hospital's review of significant trauma cases? (Responses indicate yes.)	73%	30%	29%	22%	14%	45%	41%

Table 2: Stroke
Time critical incident responses by rural EMS region, 2016

Map Number & Related Stroke Question	Central	Northeast	Northwest	South Central	Southeast	Southwest	West Central
6. Is the stroke patient outcome information provided to your agency by the hospital? (Responses indicate yes.)	64%	55%	41%	22%	36%	25%	35%
7. Do you have a protocol for transporting inter-facility patients on IV-alteplase (IV-tPA) (Responses indicate yes.)	59%	15%	29%	11%	15%	23%	29%
8. If your service is advanced life support (ALS) or part-time ALS, do you have a protocol for transporting inter-facility patients on IV-alteplase (IV-tPA)? (Responses indicate yes.)	93%	43%	46%	75%	46%	75%	46%
9. Did your staff receive 3 or more hours of stroke education in 2015? (Responses indicate yes.)	59%	40%	76%	15%	39%	35%	47%

Table 3: STEMI & Sudden Cardiac Arrest
Time critical incident responses by rural EMS region, 2016

Map Number & Related STEMI & Sudden Cardiac Arrest Question	Central	Northeast	Northwest	South Central	Southeast	Southwest	West Central
10. Is the STEMI patient outcome information provided to your agency by the hospital? (Responses indicate yes.)	32%	20%	24%	11%	33%	23%	24%
11. Is the sudden cardiac arrest patient outcome information provided to your agency by the hospital? (Responses indicate yes.)	32%	20%	24%	11%	33%	23%	24%
12. Does your agency have 12 lead ECG capabilities? (Responses indicate yes.)	77%	95%	88%	67%	80%	83%	100%
13. Does every in-service ambulance have 12 lead capabilities? (Responses indicate yes.)	68%	75%	65%	48%	74%	68%	65%
14. Does your agency have a protocol for bypassing a local receiving facility in order to transport directly to a cardiac catheterization lab (Cath Lab) capable facility? (Responses indicate yes.)	64%	60%	65%	44%	67%	18%	41%
15. Do your staff have a protocol to activate the Cath Lab at a receiving facility? (Responses indicate yes.)	59%	70%	53%	44%	74%	23%	53%
16. Do you have a protocol for transporting inter-facility patients who have received thrombolytics? (Responses indicate yes.)	59%	20%	35%	11%	18%	20%	41%
17. If your agency is advance life support (ALS), do you have a protocol for transporting inter-facility patients who have received thrombolytics? (Responses indicate yes.)	93%	67%	55%	50%	54%	80%	64%
18. If your agency has a Lucas device or other automated CPR device, is there one for each ambulance that is in service? (Responses indicate yes.)	77%	95%	94%	93%	23%	42%	100%

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To obtain this information in a different format, call: 651-201-3838. Printed on recycled paper.

¹ American Heart Association. Opportunities to Improve STEMI Systems of Care. Available at: <http://www.heart.org/en/professional/quality-improvement/mission-lifeline/opportunities-to-improve-stemi-systems-of-care>