

Developing Regional STEMI Systems of Care: A Review of the Evidence and the Role of the Flex Program

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Introduction

This policy brief summarizes the evidence for regional systems of care for patients presenting with ST-segment elevation myocardial infarction (STEMI). These systems of care have both a quality improvement and a systems development focus and provide a valuable opportunity for State Flex Programs to engage CAHs and EMS in rationalizing and improving STEMI care for rural residents. This brief discusses the vital role that rural EMS agencies and CAHs can play in regional systems of STEMI care and highlights the work of four State Flex Programs in this area. It provides a resource to State Flex Programs interested in developing interventions to engage rural EMS agencies, CAHs, and other hospitals in developing regional systems of care. More detailed information is available in the associated Flex Briefing Paper no. 29, available on the Flex website at: <http://flexmonitoring.org>.

This work is part of a series of Flex Monitoring Team briefs whose purpose is to identify and assess evidence-based interventions for use by State Flex Programs, CAHs, and EMS units.

Medicare Rural Hospital Flexibility (Flex) Program Context

The Medicare Rural Hospital Flexibility (Flex) Program, created by Congress in 1997, allows small hospitals to be licensed as Critical Access Hospitals (CAHs) and offers grants to States to help implement initiatives to strengthen the rural health care infrastructure. To participate in the Flex Grant Program, States must develop a rural health care plan that provides for the creation of one or more rural health networks; promotes regionalization of rural health services; and improves the quality of and access to hospital and other health services for rural residents. The core activity areas of the Flex Grant Program are: 1) support for quality improvement in CAHs; 2) support for financial and operational improvement in CAHs; 3) support health system development and community engagement, including the integration of EMS into local/regional systems of care; and 4) conversion of eligible rural hospitals into CAHs. State applicants' work plans must include at least one of the following: 1) support CAHs, communities, rural and urban hospitals, EMS, and other community providers in developing local and/or regional

Key Findings

- CAHs and rural EMS agencies play an important role in STEMI systems of care.
- EMS providers use prehospital hospital ECGs and transport protocols to ensure timely reperfusion.
- CAHs provide fibrinolytic therapy and post-reperfusion follow-up care including cardiac rehabilitation.
- State Flex Programs can facilitate involvement of CAHs and EMS agencies in STEMI systems of care.

systems of care and 2) support the inclusion of EMS into those systems of care that may include, but are not limited to, regional and state trauma systems.¹

Scope of the Problem: ST-Segment Elevation Myocardial Infarction (STEMI)

STEMI is a significant health problem in America with more than 400,000 events per year.² It is characterized by a completely blocked coronary artery and a critical need for rapid reperfusion to restore blood flow by re-opening the blocked artery.³ Reperfusion treatment options include fibrinolytic therapy and primary percutaneous coronary intervention (PCI).³⁻⁴ Although PCI is the preferred intervention, fibrinolytic therapy remains an important treatment option particularly in isolated rural areas where transport times, even under ideal conditions, may preclude the receipt of primary PCI within the recommended 90 minute window.³⁻⁴ The current guidelines for the timing and choice of reperfusion strategy are as follows:

- STEMI patients presenting to a PCI capable (STEMI receiving) hospital should be treated with primary PCI within 90 minutes of first medical contact (i.e., EMS arrival on scene).
- STEMI patients presenting to a non-PCI capable (STEMI referral) hospital and who cannot be transferred to a STEMI receiving hospital and undergo PCI within 90 minutes of first medical contact should be treated with fibrinolytic therapy within 30 minutes of hospital presentation unless fibrinolytic therapy is contraindicated.⁵

The development of systems of STEMI care that include EMS providers and STEMI receiving and referral hospitals are seen as vital to meeting these guidelines.⁴ The goal is to coordinate response to and care of STEMI patients across participating providers to reduce barriers to the timely delivery of reperfusion.

American Heart Association's Mission: Lifeline

AHA developed Mission: Lifeline to improve the quality of care for acute myocardial infarction (AMI) patients and increase the number of STEMI patients

with timely access to primary PCI by encouraging collaboration and coordination between component parts of the STEMI care system.³ To do this, AHA defined an "ideal capacity" for each component of the system along with a set of guidelines and system recommendations that can be adapted to the unique and specific needs of individual communities (See Table 1).⁵ Most importantly for rural hospitals, the guidelines specifically recognize and preserve a role for STEMI referral hospitals in the overall system of care.

State Flex Program Role in Developing Regional STEMI Systems of Care

Engaging Policymakers and Statewide Coalitions of STEMI Providers

Representatives from **South Carolina's** Flex Program are members of South Carolina's Mission: Lifeline (SC: ML) Steering and EMS Advisory Committees to represent the interests of rural hospitals and EMS and to ensure their participation in development of regional systems in the Midlands, Pee Dee, Upstate, and Low Country areas. SC:ML is also focused on establishing a statewide STEMI data management system and developing common clinical performance goals monitored by key acute care indicators. In support of these performance measurement activities, the Flex Program is exploring development of rural relevant STEMI measures and supporting the linkage of EMS data from the Prehospital Medical Information System with hospital data from the Acute Coronary Treatment and Intervention Outcome Network registry.

Facilitating the Development of Local and Regional Coalitions and Supporting EMS Training

The **Illinois** Critical Access Hospital Network (ICAHN) supports CAHs and rural EMS participation in STEMI systems of care based on Mission: Lifeline guidelines. ICAHN retains a consultant to facilitate development of STEMI workgroups and provide information and updates to hospitals, EMS units and other STEMI stakeholders. The consultant works directly with CAHs, EMS providers, and regional systems to implement systems of care consistent with Mission Lifeline recommendations; provides technical assistance to CAHs and EMS providers; supports data collection and performance

monitoring activities; facilitates collaboration by participating in state and regional meetings; directs a STEMI needs assessment; and organizes educational resources. The consultant also serves as a facilitator for regional STEMI committees to help members focus on patient care and avoid political issues. As part of this work, she supports an individualized approach to developing its system of care based on local resources and needs and advocates for system guidelines to encourage the return of patients to their home communities and hospitals for follow-up and cardiac rehab care.

Development of STEMI Systems of Care Involving CAHs and Dissemination of Best Practices

Washington's Rural Healthcare Quality Network's (RHQN) ongoing AMI/STEMI initiative supported development of standardized protocols, standing orders, data collection tools, and educational materials for use by Washington CAHs. RHQN provides technical assistance and support to CAHs and EMS, assists them with data collection and analysis, and disseminates information on best practices for AMI/STEMI care through newsletters and three annual statewide AMI/STEMI conferences. RHQN also facilitates regional meetings between CAHs, STEMI receiving hospitals, and EMS services to implement emergency cardiac systems of care. All 34 Washington CAHs have adopted the statewide AMI transfer protocols and report significant improvement in outcomes and patient safety as a result.⁶ During a one year period, average door to transport time in CAHs declined from 197 to 100 minutes. Door to ECG times also improved as the percentage of AMI patients receiving an ECG within 12 minutes of arrival in the rural ED increased from 62% in 2009 to 81% in 2010.

Michigan's Spectrum Health Reed City Hospital, a CAH, undertook a STEMI performance improvement challenge involving all community and system STEMI stakeholders. Part of the Spectrum Health System which includes the Meijer Heart Center. Reed City's first door to balloon (D2B) times averaged 120 minutes due to a lack of 12 lead ECG capability in one EMS agency, long travel distances, poor weather conditions, and delays in mobilizing helicopter transport. Reed City's multidisciplinary team expanded EMS 12 lead ECG capacity,

implemented standardized protocols and order sets, revised helicopter activation and coordination procedures, and reorganized emergency department response procedures. As a result, D2B times and total ED time dropped for patients arriving by EMS or walking through the ED door.⁷ Through the Michigan Critical Access Hospital Quality Network (MICAHQN), which is funded by Michigan's Flex Program, formal presentations and education sessions have been provided to the 36 network members. The Flex Program also featured the efforts of Reed City and the STEMI Initiative of Northern Lower Michigan in Traverse City in its CAH and MICAHQN newsletters.

Conclusion

STEMI initiatives provide a valuable opportunity for State Flex Programs to engage CAHs and EMS agencies in improving the delivery of care to rural STEMI patients. The evidence identifies a vital role for EMS in these STEMI systems of care and provides opportunities to engage EMS units in working with local CAHs as well as other rural and urban hospitals. Examples of State Flex Program STEMI activities suggest a number of options for Flex Program involvement. The first involves participation in statewide STEMI committees which focus on developing statewide standards for STEMI care and encourage implementation of those standards and systems in rural communities. The second involves working with EMS units, CAHs, and other hospitals to improve system capacity and coordination of care by providing training to EMS units on the use and interpretation of 12 lead ECGs, supporting development of regional systems of STEMI care; disseminating information on these systems of care to other hospitals; and forming committees to address deficiencies in local STEMI care and facilitating discussions between the participants targeted system improvements.

For more information on this study, contact John Gale at fgale@usm.maine.edu or 207-228-8246.

Table 1: Mission: Lifeline Ideal System of STEMI Care

Level of Care	Characteristics and Capacities
EMS	<ul style="list-style-type: none"> • All ambulances are equipped with 12 lead ECGs • EMS personnel trained to: • Communication gaps with hospitals and cath labs are closed • EMS personnel remain on site (at the STEMI referral hospital) with the patient on a stretcher pending a transport decision • EMS services agree to be activated when a walk-in STEMI patient presents at STEMI referral hospital
STEMI Referral Hospital	<ul style="list-style-type: none"> • Adheres to standardized transport protocols based on criteria for risk, contraindication for fibrinolysis, and proximity to PCI services • Uses standardized triage/transfer protocols • Treats patients in accordance with ACC/AHA guidelines • Transfers to STEMI receiving hospitals using reperfusion checklists, standardized pharmacological regimens/order sets, and clinical pathways • Engages in data collection activities; rapidly and efficiently transfers data • Provides system feedback • Establishes plans for return of patient to the community after PCI
STEMI Receiving Hospital	<ul style="list-style-type: none"> • 24/7 PCI capability • Accepts prehospital ECG diagnosis, ED notification, and cath lab activation using standard, established algorithms (allows for direct transport from field to cath lab) • Establishes a single call process allowing referral hospitals to activate the cath lab • Develops written collaboration protocols with referral hospitals • Establishes a multidisciplinary team (with representatives from EMS and referral hospitals) that meets regularly • Provides for ongoing continuing education • Monitors system performance, process measures, and patient outcomes.

Source: American Heart Association. *Ideal STEMI-System*.⁵

Endnotes

1. ORHP. *Medicare Rural Hospital Flexibility Grant Program: Funding Opportunity Announcement, Fiscal Year 2010*. (HRSA-10-049). Rockville, MD: U.S. DHHS; January 2010.
2. Antman EM, et al. ACC/AHA Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction. *Circulation*. 2004 Aug 3; 110:588-636.
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4. Antman EM, et al. 2007 Focused Update of the ACC/AHA 2004 Guidelines for the Management of Patients With ST-Elevation Myocardial Infarction: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *J Am Coll Cardiol*. 2008 Jan 15; 51:210-47.
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6. Michigan Center for Rural Health. STEMI Performance Improvement Challenge. *Rural EMS Quarterly*. 2010, September;1-2.
7. Rural Healthcare Quality Network. Good News on AMI Care in Rural Washington State. *RHQN Newsletter*. 2011, February.