2016 Minnesota Cardiovascular Emergencies Conference

Thank you!
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FINANCIAL DISCLOSURE:
No relevant financial relationship exists
Lunch 12:30 – 1:10 Fireside Room

Breakouts I Elm Creek Amphitheatre  1:15 - 2:00 - 2:45

• Acute Coronary Syndrome Presentation: Rural Emergency Department EMS  Dr. John Gallagher
• Therapeutic Adjuncts to Primary Reperfusion and Post Resuscitation Care Dr. Scott Mikesell
• ECMO/eCPR/Cardiogenic Shock Dr. Kasia Hryniewicz

Breakout II Salon 3 Hennepin Ballroom

• STEMI Recognition and 12 l ECG Assessment Travis Spier
• 12 L ECG Advanced Interpretation Tom Bouthillet
• STEMI Scenarios and Lessons Learned Richard Mullvain

Breakout III Salon 1 Hennepin Ballroom

• Data Collection and Reporting Utilizing the Cares and Resuscitation Registries Lucinda Hodges
• Operational Lessons learned from high performing systems of cardiac arrest Carol Frazee
• Cardiac Care Project Minnesota: LUCAS Grant Jodi Millner

Exhibits

• The Medicines Company
• Physio-Control
• Astra Zeneca
• Zoll
Mission: Lifeline is the American Heart Association’s national initiative to advance the systems of care for patients with ST-segment elevation myocardial infarction (STEMI) and those resuscitated after experiencing an Out-of-Hospital Cardiac Arrest. The overarching goal of the initiative is to reduce mortality and morbidity for STEMI and Out of Hospital Cardiac Arrest patients and to improve their overall quality of care.
STEMI Point of Entry Protocol

Onset of symptom of STEMI

9-1-1 EMS dispatch

EMS on-scene
• Obtain 12-lead ECGs
• Consider prehospital fibrinolytic if capable and EMS-to-needle within 30 min

EMS transport within 8 min

Prehospital fibrinolysis: EMS-to-needle within 30 min

EMS Triage Plan

STEMI-referral hospital (non PCI-capable)

STEMI-receiving hospital (PCI-capable)

Hospital fibrinolysis: Door-to-needle within 30 min
FMC to device within 120 min

EMS transport: EMS-to-balloon within 90 min

Patient self-transport: Hospital D2B within 90 min

GOALS†

<table>
<thead>
<tr>
<th>Patient</th>
<th>Dispatch</th>
<th>EMS on scene</th>
<th>EMS transport</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 min after symptom onset</td>
<td>1 min</td>
<td>within 8 min</td>
<td>Prehospital fibrinolysis: EMS-to-needle within 30 min</td>
</tr>
</tbody>
</table>

Total ischemic time: Within 120 min*

* Golden Hour = First 60 minutes

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Regional Systems of STEMI Care, Reperfusion Therapy, and Time-to-Treatment Goals

All communities should create and maintain a regional system of STEMI care that includes assessment and continuous quality improvement of EMS and hospital-based activities. Performance can be facilitated by participating in programs such as Mission: Lifeline and the D2B Alliance.

Performance of a 12-lead ECG by EMS personnel at the site of FMC is recommended in patients with symptoms consistent with STEMI.
Regional Systems of STEMI Care, Reperfusion Therapy, and Time-to-Treatment Goals

Reperfusion therapy should be administered to all eligible patients with STEMI with symptom onset within the prior 12 hours.

Primary PCI is the recommended method of reperfusion when it can be performed in a timely fashion by experienced operators.

EMS transport directly to a PCI-capable hospital for primary PCI is the recommended triage strategy for patients with STEMI with an ideal FMC-to-device time system goal of 90 minutes or less.*
Comparing Time to Percutaneous Coronary Intervention in Rural States: Arriving via Ambulance vs Personally Owned Vehicle

John Gallagher MD, Winona Health, Jeffrey Gatter, MD Trinity Health, Thomas Sly, MD, Sanford Health, Mindy Cook, BSN, Gary Myers, MS, Pam Moe, RN, Michelle Schrammott, MBA, American Heart Association

Background

Minnesota, North Dakota and South Dakota continue to build the infrastructure to improve the system of care for patients experiencing a STEMI (ST-elevation myocardial infarction) event. Time from symptom onset to Percutaneous Coronary Intervention (PCI) is a critical component for better patient outcomes. EMS agencies are critical to the success of an effective STEMI system of care. However, about 52% of STEMI patients in these states are arriving by self-transport or personally operated vehicles instead of activating the system via 911. Ideally, the catheterization lab team would be notified by EMS personnel in the field or by emergency physicians after receiving the transmitted ECG indicating a STEMI and reducing the time to PCI.

Methods

There were 774 STEMI patient were entered into ACTION Registry-GWTG from Quarter 3 2013 to Quarter 2 2014. The data included STEMI patients from 16 hospitals in Minnesota, North Dakota and South Dakota participating in Mission: Lifeline, an American Heart Association initiative to improve STEMI systems. The patients analyzed arrived directly to a PCI-capable hospital. While the mode of arrival to first facility percentage comparison includes all patients, the time comparison does not include patients that were transferred from a PCI-referring hospital.

Results

The median time from patient arrival at PCI center to catheterization lab arrival ranged between 22 and 31 minutes with a mean 25 minutes for patients arriving via EMS. Patients that arrive by personally owned vehicle had a median time from arrival to catheterization lab that ranged between 35 and 41 minutes with a mean of 39 minutes. The median time from hospital arrival to PCI was a mean of 42 minutes for patients arriving via EMS compared to those arriving via self-transport at 37 minutes.

<table>
<thead>
<tr>
<th>Median Time Arrival to PCI (in min)</th>
<th>SD</th>
<th>MN</th>
<th>ND</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Medical Services</td>
<td>41</td>
<td>38</td>
<td>39.5</td>
<td>43.5</td>
</tr>
<tr>
<td>Personally Owned Vehicle</td>
<td>59</td>
<td>56</td>
<td>54.5</td>
<td>56.5</td>
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Conclusions

Although extensive system development and 911-activated placement has occurred in the three-state region, creating robust STEMI systems of care, a large number of patients continue to utilize these systems by not activating EMS as an entry point. We show that use of EMS results in a decreased time from hospital arrival to PCI compared to presentation by POV. Furthermore, since time from hospital arrival to PCI is a subset of total ischemic time, failure to utilize EMS in the setting of STEMI may increase total ischemic time.
MN Co-Chairs 2013-2016

Dr. Scott Mikesell, DO, FACC, FSCAI
American Heart Association MN Mission: Lifeline Co-Chair

Richard Mullvain, R.Ph., BCPS (AQC) CCCC
American Heart Association MN Mission: Lifeline Co-Chair
STEMI GUIDELINE

Minnesota Mission: Lifeline Statewide STEMI Interfacility Transfer Guideline

IDENTIFY / CONFIRM STEMI:
- Signs & Symptoms suspect for AMI (Acute Myocardial Infarction) - Duration > 15 minutes < 12 hours
- ST Elevation as defined by diagnostic criteria on pg. 2
- Pre-Hospital STEMI confirmed by 12 L ECG trained ALS EMS recognize ST segment elevation of 2 mm in 2 contiguous leads, Confirmed interpretation of STEMI transmitted, or ECG Monitor interpretative statement infers: “Acute Myocardial Infarction” with pt. signs & symptoms suspect of AMI.

ACTIVATE TRANSPORT:
- Establish availability and estimated time to PCI hospital
- PMS for intracardiac transfers to PCI hospital

ESTABLISH TIMES:
- Symptom Onset: First Medical Contact: ETA to PCI Hospital

ABSOLUTE CONTRAINDICATIONS
- Major surgery within last 3 weeks
- Traumatic or prolonged CPR (over 10 minutes)
- Known intracranial pathology not covered
- Uncontrolled hypertension on presentation
- Current use of oral anticoagulants
- Known allergy to TNK (Full Dose)

RELATIVE CONTRAINDICATIONS FOR FIBRINOLYSIS
- Major surgery within last 3 weeks
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ACTIVATE CODE STEMI / STEMI ALERT AT PCI HOSPITAL
(See page 2 for further details.)

TRANSPORT PATIENT AS SOON AS POSSIBLE:
- Fax or Transfer ECG and other pertinent records (MSM reports, allergies, past medical history) to receiving hospital.
- Establish STEMI / STEMI ALERT AT PCI HOSPITAL

Notes:
- All eligible STEMI patients receiving a Thrombolytic should be transferred to a PCI capable hospital within 120 minutes (including transport time)

STEMI (ST Elevation Myocardial Infarction) Diagnostic Criteria:
- ST elevation at the J-point is at least 0.2 mV (0.5 mm) in at least 2 adjacent leads in men or 0.25 mV (0.5 mm) in women in leads V1-V3 and/or at least 1 mm (0.1 mV) in other contiguous leads.
- New & persistent Q waves or significant ST segment depression or both in more than 2 contiguous leads.
- No ST elevation in a patient with a history of complete heart block.

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Minnesota Mission: Lifeline EMS STEMI Transport Guideline

DLS & ALR:

- Administer Oxygen to maintain SpO2 90%–94% or bilevel as needed starting at 1 LPM nasal cannula
- Obtain Systolic/Diastolic blood pressure (BP) in both arms
- Administer Cleurepine 0.1 mg over 4 minutes
- Evaluate D-dimer or PTT
- Record hyperglycemic medications taken in the past 24 hours including: Statins, Thiazolidinediones, Diacylpeptides, Accutena, Tetrabenazine, Naloxone
- Check BP prior to each administration dose. Hold if SBP > 90
- Order a rapid Advance O2 request if transport time exceeds 15 minutes
- Obtain a baseline of APs (L) lower extremity preferred. Establish a 2nd IV line as time allows.

Pre-Hospital STEMI ALERT Activation Criteria:

- Identify potential ACS patents, Recognize STEMI, Alert Receiving Facility
- Actuate STEMI Alert when any one of the following criteria are met. (Any patient demonstrates signs of symptoms suggestive of [AMI] acute myocardial infarction) as documented above with a duration of ≥15 minutes
  1. Patient presented in D1 LEC presenting recognizable ST segment elevation of ≥0.1 mm in 2 contiguous leads
  2. Interpretation of ECG transmitted and reviewed by supervisor (Phleegion, N.H.). (24) continues to be diagnostic of STEMI
  3. 12 Lead ECG Monitor Algorithm Interpretive statement reads: “Acute Myocardial Infarction”

Determine Transport Destination

- Transport time estimated to be ≤60 minutes
- Notify medical control of STEMI and consider transport via the most expedient method available to the region: STEMI Capable Receiving Facility
- Notify referring PCC
- Active content alert at receiving facility and transmit 12 LEQ as able
- Follow Consel AII Transport

Transportation Criteria:

- Transport time estimated to be ≤60 minutes
- Notify medical control and consider transport to the closest appropriate non-PCI capable referring hospital for possible thrombolytic therapy and subsequent urgent transfer to a PCI-Capable Receiving Facility for reperfusion
- Intake thrombolytic contraindication checklist per protocol
- Actuate STEMI Alert at receiving facility and transmit 12 LEQ as able for provider confirmation
- Follow Consel AII Transport

Documentation Reminders:

- Provide a printed copy of EMS Run Sheet, and 12LEQ with Report to the receiving hospital ED staff
- Obtain Date and Time of DCCS dispatch, Final Medical Patient Contact, Scene depature, STEMI alert requested
- Document EMS agency number, and EMS run number

AHA Mission 1: Lifeline EMS Best Practice Goals

1. All patients with non-traumatic chest discomfort ≥36 yrs. of age, treated and transported by EMTs receive a pre-hospital 12-lead electrocardiogram
2. All STEMI patients transported directly to a STEMI Receiving center, receive a prehospital (pre-hospital) medical contact to PCI time ≤60 minutes directly or ≤120 minutes for timely hospital transfers
3. All thrombolytic eligible STEMI patients treated and transported to a referring hospital for fibrinolytic therapy receive a door to needle time ≤90 minutes

AHA Mission 1: Lifeline EMS Recognition Achievement Measures:

1. Percentage of patients with non-traumatic chest pain ≥36 years, treated and transported by EMS who receive a pre-hospital 12-lead electrocardiogram
2. Percentage of STEMI patients treated and transported directly to a STEMI receiving center, with pre-hospital first medical contact to device time ≤90 minutes
3. Percentage of STEMI patients treated and transported to a STEMI receiving hospital for thrombolytic therapy with a door to administration time ≤60 minutes

[Version reviewed 6/2015]
Learn Rapid STEMI ID

851 assigned and 149 remaining

1500 STEMI provider manuals
Rural MN Hospital Engagement

- 101 Eligible Referring Hospitals 60 awarded grants - Participation rate among referring hospitals was about 59%.
- On Site Referring Hospital Education:
  - 59 sessions were completed with 618 attendees
- MN M:L STEMI Conferences and Workshops
  - Statewide Annual Conferences (3) 689
  - Year 2 Regional Workshops (2) 143
  - Year 3 Regional- Workshops (5) 342
  » Total = 1174
Hospital Public education - 30 facilities requested materials

EMS public education - 28

EMS education materials - 62

Hospital education material - 78
12 L ECG STEMI Recognition Educational Video
Regional Model Sharing

- ML staff and chairs Dr. Mikesell and Richard Mullvain and Mindy Cook presented and had a booth display at the Arrowhead EMS Conference in Duluth, January 2014, 2015, 2016

- National Abstract accepted to (QCOR) presented at Scientific Sessions 2015. Manuscript writing group workgroup and data analytics request in progress

- EMS Medical Directors Retreat Presentation Sept. 2015 MN STEMI Systems of Care
The HeartCare™ Channel Grantees
- St Luke's Health Duluth
- Essentia Health Fargo
- Altru Health Grand Forks

A patient educational resource aimed at empowering heart and stroke patients to live healthier, longer lives.
MN Median past 12 months Symptom onset to first EMS FMC 58 minutes vs POV 118 minutes
• Print Ads, Facebook
• Radio PSA’s–
• Promotion to radio stations by MN Communication’s Admin.
• Radio News Stories

• Keep Car Parked for Your Heart: Driving Delays Treatment (27 radio 707 outlets)
  http://www.publicnewsservice.org/2015-03-13/health-issues/keep-car-parked-for-your-heart-driving-delays-treatment/a45100-1
• EMS and hospitals print materials.
2015 Hospital Quality Recognition Awards

2015 AHA Mission: Lifeline Recognition

<table>
<thead>
<tr>
<th>Hospital</th>
<th>State</th>
<th>Recognition</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. Luke’s Hospital</td>
<td>MN</td>
<td>Gold</td>
</tr>
<tr>
<td>CentraCare Heart &amp; Vascular Center</td>
<td>MN</td>
<td>Silver Plus</td>
</tr>
<tr>
<td>Sanford Bemidji Medical Center</td>
<td>MN</td>
<td>Bronze</td>
</tr>
<tr>
<td>Mayo Clinic Health System Mankato</td>
<td>MN</td>
<td>Silver</td>
</tr>
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2015 ACC Recognition

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Recognition</th>
</tr>
</thead>
<tbody>
<tr>
<td>St. Luke’s Hospital</td>
<td>Platinum</td>
</tr>
<tr>
<td>Essentia Health -St. Mary’s Medical Center</td>
<td>Platinum</td>
</tr>
<tr>
<td>CentraCare Heart &amp; Vascular Center</td>
<td>Silver</td>
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<td>Silver</td>
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</table>

The American Heart Association recognizes this hospital for achieving 85% or higher composite adherence to all Mission: Lifeline® STEMI Receiving Center Performance Achievement indicators for consecutive 24-month intervals and 75% or higher compliance on all Mission: Lifeline® STEMI Receiving Center quality measures to improve the quality of care for STEMI patients.

The American Heart Association recognizes this hospital for achieving 85% or higher composite adherence to all Mission: Lifeline® STEMI Receiving Center Performance Achievement indicators for consecutive 12-month intervals and 75% or higher compliance on all Mission: Lifeline® STEMI Receiving Center quality measures to improve the quality of care for STEMI patients.
MN 2015 AHA EMS Recognition Award Recipients

1. Percentage of patients with non-traumatic chest pain ≥ 35 years old, treated and transported by EMS who get a pre-hospital 12 lead ECG
2. Percentage of STEMI patients transported to a STEMI Receiving Center, with pre-hospital First Medical Contact (FMC) to Device (PCI) ≤ 90 Minutes
3. Percentage of STEMI patients transported to a STEMI Referring Center, with Arrival (to Referring Center) to Fibrinolytic Therapy administered in ≤ 30 Minutes (Door to Needle)

- Gold Cross Ambulance Service
  – Rochester MN Gold

- Gold Cross Ambulance Service
  St Cloud MN Silver

- Lake County Ambulance Service
  Two Harbors MN Bronze
Ratings of Referring Hospitals and EMS on trainings provided by Mission: Lifeline

- This training enhanced knowledge of the subject matter.
- This training impacted behavior change for patient outcomes.
- This training was relevant to what is expected in the course of our job.
- The training increased our confidence in treating STEMI patients.
- The training improved our capability to treat STEMI patients.
- We are satisfied with the training overall.

[Bar chart showing comparison between Referring hospitals and EMS agencies]
Mission: Lifeline Report Data
Derived From ACTION-Registry Get With The Guidelines Data

Mission: Lifeline Report Options

- Individual Receiving Center or Referring Center STEMI Reports
- Regional Level STEMI Reports
Rural MN Regional Report Participating Hospitals

<table>
<thead>
<tr>
<th>Sanford Medical Center Bemidji MN</th>
</tr>
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<tbody>
<tr>
<td>St. Luke’s Hospital Duluth MN</td>
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<tr>
<td>Essentia Health East-St. Mary's Medical Center Duluth MN</td>
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<td>Mayo Clinic Health System Mankato MN</td>
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<tr>
<td>Prairie Lakes HealthCare Watertown SD</td>
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<td>Avera McKennan Hospital Sioux Falls SD</td>
</tr>
</tbody>
</table>
MN FMC to PCI median past 12 months 75 minutes
National median 80 minutes
MN median past 12 months 129 min
National median 137 min

MN Data Q2 2015

MN LOS Referring facilities median past 12 months 54 minutes
National benchmark 59 minutes
Minutes Are Huge
Calling 911 in rural areas leads to faster heart attack care

- Patients brought to the hospital by ambulance took an average of about 26 minutes to get there compared with an average of 38 minutes for patients who drove themselves.
- The average time from hospital arrival to undergoing artery-opening procedures in the cardiac catheterization lab was an average of 42 minutes for those who traveled by ambulance versus 57 minutes for those who drove themselves.

3/28/2016
Recognition of Key Volunteers

- Hospital Advisory Committee
- Quality Committee
- Hospital Education providers
- Conference planning committee
EMS Update

2009-2013 Acute Myocardial Infarction (ICD10 I21 & I22)
35+ Age-Adjusted Death Rate per 100,000
EMS Agencies Receiving Equipment Grants
60 Miles to EMS Agency Receiving Equipment Grant
STEMI Receiving/Referral Centers

Gary W. Myers, MS, NREMT
Sr. Mission: Lifeline Director
EMS Consultant for Midwest Affiliate
American Heart Association, Midwest Affiliate
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(605) 215-1551
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• 98 equipment grants
• 60% of total eligible applied (132 applications)
• 45% of total eligible received funding (217 total eligible)
• 75% of all applications received were funded
• Approximately 25 active EMS Advisory Committee members
• 104 education sessions completed in-house
• 1242 total EMS providers trained
• 17 instructors statewide
• 71% of interviewed EMS agencies follow the Minnesota EMS STEMI guideline
• 55 Agencies participated in evaluation surveys
Devices by Brand

- Philips, 5%
- Zoll, 27%
- Physio, 68%
12-Lead Transmissions (source: Physio-Control Lifenet)
EMS satisfaction with equipment

- Philips: 3.67
- Physio-Control: 4.86
- Zoll: 4.57
• EMS agencies were nearly unanimous in their positive view of M:L and AHA. Agencies noted that M:L and AHA were doing a good job providing education and helpful teaching materials. As one EMS agency said, “The focus isn’t just about providing you equipment. It’s about providing the knowledge to use the equipment and about providing education to your service and the public as well.”

• EMS agencies appreciated that they were given simple guidelines to follow, guidelines that aren’t too burdensome for volunteers to learn and that are easy to remember in the field.

• “We were at a place where affording to replace those monitors would have been incredibly difficult for us. I’m so thankful and appreciative of receiving the grant so we could accomplish that.”
• Have had success stories where we were 15 miles away from the hospital, and we sent a 12-lead. Before we got up to the main highway, the hospital had received the 12-lead, had called to Bemidji and had a chopper ready to go because they saw it was a STEMI. Before we even got to the hospital, the steps were implemented. That was really exciting. This is how it’s supposed to work.

• One of our first patients that we did a 12-lead on was a middle-aged female that was experiencing some chest pains. We sent the EKG to the doc, and they recognized a STEMI. She went into our cath lab with slight chest pains but having a heart attack. For the crew and everyone involved to see that and for her family to acknowledge that that’s what made our decision to go where we went, I think it’s a strong story to experience or to hear. We know the efforts that we put into this were the right efforts, and they made a difference.
Nebraska

- Year 3 of grant
- Statewide STEMI guidelines for EMS and Referring Hospitals complete
- Statewide EMS and Hospital education continues
- All EMS equipment grants have been distributed – 104 agencies
- Hospital grants ongoing – 30 so far
- 1 statewide conference in 2015; 3 regional conference scheduled for 2016
- State of NE has contributed 310,000 to 12-lead equipment in excluded areas
- Public education campaign on-going. Includes social media, radio, T.V., paper and theatres and materials for hospitals and EMS agencies.
Iowa

• Year 2 of grant
• Statewide STEMI guidelines for EMS and Referring Hospitals complete
• Statewide EMS and Hospital education to start this spring
• EMS equipment grants 18 in Round 1; Round 2 announcement end of March 2016
• Hospital grants ongoing – 2 so far, following the EMS grants by round
• 3 regional conference scheduled for 2016
• Currently working on state appropriation to support unfunded areas and project as a whole
• Public education campaign under development
Special thanks to all of our volunteers. Some key champions…

EMS Advisory Committee Members
• Dr. Carson Gardner

EMS Educators
• Travis Spier
• Kathy Lonski

EMS Regional Directors
• Tom Vanderwal
• Pat Lee
• Marion Larson
• Mark Griffith
• Mark McCabe
• Don Hauge
• Ann Jensen
Thank you!