WELCOME to the Mission: Lifeline STEMI & Cardiac Resuscitation Systems of Care Webinar

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Graham Nichol, MD Chair Mission: Lifeline Cardiac Resuscitation
Chris Bjerke, RN, MBA National Mission: Lifeline Director
Speaking Disclosures

Chris Granger, MD

- Research contracts: AstraZeneca, Novartis, GSK, Merck, Sanofi-Aventis, BMS, Pfizer, The Medicines Company, Astellas, Medtronic, and Boehringer Ingelheim
- Consulting/Honoraria: AstraZeneca, GSK, BMS, Pfizer, Lilly, Novartis, Roche, Boehringer Ingelheim, The Medicines Company, and Sanofi-Aventis
- For full listing see www.dcri.duke.edu/research/coi.jsp

Graham Nichol, MD

- Funding
  - University of Washington, Seattle, WA. Salary, Medic One Foundation Endowed Chair in Prehospital Emergency Care.
  - NHLBI, Bethesda, MD. Co-PI, Resuscitation Outcomes Consortium Data Coordinating Center.
  - NHLBI, Bethesda, MD. PI, Randomized Trial of Hemofiltration After Resuscitation from Cardiac Arrest.
  - NHLBI, Bethesda, MD. Co-I, Randomized Field Trial of Cold Saline IV After Resuscitation from Cardiac Arrest.
  - NHLBI, Bethesda, MD. Co-I. Monitoring Disparities in Chronic Conditions.
  - Medtronic Foundation, Minneapolis, MN. PI, Cascade HeartRescue Program.
Speaker Disclosures Continued

• Collaborations
  – Sotera Wireless, San Diego, CA. Unpaid research collaborator.
  – Gambro Renal Inc., San Diego, CA. Unpaid research collaborator
  –

• AHA Volunteer
  – Member, Western States Affiliate BOD
  – Volunteer, Mission:Lifeline Cardiac Resuscitation
  – Member, National Advanced Cardiac Life Support Subcommittee
  – Chair, Resuscitation Science Symposium Planning Committee

Chris Bjerke
  – American Heart Association Employee
  – No other disclosures
Outline

Mission: Lifeline Background
  • STEMI Statistics
  • Mission: Lifeline History
  • Program updates
  • Program Outcomes

Opportunities to Improve Systems of Care

Cardiac Resuscitation Statistics
  • History
  • Mission: Lifeline Tools
    - Point of Entry Protocol
    - Ideal System Elements

How Can you get involved?
  • Questions and Answers
Acute Myocardial Infarction (AMI) Statistics

- Myocardial infarction strikes 935,000 people a year in the United States
- Over 250,000 of those are STEMIIs
- It is estimated that the combination of direct and indirect health care costs of coronary heart disease reached over $500 billion in 2011
- 1 of 6 deaths (>400,000 per year) is from coronary disease
- Coronary heart disease is the single largest killer
History 2004-2006

MAY 2004
AHA recruited an Advisory Working Group (AWG)

JUNE 2005
Price Waterhouse Coopers presents its market research to AWG

MARCH 2006
AWG Consensus Statement appears in Circulation

Stakeholders called to action

AWG develops a set of guiding principles

AHA held a conference of multidisciplinary groups involved in STEMI patient care

AHA Consensus Statement

Recommendation to Develop Strategies to Increase the Number of ST-Segment-Elevation Myocardial Infarction Patients With Timely Access to Primary Percutaneous Coronary Intervention

The American Heart Association’s Acute Myocardial Infarction (AMI) Advisory Working Group

Alice K. Jacobs, MD, FAHA; Chair; Elliott M. Antman, MD, FAHA; Gray Elliott, MD; David P. Faxon, MD, FAHA; Tammy Gregory; George A. Mensah, MD, FAHA; Peter Moyer, MD; Joseph Ornato, MD, FAHA; Eric D. Peterson, MD, FAHA; Larry Sadwin; Sidney C. Smith, MD, FAHA
History 2007-2008

**EARLY 2007**
Drafts of STEMI Systems of Care manuscripts are finalized
Action items for the AHA begin to take shape

**APRIL 2007**
A cross-functional team was recruited to spearhead Mission: Lifeline

**MAY 2007**
Eleven manuscripts are published in *Circulation*
Mission: Lifeline was formally launched

**JULY 2008**
Affiliate Staff Kick-Off was held

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**Development of Systems of Care for ST-Elevation Myocardial Infarction Patients**

*Executive Summary*
Endorsed by AHA, the American Ambulance Association, the American Association of Critical-Care Nurses, the American College of Emergency Physicians, the Emergency Nurses Association, the National Association of Emergency Medical Technicians, the National Association of EMS Physicians, the National Association of State EMS Officials, the National EMS Information System Project, the National Rural Health Association, the Society for Cardiovascular Angiography and Interventions, the Society of Chest Pain Centers, and UnitedHealth Network

Alice K. Jacobs, MD, FAHA; Chair; Elliot M. Arrin, MD, FAHA; David P. Faxon, MD, FAHA; Tannany Gregory; Beaula M. Solus, JD

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## 2009-Present

<table>
<thead>
<tr>
<th>Springer 2009</th>
<th>Fall 2009</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completion of a national EMS Assessment for STEMI Systems represents 91% of US population</td>
<td>Accreditation requirements for STEMI Systems, hospitals and EMS Agencies are released</td>
<td>Hospital recognition program and reports are released</td>
<td>AHA collaborates with SCPC and hospital accreditation program released</td>
</tr>
</tbody>
</table>
ST Elevation Myocardial Infarction (STEMI)

- Early diagnosis and rapid reperfusion therapy for ST-segment myocardial infarction (STEMI) limits infarct size and improves survival
- Door-to-balloon is <90 minutes in 90% of cases in ACTION- Get With The Guidelines Registry
- Current guidelines recommend reperfusion therapy within 90 minutes of first medical contact and within 120 minutes for hospital transfers
- Delay in symptom onset to treatment increases mortality

American Heart Association: Heart Disease & Stroke Statistics, 2009 update
STEMI Systems Coverage

As of 6/3/2011 (563 Systems; 58.9% Population Coverage)

* Population coverage based on self-reported ZIP code coverage area. Coverage area data is not currently available for all registered systems.
STEMI Systems Coverage

As of 3/5/2012 (615 Systems; 61.4% Population Coverage)
# Participants

- 2009: 365
- 2010: 539
- 2011: 712

# AR-G Participants
ACTION Registry-GWTG Records Submitted by Diagnosis

- Total Records
- Non-STEMI
- STEMI
Use of Reperfusion Therapy for STEMI

**STEMI**
N = 34,264

- **Reperfusion**
  N = 27,501 (80%)

- **No Reperfusion**
  - No Contraindication Listed
    N = 2,303 (7%)
  - Not Eligible for Reperfusion Therapy
    Contraindication Listed
    N = 4,460 (13%)

**Primary PCI** – 84%*
**Fibrinolytics** – 7%*
**Both PCI + Lytics** – 1%*

92% of eligible patients reperfused

* Among patients receiving reperfusion

ACTION Registry-GWTG DATA: July 1, 2010 – June 30, 2011
STEMI Door-to-Balloon Times
Median Times for Transfer and Non-Transfer In patients

Transfer In D2B Times
169
119

Non-Transfer In D2B Times
79
61

2007
2011
## Mission: Lifeline Data

<table>
<thead>
<tr>
<th>Measure Metric</th>
<th>National Score Q1 2010</th>
<th>National Score Q3 2011</th>
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<tbody>
<tr>
<td>Overall Mission: Lifeline Composite Score</td>
<td>94.5%</td>
<td>93.9%</td>
</tr>
<tr>
<td>Time to PPCI &lt;=90 Minutes</td>
<td>91.5%</td>
<td>94.2%</td>
</tr>
<tr>
<td>Mission: Lifeline FMC to PPCI &lt;=90 Minutes</td>
<td>56.9%</td>
<td>64.3%</td>
</tr>
<tr>
<td>Reperfusion Therapy</td>
<td>93.0%</td>
<td>~</td>
</tr>
<tr>
<td>ASA at Arrival</td>
<td>99.1%</td>
<td>98.9%</td>
</tr>
<tr>
<td>ASA at Discharge</td>
<td>98.5%</td>
<td>99.0%</td>
</tr>
<tr>
<td>Beta Blocker at Discharge</td>
<td>97.2%</td>
<td>97.9%</td>
</tr>
<tr>
<td>Statin at Discharge</td>
<td>98.5%</td>
<td>98.9%</td>
</tr>
<tr>
<td>ACE-I or ARB for LVSD at Discharge</td>
<td>89.7%</td>
<td>91.9%</td>
</tr>
<tr>
<td>Adult Smoking Cessation Advice</td>
<td>98.6%</td>
<td>98.3%</td>
</tr>
</tbody>
</table>
Mission: Lifeline Receiving Center National Report Qrt 1 2010, Qrt 3 2011

Door 1 – Transfer - Device

- % <90 Minutes
  - 2010: 3%
  - 2011: 6%

- % < 120 Minutes
  - 2010: 21%
  - 2011: 32%
## In-Hospital Outcomes - STEMI

<table>
<thead>
<tr>
<th>Variable</th>
<th>STEMI (n=41,808)</th>
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<tbody>
<tr>
<td>Death*</td>
<td>6.0%</td>
</tr>
<tr>
<td>Re-infarction</td>
<td>0.9%</td>
</tr>
<tr>
<td>HF</td>
<td>5.3%</td>
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<tr>
<td>Cardiogenic Shock</td>
<td>4.6%</td>
</tr>
<tr>
<td>Stroke</td>
<td>0.6%</td>
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<tr>
<td>RBC Transfusion**</td>
<td>7.9%</td>
</tr>
<tr>
<td>Suspected Bleeding Event**</td>
<td>4.2%</td>
</tr>
</tbody>
</table>

*Unadjusted mortality

** Among non-CABG

ACTION Registry-GWTG DATA: July 1.2010 – June 30, 2011
Mission: Lifeline Goals

- Promote the ideal STEMI and Cardiac Resuscitation systems of care
- Help STEMI and Cardiac Arrest patients get the life-saving care they need in time
- Bring together healthcare resources into an efficient, synergistic system
- Improve overall quality of care
“MEN WANTED for Hazardous Journey. Small wages, long months of complete darkness, constant danger, safe return doubtful. Honour and recognition in case of success.”

– Ernest Shackleton
“They're not gonna catch us. We're on a mission from God.”
- Elwood in Blues Brothers
Why Create Better Systems?

• 382,000 individuals with out of hospital cardiac arrest assessed by EMS annually
  – Roger Circulation 2012

• About 50% of cardiac arrest victims have acute occlusion on coronary angiography
  – Nichol Circulation 2010

• 11.4% of those treated by EMS for cardiac arrest survive to discharge
  – Roger Circulation 2012

• 41% received bystander CPR
  – Roger Circulation 2012

• 2.1% had an AED applied by lay persons before EMS arrival
  – Weisfeldt JACC 2010
History

Regional Systems of Care for Out-of-Hospital Cardiac Arrest: A Policy Statement from the American Heart Association

2010

Task Force convened to explore addition of Cardiac Resuscitation quality improvement efforts to current M:L Program

• Overlapping clinical conditions
• Common providers and procedures
• Well-documented effectiveness of regionalized STEMI systems

Development of Ideal systems for Cardiac Arrest

2011

APRIL 2012

Launch of STEMI and Cardiac Resuscitation Systems of Care Mission: Lifeline program
Why Add Cardiac Resuscitation to Mission: Lifeline STEMI?

OPPORTUNITIES

- Increase community response and action
  - Bystander CPR
  - Public access to AEDs
- Improve coordination by First Responder Professionals, EMS, Emergency Departments and Hospital providers
  - Effective and Continuous CPR
  - Induction of Therapeutic Hypothermia
  - Prompt PCI when indicated
  - Multidisciplinary Approach throughout the continuum of care
- Develop and implement regional system of care for patients resuscitated from OHCA
- Increase in continuous monitoring and reporting of OHCA incidence, process variables and outcomes
Each Minute Without CPR and Defibrillation a SCA Victim's Chance of Survival Decreases 7-10%
Large Regional Variation in Survival After Out-of-Hospital Cardiac Arrest

Nichol JAMA 2008
Large Regional Variation in Survival from Admission to One Month
Herlitz Resuscitation 2006
EMS-Treated Cardiac Arrest
Rea Ann Emerg Med 2010
Bystander Witnessed VF of Presumed Cardiac Etiology
Rea Ann Emerg Med 2010
<table>
<thead>
<tr>
<th>Community</th>
<th>EMS</th>
<th>Referral Center (no PCI)</th>
<th>Receiving Center (PCI-capable)</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Designated Community Champion for Cardiac Resuscitation</td>
<td>• Must meet criteria for ideal STEMI EMS</td>
<td>• Must meet criteria for ideal STEMI Referral Center</td>
<td>• Must meet all requirements of a STEMI Receiving Center</td>
</tr>
<tr>
<td>• Community has a multidisciplinary group to monitor, provide feedback and improve Cardiac Resuscitation care process and outcome</td>
<td>• Medical director actively participates in multidisciplinary team including but not limited to EMS, emergency medicine, nursing, cardiology, neurology and critical care personnel, referral center staff and receiving center staff to monitor, provide feedback and improve Cardiac Resuscitation care processes and outcomes</td>
<td>• Designated hospital champion for Cardiac Resuscitation</td>
<td>• Designated hospital champion for Cardiac Resuscitation</td>
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<tr>
<td>• Uses multiple strategies to increase skills and awareness of CPR, including but not limited to CPR in schools, Hands-Only CPR, public awareness campaign, certified CPR courses, with a goal of achieving &gt;60% bystander CPR</td>
<td>• Activey participates in multidisciplinary team meetings to monitor, provide feedback and improve Cardiac Resuscitation care process and outcome</td>
<td>• Implements and maintains standard triage and treatment protocols for Cardiac Resuscitation patient consistent with AHA guidelines</td>
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</tr>
<tr>
<td>• Implements and maintains public access defibrillation program including training, regular maintenance and usage tracking</td>
<td>• Implements and maintains protocols for triage of patients to hospitals able to care for Cardiac Resuscitation patients</td>
<td>• Emergency medical dispatchers provide bystander CPR instruction</td>
<td>• Initiates hypothermia as soon as possible when indicated</td>
</tr>
<tr>
<td>• External certification not self-designation as part of cardiac resuscitation system of care</td>
<td>• Provides audit and feedback of cardiac arrest process and outcome to provider and EMS</td>
<td>• Provides aud and feedback of cardiac arrest process and outcome to provider and EMS</td>
<td>• Initiates cardiotherapy consult as soon as possible</td>
</tr>
<tr>
<td></td>
<td>• Ambulance dispatched to suspected Cardiac Resuscitation have 12-lead ECG and manual defibrillator equipment where permitted by law and transport highest priority to appropriate receiving center</td>
<td>• Ambulance dispatched to suspected Cardiac Resuscitation have 12-lead ECG and manual defibrillator equipment where permitted by law and transport highest priority to appropriate receiving center</td>
<td>• Universal 24/7 acceptance of Cardiac Resuscitation patient regardless of diversion status of ED</td>
</tr>
<tr>
<td></td>
<td>• Field triage of patients with return of circulation after arrest to Cardiac Resuscitation Receiving Center, when feasible (including transport time &lt; 45 minutes longer than nearest hospital)</td>
<td>• Field triage of patients with return of circulation after arrest to Cardiac Resuscitation Receiving Center, when feasible (including transport time &lt; 45 minutes longer than nearest hospital)</td>
<td>• Has plan to treat simultaneous Cardiac Resuscitation patients</td>
</tr>
<tr>
<td></td>
<td>• Able to communicate ECG results to the Cardiac Resuscitation Receiving Center when possible</td>
<td>• Able to communicate ECG results to the Cardiac Resuscitation Receiving Center when possible</td>
<td>• Has plan for and ability to treat re-arrest, including mechanical CPR AND/ OR pharmacological support</td>
</tr>
<tr>
<td></td>
<td>• Send patient to the closest, most appropriate Cardiac Resuscitation Referral or Receiving Center</td>
<td>• Send patient to the closest, most appropriate Cardiac Resuscitation Referral or Receiving Center</td>
<td>• Capable of assessment of need for ICD placement and providing appropriate follow up</td>
</tr>
<tr>
<td></td>
<td>• Has process for pre-hospital identification and activation of STEMI in patients resuscitated from OHCA, destination protocols to Cardiac Resuscitation Receiving Centers</td>
<td>• Has process for pre-hospital identification and activation of STEMI in patients resuscitated from OHCA, destination protocols to Cardiac Resuscitation Receiving Centers</td>
<td>• Defers assessment of prognosis and withdrawal of care for at least 72 hours after Cardiac Resuscitation</td>
</tr>
<tr>
<td></td>
<td>• Has process for transfer of appropriate patients who arrive at Cardiac Resuscitation Referral Centers to Cardiac Resuscitation Receiving Centers</td>
<td>• Has process for transfer of appropriate patients who arrive at Cardiac Resuscitation Referral Centers to Cardiac Resuscitation Receiving Centers</td>
<td>• Provides CPR and ACLS training for appropriate staff</td>
</tr>
<tr>
<td></td>
<td>• Each system component (Community EMS, Cardiac Resuscitation Referral Centers, and Cardiac Resuscitation Receiving Centers) meets criteria listed above</td>
<td></td>
<td>• Provides CPR and ACLS and PALS training for appropriate staff</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• External certification not self-designation as part of cardiac resuscitation system of care</td>
</tr>
</tbody>
</table>
| | | | • Should include at least compression-only CPR training for all employees.
Ideal Community

- Hands Only CPR with a goal of achieving >50% bystander CPR
- Early activation of 911
- Apply AED before EMS arrival
- Designated Community Champion
- Multidisciplinary group to monitor, provide feedback and improve processes and outcomes
- Implements and maintains public access defibrillation program
- Identify Community Champion
Ideal EMS

• EMS Dispatchers provide bystanders CPR instruction
• Ambulances are equipped with 12-lead ECG machines and Manual defibrillators
• EMS providers are trained to:
  – Use and transmit 12-lead ECGs
  – Care for STEMI & Cardiac Arrest
  – Provide feedback on performance and compliance with guidelines
• For positive ECG results provides early cath lab activation enroute
• Implements and maintains destinations protocols for triage of patients to hospitals able to care for Cardiac Resuscitation & STEMI patients
• EMS Champion
Ideal Referral Hospital

- Standardized POE protocols dictate transport of STEMI patients directly to a receiving hospital based on:
  - Specific criteria for risk; including cardiac arrest
  - Contraindications to thrombolysis
  - The proximity of the nearest PCI service

- Patients presenting to a referral hospital are treated according to standardized triage and transfer protocols

- Initiates hypothermia as soon as possible, when indicated

- Transports early patients resuscitated from OHCA to Receiving Center to allow angiography of cath eligible/appropriate patients as soon as possible, to achieve goal of first door to device within 120 minutes
Ideal Referral Hospital (Continued)

- Rapid and efficient data transfer, data collection and feedback
- Integrated plans for return of the patient to the community for care are provided
- Provides CPR training for community, with goal of achieving bystander CPR rates > 50%
- Implements and maintains ability to treat re-arrest including mechanical CPR AND/OR pharmacological support if indicated
- Referral Hospital Champion
Ideal Receiving Hospital

• Pre-hospital ECG diagnosis of STEMI, ED notification and cath lab activation occurs according to standard algorithms

• Algorithms facilitate:
  – A short ED stay for the STEMI patient
  – Transport directly from the field to the cath lab

• Single-call systems activate the cath lab

• Primary PCI is provided as routine treatment for STEMI 24-7

• Has plan for and ability to treat re-arrest, including mechanical CPR AND/OR pharmacological support

• Capable of assessment of need for ICD placement and providing appropriate follow up

• Defers assessment of prognostication and withdrawal of care for at least 72 hours after Cardiac Resuscitation.

• Receiving Center Champion
Ideal System of Care

- Individual parties are encouraged to work together for common goals.
- Build a consensus on what the ideal STEMI system looks like for their region, considering its unique challenges
- System Champion
How Can You Get Involved?

STEMI and Cardiac Resuscitation Systems of Care

REGISTER | STEMI SYSTEMS OF CARE | STEMI AND CARDIAC RESUSCITATION SYSTEMS OF CARE

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Online Registration Options

Existing Users

- STEMI and Cardiac Resuscitation
- STEMI
- Resuscitation

New Users

- STEMI and Cardiac Resuscitation
- STEMI
Questions

Missionlifeline@heart.org