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

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Graham Nichol, MD Chair Mission: Lifeline Cardiac Resuscitation
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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 STEMIs
- 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

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**Circulation**

**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
2009-Present

**SPRING 2009**
Completion of a national EMS Assessment for STEMI Systems represents 91% of US population

**FALL 2009**
Accreditation requirements for STEMI Systems, hospitals and EMS Agencies are released

**2010**
Hospital recognition program and reports are released

**2011**
AHA collaborates with SCPC and hospital accreditation program released
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)

Registered STEMI System Coverage

* Population coverage based on self-reported ZIP code coverage area. Coverage area data is not currently available for all registered systems.
ACTION Registry-GWTG Records Submitted by Diagnosis

- Total Records
- Non-STEMI
- STEMI

Q1 2009: 5761
Q1 2010: 7380
Q2 2010: 9,940
Q3 2010: 25,760
Q4 2010: 26,724
Q1 2011: 28,952
Q2 2011: 27,929
Q3 2011: 17,688
Q4 2011: 16,969
Q1 2012: 11,264
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%*

*Among patients receiving reperfusion

92% of eligible patients reperfused

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

<table>
<thead>
<tr>
<th></th>
<th>2007</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transfer In D2B Times</td>
<td>169</td>
<td>119</td>
</tr>
<tr>
<td>Non-Transfer In D2B Times</td>
<td>79</td>
<td>61</td>
</tr>
</tbody>
</table>

ACTION Registry-GWTG

©2011, American Heart Association
### Mission: Lifeline Data

<table>
<thead>
<tr>
<th>Measure Metric</th>
<th>National Score Q1 2010</th>
<th>National Score Q3 2011</th>
</tr>
</thead>
<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>
Door 1 – Transfer - Device

% <90 Minutes
- 3% (2010)
- 6% (2011)

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

<table>
<thead>
<tr>
<th>Variable</th>
<th>STEMI (n=41,808)</th>
</tr>
</thead>
<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>
</tr>
<tr>
<td>Cardiogenic Shock</td>
<td>4.6%</td>
</tr>
<tr>
<td>Stroke</td>
<td>0.6%</td>
</tr>
<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

2010

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

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

Survival to Discharge (%)

Region

- EMS-Assessed
- EMS-Treated
- VF
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
## STEMI & Cardiac Resuscitation

### Ideal System

#### Cardiac Arrest
- Unresponsive
- Not breathing normally

#### Community
- Hands Only CPR | Bystander CPR
- Early activation of 911
- Apply AED before EMS arrival

#### EMS On-Scene
- Minimize interruptions of CPR
- Encourage 12-lead ECG after ROSC
- Consider Destination Protocol

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### EMS Triage Plan

#### Receiving Hospital (PCI-capable)
- Initiate hypothermia <8 hrs from onset of arrest
- Consider early PCI
- Defer Prognosis assessment for 3 days
- Consider need for ICD before discharge

#### Interhospital Transfer

#### Referral Hospital (non PCI-capable)
- Initiate hypothermia <8 hrs from onset of arrest
- Consider transfer to resuscitation receiving center if unconscious and hemodynamically stable

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7/12/2012
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

LEARN ABOUT MISSION: LIFELINE.

GET THE LATEST NEWS AND HOT TOPICS.

ACCESS TOOLS AND RESOURCES.

REGISTER YOUR SYSTEM OF CARE.

JOIN THE MISSION: LIFELINE NETWORK.

LOCATE SYSTEMS OF CARE.

COLLECT AND REPORT YOUR DATA.

EARN RECOGNITION. GET ACCREDITED.
Online Registration Options

Existing Users
- STEMI and Cardiac Resuscitation
- STEMI
- Resuscitation

New Users
- STEMI and Cardiac Resuscitation
- STEMI
Questions

Missionlifeline@heart.org