STEMI Systems of Care

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Vice President – Heart and Vascular Services, Imaging Services
Cone Health

May 2013
STEMI Systems of Care

• Objectives
  – Demonstrate the clinical and operational potential of a regionalized STEMI program from a hospital administrative point of view
  – Discuss the value of the ACC NCDR ACTION – GTWG registry in improving clinical outcomes
Disclosures

• Unfortunately, I have no potential conflicts of interest or disclosures to share!
Wake Forest Baptist Health

• 3 Hospital System in Central NC
  – North Carolina Baptist Hospital
    • Integrated health care system operating 1,154 acute care, rehabilitation and long-term care beds
    • 872-bed teaching and tertiary referral center
    • Brenner Children's Hospital & Health Services
      – 160-bed "hospital within a hospital"
    • Wake Forest University School of Medicine - 550+ physicians
  – 5 Cath Labs (including 1 hybrid cath lab/OR), 3 EP Labs, 1 PV hybrid OR
    • 1800 Diagnostic Cath cases/year
    • 900 Interventional cases/year
    • 550 Open Hearts/year
Cone Health

• 6 Hospital System in Central NC
  – 1100+ physicians
  – Moses Cone Hospital - Greensboro
    • 6 Cath Labs (including 1 JV Lab), 2 EP Labs, 2 PV Labs, 1 Hybrid OR
      – 4,400 Diagnostic Cath cases/year
      – 1,400 Interventional cases/year
      – 3 Cardiology groups, 4 independent cardiologists
  – Alamance Regional Medical Center - Burlington
    • 1 Cath Lab: Elective PCI w/o Surgical backup
      – 900 Diagnostic Cath cases/year
      – 175 Interventional cases/year
      – 2 Cardiology groups
The Wake Forest Journey

• 2002-2004 Performance
  – Aspirin at Arrival/Discharge = 98-100%
  – Beta Blocker at Arrival/Discharge = 95-100%
  – ACE/ARB for LVSD = 90-100%
  – Smoking Cessation Counseling = 95-100%
  – Door to Reperfusion Time <120” = 40-60%
  – From July 2002 to May 2004, mean cycle time was 128 minutes for patients presenting to the Emergency Department with only 17% making it in less than 90 minutes.

• Significant progress and sustainability made in most measures except door to reperfusion
How do we tackle this?

“Some problems are so complex that you have to be highly intelligent and well informed just to be undecided about them.”

Laurence J. Peter
Six Sigma

• “Six Sigma is an investment in our future and a shift in our organizational culture”
  – Hospital based initiative
  – Hardwired incentive and performance measures
  – Physician incentives not always aligned

“Forced Inspiration”
It Takes a Village

• Team Members Identified
  – Key Stakeholders
  – Subject Matter Experts
  – Green Belt and Black Belt members
  – Newly created STEMI Coordinator
For every problem there is one solution which is simple, neat and wrong.

Satirist, H. L. Mencken
Making an Impact...

Control Chart of DTB Process by Individual Patient
As of February 28, 2007

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And then along came RACE!

**RACE - Reperfusion of the Acute MI in Carolina Emergency Departments**

James Jollis, M.D.  
Mayme Lou Roettig  
Chris Granger, M.D.
RACE Project

1) Develop leadership and data structure

2) Establish Regional PCI Centers (primary PCI, lytic ineligible, rescue)

3a) Hospital by hospital establishment of STEMI plan (review, consensus, training)

3b) EMS by EMS establishment of STEMI plan (review, consensus, training)

4) Improve the system

Measurement & Feedback
NC RACE Centers and Regions

65 hospitals (10 PCI, 55 non PCI)

- Winston-Salem
- Durham-Chapel Hill-Greensboro
- Asheville
- Charlotte
- East Carolina

Each non-PCI center was assessed for reperfusion designation based on resources, transfer ability, and transfer time to PCI center.

10 PCI centers
16 Transfer for PCI
28 Lytics
11 Mixed

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RACE

• Key RACE Strategies
  – Deployment of EMS ECG acquisition and transmission from the field
  – Extension of evidenced based protocols to rural North Carolina EMS and EDs via RACE
    • Thrombolytics
    • Bypass of non-PCI centers
  – Transparent sharing of performance metrics and best practices
RACE Project

OPERATIONS MANUAL
Optimal system specifications by point of care
- EMS
- Non-PCI and PCI ED
- Transfer
- Catheterization lab
- Other system issues – payers, regulations
- Choice of PCI or lytic reperfusion regimens
Wake Forest Baptist
Breakthrough and Sustained Performance
RACE Mortality Trend - NC

- RACE 1st phase 2005-2007: 6.9%
- Before RACE 2nd phase 2008: 5.8%
- After RACE 2nd phase 2009: 5.7%

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The Cone Health Journey

• Among the highest NC PCI volumes historically
• Innovative and highly published interventional cardiology team
  – Drs. Bruce Brodie, Tom Stuckey - Early Primary PCI Champions
• 4 Cardiology groups plus 4+ independent cardiologists
• Impressive mean times, but percentage ≤90” highly variable
The Cone Health Journey

Mortality and Door to Balloon

- Mortality
- Median D2B

The Cone Health Journey

RACE-ER Data
Median Time < 90:
Arrival in ED to First Device Activation Walk-ins Only
Percent of Patients
October 2009

RACE ER
GOAL 75%

NON-TRANSFER FACILITIES

<table>
<thead>
<tr>
<th>Facility</th>
<th>Q3 08</th>
<th>Q4 08</th>
<th>Q1 09</th>
<th>Q2 09</th>
<th>NC  Q2 09</th>
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</thead>
<tbody>
<tr>
<td>Your Hospital</td>
<td>38%</td>
<td>67%</td>
<td>40%</td>
<td>70%</td>
<td>80%</td>
</tr>
<tr>
<td>NC</td>
<td></td>
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</tr>
</tbody>
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Lisa Monk MSN, RN, CPHQ
Project Leader
The Cone Health Journey

RACE-ER Data
Median Time < 90:
First Medical Contact to First Device Activation
Percent of Patients
October 2009

RACE-ER
GOAL 75%

NON-TRANSFER FACILITIES

<table>
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<tr>
<th>Facility</th>
<th>Q 3 08</th>
<th>Q 4 08</th>
<th>Q 1 09</th>
<th>Q 2 09</th>
<th>Q 2 09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Hospital</td>
<td>67%</td>
<td>54%</td>
<td>48%</td>
<td>67%</td>
<td>52%</td>
</tr>
</tbody>
</table>

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The Network for Exceptional Care

Lisa Monk MSN, RN, CPHQ
State Project Leader
The Cone Health Journey

Q4 2010 – % Door to Balloon % < 90’ (EMS & POV)

Q4 2010 - D 2 B POV (Median X - minutes )
The Cone Health Journey

• 2009 – SCPC Accredited Chest Pain Center
  – Improved performance metrics across AMI
    • Still suffered from “Consistent Inconsistency”

• 2011 - Created a full time STEMI Coordinator (finally!)
  – Hard wired team made up of Cardiology, Nursing, EMS, ED, Quality, CVIS, Administration
  – Established standardized order sets, protocols, STEMI performance feedback loop for all key stakeholders
  – Integrated STEMI P4P metrics into Cardiology Co-Management Agreement
Cone Health STEMI Trends

Full time STEMI Coordinator Position Added
Referral Pattern Concerns

• Regionalized STEMI Program
  – EBM should really supersede ego and market share competition
    • What is the best decision for the patient?
  – Rural hospitals may be bypassed for primary PCI or lytics in the field
    • Some locations are good thrombolytic models
    • PCI centers should promote successful partnership stories
    • Consider non-PCI SCPC Accreditation
  – Local competitive markets
    • When transport time is equal, service/reputation can impact referrals
      – Engage EMS
        » CME Education, Communicate D2B times & outcomes, EMS Week
      – Promote 911
      – Patient Service Excellence
The Value Equation

• Quantifying hard savings in these projects was challenging.
• Value was measured in end results.

**Definitive returns**
- Improved delivery and quality of health care
- Improved patient outcomes

**Potential returns**
- Recognition for excellence may lead to increased referral base
- Length of stay, rehabilitation, and readmissions
- P4P

So how do we measure our impact?
“You can’t manage what you don’t measure”
ACC ACTION Registry - GWTG

- National standard for understanding treatment patterns, clinical outcomes, drug safety, and the overall quality of care provided to high-risk AMI patients
- Improved adherence to the ACC/AHA Clinical Guidelines recommendations
- Target and reduce procedural complications, support quality improvement initiatives
ACC ACTION Registry - GWTG

• Participation helps identify areas of excellence as well as opportunities for improvement, and also allows your facility to apply emerging best practices and position itself as a quality leader.
Overall AMI performance composite

My Hospital - US Hospitals 50th Pctl - US Hospitals 90th Pctl
91.7% 94.7% 98.8%

My Hospital - US Hospitals 50th Pctl - US Hospitals 90th Pctl
96% 94.7% 98.9%
Overall defect free care

My Hospital-US Hospitals 50th Pctl-US Hospitals 90th Pctl
60.7% 72.6% 93.0%

My Hospital-US Hospitals 50th Pctl-US Hospitals 90th Pctl
77.8% 73.0% 93.6%
STEML performance composite

My Hospital-US Hospitals 50th Pctl-US Hospitals 90th Pctl
95.2% 96.5% 99.5%

My Hospital-US Hospitals 50th Pctl-US Hospitals 90th Pctl
97.6% 96.7% 99.5%
NSTEMI performance composite

<table>
<thead>
<tr>
<th></th>
<th>My Hospital-US Hospitals 50th Pctl</th>
<th>US Hospitals 90th Pctl</th>
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</thead>
<tbody>
<tr>
<td>2015</td>
<td>88.5%</td>
<td>93.3%</td>
</tr>
<tr>
<td>2017</td>
<td>94.8%</td>
<td>93.6%</td>
</tr>
<tr>
<td>2018</td>
<td>98.6%</td>
<td>94.8%</td>
</tr>
<tr>
<td>2019</td>
<td>98.6%</td>
<td>94.8%</td>
</tr>
<tr>
<td>2020</td>
<td>98.6%</td>
<td>94.8%</td>
</tr>
<tr>
<td>2021</td>
<td>98.6%</td>
<td>94.8%</td>
</tr>
<tr>
<td>2022</td>
<td>98.6%</td>
<td>94.8%</td>
</tr>
<tr>
<td>2023</td>
<td>98.6%</td>
<td>94.8%</td>
</tr>
<tr>
<td>2024</td>
<td>98.6%</td>
<td>94.8%</td>
</tr>
<tr>
<td>2025</td>
<td>98.6%</td>
<td>94.8%</td>
</tr>
</tbody>
</table>
Acute AMI performance composite

<table>
<thead>
<tr>
<th>Year</th>
<th>My Hospital-US Hospitals 50th Pctl</th>
<th>US Hospitals 90th Pctl</th>
</tr>
</thead>
<tbody>
<tr>
<td>1987</td>
<td>91.3%</td>
<td>96.3%</td>
</tr>
<tr>
<td>1992</td>
<td>91.3%</td>
<td>98.1%</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>My Hospital-US Hospitals 50th Pctl</th>
<th>US Hospitals 90th Pctl</th>
</tr>
</thead>
<tbody>
<tr>
<td>1997</td>
<td>96.3%</td>
<td>99.1%</td>
</tr>
<tr>
<td>2002</td>
<td>96.6%</td>
<td>99.2%</td>
</tr>
</tbody>
</table>
Median Time in minutes to primary PCI for STEMI patients

My Hospital-US Hospitals 50th Pctl-US Hospitals 90th Pctl
49 60.6 49.1

My Hospital-US Hospitals 50th Pctl-US Hospitals 90th Pctl
45 59.9 48.0
Time from ED arrival at STEMI referral facility to Primary PCI at STEMI receiving facility among transferred patients

My Hospital-US Hospitals 50th Pctl-US Hospitals 90th Pctl
117 110.9 82.7

My Hospital-US Hospitals 50th Pctl-US Hospitals 90th Pctl
111 108.7 82.3

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ACC ACTION  Registry - GWTG

• Alignment of Incentives
  – Cardiology Co-Management Agreement
    • Clinical and operational metrics and goals established
    • P4P for MD participation, time, and group performance
## ACC ACTION Registry - GWTG

### Co-management Agreement Performance Metrics

**Quality/Performance Incentive - FY13**

<table>
<thead>
<tr>
<th>Clinical Outcomes Metrics</th>
<th>Annual Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiology Service Line RAMI</td>
<td></td>
</tr>
<tr>
<td>Creatinine assessed pre and post PCI procedure</td>
<td></td>
</tr>
<tr>
<td>Median fluoro time (PCI Only)</td>
<td></td>
</tr>
<tr>
<td>PCI in-hospital risk adjusted rate of bleeding events (all patients)</td>
<td></td>
</tr>
<tr>
<td>NSTEMI Performance Composite Score</td>
<td>$ XX,XXX</td>
</tr>
<tr>
<td>STEMI Performance Composite Score</td>
<td>$ XX,XXX</td>
</tr>
</tbody>
</table>

| Complications and Patient Safety Metrics                                                |                  |
| 30-day readmission rate for recurrent CHF (All adult, includes planned readmits)       |                  |
| 30-day CHF readmission rate for any reason (CMS Payor, includes planned readmits)      |                  |
| Post PCI patients with death, emergency CABG, stroke or repeat target vessel revascularization post procedure |                  |
| Proportion of PCI procedures with acute kidney injury                                   |                  |

| Process and Efficiency Metrics                                                         |                  |
| Proportion of elective PCIs with prior positive stress or imaging study (or FFR <=0.8 during PCI) |                  |
| MD arrival time to lab within 10 minutes of being paged for first case of day           |                  |
| Inpatient echo reports read and documented in Camtronics within 24 hours of procedure performance |                  |
| Patients WITHOUT ACS: Proportion of evaluated PCI procedures that were appropriate     |                  |

| Satisfaction Metrics                                                                  |                  |
| Invasive Lab Satisfaction                                                             |                  |
| MCMH Patient Satisfaction (HCAHPS Overall Satisfaction)                               |                  |
| Participation in and completion of annual physician satisfaction surveys               |                  |
QUALITY SELECTION CRITERIA

Below is a detailed listing of your facility’s results based on information provided in the Provider Survey and from data obtained from the Hospital Compare web site with a release date of October 2012. The CMS/Medicare ID used for Hospital Compare data is: 340091

<table>
<thead>
<tr>
<th>Question</th>
<th>Metric Name</th>
<th>Selection Criteria Description</th>
<th>Your Response for this Metric</th>
<th>Your Score for this Metric</th>
<th>% of the Applicants Meeting this Metric (as of January 2013)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>Formal Program Structure</td>
<td>The facility has a formal cardiac program structure with ALL of the following characteristics: Commitment leadership, including both clinical and administrative leaders of the facility’s cardiac program; unified vision and goals, shared by program leadership, regarding collaboration of a multidisciplinary team and mutual accountability for delivering patient-centered care; written policies, procedures and guidelines that provide care coordination during inpatient episodes of care; AND processes to monitor the facility’s adherence to written policies, procedures and guidelines.</td>
<td>Yes</td>
<td>Meets</td>
<td>96%</td>
</tr>
<tr>
<td>31</td>
<td>Transitions of Care</td>
<td>Communication processes are supported by the program to manage transition of care upon discharge of a patient from the facility using at least one of these processes: The program’s licensed clinician (e.g., NP, PA, MD) speaks personally with the Primary Care Physician (PCP) or a licensed clinician (e.g., NP, PA, MD) working with the PCP; Program communicates with the PCP and verifies that the operative note and discharge note are made available upon discharge.</td>
<td>1 of 2 boxes checked</td>
<td>Meets</td>
<td>87%</td>
</tr>
<tr>
<td>33</td>
<td>ACTION Registry®</td>
<td>The facility participates in the National Cardiovascular Disease Registry® (NCDR) ACTION Registry® Get With The Guidelines® (GWG). For more information, see <a href="http://www.ncdr.com/webnccdrgp/default.aspx">http://www.ncdr.com/webnccdrgp/default.aspx</a>.</td>
<td>Yes</td>
<td>Meets</td>
<td>56%</td>
</tr>
<tr>
<td>30</td>
<td>PCI Quality Improvement Intervention</td>
<td>The facility has implemented a quality improvement intervention based on data from their NCDR CathPCI® Registry Institutional Outcomes Report and is able to briefly describe the intervention, including pre- and post-intervention data that shows the percentage of improvement.</td>
<td>Yes</td>
<td>Meets</td>
<td>79%</td>
</tr>
</tbody>
</table>
Regulatory, Payer and Contracting Recognition

- Satisfy the data collection and reporting requirements of regulatory, contracting, and payer organizations
  - BCBS Blue Distinction Centers
  - Aetna IOQ
  - United Healthcare COE
  - AHA Mission Lifeline
  - Society for Cardiovascular Patient Care
The best reason for regionalized STEMI care...

The RACE to treat chest pain

Thanks to a statewide project on chest pain treatment called RACE, heart attack patients at North Carolina hospitals receive standardized care that cuts the time it takes to start unblocking their coronary arteries. The improvement came not a moment too soon for Stuart Peters of Advance, N.C.

Peters, 60, was clearing timber on a Habitat for Humanity home site last March when he began having heart attack symptoms. His wife, retired registered nurse Becky Peters, remembers how quickly he received care.

"He was taken to Davie County Hospital where he was diagnosed and treated immediately with drugs to help unblock his artery," she said. Peters' emergency department professionals responded to his heart attack patients with uniform, standardized care.

Peters' experience illustrates the success of the coordinated process. His condition was stabilized with medication at Davie Hospital, then he was transported to Wake Forest University Baptist Medical Center, an accredited Chest Pain Center. There, he underwent emergency bypass surgery. The operation was completed in about 45 minutes, and Peters was discharged from the hospital four days later.

The stars aligned that day

Julia Sims, sudden cardiac arrest survivor

Becky and Stuart Peters are grateful for Stuart's fast heart attack treatment.

Cone Health
The Network for Exceptional Care
Tennessee citizens deserve this too!
After RACE

- **RACE-ER** *(Reperfusion of AMI in Carolina Emergency Departments – Emergency Response)*
  - Targeted time from first contact to medical treatment
  - Direct PCI decreased from 103 minutes to 91 minutes
    - 52% were treated within 60 minutes.

- **RACE-CARS** - statewide focus on out of hospital cardiac arrest
  - Goal - increase the survival rate of cardiac arrest victims by fifty percent within five years.
The measure of success is not whether you have a tough problem to deal with, but whether it is the same problem you had last year.

-John Foster Dulles
Thank you!

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Vice President - Heart and Vascular Services, Imaging Services

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