SUMMARY:
CODE STEMI process implemented to achieve 90th percentile in ACTION registry and to decrease D2B times on STEMI patients

HOSPITAL:
The Heart Hospital Baylor Plano

LOCATION:
Plano, TX

CONTACT:
Kelly Ray, RN BSN CCCC, Chest Pain Coordinator/EMS Liaison, The HEART HOSPITAL Baylor Plano, Kelly.Ray1@baylorhealth.edu

CATEGORY:
▪ D: Disposition Decision/ Throughput
▪ E: Exit from the ED

KEY WORDS:
▪ Communication
▪ Continuity of Care
▪ Length of Stay
▪ Patient Satisfaction
▪ Rapid Intake

HOSPITAL METRICS:
▪ Annual ED Volume: 5,700
▪ Hospital Beds: 116
▪ Ownership: Joint Physician Ownership
▪ Trauma Level: N/A
▪ Teaching Status: No

TOOLS PROVIDED:
▪ CODE STEMI PowerPoint

CLINICAL AREAS AFFECTED:
▪ Ancillary Departments
▪ Cardiology
▪ Emergency Department
▪ EMS
▪ Inpatient Units

STAFF INVOLVED:
▪ Administrators
▪ Ancillary Departments
▪ ED Staff
▪ Nurses
▪ Physicians

Innovation
The Heart Hospital Baylor Plano STEMI Team set a goal to consistently reach the 90th Percentile for the ACTION registry metric. The CODE STEMI Trial provides collaboration in caring for the STEMI patient with a CODE response within the facility. The patient is expedited to the cath lab, thus resulting in a decrease in door-to-balloon metrics. The trial was started 2013Q3 with an average Door-To-Balloon Time of 67.5 minutes. Once implemented, the CODE STEMI process
reduced the Door-to-Balloon average to 46.5. The goal of reaching the 90th percentile was reached and has been maintained.

**Background**
The CODE STEMI Process has streamlined the process for STEMI patients. When advised by a physician, a CODE STEMI is activated and called via the overhead paging system within the hospital. Once activated, the CODE STEMI team member knows the duties and tasks to be completed and knows to quickly get the patient transported to the cath lab for intervention. The process is the same for Emergency Department patients as well as inpatients. The process is consistent for business hours and non-business hours.

**Innovation Implementation**
The CODE STEMI process was implemented first in October 2013 in the Emergency Department during normal business hours (7a-5p). All staff throughout the facility were educated during staff meetings and with several mock drills on all units. In February 2014, the process was implemented house-wide. The data on every STEMI patient is reviewed within 24 hours to evaluate the process and opportunities for improvement by the ED Manager, Chest Pain Coordinator, Quality Data Abstractor, and Cath Lab Manager. The data is trended and presented at the Cardiovascular Section Meeting and Chest Pain Collaboration Meeting monthly. The data is also reported to the NCDR ACTION Registry, Cath PCI registry, and Mission Lifeline Get with the Guidelines Registry.

**Code STEMI: Phase I Timeline**

<table>
<thead>
<tr>
<th>DATE</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/1/2013</td>
<td>Phase I: Code STEMI implemented M-F regular business hours</td>
</tr>
<tr>
<td>11/13/2013</td>
<td>Implemented daily STEMI debriefing meetings</td>
</tr>
<tr>
<td>1/13/2014</td>
<td>Mock Code 3CUB</td>
</tr>
<tr>
<td>1/27/2014</td>
<td>Mock Code 2CUB</td>
</tr>
<tr>
<td>2/3/2014</td>
<td>Mock Code Non-Invasive</td>
</tr>
</tbody>
</table>

Copyright © 2002-2014
Urgent Matters
**Timeline**

The goal of maintaining the 90th percentile within ACTION Registry was set in August 2013. The STEMI team met with physician leaders, unit managers, and bedside leaders to discuss how to meet the goal. The concept of CODE STEMI quickly took off and trials were started in October 2013 after education to staff house-wide. The Emergency Department implementation was from October – February. Multiple mock drills were conducted to work through unforeseen barriers. The full implementation was February 2014 with great success. The process continues today with collaboration with EMS. An EKG is no longer necessary prior to activating the CODE STEMI or Cath Lab. The Cath Lab is not activated upon report from EMS of a STEMI. The data is continually assessed to evaluate the process. Furthermore, Press-Ganey patient satisfaction reports have not declined due to the process implementation. The Heart Hospital continues to be ranked in the 90th percent of overall satisfaction per Press-Ganey.

**Results**
Cost/Benefit Analysis
The CODE STEMI process has not added any personnel or equipment. A cost analysis has not yet been completed. However, saving heart muscle due to rapid reperfusion would equate to a decreased length of stay, increased patient satisfaction, and decrease in resources needed during admission.

Advice and Lessons Learned
• Plan – All key stakeholders must be an active member in planning discussions. Physician leaders are key to success! With their buy-in changes happen more smoothly.
• Do – Run multiple scenarios with mock drills. Try to trouble shoot any barrier ahead of time and preplan the action.
• Check – Reevaluate the process at every step.
• Act – Implement the process and continue to re-evaluate to sustain
• Repeat – Always strive to continue to improve. Never let a process become stagnant.

Sustainability
The process has not included patients arriving via EMS. The CODE STEMI and cath lab will be activated upon verbal report from EMS. The ED will no longer wait to receive the transmitted EKG prior to activation. The next step is to collaborate with transferring facilities and free standing ED/Urgent Care to educate on the process and streamline the transfer process for STEMI patients. A protocol is being written to include by-passing the Emergency Department and transporting the patient directly to the cath lab for intervention.

Tools to Download
• PowerPoint – CODE STEMI OVERVIEW JULY
CODE STEMI TRIAL

October 2013-Present
Baseline Process
2012Q3 – 2013Q2

Taking Action on Door-to-Balloon

Authors: Krist Versheiden, BSN, RN-BC; Tiffany Grippon, FSHA; Holly Machtelen, RN, BSN; Kelly Rhy, RN, BSN, CCCC; Ashley Sills
Task Force Members: Manny Betran, BSN, MBA, RN, CEN; Susan Dorval, RN; Jeff Horniaj, RN, BSN, MBA; Susan Moats, RN, BSN, MBA; Kim Nguyen, PhD, MBA, RN, Alaina Tellison, PhD Candidate, RN, NE, BC; Claudia Wimmer, RN, BSN

The Heart Hospital Baylor Plano • Plano, Texas

Background
The Heart Hospital Baylor Plano participates in multiple registries that report door-to-balloon (D2B) metrics for our STEMI (ST-segment elevation myocardial infarction) population. With definition variances across registries, disparate outcomes were reported across departments, leading to dissimilar processes for measuring improvement. This project sought to reconcile processes to achieve efficiency.

Objective
By standardizing processes for patient care, data collection and outcomes reporting between 2012Q3 to 2013Q2, we sought to reduce ACTION Registry®-SWIFT™ median D2B time from baseline of 60 minutes to 54 minutes (10%).

Project / Methods
- Multidisciplinary, interdepartmental team formed
- Engaged front-line staff, physicians and administrators early in process
- Analyzed D2B metric inclusion/exclusion criteria for:
  - ACTION Registry®-SWIFT™
  - CalPAC Registry
- Acute Myocardial Infarction (AMI) Core Measures
- Identified standard for project data collection/reporting
- ACTION Registry®-SWIFT™ selected based upon inclusion of STEMI patients identified in our Emergency Department (ED)
- Focus on isolated population was aimed at piloting process changes with intention to later apply across isolated population (CalPAC Registry)
- Evaluation of current STEMI Protocol
  - Improved communication process for notifying physicians and activating on-call staff
- Multi-format educational sessions for key stakeholders focused on:
  - STEMI Protocol communication process changes
  - Inclusion/exclusion criteria
- Definitions for all time-related data points from initial medical contact to door activation

Results
Between 2012Q3 to 2013Q2, ACTION Registry®-SWIFT™ Outcomes Reports revealed median D2B time decreased from 60 minutes to 55 minutes (11%), surpassing stated goal of 10% improvement.

D2B Metric Comparison by Registry

Conclusions
- Setting definitions for similar metrics within a health care facility can lead to numerous methods for data collection, which results in disparate data endpoints
- The Heart Hospital Baylor Plano’s interdepartmental collaboration efforts resulted in timelier perfusion of heart muscle with decreased D2B times for target population in ACTION Registry®-GWTI
- Process improvement efforts were scaled to a specific population (ACTION Registry®-GWTI) and should be applied to an expanded population (CalPAC Registry)

Next Steps
- Achieve 95th percentile ranking for ACTION Registry®-GWTI D2B metric through continuous process improvement
  - Code STEMI process piloted 2013Q1
  - Will spread process to institutional units to achieve CalPAC Registry population
- As we move how an organized approach to D2B process improvement and outcomes reporting, we can reinforce CalPAC Registry and AMI Core Measures D2B metrics as we spread process to institutional units

Caveats
- Daily staffing resources are necessary to ensure concurrent data collection and reporting as outlined in Quick Review Process under “Project/Methods”
- Collaboration of medical leadership, Emergency Department, Cardiac Catheterization Department, Quality Department and EMS providers critical for success

Disclosures/References
There is nothing to disclose for any of the co-authors.

Baseline Outcomes
2012Q3 – 2013Q2

**ACTION Registry® - GWTG™ Door-to-Balloon**
The Heart Hospital Baylor Plano 2012Q3-2013Q2

<table>
<thead>
<tr>
<th>Quarter</th>
<th>Action Registry®</th>
<th>CathPCI Registry®</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012Q3</td>
<td>60 (n=13)</td>
<td>60 (n=13)</td>
</tr>
<tr>
<td>2012Q4</td>
<td>56 (n=21)</td>
<td>59.9 (n=21)</td>
</tr>
<tr>
<td>2013Q1</td>
<td>54.5 (n=18)</td>
<td>59.9 (n=18)</td>
</tr>
<tr>
<td>2013Q2</td>
<td>53 (n=20)</td>
<td>59.9 (n=20)</td>
</tr>
</tbody>
</table>

**Door-to-Balloon Comparisons by Registry**
The Heart Hospital Baylor Plano 2012Q3-2013Q2

- **Action Registry® - GWTG™**
  - 2012Q3: 60 (n=5)
  - 2012Q4: 56 (n=7)
  - 2013Q1: 54.5 (n=10)
  - 2013Q2: 58 (n=12)

- **CathPCI Registry®**
  - 2012Q3: 37 (n=7)
  - 2012Q4: 50 (n=11)
  - 2013Q1: 45 (n=4)
  - 2013Q2: 33 (n=12)

- **Baseline Outcomes 2012Q3 – 2013Q2**
  - The Heart Hospital Baylor Plano
  - US Hospitals 50 Percentile
  - US Hospitals 90 Percentile
  - Goal
Flow Chart

CODE STEMI
Phase I

Patient arrives to the ED with ACS signs or symptoms

EKG completed and given to SR MD

ED Unit Secretary
- Calls CODE STEMI
- Overhead to unit
- Activates Cath Lab via MEDHOST paging system
- Calls AMI on call

CODE STEMI activated (65 min from EKG time)

Yes

Assign CODE STEMI TEAM RNs respond to unit

Cath Lab CN calls unit to give RN assignment and ready status confirmed

CODE STEMI Team RN escorts patient to cath lab

CODE STEMI RN assists with tasks as needed during cath procedure

No

Consult with admitting physician for further orders

CODE STEMI TEAM RN ROLE:
- Medication Administration
- Obtain Consents
- Clip & Prep Patient
- Apply pads to chest
- Other tasks as needed
<table>
<thead>
<tr>
<th>Date</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/1/2013</td>
<td>Phase I: Code STEMI implemented M-F regular business hours</td>
</tr>
<tr>
<td>11/13/2013</td>
<td>Implemented daily STEMI debriefing meetings</td>
</tr>
<tr>
<td>1/13/2014</td>
<td>Mock Code 3CUB</td>
</tr>
<tr>
<td>1/27/2014</td>
<td>Mock Code 2CUB</td>
</tr>
<tr>
<td>2/3/2014</td>
<td>Mock Code Non-Invasive</td>
</tr>
</tbody>
</table>
2013Q4 Door-to-Balloon: Code STEMI
Code STEMI Activated Vs. Not Activated
ACTION Registry - GWTG Population

Overall

Code STEMI Not Activated

Code STEMI Activated

Median Time in Minutes

90th % (46.9)

50th % (59.4)

21 minute difference

62.5
n=6

67.5
n=4

46.5
n=2

Overall

Code STEMI Not Activated

Code STEMI Activated
# Code STEMI: Phase II Timeline

<table>
<thead>
<tr>
<th>Date</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>2/1/2014</td>
<td>Phase II: Code STEMI implemented house wide 24/7</td>
</tr>
<tr>
<td>2/10/2014</td>
<td>CUB RN orientation to cath lab starts (5CUB, 6CUB)</td>
</tr>
<tr>
<td>3/18/2014</td>
<td>Expanded outcomes reporting beyond ACTION Registry-GWTG (CathPCI Registry &amp; AMI Core Measures D2B related metrics)</td>
</tr>
<tr>
<td>4/2/2014</td>
<td>• STEMI Team met with Plano FD</td>
</tr>
<tr>
<td></td>
<td>• Discussed data collection processes / variations in data reported</td>
</tr>
<tr>
<td></td>
<td>• THHBP STEMI Spreadsheet updated to include additional EMS metrics</td>
</tr>
<tr>
<td></td>
<td>• Implementation: April 2014 STEMIs</td>
</tr>
<tr>
<td>7/1/2014</td>
<td>CUB RN orientation to cath lab 85% complete</td>
</tr>
</tbody>
</table>
**Code STEMI: Phase II**

**ED Unit Secretary**
- Calls CODE STEMI
- Overhead to activated
- Activates Cath Lab on MEDHOST paging system
- Calls AMI on call

**CODE STEMI**
**Phase II**

- STEMI
  - Yes
  - STEMI activated (45 min from EKG time)
  - Assigned CODE STEMI TEAM RN to respond to unit
  - Cash Lab ON call to give time assignment and ready status continued
  - CODE STEMI Team RN aka, patient to cath lab
  - CODE STEMI RN assists with tasks as needed during cath procedure

- No
  - IF STEMI Suspected
    - Consult Admitting Cardiologist immediately
    - If unavailable or during Non Business Hours, consult ED MD
    - With EKG down to ED for review
    - ED MD will determine need for activation
  - Consult with admitting physician for further orders

- EKG obtained and given to CUB Charge RN
  - Admitted patient

**Patient arrives to the ED with ACS signs or symptoms**
- EKG completed and given to ER MD
## Goal

<table>
<thead>
<tr>
<th>EMS Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMS Dispatch to Patient</td>
</tr>
<tr>
<td>≤ 25 min</td>
</tr>
<tr>
<td>EMS Dispatch to Door</td>
</tr>
<tr>
<td>EMS On Scene to Door</td>
</tr>
<tr>
<td>≤ 10 min</td>
</tr>
<tr>
<td>EMS at Patient to EMS EKG</td>
</tr>
<tr>
<td>EMS at Patient to EMS Activation</td>
</tr>
<tr>
<td>EMS at Patient to Door (Mission: Lifeline)</td>
</tr>
<tr>
<td>Door Time Difference (ED/Hosp)</td>
</tr>
<tr>
<td>≤ 90 min</td>
</tr>
<tr>
<td>FMC2B (Mission: Lifeline)</td>
</tr>
</tbody>
</table>

## Hospital Metrics

<table>
<thead>
<tr>
<th>Goal</th>
<th>Hospital Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 10 min</td>
<td>Door to EKG</td>
</tr>
<tr>
<td>1</td>
<td>EKG to STEMI Activation</td>
</tr>
<tr>
<td>2</td>
<td>STEMI Activation to Pt Arrival in Cath Lab</td>
</tr>
<tr>
<td>3</td>
<td>Patient Arrival to Cath Lab to 1st Device</td>
</tr>
<tr>
<td>4</td>
<td>D2B</td>
</tr>
<tr>
<td>≤ 46.9 min</td>
<td>Door In Door Out</td>
</tr>
<tr>
<td>≤ 29.2 min</td>
<td>STEMI Activation to On Call Staff Arrival</td>
</tr>
<tr>
<td></td>
<td>Door In to Cath Lab Arrival</td>
</tr>
<tr>
<td></td>
<td>Door In to STEMI Activation</td>
</tr>
<tr>
<td></td>
<td>SOAR</td>
</tr>
</tbody>
</table>

Shaded areas represent Plano FD Metrics on E2B Spreadsheet and/or Mission: Lifeline EMS Recognition Metrics.

Preliminary data forwarded to EMS via Quick Review process with any updates to data presented to EMS at Chest Pain Collaboration Meetings.

If EMS agency does not attend Chest Pain Collaboration Meetings, update will be emailed. Will include event overview & non-system reasons for delay.

Mission: Lifeline EMS Recognition Worksheet specifically asks for:

- Difficult access?
- Consent delay?
- Arrest and/or intubation?
- Difficult Lesion?
- Other documented delay?

### Code STEMI: Phase II

STEMI Spreadsheet Updates: April 2014

4 phases in Door-to-Balloon (D2B) timeline

- Take-away from NCDR.14
- Future area of focus
- Trend
- Business vs. Non-Business Hours

April 2014 Report: Full Implementation

- Trend
- Business vs. Non-Business Hours
Code STEMI: Phase II Outcomes
Door-to-Balloon (Overall)
10/1/2013 - 5/31/2014

Median Time in Minutes

Door-to-Balloon (Overall)

Oct-13  | Nov-13  | Dec-13 | Jan-14 | Feb-14 | Mar-14 | Apr-14 | May-14
--- | --- | --- | --- | --- | --- | --- | ---
68 | 57 | 56 | 58 | 74 | 49 | 50 | 46.9
n=3 | n=4 | n=5 | n=2 | n=4 | n=5 | n=5 | n=1
Code STEMI: Phase II Outcomes
Door-to-Balloon: Business Vs. Non-Business Hours
10/1/2013 - 5/31/2014

Door-to-Balloon:
Business Hours Vs. Non-Business Hours

<table>
<thead>
<tr>
<th>Month</th>
<th>D2B Business Hours</th>
<th>D2B Non-Business Hours</th>
<th>90th Pctl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct-13</td>
<td>46 n=1</td>
<td>46 n=1</td>
<td></td>
</tr>
<tr>
<td>Nov-13</td>
<td>47 n=1</td>
<td>47 n=1</td>
<td></td>
</tr>
<tr>
<td>Dec-13</td>
<td>49 n=3</td>
<td>49 n=3</td>
<td></td>
</tr>
<tr>
<td>Jan-14</td>
<td>50 n=1</td>
<td>50 n=1</td>
<td></td>
</tr>
<tr>
<td>Feb-14</td>
<td>41 n=1</td>
<td>41 n=1</td>
<td></td>
</tr>
<tr>
<td>Mar-14</td>
<td>37 n=2</td>
<td>37 n=2</td>
<td></td>
</tr>
<tr>
<td>Apr-14</td>
<td>39 n=2</td>
<td>39 n=2</td>
<td></td>
</tr>
<tr>
<td>May-14</td>
<td>56 n=3</td>
<td>56 n=3</td>
<td></td>
</tr>
</tbody>
</table>

Median Time in Minutes

D2B Business Hours
D2B Non-Business Hours
90th Pctl

Joint ownership with physicians
Code STEMI: Phase II Outcomes
Door-In-Door-Out (Non-transfers)
10/1/2013- 5/31/2014

**Door-In-Door-Out (Overall)**

<table>
<thead>
<tr>
<th>Month</th>
<th>Median Time in Minutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct-13</td>
<td>26</td>
</tr>
<tr>
<td>Nov-13</td>
<td>30.7</td>
</tr>
<tr>
<td>Dec-13</td>
<td>33.5</td>
</tr>
<tr>
<td>Jan-14</td>
<td>33</td>
</tr>
<tr>
<td>Feb-14</td>
<td>33</td>
</tr>
<tr>
<td>Mar-14</td>
<td>45.5</td>
</tr>
<tr>
<td>Apr-14</td>
<td>32</td>
</tr>
<tr>
<td>May-14</td>
<td>25</td>
</tr>
</tbody>
</table>

**Door-In-Door-Out (Business Vs. Non-Business Hours)**

<table>
<thead>
<tr>
<th>Month</th>
<th>Business Hours DIDO</th>
<th>Non-Business Hours DIDO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct-13</td>
<td>26</td>
<td>45</td>
</tr>
<tr>
<td>Nov-13</td>
<td>19</td>
<td>48</td>
</tr>
<tr>
<td>Dec-13</td>
<td>32</td>
<td>48</td>
</tr>
<tr>
<td>Jan-14</td>
<td>28</td>
<td>48</td>
</tr>
<tr>
<td>Feb-14</td>
<td>19</td>
<td>43</td>
</tr>
<tr>
<td>Mar-14</td>
<td>18</td>
<td>33</td>
</tr>
<tr>
<td>Apr-14</td>
<td>18</td>
<td>33</td>
</tr>
<tr>
<td>May-14</td>
<td>18.5</td>
<td>33</td>
</tr>
</tbody>
</table>
Code STEMI: Phase II Outcomes
Door-to-Door-to-Balloon
10/1/2013 - 5/31/2014

Door-to-Door-to-Balloon (Transfers)

90th % Benchmark = 82.7

Oct-13 Nov-13 Dec-13 Jan-14 Feb-14 Mar-14 Apr-14 May-14

Median Time in Minutes

86 (n=2) 85 (n=1) 74 (n=1) 68 (n=2) 63 (n=2) 44 (n=1) 82 (n=1) 79 (n=4)

90% Percentile Benchmark = 82.7

All Transfers  BRMCP  Baylor Frisco
Collaboration