Edward Hospital
801 S. Washington
Naperville, IL 60540

September 26, 2011

Cindy Rentsch
Manager, Emergency Department

Dear Mrs. Rentsch,

I am enclosing the report I prepared on effective ways to improve the door-to-balloon times for patient's presenting to the Emergency Department with ST-Elevation Myocardial Infarction (STEMI), as you requested to be submitted by October 6, 2011. This report shows the necessity for improving the door-to-balloon times at this hospital by promoting education, teamwork, and improved communication.

Early recognition of a STEMI through an electrocardiogram (ECG) allows for early entry into the cardiac catheterization (cath) lab and reperfusion of the blocked artery through primary Percutaneous Intervention (PCI). This important action is necessary to reduce the patient's risk of disability and death.

If the door-to-balloon less than 90 minutes goal is not met, the hospital will be penalized. This will not only be a financial penalty, but with the public's awareness of this benchmark, the community may perceive a lack of commitment by the hospital to provide safe and quality care.

Thank you for this opportunity and I hope you find this report helpful in reducing the door-to-balloon time of patients entering the Emergency Department with a STEMI. If you have any questions or suggestions regarding the recommendations or research, please contact me at 630-123-4567 or e-mail me at the address below.

Sincerely,

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Emergency Department
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Enclosure: Report
ST-Elevation Myocardial Infarction:
Door-to-Balloon Less Than 90 Minutes

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Prepared for
Cindy Rentsch
Manager, Emergency Department

September 26, 2011
**Abstract**

This report investigated how early recognition of a ST-Elevation Myocardial Infarction (STEMI) reduces the time between the patients presentation to the Emergency Department (ED) and the time of catheter balloon inflation on the blocked coronary artery, also known as door-to-balloon time. This window of time is necessary not only to save heart muscle, reduce infarct size, and decrease morbidity and mortality for these patients, but it also measures the hospital’s quality of care.

Hospitals enrolled as a STEMI Receiving Centers must track and report door-to-balloon times as one of their core measures to the federal government. If this standard of care is not met greater or equal to 88% of the time, it will affect their accreditation and Medicare reimbursement.

To meet the goal of door-to-balloon less than 90 minutes of a STEMI diagnoses, a quality improvement initiative needs to be established. Initiation of more effective processes will deliver optimal patient care with improve outcomes. The first initiative to establish is to have the ECG performed within 5 minutes of the arrival for anyone presenting to the ED or Emergency Medical Services (EMS) with chest pain. This plan will allow the ED physician to contact the Cardiologists and the cath lab earlier and significantly reduced the time the patient is in the ED.
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Introduction

Background

Approximately 400,000 people in the United States experience the most life threatening type of heart attack called a ST-elevation myocardial infarction (STEMI) each year, according to Scaletta (2011). An abnormal ECG pattern, ST-elevation, indicates that a specific part of the patient’s heart has not been receiving an adequate amount of blood, or any blood at all, for a period of time due to blocked arteries. Any delay in opening the coronary artery leads to a substantial increase for heart damage, which in turn increases the risk of death.

Antman (2008) believes the guiding principle to primary Percutaneous Intervention (PCI) is that “time is muscle” and each 30-minute delay in opening the blocked artery increased one-year mortality to 7.5%. On the other hand, patients treated within less than two hours of the onset of chest pain were shown to have lower 30-day mortality and better systolic function than those treated later (Lamia, 2007).

Criteria to be a STEMI Receiving Center requires centers to be committed to providing PCI for acute myocardial infarctions. Edward Hospital is enrolled as a STEMI Receiving Center for, and has not met the goal of, door-to-balloon in less than 90 minutes in the past four quarters.

The beneficial outcomes of PCI depend not only on timing, but also on the procedure being performed in high-volume centers by experienced interventional cardiologists, according to Le May, Dionne, Maloney, and Poirrer (2010). Edward Hospital Cardiac catheterization lab performs 8,000+ PCI a year and provides Cardiologists, Interventional Cardiologists, and appropriate staff who are available 24/7 (D. Wilson M.D., personal communication, September 21, 2011).

The goal of door-to-balloon continues to be a challenge because PCI is a multidisciplinary and time-sensitive therapeutic intervention. This process is measured in minutes, outcomes are measured by short-term mortality, and therefore, teamwork and smooth transitions between various care-provider units is critically important. This report will explore and make recommendations as to what must be done to meet the benchmark door-to-balloon less than 90 minutes after identifying a case of STEMI.

Problem

Edward Hospital’s major corporate goal this year is for at least 90% of the STEMI patients to receive PCI within 90 minutes of diagnosis in the Emergency
Department. This goal has not been achieved, as noted on the web site
www.hospitalcompare.hhs.gov (See Table 1).

**Table 1  Heart Attack Patients Given PCI Within 90 Minutes Of Arrival**

<table>
<thead>
<tr>
<th>Average for all reporting hospitals in the U.S.</th>
<th>Average for all reporting hospitals in Illinois</th>
<th>EDWARD HOSPITAL</th>
<th>Data Collected To</th>
<th>Data Collected From</th>
</tr>
</thead>
<tbody>
<tr>
<td>90%</td>
<td>91%</td>
<td>81% of 36 patients</td>
<td>10/1/2009</td>
<td>9/30/2010</td>
</tr>
</tbody>
</table>

*Note. From U.S Department of Health and Human Services, September 2011.*

The American Heart Association is active in getting heart attack warning signs out to the public; however, there is still a lot of uncertainty or denial of one who is experiencing chest pain. Re-education is necessary to re-familiarize the ED staff and EMS personnel of the many types of atypical symptoms patients may experience when having a heart attack. Despite the very best efforts of the ED staff, the diagnosis of some STEMI patients is occasionally delayed.

A more collaborative relationship between the cardiac cath lab and the Emergency Department needs to be developed. Improved communication between all the involved departments will expedite the process to get the STEMI patient to cath lab in a timely manner.

*Purpose*

The purpose of this report is to show how and why bettering the door-to-balloon time is necessary for Edward Hospital and its patients. Failure to meet this goal not only decreases the Medicare reimbursement, but with continued low percentages, EMS will not be allowed to take chest pain patients to our STEMI Receiving Center, and communities will be less confident in the hospital’s ability to provide safe and quality care.
Scope

This report will focus on the needs of Edward Hospital to improve the standard of care for patients presenting with a STEMI. The results will show a decrease in the door-to-balloon times through a multidisciplinary approach, therefore, reducing mortality and saving heart muscle.

Discussion

STEMI Standards

Who is behind these standards?

The American Heart Association (AHA) and The American College of Cardiology (ACC) set a goal to reduce door-to-balloon time less than 90 minutes of arrival to an Emergency Department. The Centers for Medicare and Medicaid (CMS) and Joint Commission on Accreditation of Hospital Organizations (JCAHO) have joined in on this goal (Lamia, 2007). This time is an important quality measure that the STEMI Receiving Center must report on quarterly to a registry called ACTION-Get With the Program (D. Wilson M.D., personal communication, September 21, 2011). The federal government then tracks and posts the results on its Medicare Compare web site.

Healthcare Reform 2010, according to DewBerry and Rose (2010), required Medicare to make changes in that Medicare reimbursement would be based not only on quantity of care, but also on the quality of care delivered. Hospitals are required to provide their performance measurements on the Hospital Compare website, which allows the public to see a hospital's quality information.

Hospital Compare attempts to produce evidence-based, meaningful and quantifiable quality of care measures. Reiter and Scaletta (2008) noted Emergency Departments will be required to track and report the following standards for patients diagnosed with an Acute Myocardial Infarction (AMI): Aspirin at arrival, Beta Blocker at arrival, Median time to primary PCI, and primary PCI within 90 minutes of arrival. Hospitals that reach certain quality measures will be rewarded financially and those that do not will be penalized financially.
What standards are measured?

Enrolled STEMI Receiving Centers (D. Wilson M.D., personal communication, September 21, 2011) will be expected to achieve and maintain the following quality measures and report the following hospital data:

- STEMI volume
- Percent of patients with door-to-balloon time <90 minutes
- Mean and Median door-to-balloon time in minutes
- Mortality data reporting

EMS data:

- EMS dispatch time to balloon time
- Arrival time at patient to time of field 12-lead ECG
- Arrival time at patient to balloon time
- Depart scene time to arrival time at hospital

Promoting STEMI awareness

What is STEMI?

STEMI is an Acute Myocardial Infarction, a blockage in a coronary artery. Survival depends on rapid diagnoses and reperfusion of the artery through primary Percutaneous Intervention. ST-elevation will be recognized in a 12-lead ECG with the criteria of at least 2mm ST elevation seen in at least 2 adjoining leads (D. Wilson M.D., personal communication, September 21, 2011). See Figure 1 and 2.

Figure 1 Normal ST-segment versus ST-elevation

![ST Segment Elevation]

A) First QRS shows normal ST segment at baseline

B) Second QRS shows elevated ST segment 3 mm above baseline

Source:
Note: From Medical University of South Carolina, September 2011.
Figure 2 12-lead ECG with ST-elevation

Source:
Source:
Note: From Medical University of South Carolina, September 2011.

How to Improve the STEMI process

A multidisciplinary team needs to be formed with the objective to identify performance improvement processes to decrease door-to-balloon time. The team will consist of staff from the Emergency Department, Emergency Medical Services, Cardiac catheterization lab, Communications, Quality, Administration, and Cardiology.

The team develops an audit tool sheet to document times and then locate where there are delays:

- Time to obtain an ECG
- Contacting appropriate staff once STEMI was identified
- Transporting patient to Cath lab after Cardiologist met patient in the ED.

Establish ED Chest Pain Standing Orders:
- Patients, 30 years and older, presenting with pain above the waist get an ECG within five minutes of arrival
- With a STEMI diagnoses, the ED Nurse calls Communications to activate a Cardiac Alert
- This alert sends a page to the Cardiologist, Interventional Cardiologist, and the Cath lab.
- The appropriate personnel will immediately report to the ED and help prep the patient for the PCI by establishing two intravenous lines, shave the patient’s groin area, and consent the patient for the procedure.

Establish EMS Chest Pain Standing Orders:
- Educate Paramedics to read 12-lead ECG focusing on ST-Elevation
- Perform a 12-lead ECG within 5 minutes of arrival to the patient presenting with chest pain and transmit it to the ED.
- If a STEMI is noted on the ECG, Paramedics will call the STEMI Receiving Center and notify the radio nurse of this patient; their name and their Cardiologist name
- The nurse will active the Cardiac Alert process while the paramedics are en route to the hospital

**Conclusion**

It is imperative that the hospital focuses on decreasing the door-to-balloon time, which can be accomplished through a multidisciplinary team approach. Compliance by Edward Hospital staff and EMS will positively impact Medicare reimbursement, the STEMI Receiving Center program, and the community perceptions of quality of care.

**Recommendations**

Incorporating the STEMI Cardiac Alert:
- EMS, ED staff, Communications, Cardiologists, Cardiac Catheterization Lab education and training about the Cardiac Alert process
- EMS and ED Nurse 12-lead ECG training to recognize ST-Elevation
- Chest pain protocol **ED**: ECG’s to be done by either the Patient Care Technician or Nurse within 5 minutes of arrival. **EMS**: ECG’s done within 5 minutes of arrival to patient and transmits the ECG to the SRC.
• When STEMI is noted, the nurse will call Communications and notify them of a Cardiac Alert. A page goes out to the Cardiologists and Cath lab who will rapidly respond to the ED
• STEMI box will be kept in the ED that contains a razor blade to prep the patient’s groin and a consent for the procedure
• Improved communication between all departments involved in STEMI care
• Cardiologists educated on the need for a timely arrival to ED consistently
• Synced/calibrated clocks between the ED and Cath lab
• Mock scenarios to practice everyone’s role in the Cardiac Alert
• Audit tool sheet
• Regularly scheduled meetings with the Performance Improvement team to discuss how the process and measures are working
REFERENCES


