ED and Cardiac Catheterization Laboratory Collaborative Approach to Improving EKG and Door to Balloon Times for STEMI Patients

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Introduction

Background

"ST-segment elevation myocardial infarctions (STEMI) is a fatal indication in an EKG that usually results from a coronary artery occlusion. Myocardial injury and ischemia may occur within 20-30 minutes. Early percutaneous coronary intervention may help restore blood flow to the ischemic area, to salvage the dying heart. " (AHA)

There are four critical time points that is integral to ensure salvaging of the heart.

1. Door Time – the arrival of the patient
2. Time of EKG
3. Recognition and STEMI activation
4. Departure from ED to transport to Cardiac Catheterization Laboratory

The ED and the Cardiac Catheterization Laboratory (CCL) have been working hand and hand in making improvements in the four critical time points. The leaders of the department collaborates monthly to discuss every STEMI case. With the assistance of Mission:Lifeline from AHA and FDNY, the team developed systems and processes to improve care for patients with STEMI.

Identified Causes of Delay:

1. Delay in recognition of patient's symptoms at triage, especially patients without chest pain.
2. Delay in EKG due to registration and triage protocols.
3. Staff availability to do STAT EKG.
4. Delay in STEMI activation
5. Life-saving critical tasks when patient's are unstable

The STEMI QI committee composed of SBH and Montefiore physicians, SBH nursing leaders and staff, Emergency Department providers and nursing team, CCL staff, and hospital administrators, recognized the importance of immediate improvement in door-to-ECG time to <10 minutes as way to improve D2BT, with a goal time of 90 minutes. Numerous education efforts and process changes were conducted to reduce door to balloon time of STEMI patients. By the end of 2016, the efforts proved to be a success.

Aim

The aim of the project in 2016, is to decrease the door-to-balloon time for patients with ST segment elevation myocardial infarction (STEMI) who come through the Emergency Department (ED), to meet the standard of less than 90 minutes.

Plan

1. Improve Door-to-initial ECG – (Goal: 5 minutes)
2. Improve STEMI Activation to Cardiac Catheterization Laboratory Transport (Goal: 30 minutes)
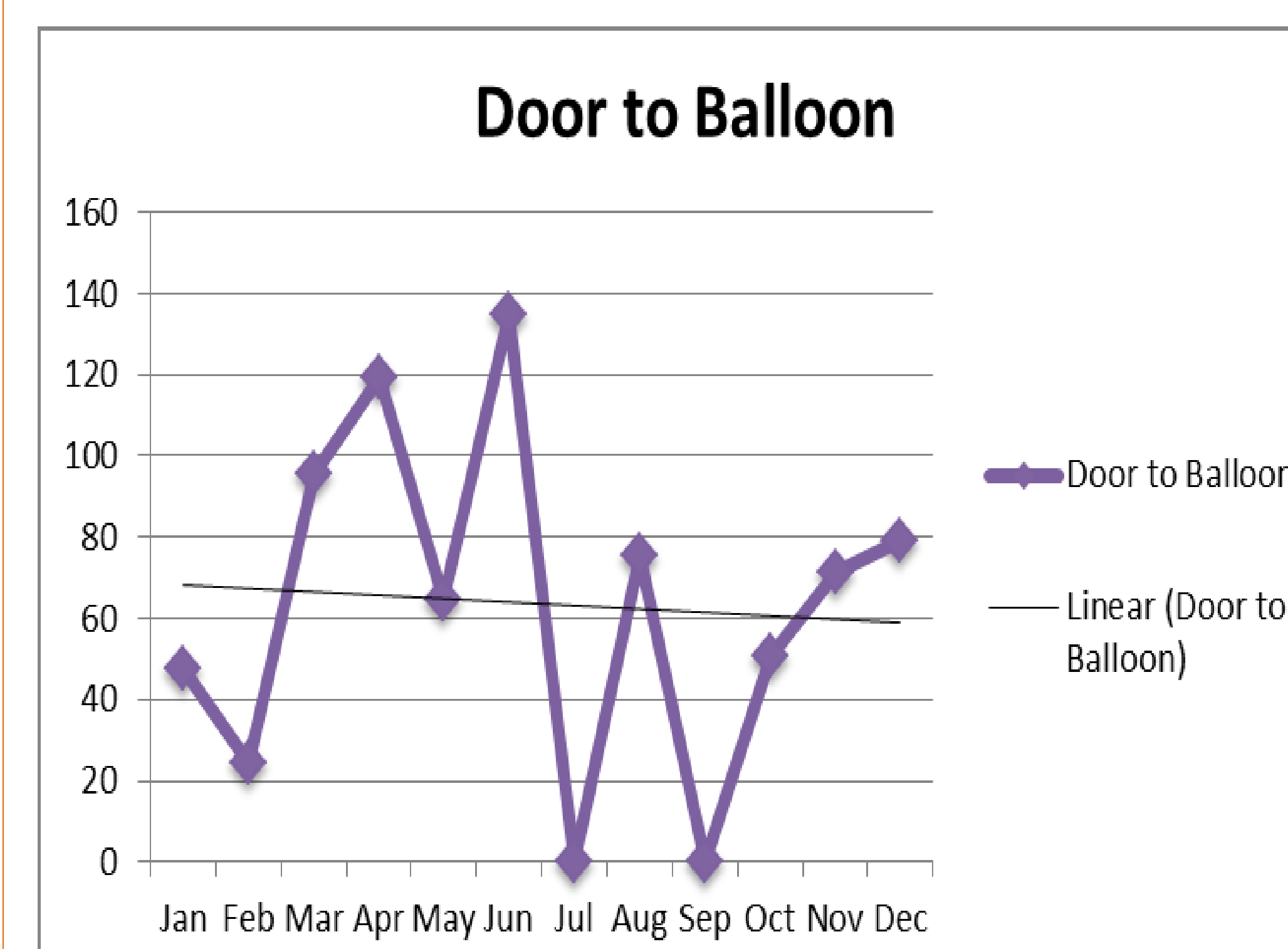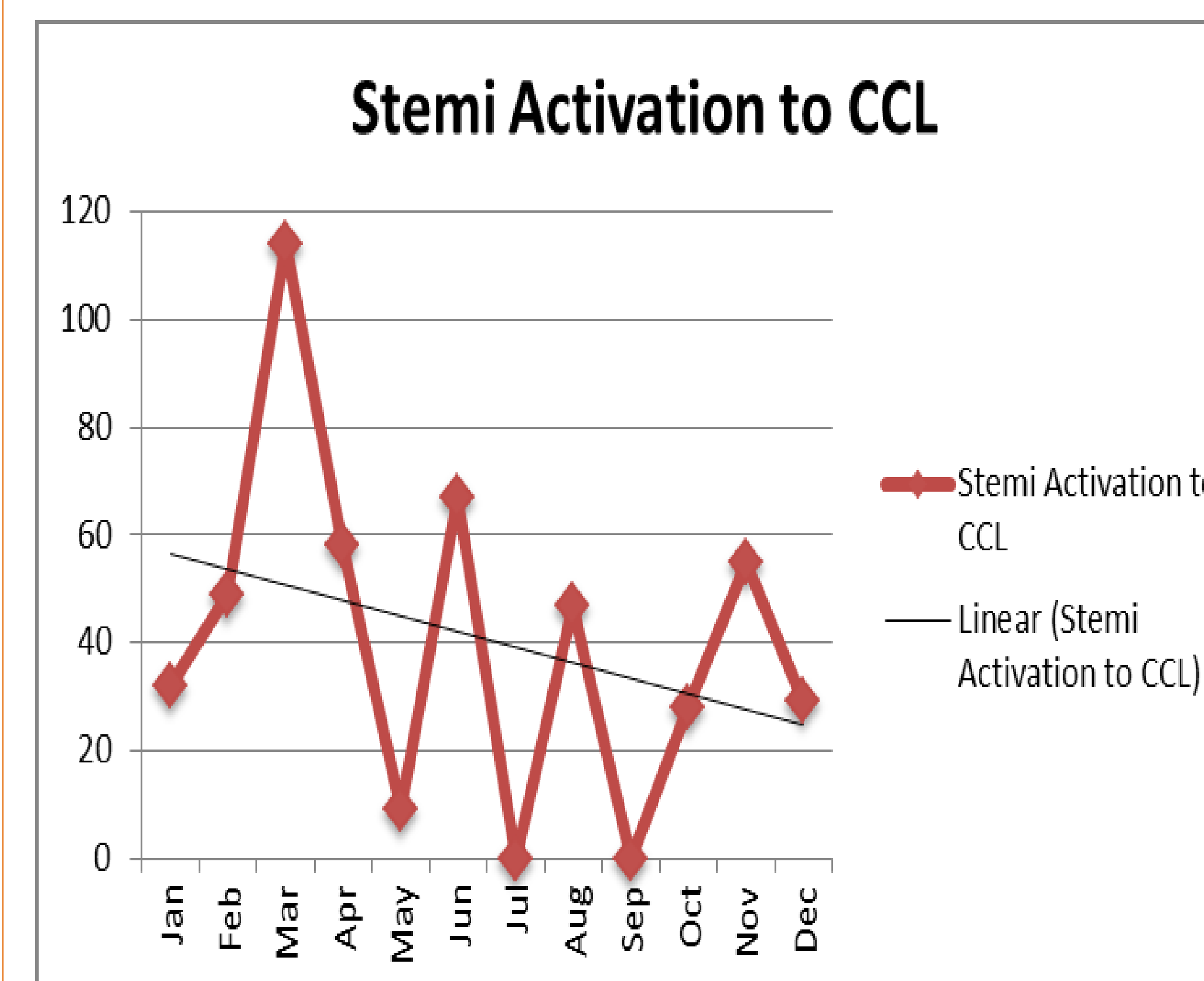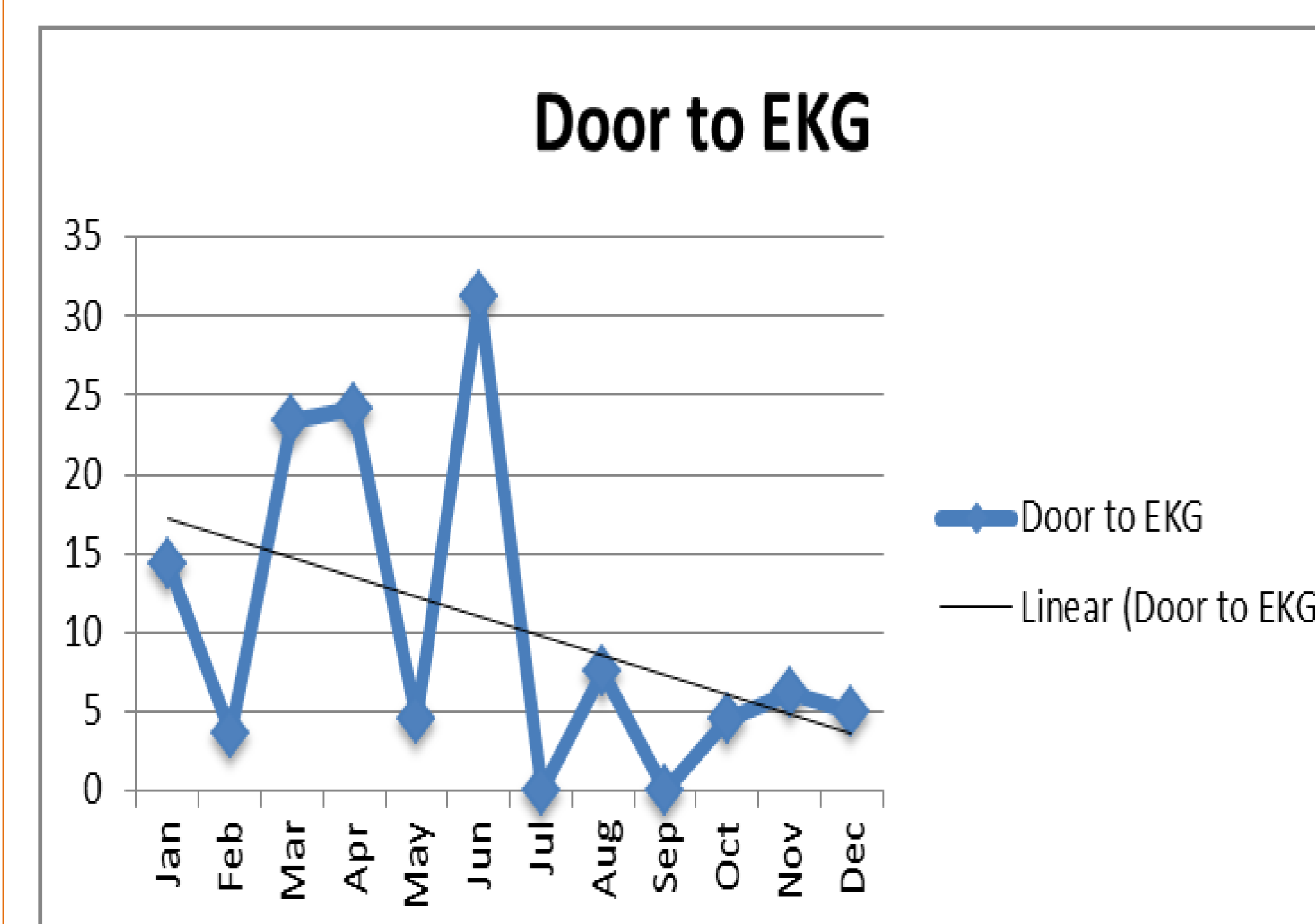3. Improve Door to PCI (Goal: 90 minutes)

Do:

Monthly meetings were conducted by the multidisciplinary STEMI QI committee to discuss every STEMI case in the Emergency Department. Each case was reviewed for its successes and delays. Improvement measures were discussed in the meeting and rolled out immediately.

Workflow changes were conducted in both the Emergency Department and the Cardiac Catheterization Laboratory.

1. Establishment of Rapid EKG process. A pre-assigned PCT/MA is in charge of doing all STAT EKGs in the Emergency Department.
2. Re-education of time-based goals for each step of the STEMI patient care processes (i.e., door-to-ECG time of <10 minutes, Time to STEMI confirmation to STEMI activation of < 10 minutes, Activation time (ED) to CCL arrival time < 30 minutes and D2BT of 90 minutes)
3. Redesigned registration and triage processes to identify high risks patients and patients with atypical acute myocardial infraction (AMI) symptoms.
4. Upgrading ECG machine that is capable of rhythm interpretation, which increased staff awareness of ST elevation
5. ED assigned a daily "Charge Physician" who interprets rapid EKGs for STEMI.
6. Prompt feedback of time-based results were discussed with staff.
7. STEMI D2BT results were reported to key stakeholders during daily "Safety Call."

Study

Door to EKG

Stemi Activation to CCL

Door to Balloon

Act

On August 2016, the ED made dramatic changes in their triage and EKG processes. Data was collected by the ED clerk and CCL nurses. The data was evaluated by the multidisciplinary leadership team on a monthly basis for accuracy and quality control. The teamwork and collaboration of both departments have been instrumental in making these successful changes happen.

Our results showed a huge decrease in door to EKG time from the Emergency Department, STEMI Activation to CCL and Door to Balloon Times.

Next Steps:

1. Continuous education of staff.
2. Recurrent meeting of the multidisciplinary team to identify problems/issues.
3. Open communication between both units is integral to the success of the project.
4. The PDSA cycle assisted in getting rapid results to the changes.
5. Create an algorithm that is simple and understandable
6. Sharing the data to staff in real time
7. Celebrate staff success
8. Support from senior leadership
9. Motivate staff to further decrease door to balloon time.
10. Integrate First Medical Contact time in data collection and quality improvements for 2017.

References:

1. Antman EM, Anbe DT, Armstrong PW, et al. ACC/AHA guidelines for the management of patients with ST-elevation myocardial infarction: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. J Am Coll Cardiol.2004;44:671–719. http://www.acc.org/qualityandscience/clinical/guidelines/stemi/.Accessed February28, 2015.
2. 2.   De Luca G, Suryapranata H, Ottervanger J, Antman E. Time delay to treatment and mortality in primary angioplasty for acute myocardial infarction. Circulation. 2004; 109(10):1223–1225.
3. 3.   TheJointCommissionPerformanaceMeasure http://www.jointcommission.org/ PerformanceMeasurement/.   Accessed February 28,2015.
4. 4.   Krugman M. Evidence-based practice: the role of staff development. J Nurses Staff Dev. 2003;19(6):279–285