

Improving STEMI Outcomes through High Reliability and Collaboration

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Background

In STEMI, Stroke and other critical medical events, time is muscle, and rapid intervention can result in better patient outcomes. Establishing and maintaining high reliability and decreased variability in the care process may also be contributing factors, independent of time. Previous implementation of an "Acute Transfer Line" process to expedite care (including dedicated transfer line, ED physician activation of cath lab, immediate launch of Critical Care Transport (CCT) team) resulted in improvement of D2B times, but further opportunity remained (Figure 1). This prompted Emergency Services Institute (ESI), the Heart and Vascular Institute (HVI), and CCT to collaborate on a performance improvement project across the health system.

Project Aims

Project goals included establishing standard treatment protocols for all involved departments, improving adherence to established protocols, decreasing variability in performance, and reducing emergency department (ED) arrival to departure times. It was hypothesized that meeting these goals would also result in reduced D2B times and reduced mortality rates in this patient population.

Project Design/Strategy

An interdisciplinary committee was formed consisting of emergency physician and nursing leadership, cardiologists, cardiac cath lab personnel, critical care transport (CCT) medical and quality directors, and the local EMS director. The committee met on a monthly basis to design, implement, and monitor the effect of the interventions throughout the health system. This was a dynamic process over an 18 month period based on information learned as a result of the collaborative meetings and data review. The focus was on high reliability and being able to replicate the improvements at all system EDs.

Changes Made

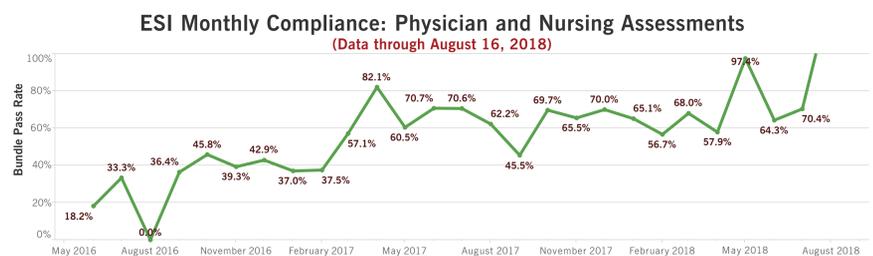
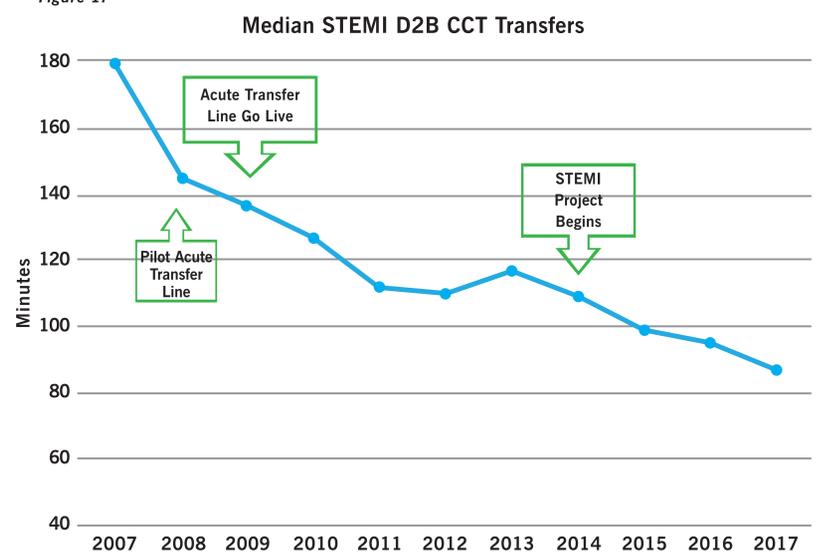
Numerous changes were implemented over 18 months, Changes were developed by the interdisciplinary team and data was evaluated monthly. Key interventions included:

- Establishing EMS pre notification of the EDs (including ECG transmission en route) for suspected STEMI, and Direct-to-Cath-Lab process created for EMS arrivals
- Establishing standard care paths for use in all system EDs (collaborative effort between interventional cardiologists and emergency physicians). Care paths include medications, doses, and other key interventions to be done in the ED.
- Creating ED Acute Care Teams based on trauma care methodologies to provide the most efficient evaluation of EMS and "walk-in" STEMI patients
- Creating a STEMI Safe Handoff Checklist to ensure standardization and completion of essential components of care prior to leaving the ED
- Collaborating with Critical Care Transport teams and CCT crew consistently educating, demonstrating STEMI Safe Handoff Checklist in referring EDs
- Establishing early CCT activation by EMS in the region. This process allowed EMS to transmit ECGs directly to CCT, putting the transport crews on standby even before the patient arrives in the ED.
- Establishing STEMI Rendezvous – giving regional ED's the ability to activate CCT prior to patient arrival based on pre-hospital ECG review.
- Establishing Dripless STEMI's – IV infusions in patients from outside ED's are minimized in order to make handoff in the Cath Lab as seamless as possible

Outcomes

Process adherence and standardization of care continued to improve throughout the intervention, resulting in high reliability and reduced variation in care. In addition, ED in/out and D2B times improved significantly throughout the study period, as did mortality. Main Campus mean ED in/out times decreased from 26 minutes to 16 minutes, an improvement which has been sustained for nearly two years post implementation. Mean regional ED in/out times also decreased from 56 minutes to 43.5 minutes. This has also been sustained. Median D2B times decreased from 72 minutes to 47 minutes for patients presenting directly to Cleveland Clinic Main Campus ED, and from 95 to 74 minutes for transfers from regional emergency departments. Reported mortality improved from below the 50th percentile at project start to greater than the 90th percentile at 18 months post-implementation.

Figure 1.



Lessons Learned

Key to the success and sustainability of the project were instituting a collaborative team of key stakeholders, and establishing ownership and accountability. Ongoing monthly meetings with process and data review continues to allow for sharing of information across disciplines and investigation of outliers. Trends – both good and undesirable – as well as questions, opportunities and next steps are reviewed at the interdisciplinary steering committee meetings monthly.

Another key lesson learned in this project was the importance of buy-in at the regional ED and local EMS levels. As local EMS members are not hospital employees, this was a particular concern. Early in the project, a one page EMS feedback tool was created to provide timely EMS feedback while maintaining patient confidentiality. These forms containing information and outcomes for individual EMS referrals were placed in EMS break rooms and hallways where EMS crews could review them. Feedback emails regarding individual cases and outcomes were also sent to referring ED teams. Opportunities to partner with EMS on news stories, training, and reward ceremonies were also taken.