Impact of Ongoing Front-End Redesign on an Urban Academic Emergency Department's Door-to-ECG Performance: A Rapid Cycle Improvement Approach

Kaveesh Kutty, MD; Susan Peterson, MD; Barbara Maliszewski, RN, MS, NEA-BC; Kelly Williams, RN, MSN

Department of Emergency Medicine, Johns Hopkins Hospital, Baltimore, MD, USA;

Introduction

The Emergency Department at our urban, academic tertiary care center is undergoing an "Up Front" Redesign to increase staff and patient safety as well as to optimize the current triage and fast-track space to care for a higher volume of lower acuity patients more efficiently. The project began in April 2021 and is expected to conclude in March 2023. This construction project poses a unique challenge: overhauling an essential area of the Emergency Department while continuing day-to-day operations with minimal disruption to patient care, quality, and safety.

Objectives

The specific aim of this project is to study an essential marker of Emergency Department quality, safety, and performance – "Door-to-ECG" (with a goal of less than 10 minutes for walk-in chest pain patients) – to observe how it is affected by the ongoing front-end redesign process. By utilizing an iterative approach, we can monitor the data as it is collected, identify issues and associated potential causes, and adjust our processes to maintain a high standard of care, despite workflow disruptions.

Materials and Methods

A retrospective, observational, pre-post interventional comparative study was conducted as a quality improvement measure. By utilizing rapid cycle improvement via a "Plan-Do-Study-Act" approach, we identified roadblocks within each stage of the Front-End Redesign process as they occurred, subsequently implementing interventions to counteract these issues. Data was obtained using dashboards within our Electronic Medical Record that track departmental metrics. The six months prior to initiation of construction were compared to the 12 months following, as this pre-intervention period was most like the post-intervention period regarding external, pandemic-related features (i.e., infection control policies and staffing).

Results

The pre-intervention Door-to-ECG completion rate within 10 minutes of patient arrival for walk-in patients presenting with chest pain ranged between 63.5% and 73.8% (mean 69.9%, SD 3.9%). A multi-disciplinary task-force was created to monitor and respond to challenges as they arose. The Door-to-ECG completion rate in the 12 month period following the onset of construction and inception of the aforementioned task force ranged between 61.9% and 78.9% (mean 72.0%, SD 4.8%). Further information related to construction phases, barriers, interventions (e.g. new ECG machine, optimizing up-front ECG workflow, etc.), and associated variation in completion percentage can be best understood via the attached figure.

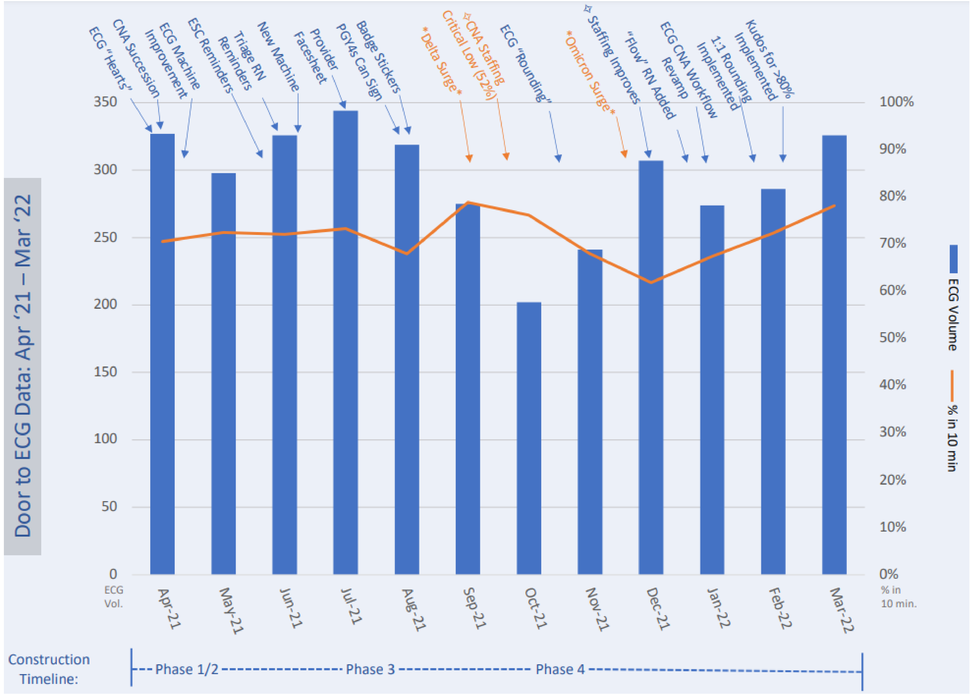

Figure 1 – Interventions & Barriers

Conclusions

The task of remodeling an emergency department while utilizing preexisting space without halting day-to-day operations is challenging. The added external and unpredictable challenges introduced by the pandemic and resultant fluctuation in both patient and staffing volumes creates greater risk. By tracking important operational and safety metrics such as Door-to-ECG, creating a task force focused on preserving and improving departmental performance in such areas, and monitoring the data in real time to respond accordingly, this department was able to preserve and begin to improve on performance in this key area of patient safety and operations.

Clinical Implications

This study provides a framework for the preservation and improvement of operational quality and safety metrics during active construction and redesign of a major, urban tertiary care center. It provides descriptive evidence of specific interventions that were put in place to prevent patient harm and degradation of quality during an otherwise high-risk phase of a department's growth. This approach can be applied to various operational metrics, as well as to a wide range of scenarios in which an emergency department is undergoing change and growth.