Embarking on a Journey to Transform and Improve Emergency Department Flow

A Sharp Grossmont Hospital and TEAMHealth Collaborative

Abstract

Measuring Emergency Department (ED) performance is a multi-faceted assessment involving metrics such as ED length of stay (LOS), door-to-provider times (D2P), and percentage left without treatment (LWOT). The latest reports by the Emergency Departments Benchmarking Alliance (EDBA) in 2016 show the national median ED LOS is 182 minutes across all ED's. Departments seeing a high-volume of patients ranging from an annual 80-120k had an average LOS of 200 minutes. Median D2P time was recorded at 27 minutes, whereas high-volume ED's averaged at 40 minutes. Analysis on patients who LWOT were 2.7% on average across all ED's, and 4.2% in high volume ED's.

The Sharp Grossmont emergency department is faced with consistent, complex, high patient volume exceeding 100,000 annual visits. Emergency Department leaders recognized the negative outcomes that poor patient throughput created. Prolonged length of stay and waiting for initial medical evaluation led to a high percentage of patients who left without treatment and low patient satisfaction. Consistently declining quality measures and community image were catalysts that drove action for the ED team.

Plan-Do-Study-Act (PDSA) was used as the improvement methodology for this project with the help of a hospital multidisciplinary team. Current state process flow was evaluated to identify constraints influencing patient throughput. Application of evidenced-based inquiry guided the team in creation of an operational future state and adoption of improvement countermeasures. A split-flow model was selected for the test of change where a Pivot Triage Nurse segmented patients into one of two ED treatment areas, AcceleratED or AdvancED Care. Emergency Department bed capacity was increased by implementing a vertical treatment space and results pending area.

Analyzing six months of post-test aggregate data revealed a 20.8% improvement in achieving D2P time in less than 20 minutes, a 62.3% LWOT reduction, and a 85.1% decrease in the overall LOS for patients treated and released from the AcceleratED Care area. Additionally, metrics revealed approximately 40% of the daily ED volume was consistently treated in the AcceleratED vertical treatment area, which reduced AdvancED bed demand and improved throughput for higher acuity patients.

Objectives

With the goal of improving overall ED quality and length of treatment stay our team outlined three outcome measures which included door to provider time (D2P), left without treatment (LWOT), and discharge length of stay (LOS).

	Pre-Implementation	Goal
Length of Stay (LOS)	409.8 minutes	Less than 180 minutes
Door-to-Provider (D2P)	27.8 minutes	Less than 20 minutes
Left Without Treatment (LWOT)	3%	Less than 1%

Methods

The Plan-Do-Study-Act (PDSA) model for improvement was used for this project. The decision was made to change the initial "park-and-play" patient model to the "split-flow" model which created a pivot nurse to triage patients to either AdvancED or AcceleratED care, eliminating sequential flow. Inclusion criteria for AcceleratED care patients was discussed and included ESI 4-5 patients as well as vertical ESI 3 patients, the following inclusion criteria were set: .

AcceleratED Care Inclusion Criteria	
• Minor trauma (1-2 x-rays needed)	• URI/ILI/Pharyngitis/Cough (>6 months, non-ill appearing and no significant PMHx if > 60 yo)
• Minor head injury (mild LOC ok, not on blood thinners)	• Mild asthma exacerbation (O2 sat > 92% on RA)
• Minor head injury (mild LOC ok, not on blood thinners)	• Uncomplicated UTI symptoms (no high fever, no severe back pain)
• Low speed MVC; patient ambulatory	• Chest pain < 30 yo w/ no cardiac history, normal EKG
• Uncomplicated back pain (no red flags)	• Testicular pain
• Abscess/cellulitis with no systemic symptoms	• Vaginal bleeding; hemodynamically stable; no unilateral pelvic pain if pregnant
• Wound rechecks; suture/staple removal	• Mild generalized abdominal pain/epigastric pain/flank pain < 45 yo
• Simple Lacerations	• Gastroenteritis symptoms (N/V/D) with HR <115
• Simple Dog Bites	• Unilateral leg pain/swelling: no red flags (i.e. normal pulse, no SOB, or significant co-morbidities)
• Simple rash (shingles, viral exantham, contact dermatitis)	• HTN (without chest pain, SOB, or HA)
• Superficial burns (1st and 2nd degree; <20% BSA; no facial, genital, or circumferential)	• Mild fatigue or dizziness with no cardiac or past medical history < 45 yo
• Dental infection	• Anxiety
• Simple Headaches (no red flag features i.e. fevers, thunderclap onset, neuro deficits)	• Chronic pain

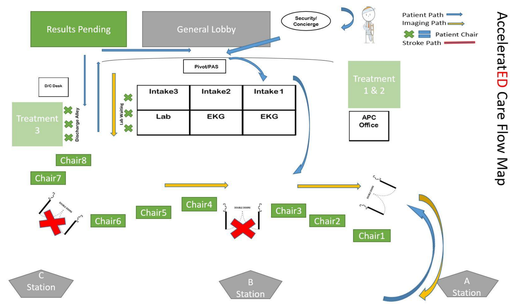


Image 1: *Pictorial representing the first phase of AcceleratED care flow.*

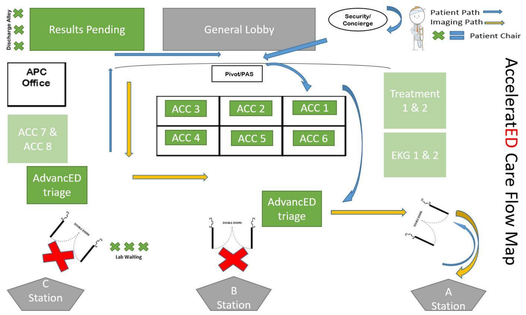
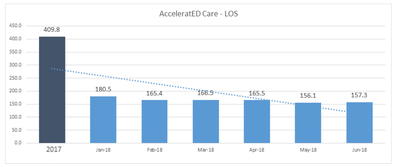


Image 2: *Pictorial representing the second phase (current) of AcceleratED care flow.*

Results

Analyzing 6-months of post-implementation data revealed an overall improvement of all metrics. ED LOS for discharged patients improved from an average of 409.8 minutes to an average of 165.2 minutes, an 85.1% improvement (Fig. 1). Average door-to-provider time was 27.8 minutes and was reduced to 22.0 minutes, a 20.8% improvement (Fig. 2). The percentage of patients leaving without treatment resulted in an average of 1.1% which is a 62.3% improvement from previous data which was 3.0% (Fig. 3). Additionally, metrics revealed approximately 40% of the daily ED volume was consistently treated in the AcceleratED vertical treatment area, which reduced AdvancED bed demand and improved throughput for higher acuity patients (Fig. 4).

Fig. 1: *Bar graph depicting the average length of stay (LOS) for discharged patients pre- and post-implementation of AcceleratED Care treatment area.*



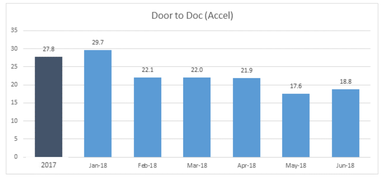
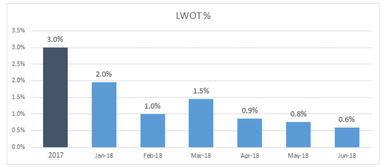


Fig. 2: *Bar graph depicting the percentage of patients seen in AcceleratED care with a door-to-provider goal under 20 minutes.*

Fig. 3: *Bar Graph depicting the average percentage of patient who left without treatment pre- and post-implementation of AcceleratED Care treatment area.*



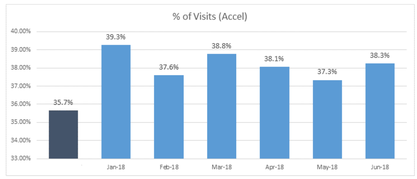


Fig. 4: *Bar Graph depicting the percentage of visits seen in AcceleratED care vs "Old Fasttrack area"*

Conclusion

In conclusion, a rapid process improvement event was conducted to restructure front-end Emergency Department flow. Utilizing Demand-to-Capacity analytics, a multidisciplinary team designed and tested a new flow process using the Plan-Do-Study-Act improvement model. All throughput goals were achieved and sustained. Additionally, interdisciplinary communication and coordination of the plan of care was enhanced. Outcome data seen in this project indicate "split-flow" is an effective throughput model that high-volume Emergency Departments should consider to streamline patient flow.

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