

## Background

The most common site for hospital sentinel events due to care delays secondary to waiting and/or inefficient processes occurs in the emergency department.<sup>1</sup> Decreasing patient length of stay in an emergency department is a key initiative for many hospitals as it is tied to the patient satisfaction component of value based purchasing reimbursement as well as labor costs.<sup>2-3</sup>

## Clinical Problem

- Comprehensive data collection at triage is an antiquated triage process that bottlenecks the system and delays care<sup>4-5</sup>
- Non ambulance arriving ED patients receiving care using a comprehensive approach experience longer door-to-triage times and longer door-to-provider times<sup>4</sup>

## Objectives

The purpose of this project was to modify a US emergency department's front-end process with the goal of improving the door-to-provider time interval. The hospital employed a comprehensive data collection process at triage; the intent was to redesign the process and implement a rapid triage process.

## Clinical Question

Does the implementation of a rapid triage process in a US east-coast ED result in improved aggregate door-to-triage and door-to-provider times for non-ambulance arriving patients?

## Literature Review

- Emergency Severity Index (ESI) is most common triage scale in US<sup>2</sup>
- Common Themes:
  - Improving door-to-provider times<sup>6</sup>
  - Provider-in-triage for larger facilities<sup>7</sup>
  - Triage bottlenecks from unnecessary questions<sup>5,8</sup>
  - Cautions in implementing rapid triage models<sup>9</sup>

## Population & Setting

Population: All ED patients presenting for treatment at the implementation site  
Setting: An east-coast ED with approximately 28,000 annual visits

## Ethical Considerations

Submitted to Creighton University Institutional Review Board and assigned project number 1451019-1. It was determined through administrative review that the project does not meet the definition of research under 45 CFR 46.102(d). Access to relevant data occurred through a HIPAA compliant platform.

## Materials & Methods

- Within the theoretical framework of the Donabedian<sup>10</sup> model of "structure-process-outcome," this was a continuous quality improvement initiative utilizing the DMAIC method<sup>11</sup> for PI
- A system-wide performance work team was formed consisting of ED nursing/medicine leaders & ED staff; individual policies were combined into one system wide ED triage policy
- EHR was redesigned with rapid triage in mind
- Hospital-level multidisciplinary PI work team formed to design/implement process flow for this specific site

### Primary Triage\*

- \*Arrival Info
- \*Arrival Doc
- \*Chief Complaint
- Triage Assessment
- \*Vital Signs
- \*Pain Assessment
- Pregnancy Status
- \*Height / Weight
- \*Allergies
- Respiratory Screen
- \*Travel Screen
- ED Triage Notes
- \*ESI / Destination
- LWBS or to L&D

\* Denotes a policy/process required field

### Screenings

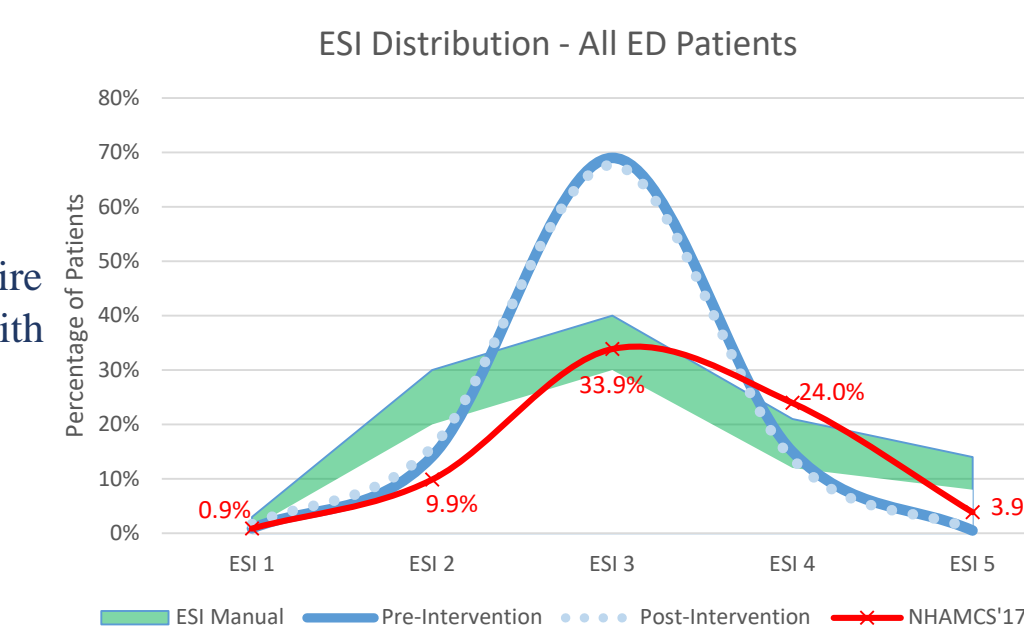
- Sepsis Screen
- Stroke Screen
- Abuse Indicators
- HIV Testing
- Tetanus Status
- SBIRT Screening
- Directives

### Primary Assessment

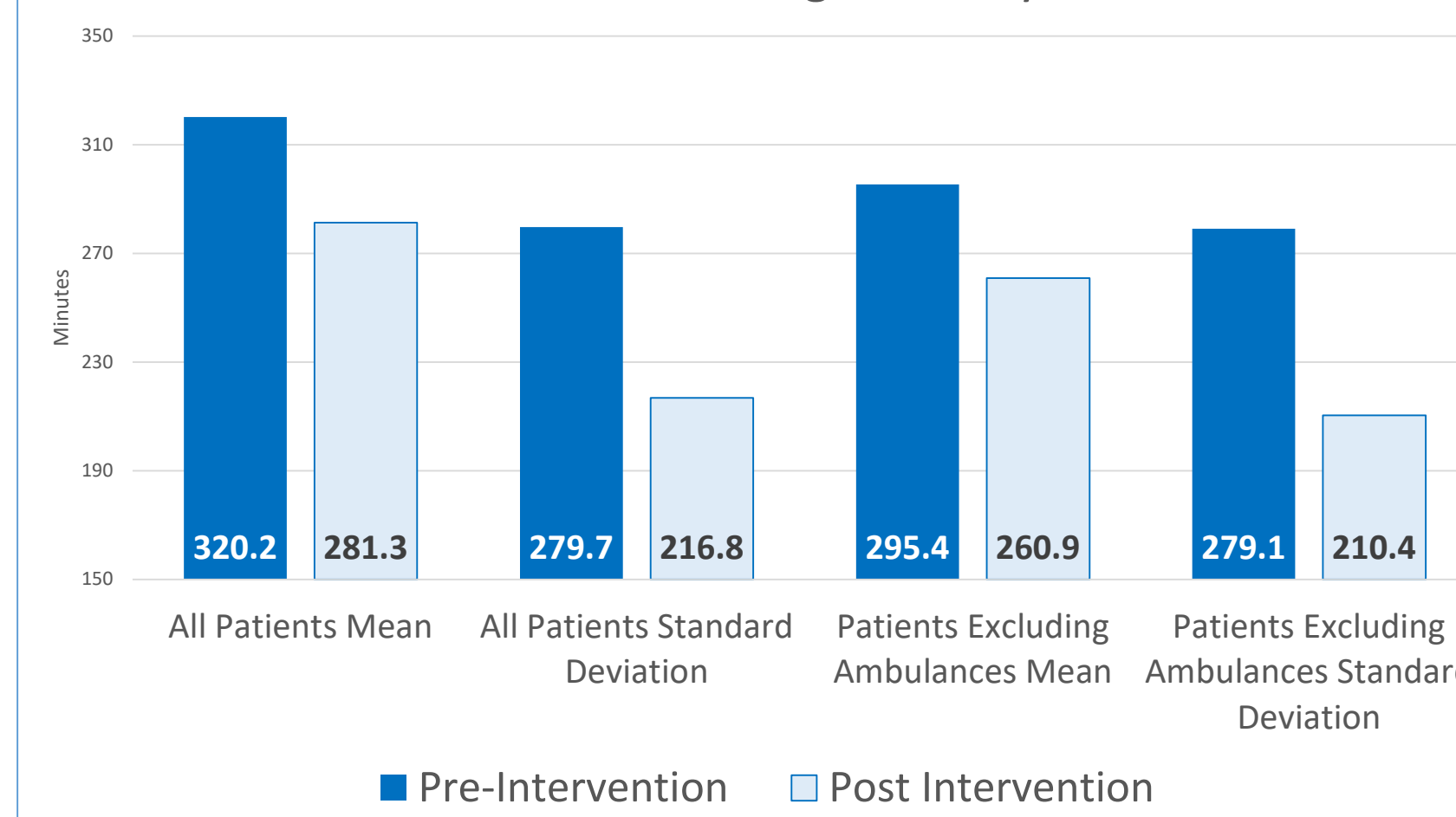
- Primary Assessment
- Pain Assessment
- OB/GYN
- Breastfeeding
- History
- Review PTA Meds
- Outside Meds
- Fall Risk
- Implants
- External Medical
- Care Everywhere
- Triage Interventions
- Orders
- Order Sets

## Results

- With all t-test p values less than 0.001, statistically significant improvements existed in all categories examined of both the entire ED patient population as well as when examining just patients arriving by a means other than ambulance. The time intervals with statistically significant improvements were door-to-triage, door-to-provider, and overall ED length-of-stay. This performance improvement initiative was successful in achieving its desired outcomes.
- Incidental finding: there was significant variation with triage categories in both the pre and post interventions groups when compared against the expected spread as published in the ESI manual<sup>2</sup> and when compared to the most recent distribution data from the CDC.<sup>12</sup>



### Overall ED Length of Stay



Unpaired T-Test Results		Door to Triage All Patients	Door to Triage Excluding Ambulances	Door to Provider All Patients	Door to Provider Excluding Ambulances	Overall LOS All Patients	Overall LOS Excluding Ambulances
		Pre-Intervention (Aug-Oct '18)	Mean: 4.0	3.9	21.3	23.5	320.2
	SD	10.0	10.3	21.1	22.3	279.7	279.1
	n	6,920	4,769	6,920	4,769	6,920	4,769
Post-Intervention (Aug-Oct '19)	Mean	2.9	2.6	18.6	19.9	281.3	260.9
	SD	6.1	6.4	18.5	19.7	216.8	210.4
	n	6,749	4,616	6,749	4,616	6,749	4,616
Intermediate Calculations	t	7.7407	7.3163	7.9472	8.2784	9.0726	6.7456
	df	13667	9383	13667	9383	13667	9383
	st. err of dif	0.142	0.178	0.34	0.435	4.288	5.114
Results	p	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
	CI	95%	95%	95%	95%	95%	95%
	From	0.821	0.951	2.033	2.746	30.476	24.451
	To	1.379	1.649	3.367	4.454	47.324	44.549

## Conclusions

- In this study, implementing rapid triage process was successful in demonstrating statistically significant reduction in door-to-triage, door-to-provider, and overall ED lengths of stay.
- Variation in triage distribution at this facility compared to the ESI manual indicates a need for further investigation into triage accuracy at this facility. This includes but is not limited to a review of triage accuracy quality controls, such as ongoing competency evaluation and the establishment of inter and intra-rater reliability.
- Performance improvement work teams are effective when using the DMAIC model while incorporating elements of shared governance and quantum leadership

## Clinical Practice & Future Research Implications

- Future research is needed to further evaluate this impact of improving door-to-triage, door-to-provider, and overall ED lengths of stay time metrics on actual patient outcomes on specific patient populations, diagnoses and/or chief complaints. The research is needed in less studied ESI2 categories as well as some ESI3 categories (e.g. severe asthma attack, appendicitis, etc.)
- Effectiveness of ongoing triage education programs on overall triage accuracy
- Strategies to reduce triage category assignment inaccuracies
- The impact of using machine-based learning tools to augment triage decisions in clinical practice

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