Standardizing Sepsis Huddles To Improve Antibiotic Timeliness in Sepsis Alerts

Research in Action, AAPA 2023

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Disclosure

COURTNEY TITUS

Has documented no financial relationships to disclose or Conflicts of Interest (COIs) to resolve.

Background: Pediatric Sepsis

- Early recognition and therapeutic intervention for pediatric patients with symptoms of sepsis has been shown to improve clinical outcomes and save lives. The national goal for these patients is to start antibiotics within the first hour of recognition.
- From October 2020 to September 2021, in the Pediatric Emergency Center at JHACH 77.3% of our sepsis alerts got antibiotics within 60 minutes from the onset of sepsis to the first dose of antibiotics initiated. These delays in delivery of antibiotics can have a negative impact on the morbidity and mortality of our pediatric population.

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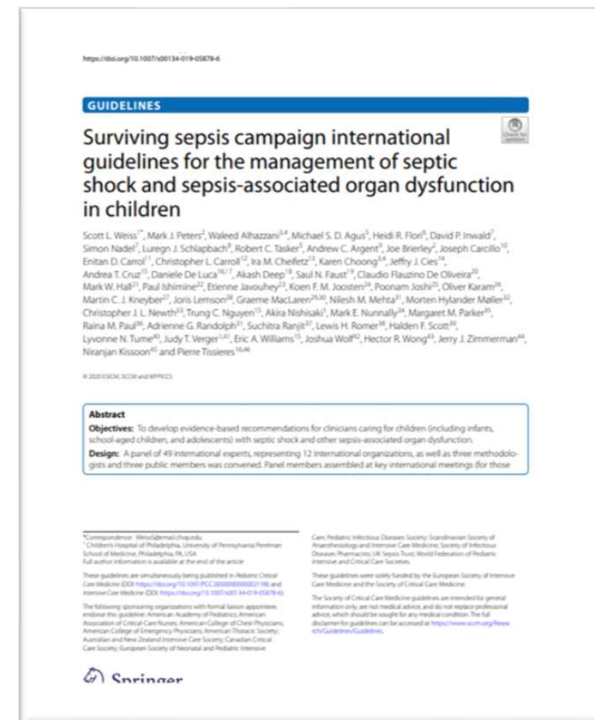
Background: Pediatric Sepsis

- The 2020 Surviving Sepsis Campaign (SSC) recommended starting antimicrobial therapy within the first hour of recognition for children with sepsis



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GUIDELINES

Surviving sepsis campaign international guidelines for the management of septic shock and sepsis-associated organ dysfunction in children

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Abstract

Objectives: To develop evidence-based recommendations for clinicians caring for children (including infants, school-aged children, and adolescents) with septic shock and other sepsis-associated organ dysfunction.

Design: A panel of 49 international experts, representing 12 international organizations, as well as three methodologists and three public members was convened. Panel members assembled at key international meetings (for those

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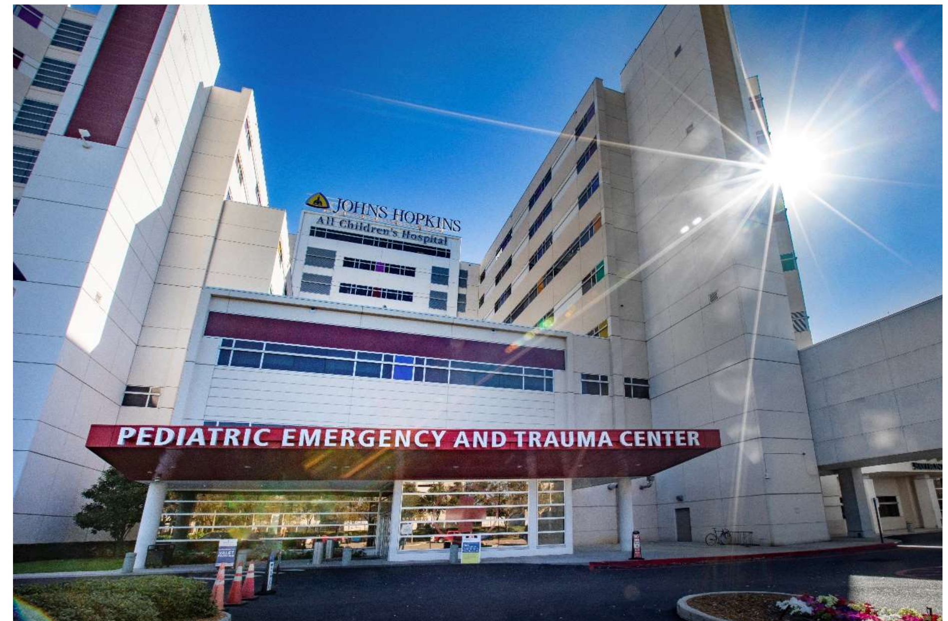
Background: Our Hospital

- Large Academic Pediatric Hospital
  Pediatric Emergency Center
  - About 45,000 patients per year
  - 13 Physicians
  - 7 APPs
  - 57 Full Time Nurses



Objective

- This effort sought to use the Lean Six Sigma (LSS) improvement framework to
  - Implement evidence-based practice recommendations
  - Reduce delays in delivery of antibiotics
  - Reduce variability and improve consistency in outcomes

- AIM: Increase the proportion of "sepsis alert" patients who get antibiotics within a target of 60 minutes or less from the onset of sepsis. Goal is for 77.3% to 85%.

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Design & Methods

Share

Using Lean Six Sigma (LSS) methodology as a framework for improvement:

- Multidisciplinary stakeholder team formed:
  - ER Providers
  - Hospitalists
  - Pharmacists
  - Nurses
  - Data Analysts
  - Project Managers
  - Lean Six Sigma Black Belt

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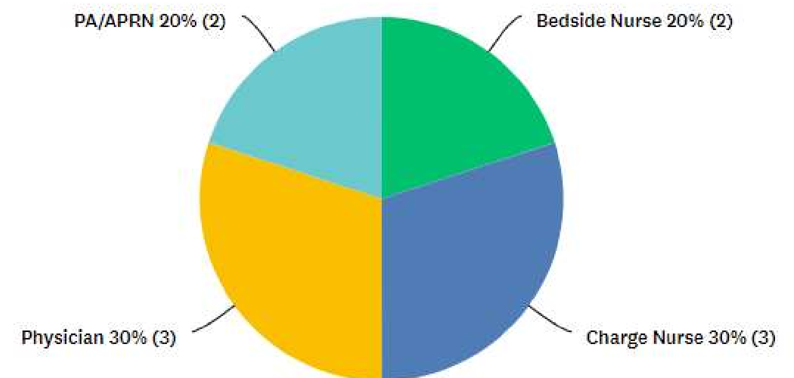
Design & Methods: Define

- Define Key Metric
- Review Current Data
- Review Current Process Map
- Staff surveys to get “Voice of the Customer”
- Virtual GEMBA walk
- Fishbone Analysis

Question: Triage Nurses, Who Do You Notify First For Sepsis Score 3 Or Greater?



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Design & Methods: Key Metric

- “Sepsis Onset” was defined using Improving Pediatric Sepsis Outcomes (IPSO) definitions of “Time Zero”
- Clinically Derived Time Zero (CDTZ) is via chart review which identifies physiological onset of sepsis using Goldstein’s criteria

GOLDSTEIN’S SEPSIS CRITERIA

*In order to meet criteria for Sepsis 1 abnormal measure out of the blue (left) columns must be met AND 1 abnormal measure from the green (right) columns.

	1 abnormal measure from these columns PLUS				1 abnormal measure from these columns	
Age Group	**Tachycardia (High HR)**	**Bradycardia (Low HR)**	**Respiratory Rate**	**Systolic Blood Pressure (SBP)**	**WBC/ Leukocyte count**	**Temperature**
0 days – 1 week	>180	<100	>50	<65	>34	>38° C Or <36° C
1 week - 1 month	>180	<100	>40	<75	>19.5 Or <5	>38° C Or <36° C
1 month – 1 year	>180	<90	>34	<100	>17.5 Or <5	>38.5° C Or <36° C
2 - 5 years	>140	NA	>22	<94	>15.5 Or <6	>38.5° C Or <36° C
6 - 12 years	>130	NA	>18	<105	>13.5 Or <4.5	>38.5° C Or <36° C
13 to <18 years	>110	NA	>14	<117	>11 Or <4.5	>38.5° C Or <36° C

Less than 3 months old >38 qualifies as a fever

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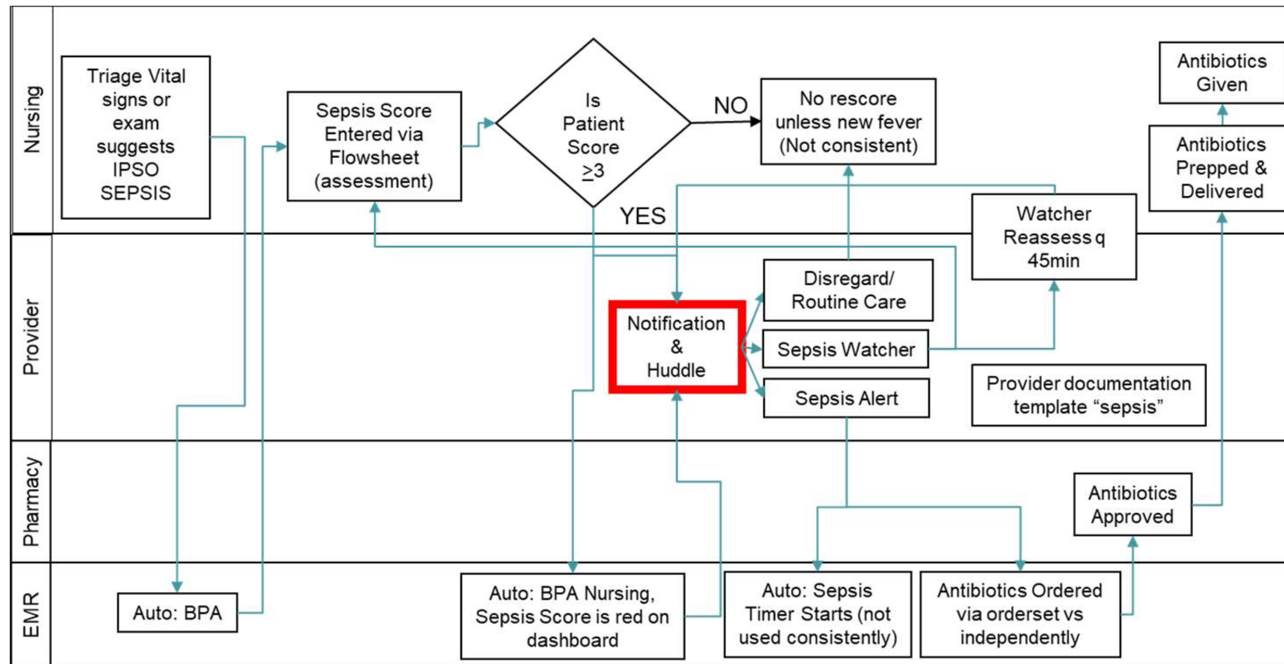
Design & Methods: Process Map



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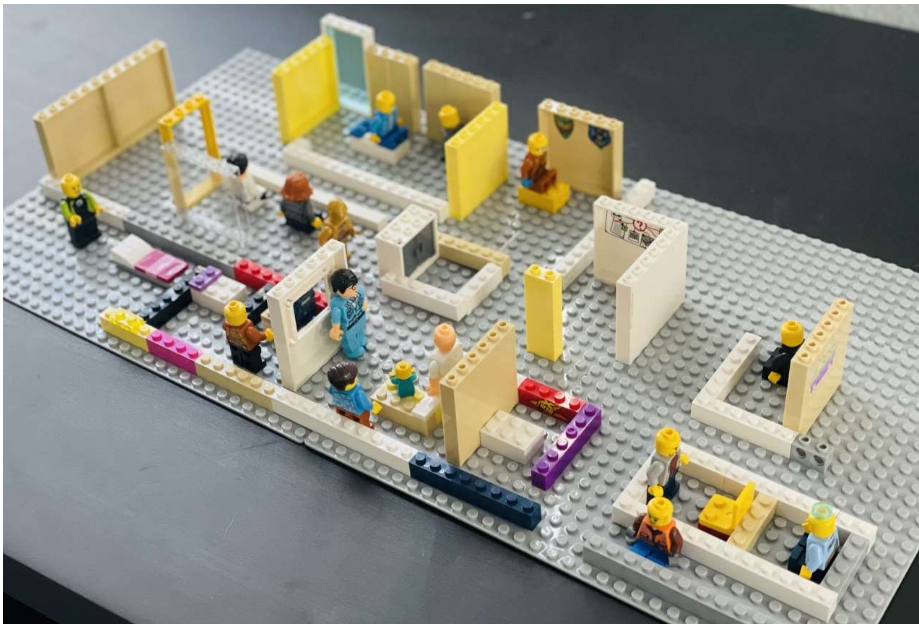
Design & Methods: Virtual Gemba



- Gemba: Japanese term for “actual place”
- Refers to the shop floor or space where value-creating work actually occurs
- February 2021 We still had COVID restrictions which meant it had to be virtual
- Legos provided a way to simulate a Gemba walk

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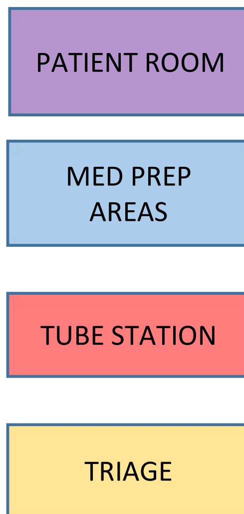
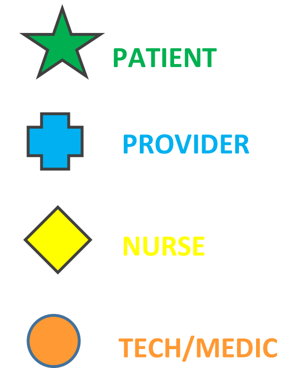
Design & Methods: Virtual Gemba

Main ER Layout





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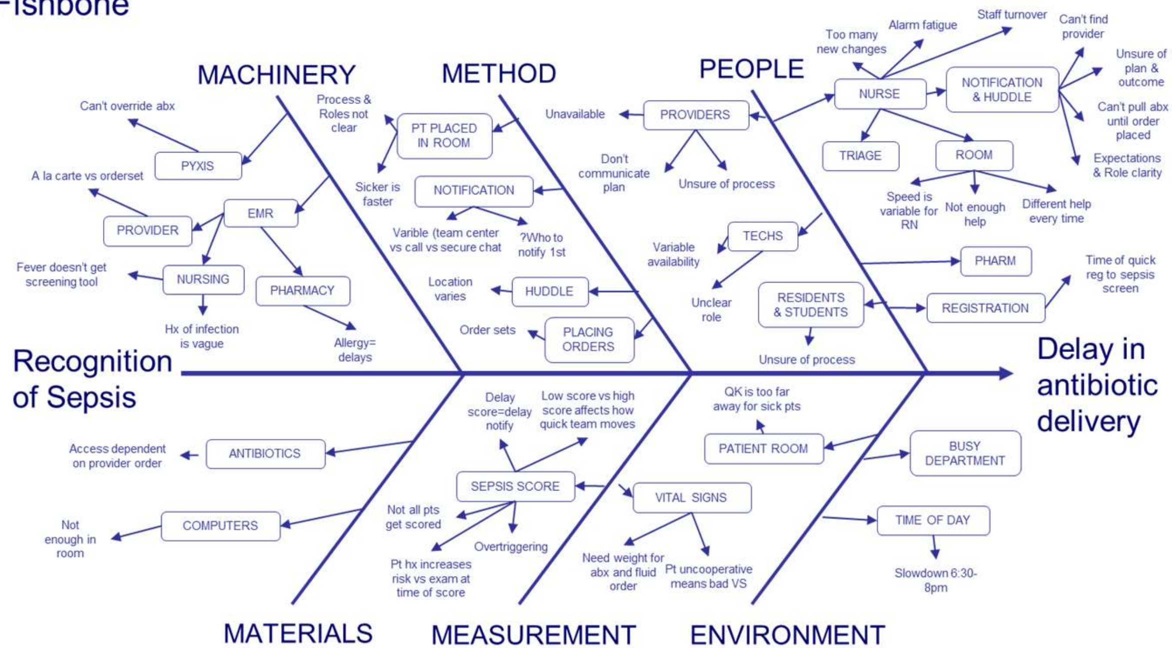
Design & Methods: Fishbone



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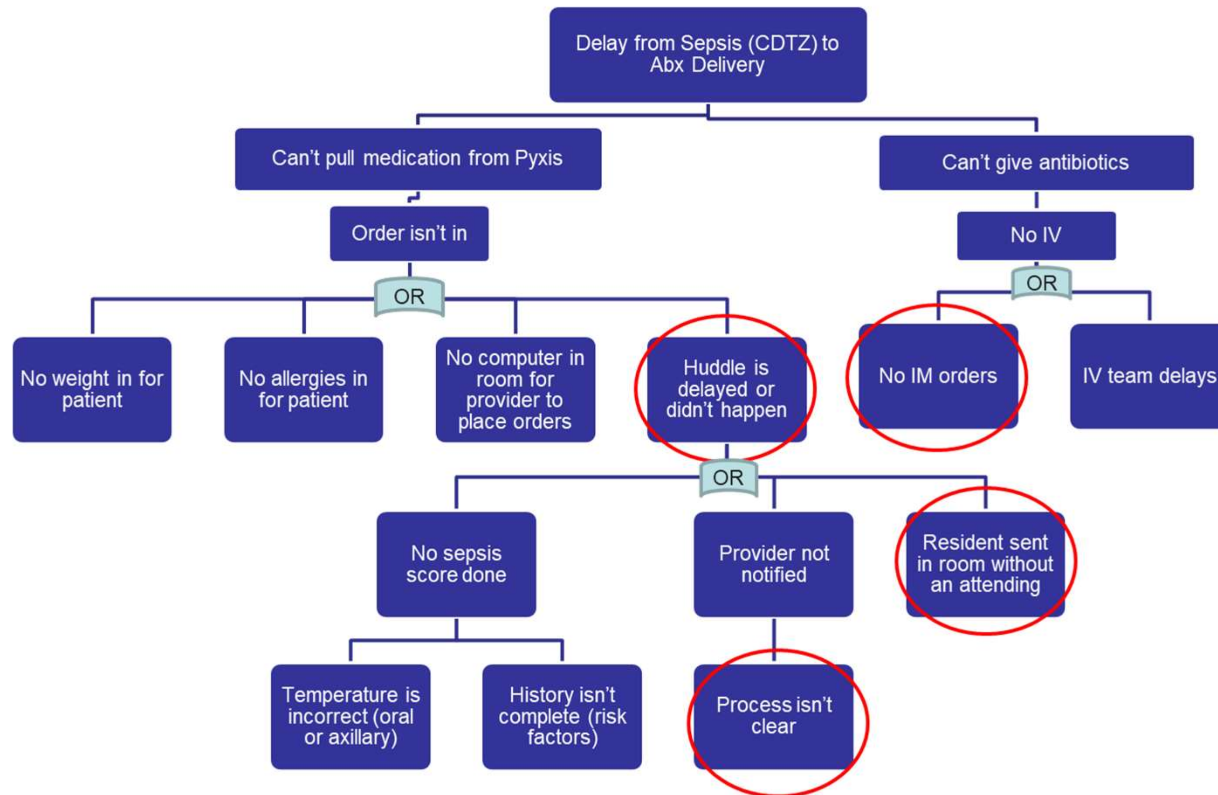
Design & Methods: Fault Tree



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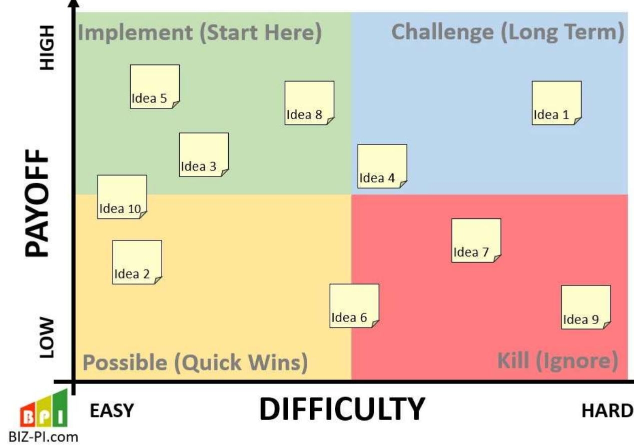
Design & Methods: Analyze

Identify the most impactful change

Affinity Diagram

PICK Chart



Cause & Effect Matrix

		Rating of Importance to Project (low 0- high 10)	10	6	7	6	2	10	2		
			1	2	3	4	5	6	7	8	
	Process Step	Process Inputs	BX <60 min	Reduces Variability	Meets Frontline Team Needs (Buy In)	Can be applied when busy or understaffed	Reduces Hospital Days (Increasing Hospital Free Days)	Reducing Mortality	Uses Fewer Resources		Total
	Scoring & Recognition	Help teams recognize sepsis by xxx (educate?mock scenarios? Modules?)	9	9	9	9	3	9	0		357
1	Clinical Pathway	Clarifying Antibiotic choice (stewardship)	9	9	9	3	9	9	1		335
2	Sepsis Alert Notification	Clarify Notification Process	9	9	9	9	3	3	1		299
3	Process after sepsis recognized & score is assigned	Clarify the process & roles after score assigned	9	9	9	9	3	3	0		297
4	Others	Pt has poor IV access (give patients IM meds)	9	9	9	9	1	1	0		273
5	EMR/Orderset	Add better computer access to place orders	9	9	9	9	0	0	0		261
6	EMR/Orderset	Get rid of limitations/hard stops delay time (port acess, weight	9	9	9	9	0	0	0		261
7	Pharmacy	Fix Pyxis Delays	9	9	9	9	0	0	0		261
8	Others	Address ED Specific Delays (time of day, shifts) Staffing to increase needs	9	3	9	9	1	1	0		237

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Design & Methods: Improve

2 Clear Themes:
- **Unclear huddle process**
- **Lack of communication**

- The team agreed to create a Standardized Huddle Process
- September 2021 to June 2022, two Plan Do Study Act (PDSA) cycles were implemented followed by a control phase.

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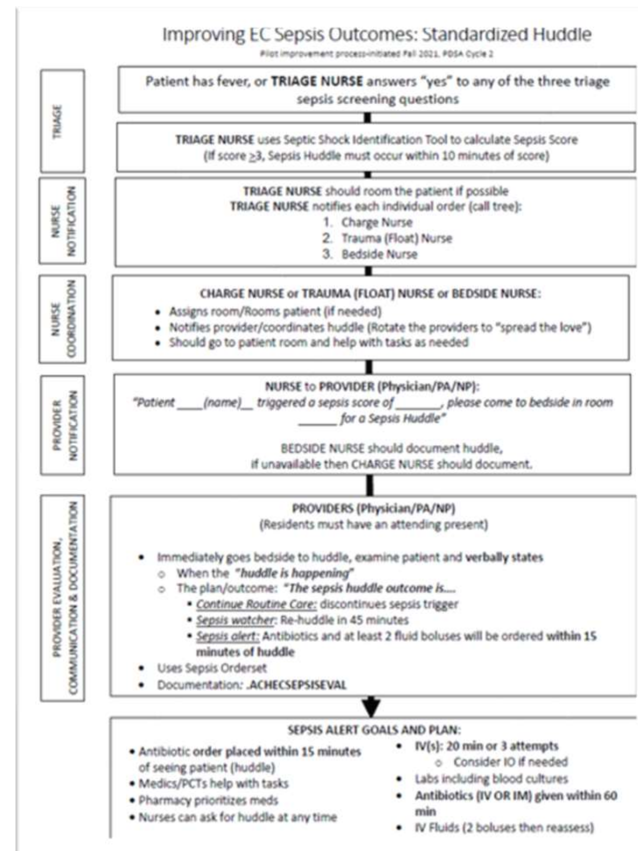
Standardized Huddle Process

A visual diagram was created:

- Improve workflow
- Role clarity
  - Charge Nurse
- Scripting for better communication
- Set timeliness goals for
  - Huddles (10 min from screen)
  - Antibiotic orders (15min)
  - IV access goals (20min/3x)



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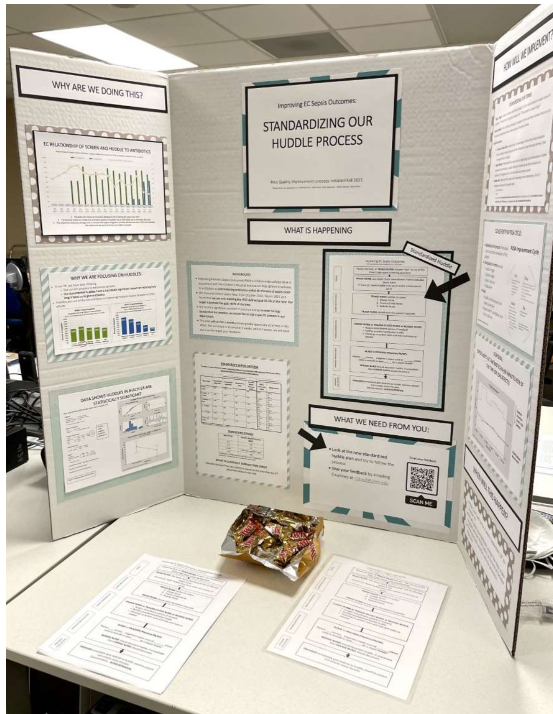
Standardized Huddle Process



Education:

- Division Meetings
- One on one discussions in real time with frontline staff
- Informational Poster in the team center
- Asked questions about barriers and challenges

Other Efforts:

- Sepsis data sent to teams biweekly
- Kudos given to those who met target

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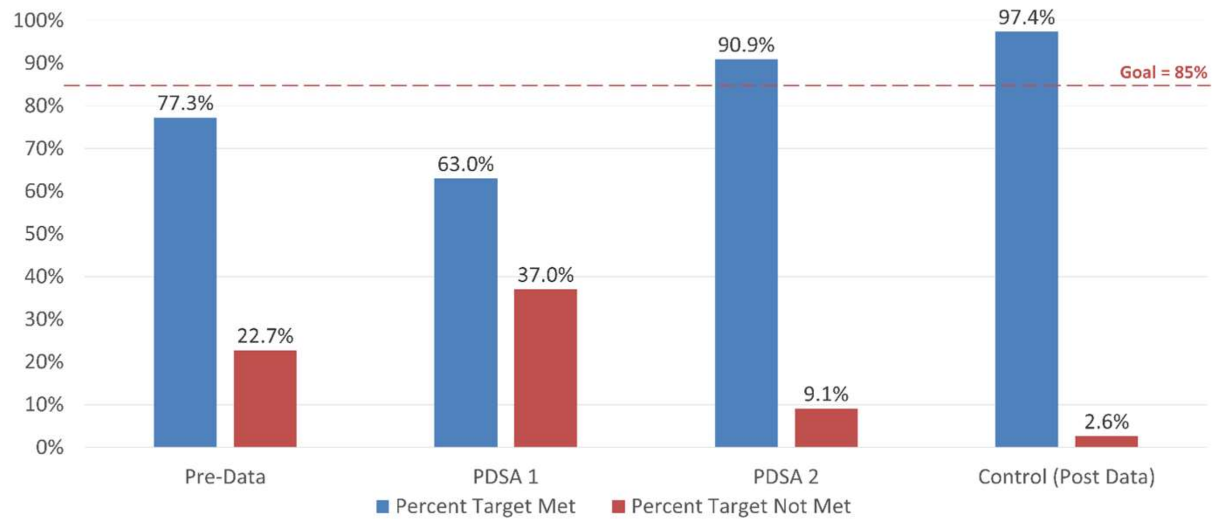
Results



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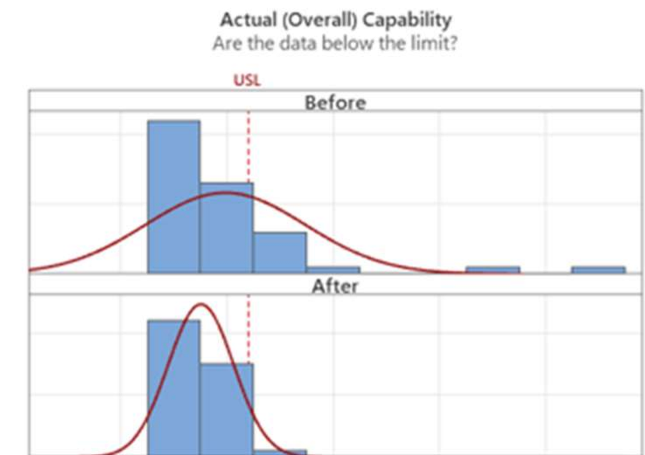
Results

- Fisher exact testing of pre versus post implementation data showed we met target 97.4% of the time (p = 0.009), above our goal of 85%.
- Capability comparison of the pre-data and control phase showed the process standard deviation was significantly reduced (p=0.047) with a reduction in the average time in minutes from recognition to antimicrobial administration from 49.2 minutes to 37.7 minutes.



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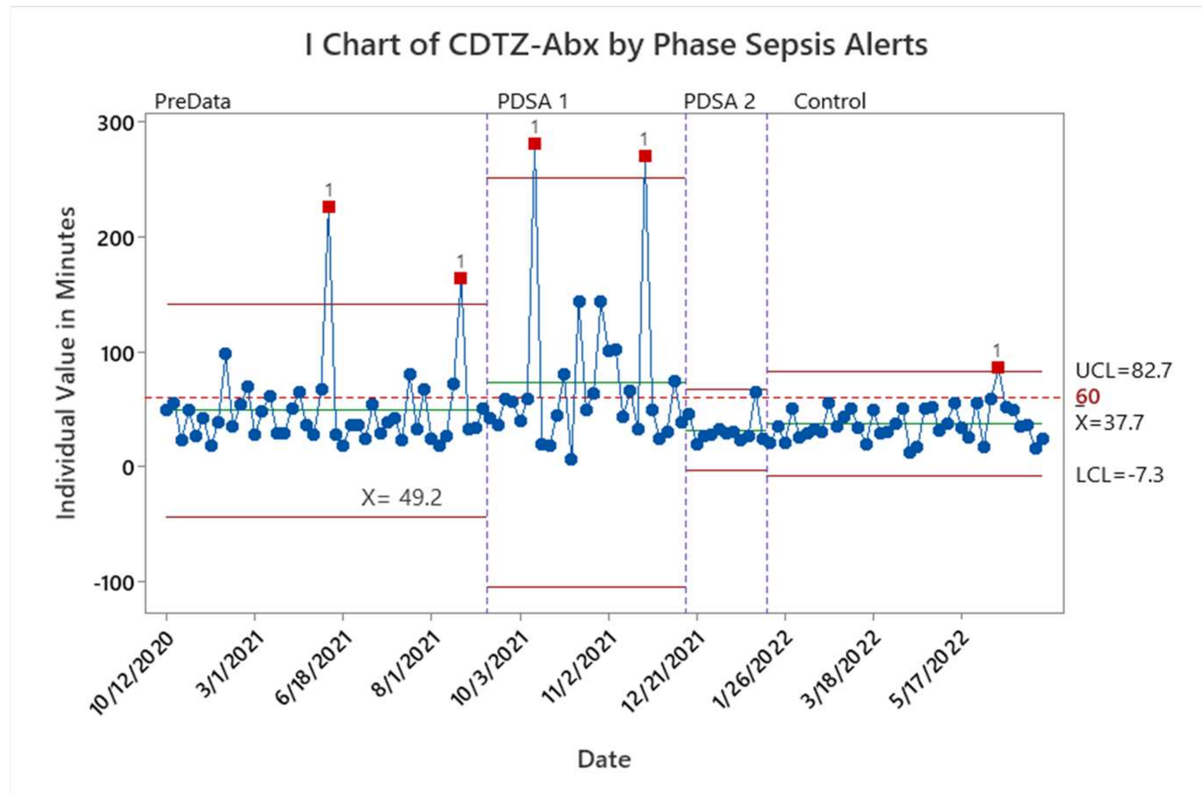
Results: Control Chart



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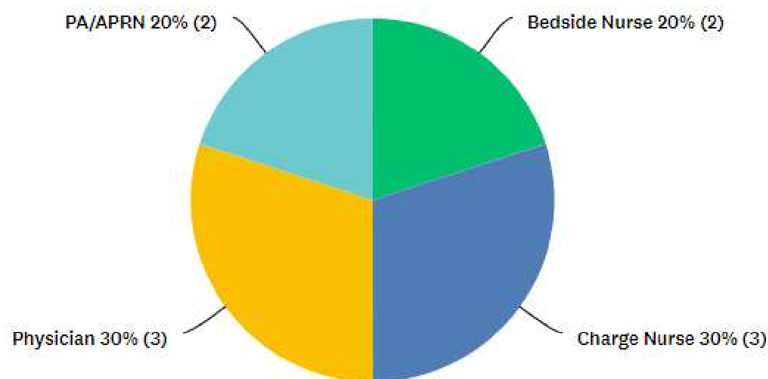
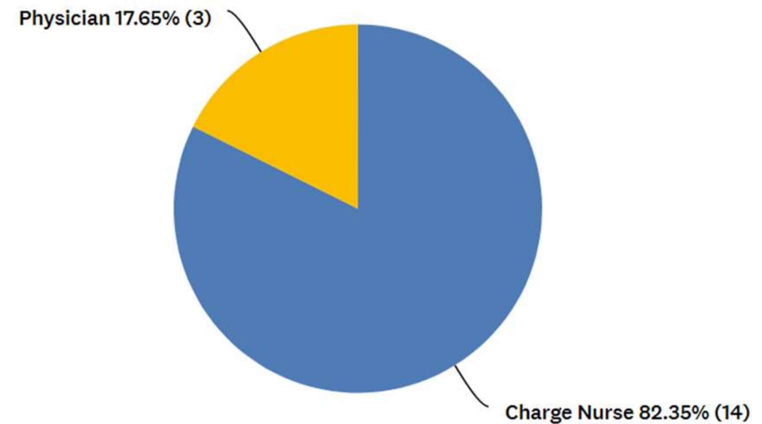
Results

Question: Triage nurses, who do you notify first for sepsis score 3 or greater?





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Conclusions

- Quality improvement methodologies enabled our team to significantly reduce variability in practice in effort to implement evidence-based recommendations for pediatric sepsis patients.
- Incorporating feedback from a multidisciplinary team provided insights and detailed perspective of root causes which directed our focus on standardizing the huddle process and improving communication between nurses and providers

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Conclusions

Thank You

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