Improvement Targets for Hospital-Acquired Sepsis

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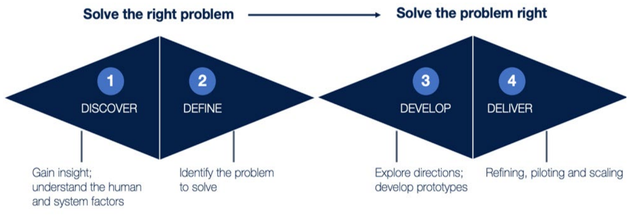
Learning Objectives

- Identify human behavior factors that contribute to sepsis-related care management among clinical care teams.
- Develop tools that effectively and efficiently aid in the early identification of hospital-acquired sepsis (HAS) and support its clinical management.

Background and Motivation

- Sepsis is the most common hospital-acquired infection and the costliest complication for hospitals in the U.S.[1]
- One-fifth of sepsis cases are hospital-acquired sepsis (HAS)(UCSF internal reporting), resulting in more than 100 deaths per year at our institution.
- Prior efforts to improve sepsis outcomes have included deploying alerts in the electronic health record (EHR), enhancing reporting infrastructure, and conducting case reviews and root-cause analyses to support early recognition and treatment of sepsis in adult patients. These efforts have largely been on a case-by-case basis and mostly for community-acquired sepsis.
- A system-level understanding of the current state of HAS is often opaque. In response, the UCSF Sepsis Collaborative was formed and has used human-centered and service design principles to uncover care gaps and opportunities at a system-wide level to tackle HAS.

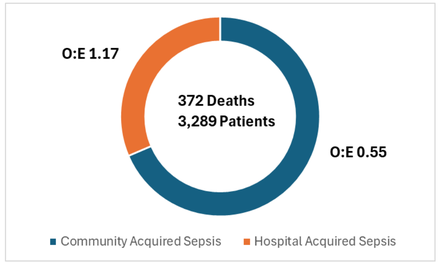
Service Design Principles



- The Sepsis Collaborative utilized a combination of quantitative and qualitative methods to discover key drivers and create solutions to improve sepsis identification, treatment, and management of HAS.
- Enhancements were made to the EHR considering the end user and including relevant clinical data.

Data Discovery: Findings from Our Local HAS Registry

- Vizient definition of HAS was used to identify the patient cohort.
- During FY23, **Observed to Expected (O:E) mortality index was higher** in those with HAS than those with community-acquired sepsis (Figure)(Vizient Clinical Database).
- Current version of sepsis Best Practice Alerts (BPAs) for HAS were being cancelled **50-85%** of the time (Tables).



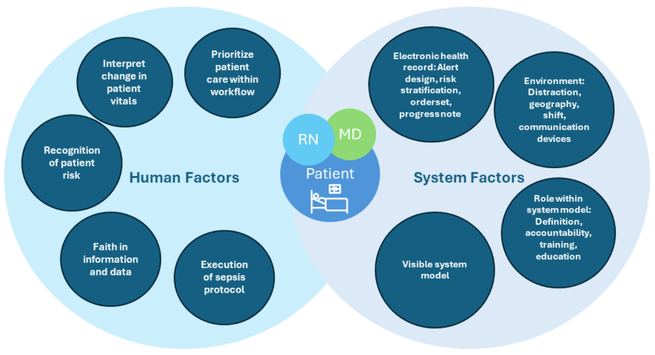
Provider

Reason	Count of Records	% of Records
0	4	0%
Accept BPA (No Action Taken)	145	1%
Activity Link	107	1%
Cancel BPA	9,734	85%
Currently being treated for Sepsis	798	7%
Defer to primary team	640	6%
NULL	11	0%
Grand Total	**11,439**	**100%**

Nurse

Reason	Count of Records	% of Records
0	7	0%
Accept BPA (No Action Taken)	54	0%
Activity Link	258	2%
Cancel BPA	5,549	50%
Chart Review/Audit Currently being treated for Sepsis	933	8%
Deferred Known Condition or Activity	275	2%
NULL	2	0%
	3,820	35%
	121	1%
Grand Total	**11,019**	**100%**

Human and Systems Factors Analysis



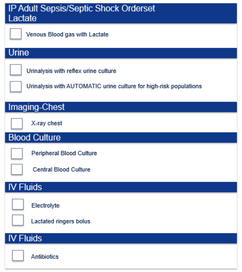
Intervention: Sepsis Activation and Management Solutions

Streamlined Sepsis BPA – In Pilot Phase

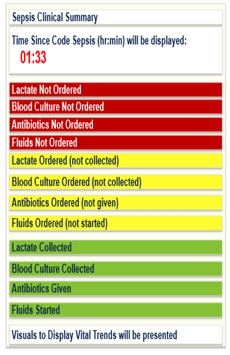
- Streamlined the number of clicks required to acknowledge the BPA.
- Linked acknowledgment reasons to a standardized BPA silencing time.

Modified Sepsis Order-set – In Pilot Phase

- Reprioritized items to improve order-set navigation and workflow.
- Consolidated disparate orders together for efficiency.
- Added direct link to order-set within BPA to support clinical management.



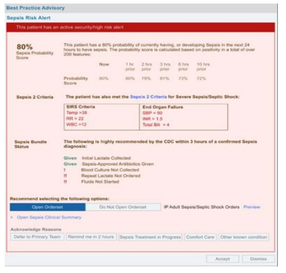
Implemented Sepsis Clinical Summary- In Pilot Phase



- Includes sepsis clock to encourage timely bundle compliance.
- Provides trends over time in relevant sepsis clinical data (i.e., vital signs, laboratory values).
- Provides a visual display of bundle compliance elements and completion status.
- Displays in a side panel of the EHR screen and is always visible.

Developed a machine learning based Early Sepsis Risk Predictor – In Beta Testing

- Model will display the probability that the patient will meet sepsis criteria.
- Eliminates redundant alerts through the conditional layer.
- Includes buttons to allow the provider to take early clinical action.



Lessons Learned

- Early engagement with key clinical partners & decision-makers is necessary for a successful intervention roll-out.
- Given the need for provider and nurse coordination for sepsis management, ensure that there is consistency between workflows.
- Traditionally, sepsis reporting is completed after a patient is discharged, making it difficult to monitor and improve sepsis management progress in real-time. Better real-time data availability is required to understand the current state of sepsis and improve patient care.
- Data validation is a critical step in creating a high-quality sepsis registry and understanding the relationship between when the BPA is triggered and its management.
- Early analysis showed variation not only in sepsis prevalence and mortality but also in sepsis management among different patient populations, making it important to streamline care to reduce inconsistency.

Key Takeaways

- The current version of the sepsis BPA was being canceled or ignored frequently, leading us to redesign the sepsis alert and orders to make it more user-friendly and drive practice.
- Visual cues (i.e., trend data, bundle compliance progress, sepsis clock) may further reinforce timely sepsis bundle compliance.
- New methodologies in clinical informatics, including artificial intelligence, may provide novel opportunities to improve sepsis identification and management strategies.

Reference

1. Balch B. Sepsis is the third leading cause of death in U.S. hospitals. But quick action can save lives. AAMC.org. Published October 10, 2023. Accessed February 12, 2024. http://www.aamc.org/news/sepsis-third-leading-cause-death-us-hospitals-quick-action-can-save-lives#:~:text=It.

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