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### Using Interprofessional Collaboration to Reduce CLABSI Rates in an Intensive Care Setting

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## BACKGROUND

- Central line-associated bloodstream infections (CLABSI) are preventable hospital-acquired infections associated with increased morbidity and mortality, and cost.<sup>1</sup>
- CLABSIs are the most expensive healthcare-associated infection (HAI) with a cost upwards of \$90,000 per infection. This cost does not account for increased length of stay or future readmissions.<sup>2</sup>
- The criteria used to define CLABSIs in an acute care setting is based on the Centers for Disease Control and Prevention's National Healthcare Safety Network (NHSN) definitions.<sup>2</sup> An infection window period (IWP) is used to review infection criteria to meet the surveillance definition. This is defined as a 7-day period, which includes the 3 calendar days before and after the first positive diagnostic test (Table 1).
- If no secondary sources are identifiable as a cause of the bloodstream infection (BSI) within the IWP, it will qualify as a CLABSI based on the NHSN definition.<sup>2</sup>

**Table 1: Example of Infection Window Period**

3 Days Before			Date of Event	3 Days After		
1-Jan	2-Jan	3-Jan	Positive culture	5-Jan	6-Jan	7-Jan

Healthcare organizations are encouraged to adhere to evidence-based central line (CL) insertion and maintenance practices to reduce infection, which include:<sup>1</sup>

- Adherence to hand hygiene practices
- Insertion bundles
- Maintenance bundles
- Removal of CL when they are no longer indicated

Despite improved compliance with these infection prevention interventions, the surgical intensive care unit (SICU) at Henry Ford Hospital (HFH) continued to experience high CLABSI rates in 2019 and 2020.

## AIMS

Using an interprofessional proactive approach, this project's goal was to reduce the number of NHSN reportable CLABSIs by identifying at-risk patients and clinically assessing for alternative infection sources.

## METHODS

An interprofessional team formed to better understand the occurrence of CLABSI on the surgical intensive care unit (SICU).

The team included:

- Unit Medical Director
- Infection Prevention Specialist
- Clinical Nurse Specialist

Multiple opportunities were identified when reviewing root cause analysis data:

- Care team documentation
- Assessments for alternative infection.
- Verification of blood culture indication following HFH Blood Culture Stewardship Guidelines

IRB approval and a waiver of informed consent were obtained.

- The interprofessional team (Figure 1):
  - Completed daily chart audits on patients with central access
  - Screened patients for blood culture collection and result status
  - Verified blood culture indication using the HFH Blood Culture Stewardship Guidelines
  - Established an IWP and reviewed medical record for infection source once blood cultures were collected
  - Shared findings with interprofessional team via secure messaging
  - Communicated potential gaps with the patient care teams, which included collaborative efforts regarding the treatment plan and proper documentation of clinical findings

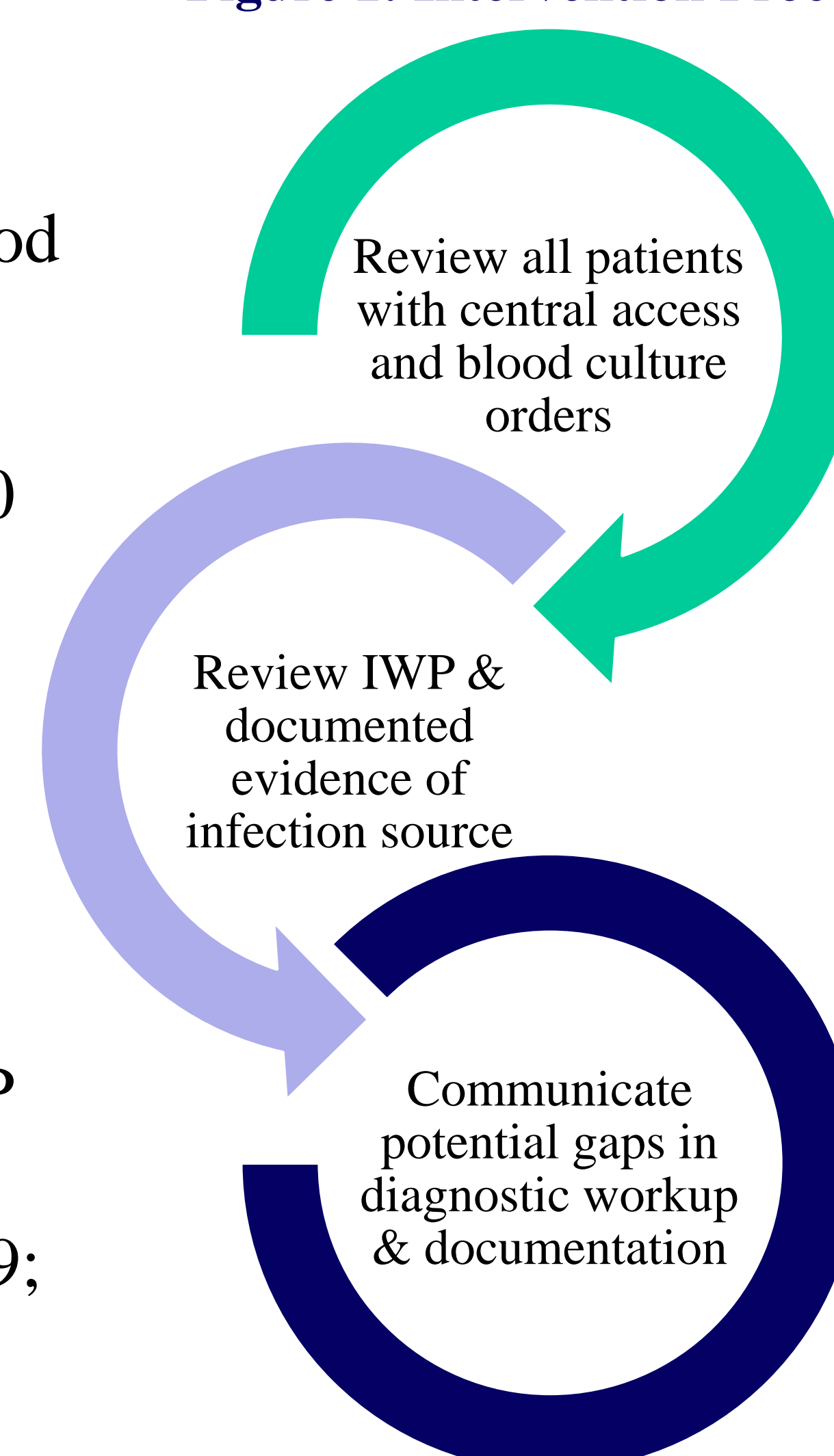
This proactive approach ensured supporting evidence was present to meet NHSN definitions for secondary BSI to avoid CLABSIs

- This quasi-experimental retrospective study compared data from the pre-intervention period (January 2019 to January 2021) to the intervention period (March 2021 to December 2022):

- CLABSI rate per 1,000 CL days
- Blood culture order rate per 1,000 CL days
- CL utilization ratio per 1,000 patient days
- Standardized infection ratio

- The t-test was used to compare the continuous variables and was determined statistically significant if  $P < 0.05$ . All analyses were performed using IBM SPSS Statistics (Version 29; Armonk, NY).

**Figure 1: Intervention Process**



## RESULTS

- After implementation, the interprofessional team identified alternative sources of bloodstream infection in 37 patients (17 in 2021 and 20 in 2022) with qualifying central access and positive blood culture.
- When comparing pre- and post-intervention periods, significant reductions were made (see Table 2). This included an 82% reduction in CLABSI rates, resulting in an estimated \$1.6 million difference in healthcare costs.<sup>2</sup>

**Table 2: Pre- and Post-intervention Data**

Metrics	Pre-Intervention	Post-Intervention	Reduction	P-value
CLABSI rate per 1000 CL days	1.78	0.33	82%	<0.001
Standardized infection ratio	1.469	0.279	81%	0.001
Blood culture order rate per 1000 CL days	311	207	33%	<0.001
CL utilization rate per 1000 patient days	570	471	17%	<0.001

## DISCUSSION

This project demonstrates that an interpersonal team reviewing potential CLABSIs and identifying alternative sources of BSI can decrease CLABSI rates, improve patient management and lead to better outcomes. In addition to being a safe and effective approach, this intervention had the additional benefit of cost savings for the health system. Healthcare institutions should consider implementing this intervention to reduce unnecessary CLABSI rates, as well as cost.

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