

## Background & Aim

Blood culture contamination is a common, yet underrecognized, adverse event within emergency departments (ED). Through root cause analysis, this project identified barriers to using standardized blood culture collection techniques in the TJUH (Thomas Jefferson University Hospital) ED.

After incorporating our proposed interventions, we aim to reduce the percentage of contaminated blood cultures to <3% in the following quarterly cycle (3-month time span). Stakeholders include patients, emergency department nurses and physicians, phlebotomist, patients, and the microbiology department.

## Baseline Metrics

On a national scale, blood culture contamination results in nearly 1 million extra hospital days, 200,000 courses of unneeded antibiotics, and over 1 billion dollars of excess cost in the United States.<sup>1</sup>

The Centers for Disease Control and Prevention established a national benchmark for blood culture contamination rates of <3%.<sup>1</sup> As seen below, the TJUH ED has been consistently over the 3% contamination rate over the last 3 cycles. The remainder of the hospital has remained below 3%.

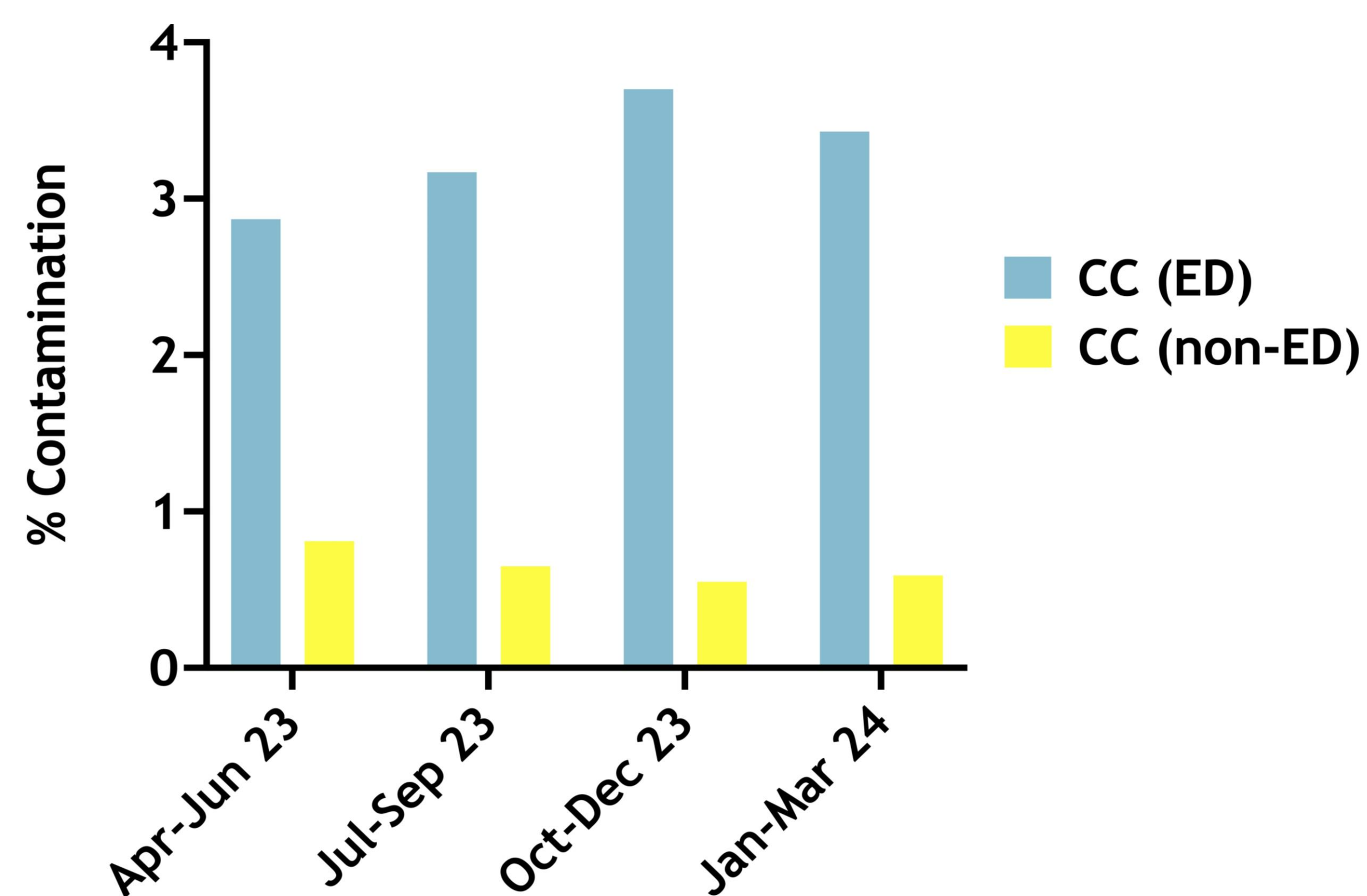


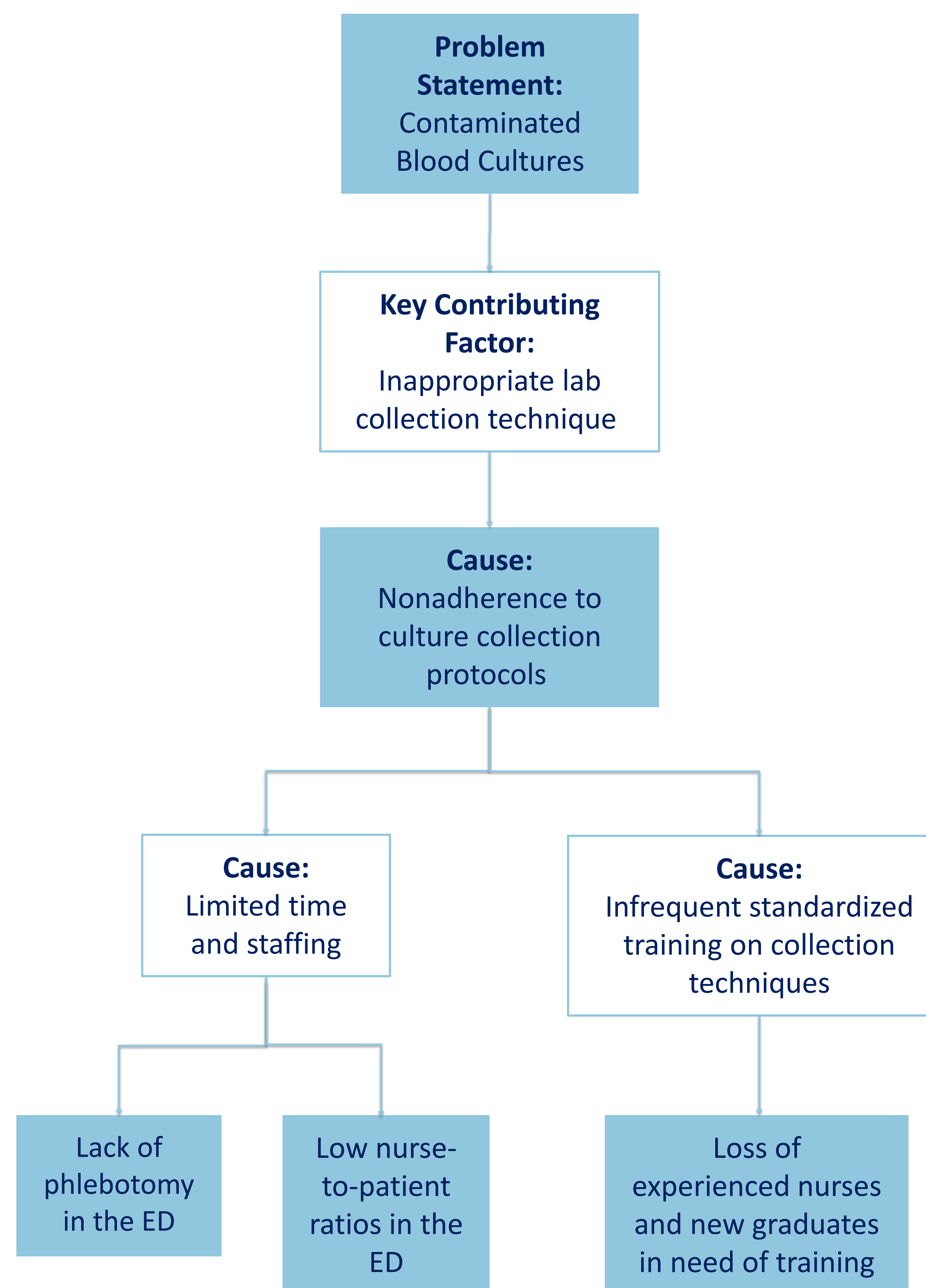
Fig 1. Percent of contaminated blood cultures per quarter in the TJUH Center City (CC) ED vs. remainder of the Center City Hospital (non-ED). Data provided by the TJUH Clinical Microbiology Laboratory

1. Centers for Disease Control and Prevention. Core Elements of Hospital Antibiotic Stewardship Programs: Blood Culture Identification.

## Root Cause Analysis

A multidisciplinary team conducted a quality improvement and patient safety review of an adverse event within the TJUH ED in which contaminated blood cultures led to a patient receiving non-essential antibiotics, unnecessary hospital resources, and multiple admissions to monitor for culture clearance.

The diagram below is a root cause analysis of this event.



## Challenges & Lessons Learned

- Epic does not require users to document blood culture collection sites, collection technique, or quantity of blood drawn, all of which are crucial to reducing the rate of contamination
- TJUH ED would benefit from more frequent and standardized blood culture collection training
- Contaminated cultures lead to unnecessary hospital admissions and utilization of resources leading to increase healthcare costs
- Contamination rates in the ED are several fold higher than non-ED settings, which our root cause analysis suggests can be significantly improved by following appropriate lab collection technique and protocols.

## Interventions & Future Directions

- Retrain all TJUH ED nursing staff on standardized collection techniques provided by the CDC. Require EPIC documentation on how blood cultures were collected
- Distribute blood culture collection kits containing needles, alcohol swabs, collection tubes, and visual instructions to save nurses the time needed to collect materials
- 3 months after implementing the interventions, calculate the quarterly percent of contaminated cultures to evaluate if our goal of <3% was achieved
- If rate remains >3%, epic documentation from contaminated cultures will be used to complete a Plan-Do-Study-Act analysis and adjust interventions to better fit the needs of nursing staff

## Linkage to Healthcare Equity

The TJUH ED serves a patient population of a disproportionately lower socioeconomic status with increased housing, food, and financial insecurity compared to the general population.

These patients are more susceptible to the negative impacts of blood culture contamination, such as unnecessary use of antibiotics, repeat blood draws, and readmissions.

We aim to minimize costs and increase healthcare value to provide equitable care to all patients.