

Sterile blood culture collection kit for reducing blood culture contamination at healthcare institutions

Summary

Clinicians at Vanderbilt have developed a sterile kit to collect blood cultures that results in substantially fewer contaminated cultures compared to the current standard of care for collecting culture specimens.

Addressed Clinical Need

Blood cultures are performed tens of millions of times annually in the U.S. Blood cultures serve as diagnostic tests for bloodstream infections. They help clinicians select optimal antibiotics and determine the severity of a patient's infection. However, a significant limitation to blood culturing is the high frequency of specimen contamination with bacteria that normally live on patients' skin. Contaminated specimens cause false positive culture results and lead to unnecessary patient morbidity and healthcare costs due to unneeded antibiotics, unnecessary admissions and emergency department visits, and increased hospital lengths of stay. Clinical and Laboratory Standards Institute (CLSI) recommends that healthcare institutions maintain a blood culture contamination rate of less than 3%, but achieving this level, particularly in the emergency department can be challenging.

Technology Description

A sterile blood culture collection kit and the associated quality improvement processes were developed that can reduce the number of culture specimens that are contaminated. This kit and processes were developed based on a two part quality improvement study, where researchers analyzed the entire blood collection process and identified numerous contributing factors in five broad categories. On the second part of the study, a sterile blood culture kit and a 10-point checklist for use at the time of culture collection was developed.

Implementation of this intervention led to an immediate and sustained reduction of contamination from 4.3% (n= 7,389) to 1.7% (n= 6,590) in an emergency department setting over 48 weeks (Self et. al, 2013).

In a pediatric emergency setting, the implementation of a standardized process for sterile insertion of a peripheral IV catheter to draw blood specimens resulted in a significant decrease in the percentage of cultures contaminated from 3.9% in the preintervention period to 1.6% in the postintervention period with yearly estimated savings of \$250 000 in hospital charges. (Hall et al., 2013)

Technology Features

- » Provides a strategy for collecting blood cultures that mitigates false positives
- » Provides a kit with necessary and familiar elements to collect blood
- » Provides a method that minimizes contamination based on strict attention to sterile technique
- » Minimally interferes with normal workflow
- » Significant net savings from lower long-term costs due to a reduction in the number of contaminated cultures

Technology Development Status

- » Sterile blood collection kit and web based educational modules have been developed and used in clinical research
- » Self WH, et al., Reducing Blood Culture Contamination in Community Hospital Emergency Departments: Multicenter Evaluation of a Quality Improvement Intervention. *Academic Emergency Medicine*, in press, 2014
- » Self, WH., et. al., Reducing Blood Culture Contamination in the Emergency Department: An Interrupted Time Series Quality Improvement Study. *Academic Emergency Medicine*, (2013) 20: 89–97
- » Hall RT, et. al., Reducing the blood culture contamination rate in a pediatric emergency department and subsequent cost savings. *Pediatrics*. 2013 Jan;131(1):e292-7
- » Multicenter Blood Culture Quality Improvement Trial: <http://clinicaltrials.gov/show/NCT01413555>
- » We are seeking a licensing partner for commercialization

Intellectual Property Status

- » Pending U.S. utility patent application

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VU REFERENCE: VU11117

Link to Vanderbilt technologies available for licensing

