Don't Stick Me Again!

Reducing Blood Culture Contamination

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*** BEST *** EVIDENCE-BASED PROJECT

Background:

Blood culture contamination (BCC) is a significant problem in the emergency department (ED) setting. False positive blood culture results are associated with unnecessary treatment and increased costs. Many patients with false positive cultures receive empiric broad-spectrum antibiotic therapy, putting them at risk for complications such as Clostridium difficile infection and acute kidney injury, as well as additional diagnostic workup.[1] This additional treatment often results in longer hospital stays, increasing the risk of hospital-acquired infections including infections with multidrug-resistant organisms (MDROs).[2,3]

Objective:

Reduce false positive blood culture events in the ED

We initiated a trial of a novel blood sample collection device in an effort to lower BCC rates

- The **Initial Specimen Diversion Device** (ISDD), known as Steripath (Magnolia Medical Technologies, Seattle, WA), diverts and isolates the initial 1.5-2.0 mL of the blood sample, which is most likely to contain skin fragments and bacteria from the remaining sample, therefore reducing contamination.[4]
- Our ED implemented the ISDD into our regular blood culture sample protocol and tracked the results
- **Goal: Reduce ED BCC rate to below 1.7%**

Design:

Interventional trial of a new clinical protocol to reduce BCC in the ED.

Setting: Adult ED and trauma center in large metropolitan area. Prior to the start of the trial, this ED collected 14,434 blood cultures over 12 months with a BCC rate of 3.5%.

Participants/Subjects: All adult ED patients requiring blood cultures, except for patients with difficult vein access or who were excluded for other reasons per staff judgement.

Methods:

ED staff received training on the use of the ISDD to draw blood cultures. During the twelve-month trial period (10/24/2017 to 10/31/2018), the ISDD was the preferred blood culture collection method for most patients. Standard method (SM) was used to collect blood cultures from some patients with difficult vein access or other factors. Samples were labeled according to collection method, and contamination events were recorded.

Results:

A total of 13,599 blood cultures were obtained during the 12-month study period. 10,879 (80%) blood cultures were obtained using the ISDD method and 2,720 (20%) were obtained using SM. There were 90 contamination events in the ISDD group and 121 contamination events in the SM group. The 12-month BCC rate using the ISDD was 0.82% (90/10,879), compared to a rate of 4.44% (121/2,720) using SM method. The lowest monthly average BCC rate with ISDD was 0.3% (February 2018). The combined BCC rate (for all blood cultures collected using both methods) during the 12-month trial period was 1.5%.

Conclusions:

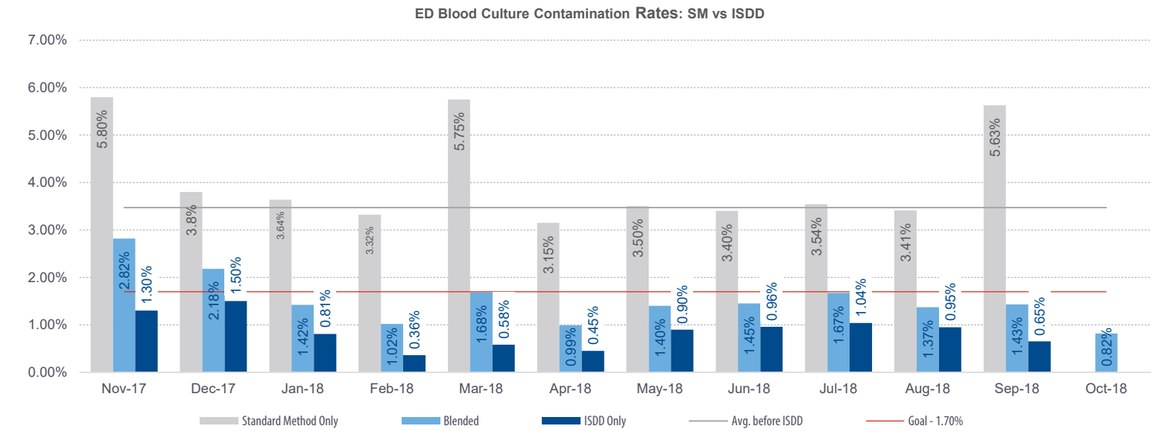
Implementation of the ISDD in the ED reduced the combined (ISDD and SM) 12-month BCC rate to 1.5%, a 57% decrease from the previous 12-month BCC rate of 3.5%. The ISDD contamination rate of 0.82% was a 76% decrease compared to the previous year at 3.5%. An estimated 259 fewer patients were impacted by false positive blood culture events during the trial period compared to the previous year. In the 12-month period prior to ISDD implementation, 433 patients with false positive blood culture results were admitted to the hospital for an average length of stay (LOS) of 5.93 days, one day longer on average than ED patients with negative blood cultures who were admitted during the same period (average LOS: 4.97 days).

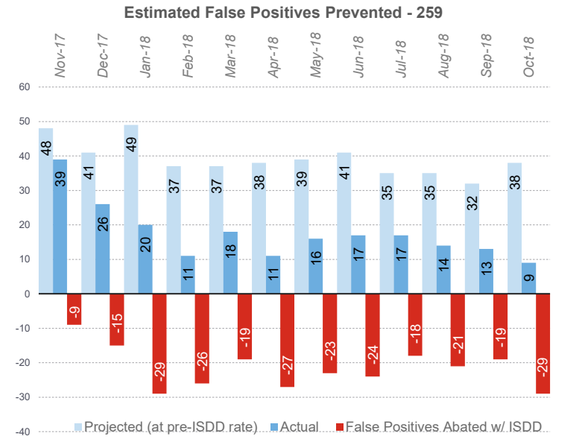
Implications:

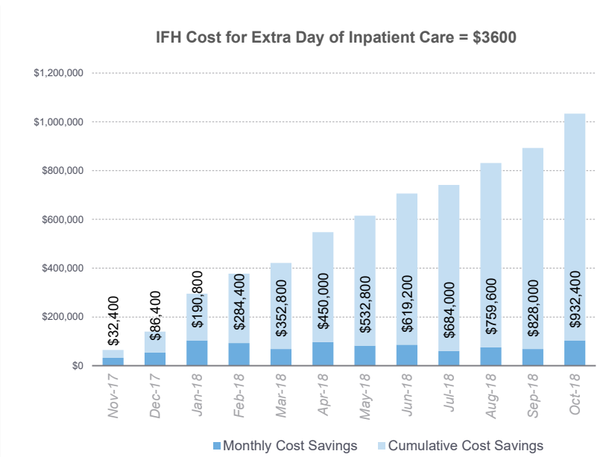
Reducing the number of patients with false positive results reduces the cost ($3,600/inpatient day at our institution) of additional hospital days and tests, as well as potential complications associated with unnecessary antimicrobial therapy. Reducing BCC promotes good antibiotic stewardship by decreasing the use of empiric broad-spectrum antibiotics that contribute to bacterial resistance. Based on the results from this trial, ISDD was implemented as standard practice in the ED (SM is still used for some patients).

Post Study Results:

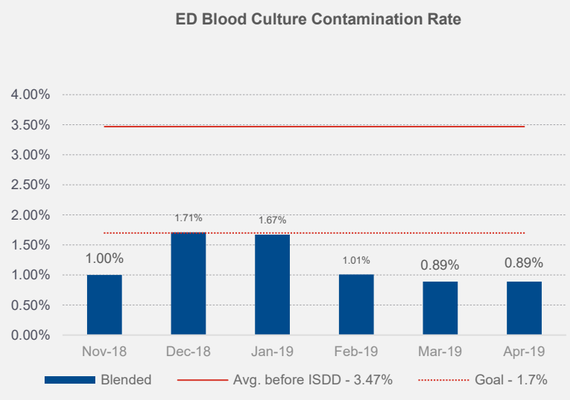
In the post-study period, the ED BCC rate has continued to decrease, remaining at or below 1.7%. During the three most recent months (Feb-April 2019), **the ED BCC rate has been below 1%.**

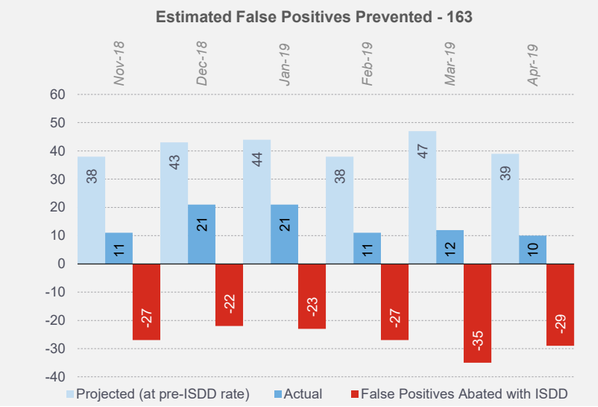






Post Study Results





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