



ER Pilot Leads to Hospital-wide Implementation of Blood Culture Device

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Clinical Significance

Blood cultures (BC) identify organisms of infection. False-positive BC lead to unnecessary antibiotic treatment, untoward consequences, extended length of stay, and increased costs.

Background

- Blood culture contamination (BCC) rate Gold Standard is 3% *
- Emergency Room (ER) collects 44% of all BCs
- BCC rate has remained greater than 3% despite training.
- Foundation for change based on Patton & Schmitt [2010] study.
- 80% of bacteria in first 5 dermal layers
- 20% of bacteria in biofilm
- Skin fragments and skin-residing bacteria reside in the initial 1.5-2.0 ml of a blood sample
- Skin asepsis a crucial concern
- Initial Specimen Diversion Device (ISDD) diverts initial 1.5-2 ml of blood sample and sequesters it away from remaining BC sample

*The American College of Pathologists, The American Society for Microbiology

Clinical Question

Would using an initial specimen diversion device to draw blood cultures decrease the BC contamination rates in the ER?

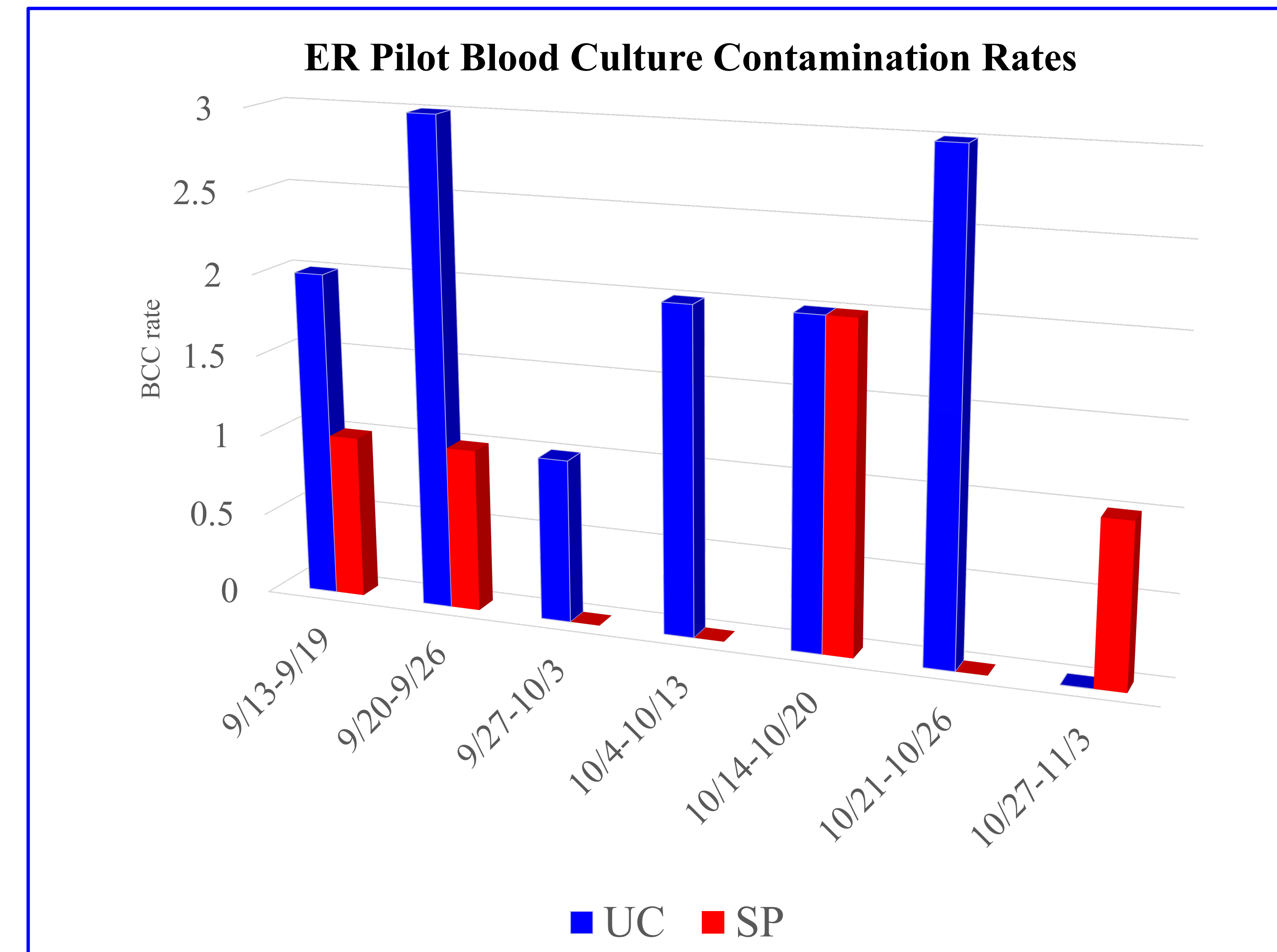
Description/Implementation Of Evidence Based Protocol

The ER Quality Improvement Committee decided to conduct a pilot study of the Initial Specimen Diversion Device (ISDD) implementation in the ER. Both the ISDD and the Usual Care (UC) methods were used to obtain BCs during the eight week study. Contamination events were recorded for each method to determine if use of the device decreased the rate of contamination events.

- All staff were trained on use of ISDD
- ISDD was used for all blood cultures collected between 0600 and midnight
- Usual care (UC) was used for blood cultures collected between midnight and 0600
- BCC data were collected for all BC drawn during the study period
- ISDD was later implemented hospital-wide, BCC data collected

Results - Pilot Study

- Total cultures: 558 Contaminations: 16 (2.87%)
- UC cultures: 237 Contaminations: 13 (5.48%)
- ISDD cultures: 321 Contaminations: 3 (0.93%)



In addition to the 3 contamination events with ISDD in the ER, two cultures obtained using ISDD were initially reported as contamination events but were later determined to be true bloodstream infections.

Results: Hospital-wide ISDD Implementation

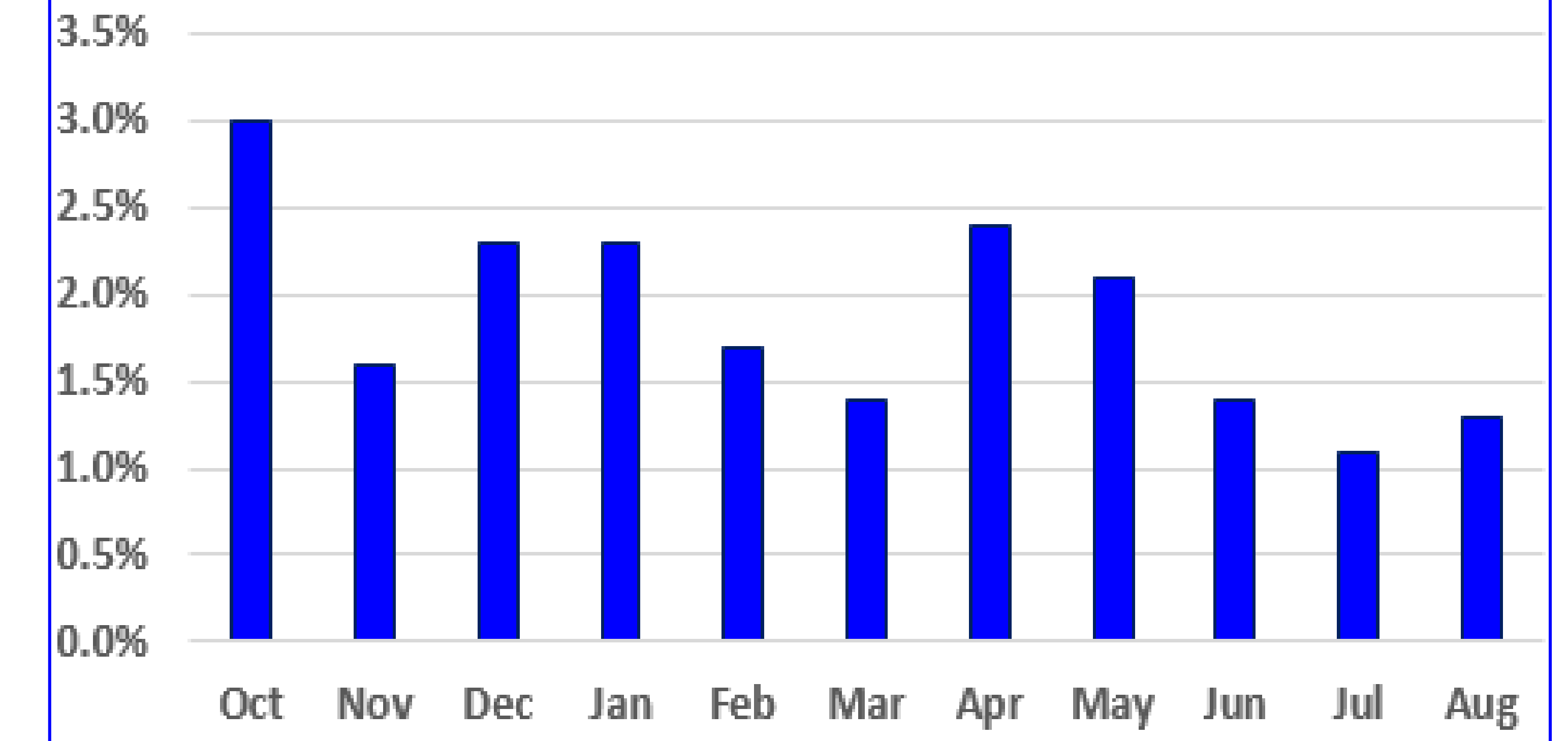
- Start date: 9/28/2017
- ER BCC rate first 2 weeks: 0/187 (0% contaminations)
- Supply problems severely limited October ISDD use
- October (ISDD and UC methods): 29/960 for 3% BCC rate
- November (supplies available): 16/996 for 1.6% hospital wide
- BCC rate improved by 12% first 7 months

Implications for Emergency Nursing Practice

- Increase patient satisfaction
- Reduced length of stay
- Improve patient outcomes
- Support Antimicrobial Stewardship
- Conserve laboratory resources

Hospital wide ISDD Implementation

BCC rates



Conclusion/Discussion

- ER ISDD use resulted in a 83% decrease compared to UC (P=.01)
- ER study supported Leadership decision to implement the ISDD hospital-wide
- High use areas [Acute care, Medical, Surgical, Prime Care, Phlebotomy and ER] began ISDD use October, 2017.
- Supply issues the first month showed no improvement.
- November supplies were available throughout the hospital with 47% improvement rate noted.
- Significant BCC reduction rates supported Hospital Leadership to continue using the ISDD device hospital-wide indefinitely.
- As utilization of ISDD has increased, and with the conversion to the second generation ISDD, hospital-wide BCC rates have continued to decrease.

References

- Ernst, DJ (2004). Controlling blood-culture contamination rates. Medical Laboratory Observer. 36(3): 14-18.
- Harding, A, Bollinger, S (2017). Reducing Blood Cultures Contamination Rates in the Emergency Department. Journal of Emergency Nursing: 39(1), e1-e6.
- Patton RG & Schmitt T (2010). Innovation for reducing blood culture contamination: Initial specimen diversion technique. Journal of Clinical Microbiology. 48(12), 4501-4503.
- Rupp M, Cavalieri, J, Marolf, C, Lyden, E. [2017]. Reduction in Blood Culture Contamination Through Use of Initial Specimen Diversion Device. Clinical Infectious Disease. 65(2): 201-205. doi: 10.1093/cid/cix304.
- Ryder, M. (2005). Catheter-Related INFECTIONS: It's all about Biofilm. Topics in Advanced Practice Nursing eJournal. 2005;5(3)