Decreasing contaminated blood cultures in the Pediatric Emergency Department

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BACKGROUND

Blood cultures are essential in diagnosing serious infections and may be helpful for therapeutic decisions. However, contamination of blood cultures (false positive) is a common problem within the hospital setting. Because blood cultures are considered the goal standard for diagnosing and treating bacteremia, healthcare organizations aim to keep the contamination rate under 3%. Blood culture contamination affects healthcare quality by decreasing patient care efficiency and safety and requiring increased resource utilization.[3]

In April 2022, during the monthly Pediatric Mortality and Morbidity (M&M) meeting, it was reported that there were contaminated blood cultures for March. Further discussion identified that there had been monthly contaminations for one year. The Pediatric Clinical Nurse Specialist (CNS) and the Pediatric Nurse Educator were asked to assist in identifying areas for improvement in practice to reduce the contaminated blood cultures in the Pediatric ED.

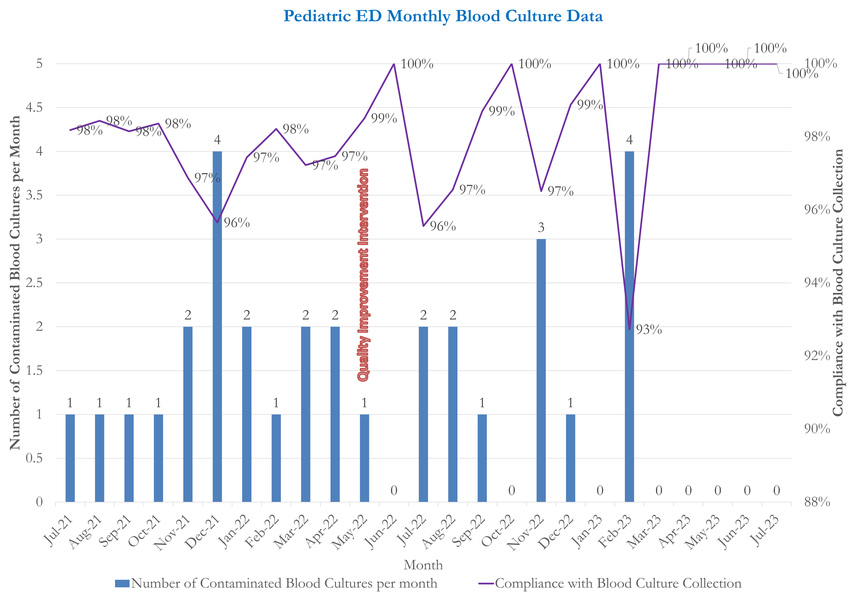
PURPOSE

This quality improvement project aims to decrease the number of contaminated blood cultures in the Pediatric Emergency Department (ED) to keep the contamination rate consistently under 3%.

METHODS

Using the John Hopkins Evidence-Based Practice for Nurses and Healthcare Professionals model, a Pediatric ED Nurse, Pediatric Clinical Nurse Specialist, and Pediatric Nurse Educator worked together following the shared governance model to review the literature to improve nursing practice. The General Laboratory Services Manager supported the project by providing the data monthly.

After completing a literature review, the pediatric ED nurse, nurse educator, and pediatric CNS collaborated to create a blood culture collection during the peripheral IV insertion checklist. Once a review with Pediatric ED medical and nursing leadership was completed and consensus was obtained, all Pediatric ED nurses completed mandatory education with a skills competency.



BLOOD CULTURE COLLECTION DURING PERIPHERAL IV INSERTION

YOUNGER CHILD	OLDER CHILD
☐ Disinfect mayo stand, remove gloves and wash hands. Gather and prep supplies ☐ Use Blood Culture Collection Kit	☐ Disinfect mayo stand; remove and wash hands. Gather and prep supplies ☐ Use Blood Culture Collection Kit
☐ Perform hand hygiene and don clean gloves	☐ Perform hand hygiene and don clean gloves
☐ Verify patient name and MRN. Explain procedure to patient/family. ☐ Scrub top of blood culture bottle with **separate** sterile alcohol pad for 15 seconds, discard the pad and allow to dry for at least 30 seconds	☐ Verify patient name and MRN. Explain procedure to patient/family. ☐ Scrub top of blood culture bottle with **separate** sterile alcohol pad for 15 seconds, discard the pad and allow to dry for at least 30 seconds
☐ Apply tourniquet and prep IV insertion skin site with chlorhexidine pad for 30 seconds using back and forth friction motion, allow to dry for 30 seconds. Do not wipe or fan to dry the site. For infants less than 2 months of age, use alcohol prep pad.	☐ Apply tourniquet and prep IV insertion skin site with chlorhexidine pad for 30 seconds using back and forth friction motion, allow to dry for 30 seconds. Do not wipe or fan to dry the site.
☐ DO NOT palpate directly over insertion site after prepping the skin. If necessary, put on sterile gloves or re-prep the site using new chlorhexidine pad.	☐ DO NOT palpate directly over insertion site after prepping the skin. If necessary, put on sterile gloves or re-prep the site using new chlorhexidine pad.
☐ Insert and secure IV, remove needle, activate safety feature then attach extension set. With each IV insertion attempt, use new supplies for blood collection. DO NOT allow extension set to touch bed/chucks as it is sterile.	☐ Insert and secure IV, remove needle, activate safety feature then attach extension set. With each IV insertion attempt, use new supplies for blood collection. DO NOT allow extension set to touch bed/chucks as it is sterile.
☐ Attach syringe to newly placed IV and draw off at least 0.5 mL needed for culture. If blood is also going to be used for other labs, use one syringe and draw up 0.5 mL and transfer into culture bottle **FIRST** and then attach a NEW syringe to extension set to draw the rest of the labs.	☐ Attach transfer device to newly place IV via extension set. Connect blood culture bottle directly to the transfer device **FIRST** and allow blood to flow into bottle.
☐ Connect syringe used for blood culture specimen to blood culture transfer device and allow blood to flow into bottle.	☐ Collect any additional labs AFTER blood culture is obtained
☐ Remove syringe and transfer device from blood culture bottle and discard into sharps container.	☐ Remove transfer device from IV extension set and discard with into sharps container.
☐ When all blood samples obtained, flush PIV per standards of care, and clamp extension set.	☐ When all blood samples obtained, flush PIV per standards of care, and clamp extension set.
☐ All collected specimens should be labeled at bedside.	☐ All collected specimens should be labeled at bedside.
☐ Document procedure in the patient's EHR.	☐ Document procedure in the patient's EHR.

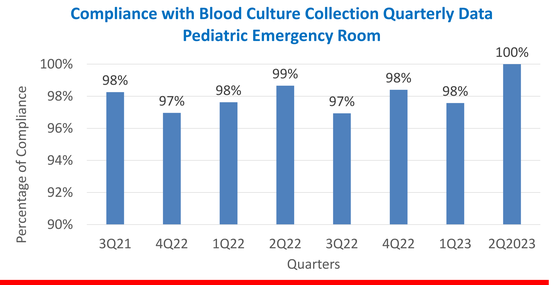
RESULTS

Working with the staff through the shared governance model to develop an evidence-based practice quality improvement initiative with monthly data sharing has shown in the data to decrease blood culture contaminations.

Preintervention data exhibited one month where blood culture contamination fell below the goal of less than 3% and four (4) months where the contamination rate was 3%. Following the intervention, the data was reviewed and reported without any additional intervention. With the first drop below the goal of less than 3%, the Pediatric CNS would review the data and meet with the nurses to assess for any continued barriers and offer additional education on the process when necessary. A barrier to success was identified in February 2023 when it was discovered that blood culture collection from the peripheral IV was not included in onboarding new Pediatric ED staff. This finding added to the training process for onboarding new staff to the Pediatric ED and the Centralized Resource Pool of pediatric nurses.

CONCLUSIONS

Working with the staff through the shared governance model in developing this quality improvement project and tracking and trending the data with the staff has established a sustainable process to decrease blood culture contaminations. The Quarterly report is shared on the Department's Unit Quality Board, discussed monthly in the Pediatric ED UBC meetings, and shared with Congress Council during Quarterly UBC reports.



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PATHWAY DESIGNATED