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Item Type	Poster Abstract
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DOI	10.13028/v0me-sm07
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Download date	2026-04-10 15:39:35
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Link to Item	https://hdl.handle.net/20.500.14038/28076

Reducing Phlebotomy-Induced Blood Loss in the PICU: A Quality Improvement Study

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Introduction:

Phlebotomy-induced blood loss contributes to development of anemia in critically ill children. Major factors contributing to this include blood overdraw from indwelling catheters and utilization of larger volume containers. We targeted these causes of excessive blood draws to decrease volumes of both the discarded blood and sample sent to the laboratory for standard tests.

Methods:

Pre and post quality improvement study in a 10-bed pediatric intensive care unit 2014-2015. All patients admitted to PICU during each 2-month study period were eligible for enrollment. Pre-intervention, nurses used standard pediatric tubes (3-3.5mL). A wash-out period followed.

For intervention, email survey and nursing/resident education sessions were used to standardize discard volumes and introduce microtainers (500 μ L) for standard hematology, chemistry, and coagulation tests. All blood draws were recorded. Incomplete tests due to lack of volume or clotting were recorded.

Results:

45 patients (138 blood draws) in pre-intervention phase and 32 patients (142 draws) in intervention phase were enrolled. Pre-intervention, mean total blood volume sent to the lab was 2.25 ± 1.87 mL and mean discard volume was 1.64 ± 1.67 mL. Post-intervention, mean total volume of blood sent and mean discard volume were significantly reduced, 1.52 ± 1.50 mL, $p < 0.05$, and 0.89 ± 0.61 mL, $p < 0.05$, demonstrating 32.4% and 45.7% reductions in blood volume respectively. There was no change in test failures due to low volume or clotting. Samples from peripheral intravenous catheters comprised the majority of the cohort. Pre-intervention, mean total blood volume from PIVs ($n=116$) was 2.06 ± 1.51 mL, and mean discard volume was 1.74 ± 1.33 mL. Post- intervention ($n=72$), mean total volumes significantly decreased to 1.39 ± 1.49 mL and 1.15 ± 0.53 mL respectively ($p < 0.05$).

Conclusions:

We demonstrated a significant reduction in phlebotomy-induced blood loss by standardizing discard volumes and using microtainers to avoid sending unnecessary blood volumes to the lab.

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