

HUMANIZING A Common Inpatient Medical Procedure

BACKGROUND

Advancing medical technology while humanizing a common healthcare practice—drawing blood—was the guiding principle in a collaborative effort between Intermountain Healthcare (Salt Lake City, Utah) and Velano Vascular (San Francisco, CA). Intermountain Healthcare is a not-for-profit health system with 22 hospitals and a broad range of clinics and services. With a focus on accelerating innovation through collaboration with Intermountain’s Healthcare Transformation Lab, Intermountain sponsored two pilots to evaluate Velano’s new transformational technology aimed at redefining the existing blood collection standard. The technology fit the Transformation Lab’s “Jobs-to-be-Done” innovation practice that reconceived the boundaries of blood collection by removing the needle. Suboptimal blood collection practices across Intermountain Healthcare’s 888,000 annual inpatient blood draws created a significant opportunity for practice standardization and quality improvement. Analysis of historical data, 240 draw observations, 260 nurse practice surveys, and cross-functional interviews revealed that current practices significantly impact the patient and practitioner experience, operational efficiencies and overall quality of care associated with this common procedure.

EXPERIENCE: On average, patients were experiencing 1.6 draws per day; 18% experience ≥3 draws per day. Almost 20% of patients (30% in pediatrics) required multiple attempts and painful fishing/probing to secure a sample. 47% of draws occur between 4:00-7:00 am, disrupting sleep and thus impacting the healing process¹. 85% of nurses surveyed said “sticks” have moderate to major impact on patient satisfaction and 70% said “sticks” have moderate to major impact on their own relationship with patients.

EFFICIENCIES: Significant variability existed across departments in procedure methods, total procedure time and who was conducting the collection. While average draw time was approximately 8.5 minutes, DVA (difficult venous access) patients could take more than 22 minutes. These “tough sticks,”

estimated at 27% of hospital inpatients, reflect a potential \$1.5 million in additional costs when accounting for the increase in labor and supply expense.

RISK: 42% of nurse collections were done off CVC/PICC lines; 82% of nurses expressed some level of concern about accidental needle sticks and concerns heightened with combative/disoriented patients.

QUALITY: Rejected/redrawn inpatient samples, often due to hemolysis, result in delayed care and patient progression, as well as additional patient discomfort. The two pilot sites had 178,000 inpatient blood collections with a 1.28% rejected sample rate due to hemolysis. Based on an inpatient redraw cost of \$208/draw², poor quality samples could result in additional redraw costs of \$474,000 (does not include cost of ED redraws @ \$337/draw³).

Findings were used to scope pilots at both Primary Children’s Hospital (PCH) and Dixie Regional Medical Center (DRMC). The objective was to evaluate Velano’s new vascular access technology, PIVO™, which enables high-quality blood draws from indwelling peripheral IV lines.

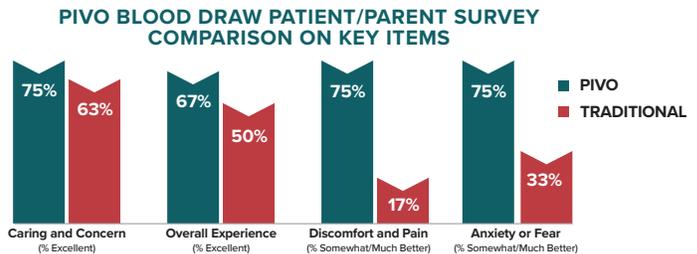
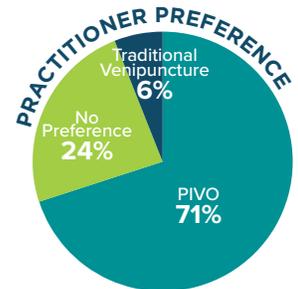
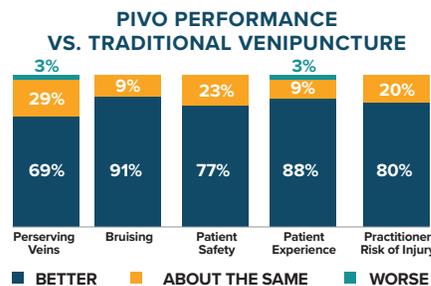
PRIMARY CHILDREN’S HOSPITAL PILOT

METHOD: Primary Children’s, one of the nation’s top-ranked children’s hospitals, was the site of our first full-scale commercial pediatric pilot, which assessed the technology on some of the most challenging venous access patients. The three-month pilot started on the Children’s Surgical Unit (CSU) with nurses responsible for performing PIVO draws. After two months, the pilot was expanded to include the Neuro/Trauma Unit (NTU). On average, 5-10 draws per day were conducted with PIVO.

RESULTS: Ethnographic observations of the pilot were conducted to capture insights on the technology’s learning curve, procedure efficiency, best practices and practitioner/patient/caregiver experience. Additionally, patient and user surveys were conducted to measure satisfaction, and collection cards identified PIVO samples for sticks avoided (315, including re-sticks).

+ **Nurse Survey:** A majority of nurses (71%) expressed an overall preference for PIVO vs. traditional venipuncture. When comparing PIVO to traditional venipuncture, nurses overwhelmingly agreed PIVO is better for patient experience, patient safety, preserving veins, reducing bruising and reducing their risk of injury.

+ **Patient/Parent Survey:** Patients and parents felt PIVO was a better experience and reduced pain, anxiety and fear. Overall experience scores may have been influenced by the practitioner’s learning curve with new technology.



¹VV analysis, 2 mln blood draws in 32 hospitals and US Department of Health and Human Services, CDC, <http://www.cdc.gov/nchs/data/has/hus13.pdf>, table 100.

^{2,3}Green S, The Cost of Poor Blood Specimen Quality and Errors in Preanalytical Processes, Clinical Biochemistry 46 (2013) 1175–1179

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DIXIE REGIONAL MEDICAL CENTER PILOT

METHOD: Dixie Regional, a 245-bed major medical referral center for Southern Utah, Northwestern Arizona and Southeastern Nevada, was the site of our first phlebotomy pilot in the U.S. The six-month pilot started in the ICU with nurses initially responsible for performing PIVO draws. After three months, the pilot expanded to the Cardiovascular unit and the Medical/Oncology unit. Following appropriate training from nursing education, competency testing, updated policies and procedures and product in-service training, 18 phlebotomists started performing PIVO draws. Over the course of the pilot, 3,000 PIVO draws were performed by phlebotomists with an average of 40-50 draws per day, avoiding more than 3,500 sticks (including re-sticks) with no reported adverse events.

RESULTS: Similar to the pilot at Primary Children’s, draw observations were conducted at Dixie Regional to capture insights on learning curves, procedure efficiency, best practices and practitioner/patient experience. Morning round observations of phlebotomists performing PIVO draws found they were proficient and confident, and there was an easing of workflow for both phlebotomists and nurses. Additionally, patient and user surveys were conducted to measure satisfaction, and collection cards identified PIVO samples for the laboratory to analyze hemolysis rates and sticks avoided.

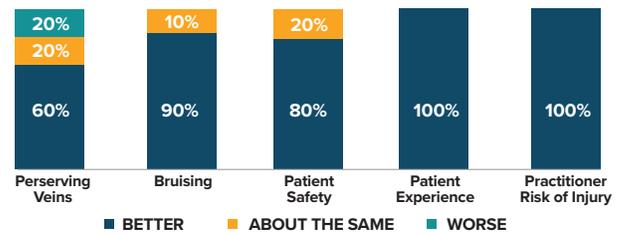
+ **Phlebotomist Survey:** DRMC Phlebotomists believe PIVO is a better solution for patient experience, patient safety, preserving veins, reducing bruising and reducing the risk of injury.

+ **Patient/Parent Survey:** Patients and parents felt PIVO was a better experience with less pain and discomfort. (Note: fear and anxiety measures excluded due to data discrepancy.)

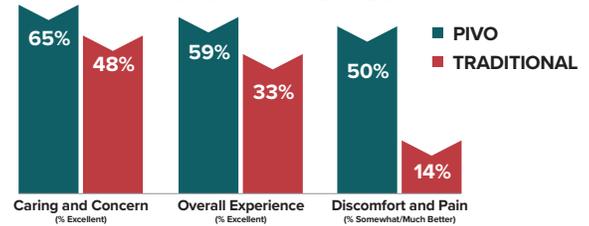
+ **Hemolysis Data:** Hemolysis with PIVO draws were less than with other draw methods during the pilot period and compared to historical baseline.

COMPARISON	PIVO DRAWS % ERRORS	NON-PIVO DRAWS % ERRORS	PIVO IMPROVEMENT
Draws During Pilot	1.6	2.5%	30%
All Draws Before Pilot	1.6	2.3%	33%

PIVO PERFORMANCE VS. TRADITIONAL VENIPUNCTURE



PIVO BLOOD DRAW PATIENT/PARENT SURVEY COMPARISON ON KEY ITEMS



POTENTIAL ECONOMIC IMPACT

In addition to the substantial benefits related to enhanced patient experience and staff satisfaction, the use of PIVO can provide measurable financial benefits.

As noted in pre-pilot workflow observations of 240 draws, almost 20% of patients (30% in Pediatrics) required multiple attempts and painful fishing/probing to secure a sample. While average venipuncture procedure time is ~8.5 minutes and cost ~\$16, DVA (difficult venous access) patients, depending on complexity, can take up to 22 minutes and cost \$24-48 dollars.³ Those requiring escalation to PICCs or Midlines, predominantly for frequent blood draws, would add even more cost. For pediatric patients in particular, common practice often involves use of topical anesthetics and additional staff to distract the patient. With the extra time and staff, it can cost as much as \$67.87 per venipuncture.⁴ These “tough sticks” can add hundreds of thousands of dollars to annual blood draw costs. By obtaining high quality samples from existing peripheral IV lines, PIVO is an option that reduces the cost of difficult draws.

Other measurable financial benefits include reduced occurrence of practitioner accidental needlestick injuries, fewer hemolysis-related redraws and avoidance of potential infection risk by reducing reliance on central lines for blood draws.

CONCLUSIONS

Collecting blood samples via PIVO through existing Peripheral IVs resulted in high levels of both practitioner and patient satisfaction. The use of PIVO in a hospital inpatient population can provide improvements in operational and clinical efficiency, reduction in risk associated with venipuncture and central line draws, and improved patient and provider experience, which all contribute to measurable financial impact.

³⁴Velano Vascular Economic Analysis