

OVERCOMING RISK: DIFFICULT VENOUS ACCESS PATIENTS

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BACKGROUND

Venipuncture blood draws are pervasive for inpatients and inform ~70% of clinical decisions. However, they are often cited as one of the biggest sources of patient dissatisfaction, largely as a result of pain associated with the procedure.

Hospital staff often experience anxiety when drawing blood from difficult venous access patients who require multiple attempts before a successful draw can be completed. **25-30% of patients suffer from Difficult Venous Access**

(DVA), making venipuncture especially difficult.

- + DVA patients often experience excessive fishing/probing, multiple sticks, vein

collapse, bruising, and insufficient sample.

- + The increasing incidence of DVA patients create added layers of dissatisfaction, risk, and cost in the blood collection process.

In July of 2018, University Hospitals Cleveland Medical Center adopted a disposable needle-free medical device called **PIVO™** that enables collection of a venous blood sample through an existing peripheral IV.

OUR AIMS ARE:

- + Greater patient satisfaction
- + Reduced anxiety for staff and

patient family members

- + Enhanced blood collection and samples from DVA patients
- + Lowered risks of CLABSI/CRBSI
- + Reduced occurrence of needlestick injuries
- + Cost savings from reductions in hemolysis-related redraws
- + Improved HCAHPS scores

Our analysis shows a clear economic benefit to PIVO as a new standard of care, and with a profound benefit in DVA patients.

FINDINGS

EXAMPLE 1: SIMPLE DVA PATIENTS

- + Assumed a patient may require up to two attempts for each venipuncture on average during their hospitalization.
- + Cost of repeat attempts: \$25.15 per draw.
- + Cost of using PIVO™ through an established IV: \$20.58 per draw.
- + *Savings per case: \$41.22, or around \$156,266 per year.*

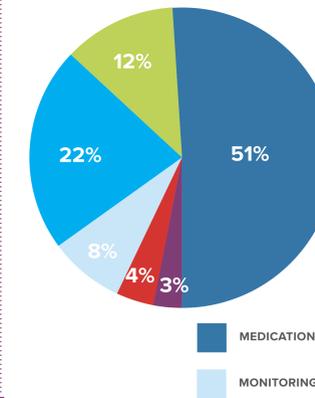
EXAMPLE 2: COMPLEX DVA PATIENTS

- + Assumed a patient may require escalation during a blood draw with an ultrasound team assisting in some cases.
- + Cost of a venipuncture draw: \$63.62.
- + Cost per blood draw with PIVO: \$20.58.
- + *Savings per case: \$388.63, or over \$800,000 per year.*

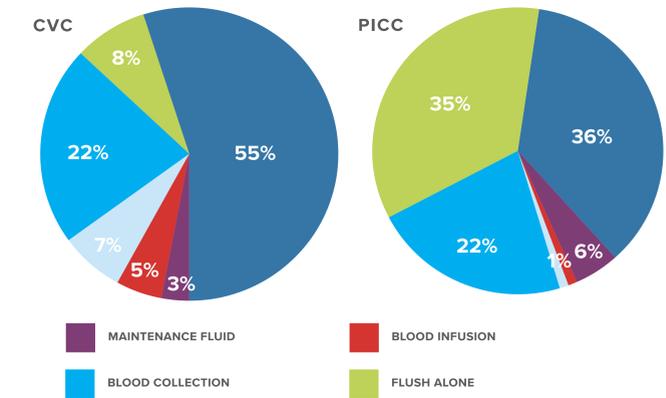
EXAMPLE 3: COMPLEX DVA PATIENTS WITH ESCALATION TO PICC

- + Assumed certain DVA patients will receive a midline or a PICC based on a number of indications, such as the need for frequent or longer-term IV therapy, need for frequent blood draws, etc.
- + Cost of receiving a PICC for frequent blood draws: \$1,35.68 per admission.
- + Estimates includes costs associated with the risk of CLABSI and DVT and with clearing occluded PICC lines with CathFlo™ or tPa.
- + Cost of using PIVO™ after peripheral IV is established using ultrasound guidance: \$169.
- + *Savings per admission: \$1,143, and \$394,238 per year.*

OVERALL RATES OF ACCESS TYPES



ANALYSIS OF CVC VS PICC LINES

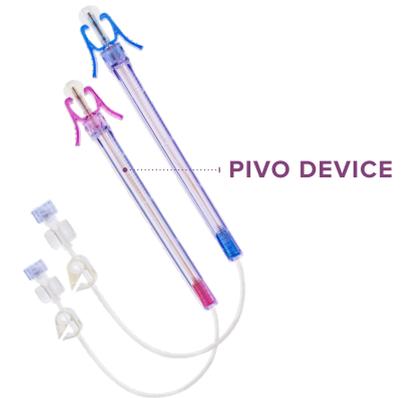


EXAMPLE 4: ICU PATIENT WITH CENTRAL LINE

- Central lines in the ICU can sometimes be left in longer than necessary for more convenient blood draws. In comparison, PIVO™ maintains comparable ease of use while eliminating risk, serving as an effective and low-cost mitigation strategy.
- + Assumed, ~2,700 patients with a central venous catheter (CVC) per year or about 17,724 catheter days.
 - + Cost of CLABSI, which use of CVC for access can result in: \$36,000-50,000
 - + *Savings of reduced CLABSI risk, at an industry average of 2.7 per 1,000 catheter days: \$60,000 per year.*
 - + **If for 10% of these patients we could decrease the use of CVC for extended access by 1 to 2 days, and instead use PIVO for peripheral line draws, catheter days could potentially be reduced by ~7% or ~1,422 catheter days.**

Reducing ~22% of daily CVC/PICC access for blood draws can further reduce:

- + Potential infection risk
- + CLABSI treatment cost
- + Any resulting CMS Value-Based Purchasing reimbursement impact associated with low safety performance scores.



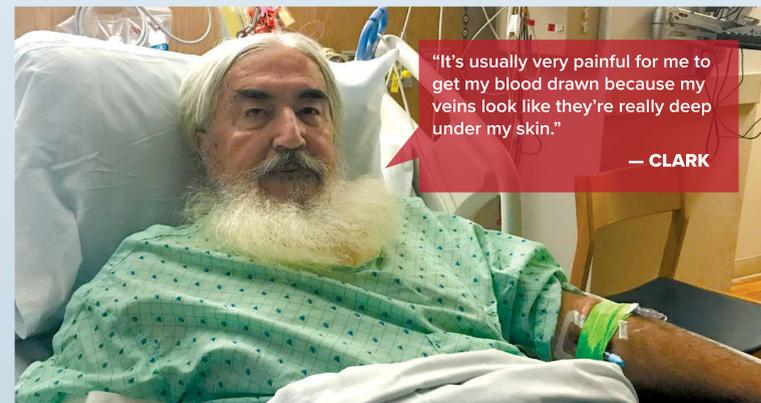
THE ECONOMIC IMPLICATIONS OF BLOOD DRAWS IN DVA PATIENTS

The cost of blood collection is greater than just the price of a needle because of multiple indirect and hidden costs. **Though cost analyses of venipuncture blood collection procedures are not found in published literature, other vascular access procedures (e.g. peripheral IV placement) illustrate similar "total cost in use."**

- + Short peripheral IV catheter insertion in the United States: between \$28 and \$35 for successful 'first-stick' insertions,¹ significantly greater than the direct materials cost of approximately \$1.60.
- + Ultrasound guided peripheral IV placement: \$99.31.²
- + Pediatric IV insertions: Median cost of \$41. However, the 28% of children who required ≥ 3 IV attempts ranged from \$69 to more than \$125, and they consumed 43% of the total IV costs.³

For the roughly one-third of patients that are DVA, blood collection costs are also multiplied. In a workflow observation of 240 draws

- + ~25% of patients (30% in Peds) required multiple attempts and painful fishing/probing to secure a sample
- + Average draw time and cost: 8.5 minutes and \$16
- + DVA patients draw time: 22 minutes and \$24-48
- + For pediatric patients requiring escalation to midlines or PICCs, common practice often involves use of topical anesthetics and added staff to distract the patient. Cost: up to \$67.87 per venipuncture.
- + These "tough sticks" can add hundreds of thousands of dollars to annual blood draw costs.



— CLARK



— RYAN

THE ESTIMATED IMPACT AT UNIVERSITY HOSPITALS CLEVELAND MEDICAL CENTER

To calculate the benefit of using PIVO™ with DVA patients at University Hospitals Cleveland Medical Center, a financial analysis was performed assuming 25% of over 27,000 patients were DVA and had an average length of stay of 6 days and received 1.5 venous blood draws daily per inpatient. DVA patients were divided into level of complexity and specific clinical use case examples.

SUMMARY

Although many assume that the cost of blood collection is negligible, the reality is that there are many indirect and hidden costs that drive up the total cost to an amount that far exceeds the cost of the required supplies. **For 25-30% of patients that are DVA, these inefficiencies and cost implications are compounded. These "tough sticks" can add hundreds of thousands of dollars to blood draw costs. PIVO is a pioneering technology that is transforming the standard of care for blood collection. While the impact on patient experience is obvious, what may not be so obvious is a better more compassionate standard of care that also delivers measurable improvements in minimizing risk, increasing efficiency, and improving the quality of care.**

REFERENCES

- 1 Helm et al. Accepted but Unacceptable Peripheral IV Catheter Failure, Journal Infusion Nursing, 2015; Vol 38(3):189-203
- 2 Goff et al. 2013
- 3 Velano Vascular Time & Motion Study 2016 & Velano Vascular Economic Model 2017

