

# Implementation of a Midline Catheter for Burn Patients to Decrease Frequent Peripheral Sticks and Infection Risk

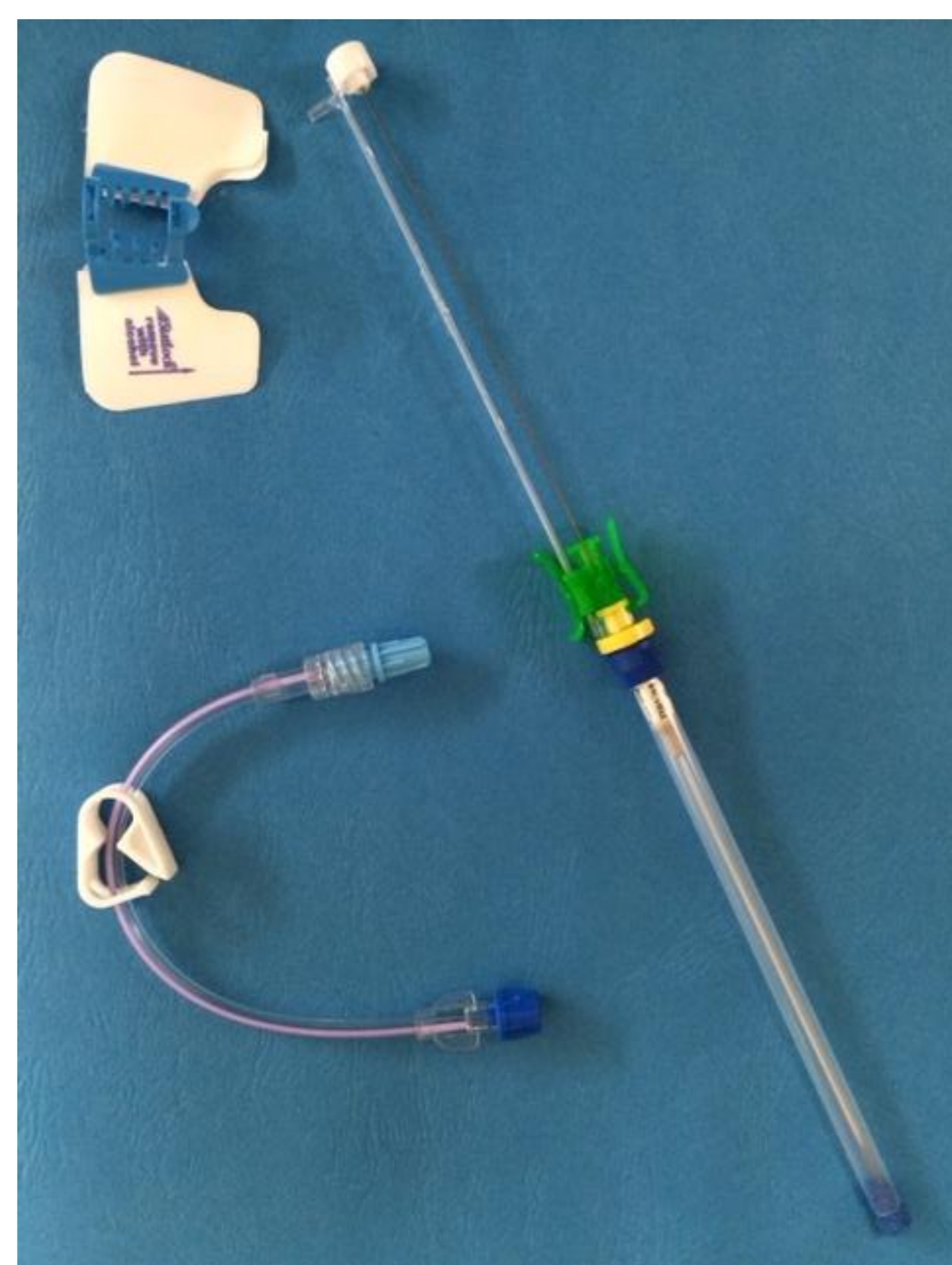
Johnnie R. Robbins MSN, RN, CCNS<sup>1</sup>; Scott A. Phillips MSN, RN, CCNS<sup>1</sup>; Christopher A. Vanfosson MSN, CCRN<sup>1</sup>; Trinity F. Peak BSN, RN<sup>1</sup>; Paul B. Mittelsteadt, MSN, CCNS, CCRN<sup>1</sup>; Nancy J. Riley RN, CRNI<sup>2</sup>; Raul G. Palacios, MD<sup>2</sup>; Krystal K. Valdez-Delgado, BS<sup>1</sup>; Nicole W. Caldwell, BA, RN<sup>1</sup>; Elizabeth A. Mann-Salinas, PhD, RN, FCCM<sup>1</sup>

<sup>1</sup>United States Army Institute of Surgical Research and <sup>2</sup>San Antonio Military Medical Center, JBSA Fort Sam Houston, TX



## Introduction

- We sought to decrease the use of central venous catheters (CVC) to mitigate infection and complications
- A device with increased dwell time, phlebotomy capability and a low complication rate was preferred to accommodate extended stays, multiple surgeries and increased infection risk
- Midline catheters are designed around this concept. They are similar to a peripherally inserted central catheter (PICC), but at 3-8 inches, they can only extend to a patient's upper arm
- This performance improvement project was initiated in July, 2013
- A midline extended catheter (MLEC) indicated for upper arm insertion was selected that was power-injectable, amenable to phlebotomy, was approved for an extended dwell time and had a historically low complication rate



## Objectives

- The purpose of this project was to determine the impact in our burn center of a midline extended catheter (MLEC) on increasing the dwell time of a device for patients needing intravenous access without having to use a central line

## Methods

- Manufacturer training was provided to the institutional Peripherally Inserted Central Catheter (PICC) team for initial use in the Burn Intensive (BICU) and Progressive Care Units (PCU)
- Standardized order sets and procedure notes were created to ensure conformity in care.
- Specific criteria were established for placement, including:
  - LOS >6 days
  - No central line needed
  - No medications or nutrition requiring central line
- Preliminary and on-going education was provided to clinicians and patients
  - 100% clinician completion of on-line training
  - In-services on BICU and PCU
  - Patient receipt of Midline literature
  - Only PICC team to place MLEC
  - Wrist and IV tubing labeled, "This is not a PICC"

### Outcome Measures

- Complications (infections, DVTs, clotting)
- Dwell time (days)
- Durational patency (patent when discontinued)
- Needle stick reduction
- Need for additional lines
- Time requirements
- Patient and Nurse satisfaction
- Cost benefit (nursing time and supplies)

### Midline Extended Catheter Performance (n=25)

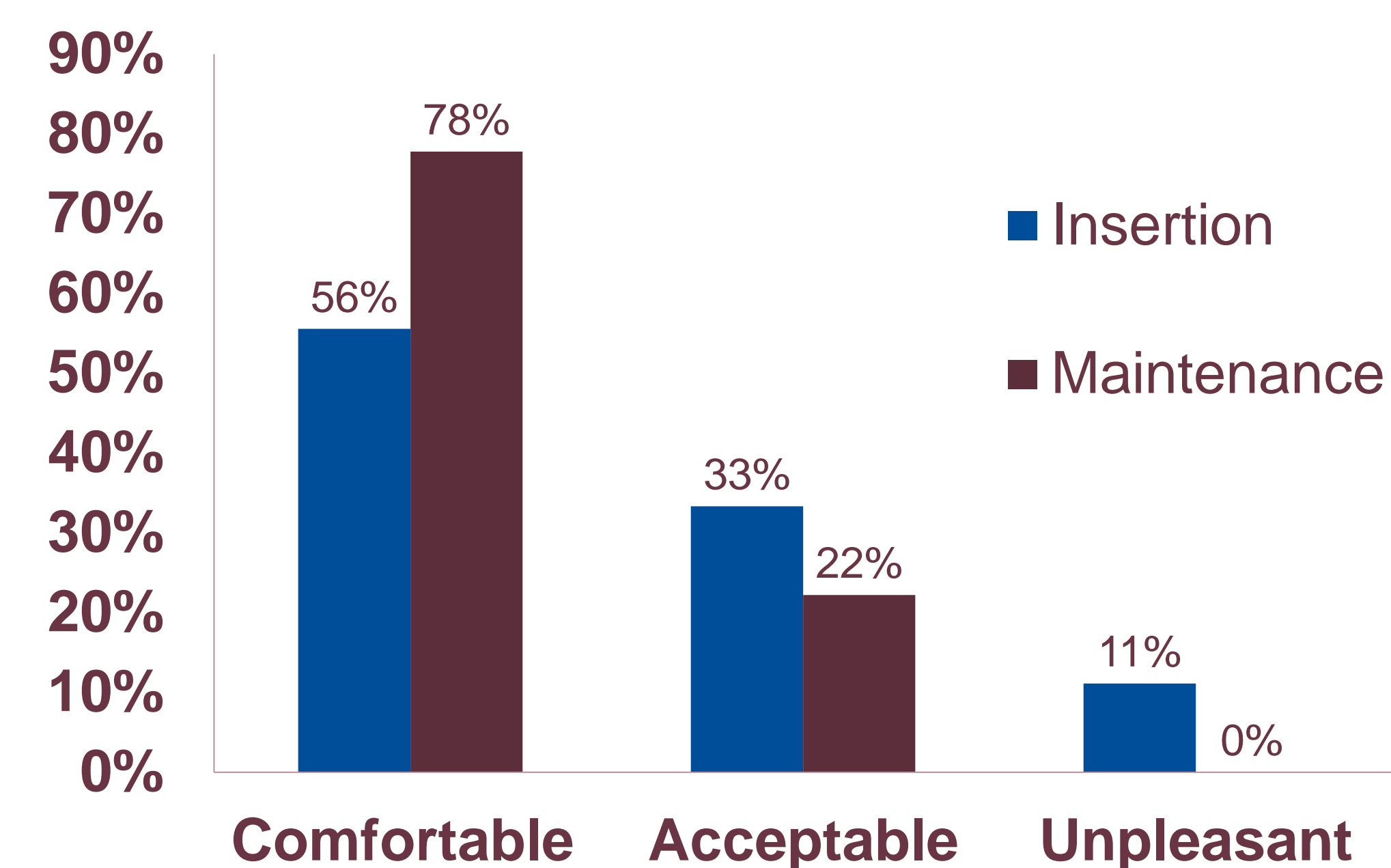
Patient Age (years)	45 ± 18 (23-81)
Dwell Days	8.4 ± 6.4 (2-29)
Draw Days	5.9 ± 5.9 (0-29)
Placement Attempts	1.6 ± 0.9 (1-4)
First-time placement success	56% (14/25)
Insertion Site	Basilic: 40% (10/25) Brachial: 40% (10/25) Cephalic: 20% (5/25)
Size Selection	4FR/8: 32% (8/25) 4FR/10: 4% (1/25) 5FR/8: 64% (16/25)
Unit Usage	BICU: 40% (10/25) PCU: 60% (15/25)
Durational Patency	84% (21/25)
Required Thrombolysis	16% (4/25)

Table 1

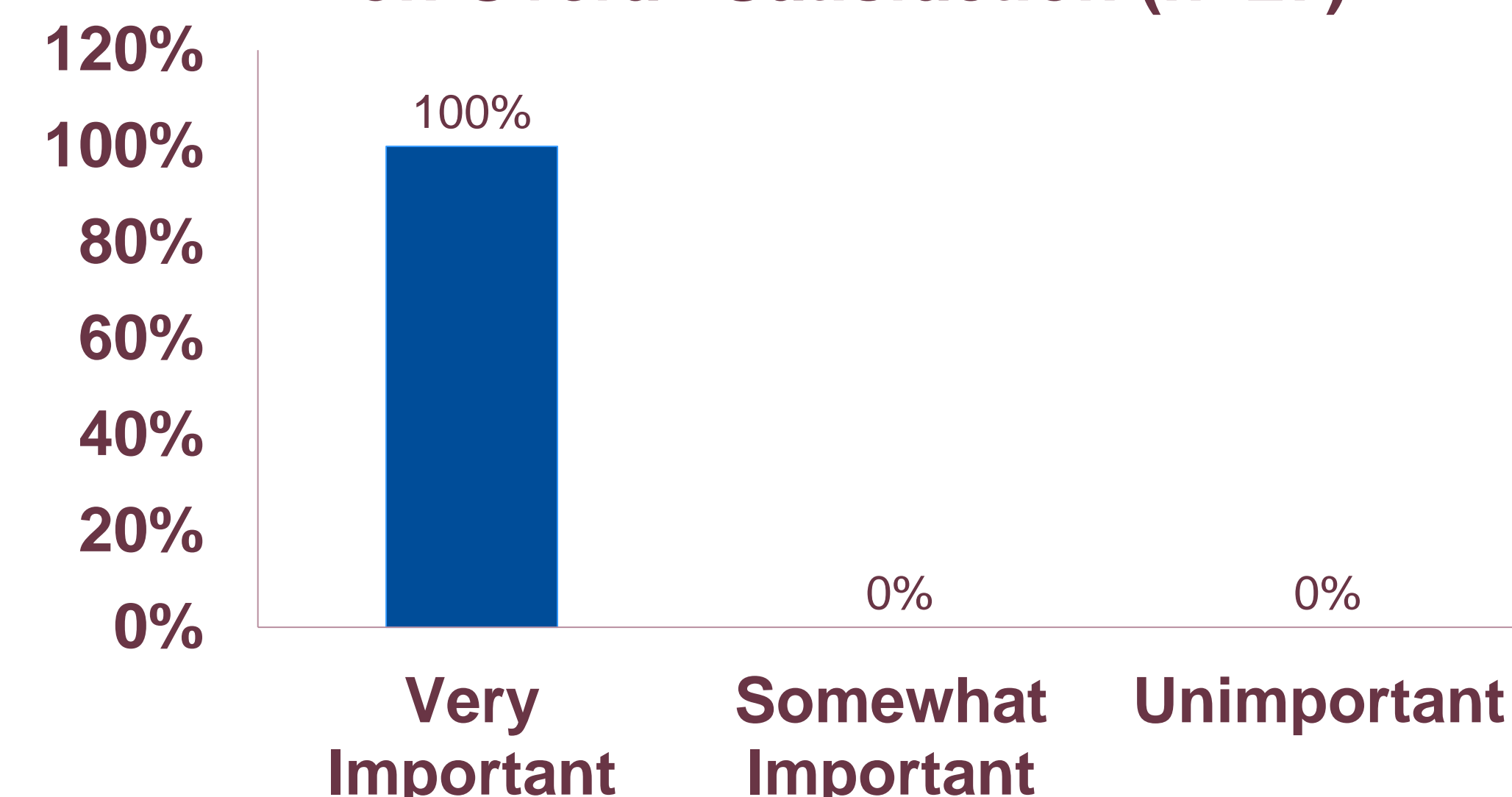
## Results

- From 31 July to 3 Sep 2013, 25 MLECs were successfully placed in 22 patients
- The first MLEC placed in the BICU worked for 29 days and potentially avoided more than 21 peripheral sticks. The longest dwell time in the PCU was 16 days and potentially avoided more than 24 sticks. Every avoided stick potentially saved nursing workload an average of 30-45 minutes
- We calculated 3.5-5.3 hours of reduced nursing time per patient for phlebotomy and line placement management
- CVC utilization was reduced by early removal in 4 patients and avoidance in 4, thereby reducing line associated infection risk
- Observed complications were: infiltration 8% (n=2); accidental dislodgement or patient removal 16% (n=4). There were no infections or episodes of venous thrombosis
- Overall, 100% of patients who completed surveys (n=9) and 93% of nurses (n=27) would prefer MLEC placement over any other. The following graphs and Table 2 detail this subjective comparison

### Midline Extended Catheter Insertion/Maintenance Evaluation (n=27)



### Importance of Fewer Needle Sticks on Overall Satisfaction (n=27)

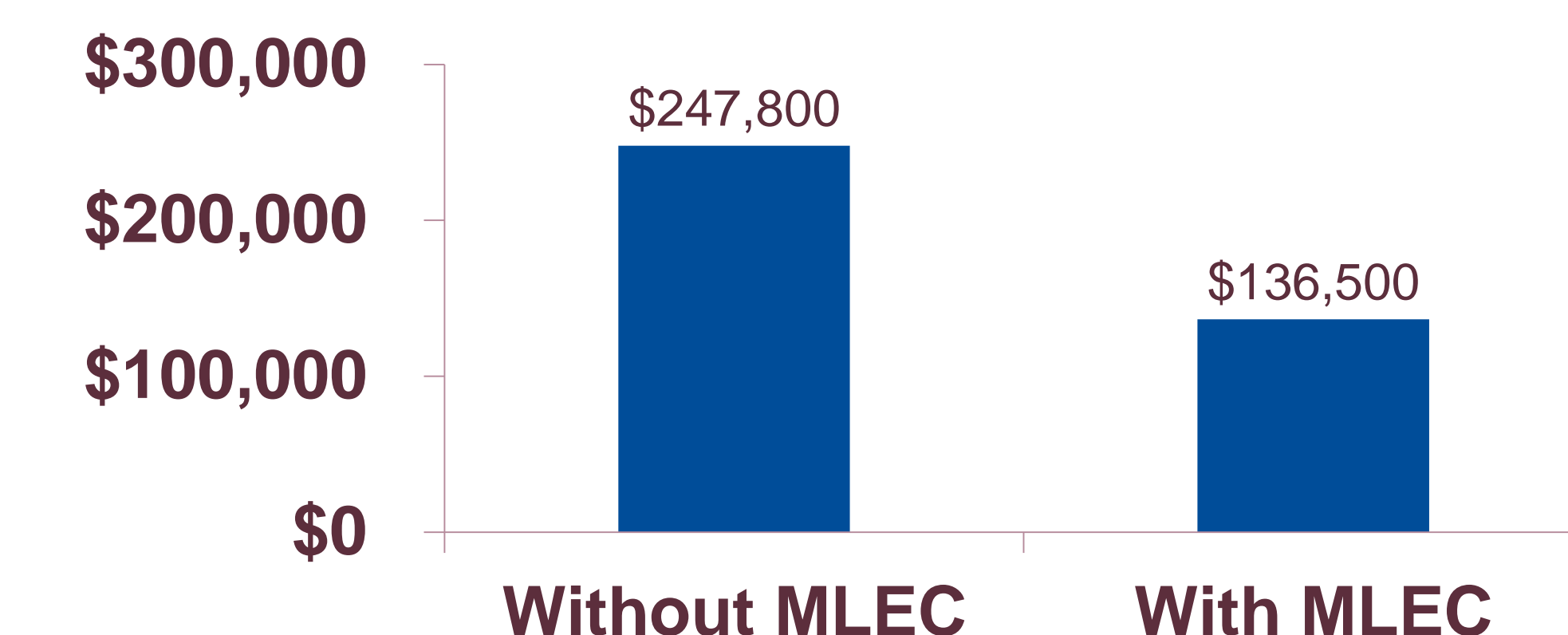


### Midline Extended Catheter Staff Satisfaction Survey (n=27)

Question	% (n)
Patency Maintained	81% (22)
Useful for Phlebotomy	37% (10)
Easy to ID as MLEC	81% (22)
Maintenance Issues	37% (10)
Attended In-Service Training	100% (27)
Usage Problems	19% (5)
Would Use This Product Again	93% (25)

Table 2

### Yearly Estimated Annual Cost to Department



\*Cost includes supply and placements costs of PICC and peripheral IV with and without MLEC usage. It does not include cost savings associated with central line bloodstream infection.

## Conclusions

- A MLEC can effectively and safely reduce peripheral sticks, contain supply costs, reduce nursing time and mitigate infection associated with central lines in the burn patient population.
- Success of the MLEC pilot project in the burn center has prompted institutional consideration of this additional modality for intravenous cannulation.

## References

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