



# Implementation of Near-Infrared Technology (AccuVein AV-400®) To Facilitate Successful PIV Cannulation

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## Abstract

Research has shown that the use of vein illumination devices facilitate non-emergent IV placement, however, studies are limited and have not included multiple populations nor evaluated staff perception of device utility and satisfaction. A research study using a near-infrared vein illumination device (AccuVein AV400®) was conducted to evaluate the utilization of central resource staff (code team, PICC nurses and flight nurses) to meet the PIV access needs of the adult and pediatric unit patient populations. Pre and post implementation measures of staff perception on device utility also were obtained.

One of the outcome measures for this study included the number of escalation calls to central resources. Data on escalation calls were collected for two months prior to introducing the device on six nursing units (two pediatric, two adult medical-surgical, one IMC, and one ICU). After one month “acclimation period”, data on escalation calls were again collected for two months. Staff on the study units were initially surveyed about their IV practices regarding venous cannulation and need for call escalation. Following device implementation for the two month intervention period, the staff was surveyed about IV practices using near-infrared technology (AccuVein AV400®) to visualize vasculature and its impact on their ability to successfully cannulate veins.

Results showed a 45% decline in escalation calls following device implementation with 91% of nurses reporting likelihood to use device prior to escalating call. The survey of nurses’ perceptions of the impact from device use showed significant satisfaction with 93% successful cannulation within 1-2 attempts. Study results indicate the use of near-infrared vein illumination technology may be beneficial to incorporate as a standard of practice for peripheral venous cannulation.

## Objective

- Describe the impact of device use in successful vein cannulation
- Discuss the effect of device utility on staff satisfaction
- Identify the benefits of device use on decreasing central resource utilization



## Methods

- Pre and post implementation staff survey
- Pre and post data collection on “escalation calls” to central resources

**RN IV Survey**

1. **Area of Practice**

- Adult Medical-Surgical
- Pediatrics
- Adult ICU/IMC

2. **Years of Experience**

- Less than 1 year
- 1-3 years
- 3-6 years
- Over 6 years

3. **How do you rate your overall expertise in IV Insertion/blood draws?**

- Novice, not at all confident in my ability
- Some competence, if patient has good veins, I will attempt
- Competent, I am confident I can usually find a vein
- Very Competent - I am confident I will be successful in most attempt on even the most complex patient, I am often used as a resource on the unit

4. **In general, when inserting a PIV or obtaining blood for a specimen collection using AccuVein AV400, how many attempts do you usually make before successfully establishing IV access or getting the specimen?**

- 0 ( I do not do venipuncture)
- 1-2
- 2-3 times
- More than 3
- Until I get it

5. **When inserting a PIV or obtaining blood for a specimen collection, how likely are you to attempt it first using AccuVein AV400 before asking for assistance?**

- Very likely
- Likely
- Somewhat likely
- Somewhat unlikely
- Not likely at all

6. **If you answered “somewhat unlikely” or “not likely at all” to question #4 or answered “0” to question #3, indicate the primary reason for not attempting IV insertions or blood draws.**

- I don't have enough time
- I don't have adequate skills

7. **Did the use of a vein illumination device (AV400) improve your ability to cannulate veins?**

- Yes
- No
- Undecided

8. **Would you use the AccuVein AV400 to aid you in visualizing veins?**

- Not likely
- Undecided
- Most likely
- At all times

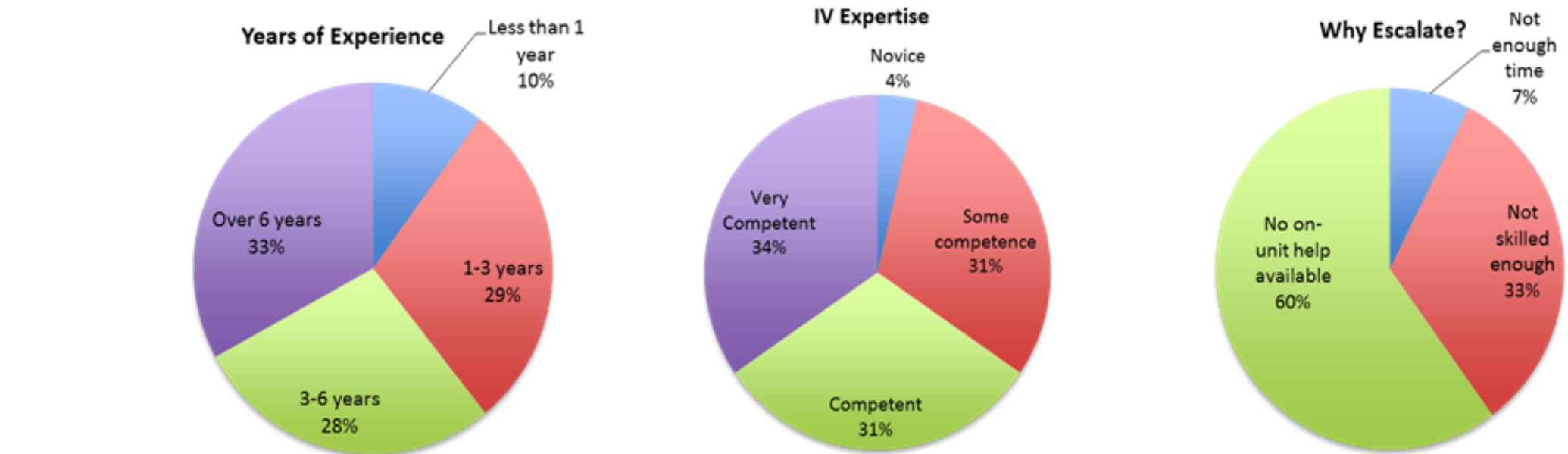
9. **If you call for assistance with IV placement or blood draws from the IV nurse or stat nurse, what is the primary reason for seeking their assistance?**

- I don't have time to do it myself
- I don't have the skills to do it myself
- I don't have another resource available on the unit to help me

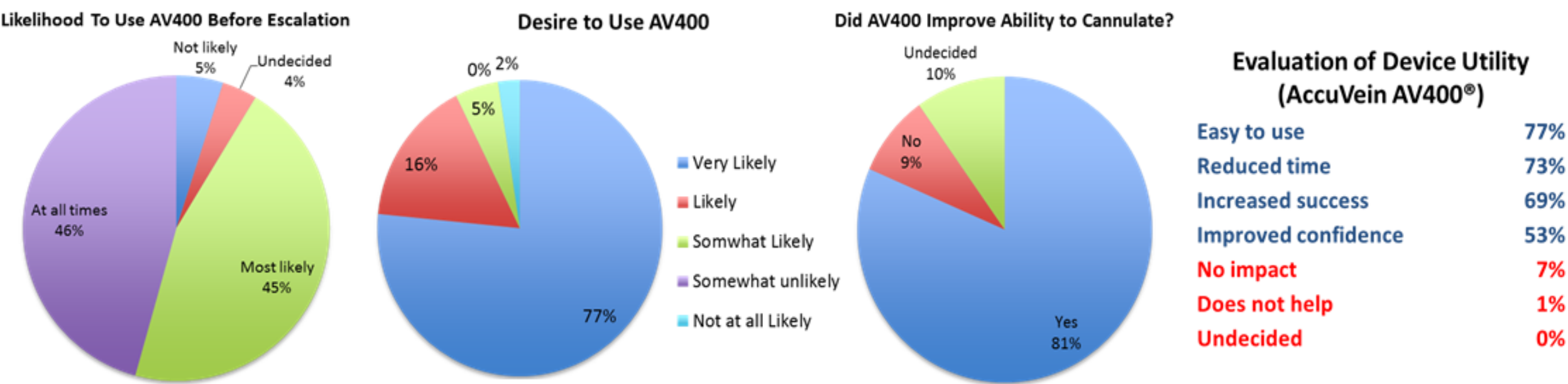
10. **How would you evaluate the impact of using AccuVein AV400 in your ability to establish PIV access on your patients (choose all that applies)?**

- no impact at all
- undecided
- device does not help in visualizing veins
- improved confidence in PIV cannulation
- easy to use in visualizing veins
- increased success in PIV cannulation
- reduced time in identifying veins appropriate for PIV
- Others: \_\_\_\_\_ (free text)

## Survey Demographics

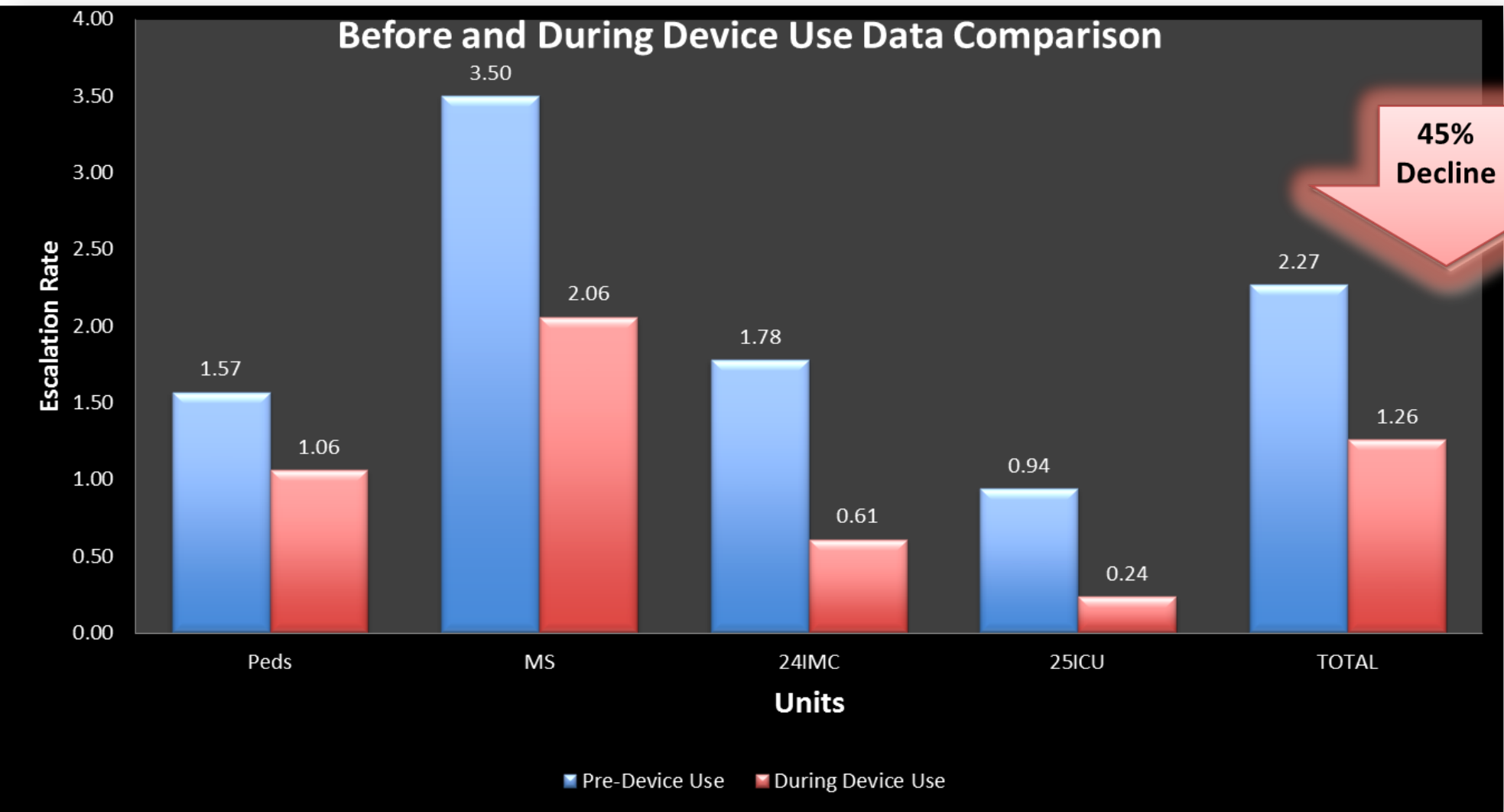


## Nurse Perception



## Results

- 45% decline in escalation calls following device implementation
- 81% reported improved ability to cannulate
- 93% successful cannulation within 1-2 attempts
- 65% of nurses reported IV expertise as “competent” or “very competent”
- 61% of nurses reported greater than 3 years of nursing experience



## Conclusions

- Near-infrared technology vein illumination device (AccuVein AV400®) improved venous cannulation.
- Availability of near-infrared technology appears to increase staff’s confidence in attempting vein cannulation.
- Additional research study needed to determine other factors impacting successful venous cannulation, e.g., time, unit resources, nurse’s skill and patient factors.

## References

Cuper, N.J., et.al (2011). Visualizing veins with near-infrared light to facilitate blood withdrawal in children. Clinical Pediatrics, 50(6), pp. 508-512.

Katsogridakis, Y.L. et.al. (2008). VeinLite transillumination in the pediatric emergency department: A therapeutic interventional trial. Pediatric Emergency Care, 24(2), pp.83-88.

Accuvein (2012). AV 400 product FAQ. Retrieved from www.accuvein.com