

Improving Foundation Year 1 Doctors’ Confidence in Ultrasound-Guided Peripheral IV Cannulation

A Paired Pre-Post Evaluation of a Practical Teaching Session

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INTRODUCTION

Difficult intravenous access (DIVA) is very common in acute care settings. Escalation to more senior clinicians to obtain intravenous access often leads to time-critical treatments and patient flow delays. Ultrasound-guided peripheral intravenous cannulation (UG-PIVC) improves success in DIVA as vessels are easier to visualise and first-time cannulation rates are higher. FY1 doctors often report limited exposure and confidence in UG-PIVC and so a course was designed for them to obtain the skills necessary to be able to perform the procedure and then to evaluate the effectiveness of the course.

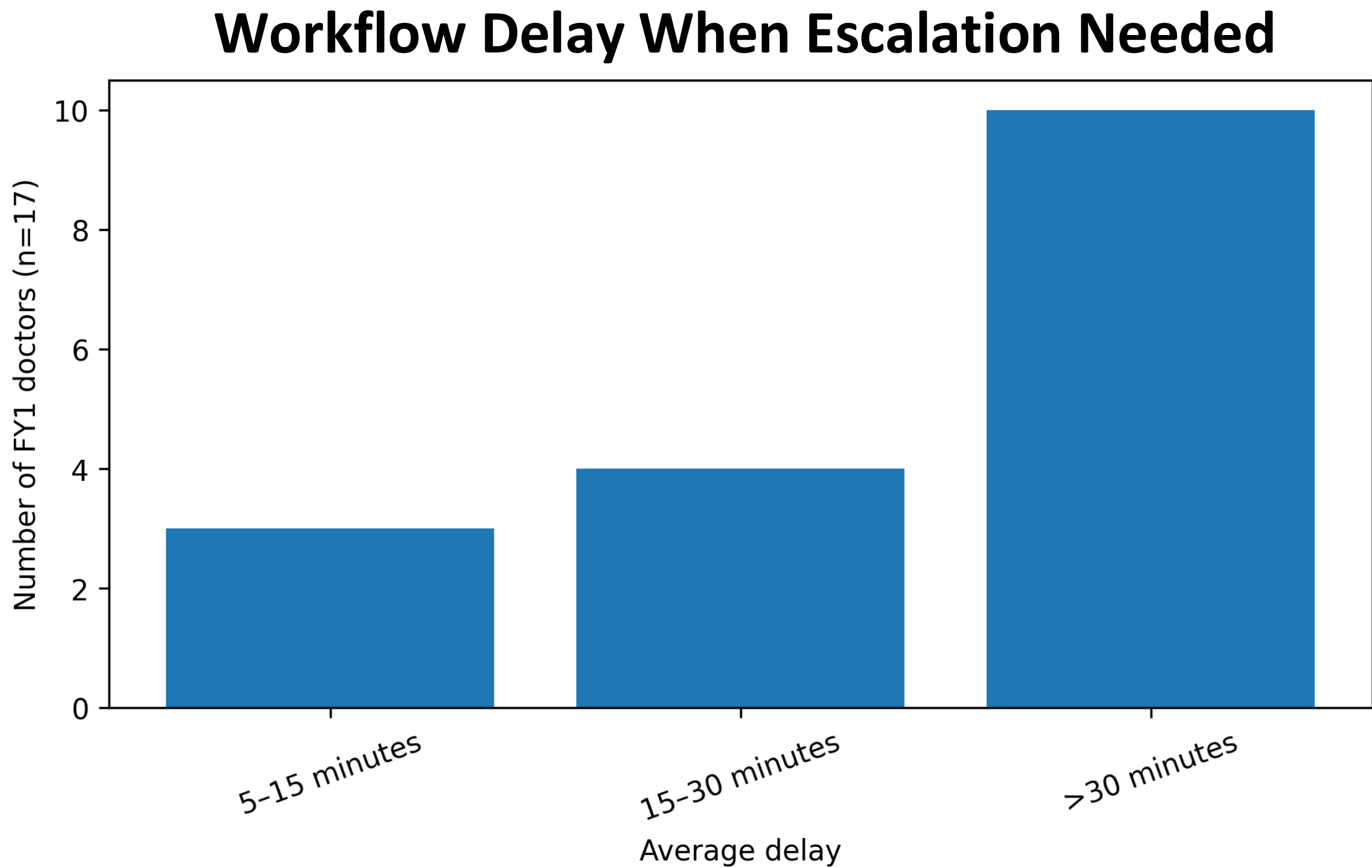
AIMS

- 1. Describe baseline FY1 experience and perceived DIVA burden.
- 2. Evaluate impact of a structured practical UG-PIVC session.

METHODS

Design: Paired pre-post questionnaire study.
Participants: FY1 doctors (n=17 paired responses).
Intervention: Supervised hands-on UG-PIVC teaching session.
Outcomes: Baseline experience, workflow impact, confidence, preparedness.
Analysis: Confidence normalised to % of scale maximum; paired Wilcoxon signed-rank tests.

RESULTS



Pre-Session Experience of FY1 Doctors (n=17)

Measure	Count	Percentage
Participants (n)	17.0	
Previous UG-PIVC attempts		
0	12.0	71%
1-5	4.0	24%
6-15	1.0	6%
Prior UG-PIVC teaching		
Informal bedside teaching	8.0	47%
No	6.0	35%
Formal teaching session	2.0	12%
Both	1.0	6%
Encounter difficult cannulation per week		
1-2 times	12.0	71%
3-5 times	5.0	29%
Escalation frequency		
Sometimes (2-3/week)	8.0	47%
Rarely (≤1/week)	7.0	41%
Almost every time	1.0	6%
Often (>3/week)	1.0	6%

Acceptability and Intention to Use (n=17)

Measure	Result
Rated 4-5 / 5	17/17 (100%)
Ready to attempt UG-PIVC with supervision	13/17 (76%)



Figure 1. Ultrasound-guided peripheral intravenous cannulation. Image generated using artificial intelligence (OpenAI DALL-E), April 2024.

Change in confidence pre vs post teaching (normalized to % of scale maximum)

Outcome (confidence)	Pre median (%)	Post median (%)	Median change (pp)	p (Wilcoxon)
Identify veins	30	80	40	0.0001
Perform UG cannulation	10	60	50	0.0004
Use US machine settings	10	60	50	0.0000

CONCLUSION

58% of FY1 doctors reported a >30minute delay in workflow in obtaining IV access. A short, supervised hands-on UG-PIVC teaching session was associated with a large and statistically significant increase in FY1 doctors’ self-reported confidence across ultrasound visualisation, cannulation and machine optimisation. 47% reported they would reduce escalations to senior clinicians for IV access support.

LIMITATIONS

Small number of colleagues and single-center cohort
Self-reported confidence rather than objective success rates.
Short-term evaluation only.

PRACTICALITIES FOR IMPLEMENTATION

Smaller supervised groups improve hands-on time.
Ensure ultrasound machine access and clear escalation pathways.
Use simple vessel models before clinical practice.
Embed into FY1 induction for maximum reach.

FUTURE DIRECTIONS

Evaluate first-pass success rates and escalation frequency.
Assess impact on treatment delays and patient flow.
Develop supervised consolidation sessions on real patient cases.