

# The Integration of Ultrasound Guided Intravenous Access into the Physician Associate curriculum.

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## Introduction

Ultrasound (US) is a technology that utilises high frequency (2 – 18 MHz) acoustic waves to create a visual depiction of the anatomical composition of the region being investigated.

Peripheral Intravenous Cannulation, also known as Peripheral Intravenous Access (IVA), involves the insertion of a small, flexible plastic tube, initially introduced by a needle, into a vein. This cannula can then be left in place, being used for applications including delivering medications, fluids and imaging contrast.

IVA can be achieved through either a “landmark” or ultrasound guided procedure. In the landmark technique, a trained medical professional uses sight and palpation to select a suitable blood vessel before inserting the cannula. The alternative is to utilise ultrasound guidance (USG), allowing the operator to visualise the vessel being accessed, highlighting its shape, direction of travel and bifurcations. Access to this information results in a significantly higher success rate amongst other benefits (Blanco, 2019).

Whilst landmark cannulation is a core skill taught within the MSc Physician Associate studies curriculum, ultrasound guidance of the procedure is not. However, given the benefits to both patient and practitioner, USG procedures are a rapidly expanding area of healthcare.

### Aim:

This study investigates the feasibility and benefits of training Physician Associate (PA) students in Ultrasound-Guided Intravenous Access (USG-IVA) and the process with which competency may be acquired and assessed.

### Objectives:

1. To demonstrate the process with which PA students can learn Ultrasound Guided Intravenous Access (USG-IVA) and become validated as competent.
2. To highlight the benefits that this would bring to service provision.

### Methods:

- To assess the demand for PA's to be trained in USG-IVA, a qualitative survey was conducted with 24 consultants representing various specialties.
- A thematic review of contemporary literature was performed to explore the potential benefits of PA students being trained in USG-IVA.
- The author attended recognised USG-IVA training and demonstrated competency in practice to develop the skills and knowledge required to teach the procedure.
- Two teaching sessions were delivered to first- and second-year students, evaluating their competency through practical assessment using an OSCE-style checklist. Pre- and post-training surveys were conducted to measure perceived knowledge and confidence.
- A competency pathway for training was proposed for students to follow.

## Key findings:

- A significant increase in post training cannulation confidence (1.7 points) and knowledge (2 points) was observed.
- 100% cannulation success rate on an IVA model following training.
- 100% of students enjoyed the training session.

## Data Analysis:

Table 1. Consultant survey responses.

Question:	Answer:		
	Yes	No	Unsure
Are you aware of the role of the Physician Associate?	24	0	N/A
Have you worked with a Physician Associate (student or graduate) previously?	24	0	N/A
In your opinion, should a Physician Associate have basic knowledge of ultrasound upon graduation such as the ability to perform US guided IVA?	23	1	0
Would it benefit your department and it's patients for a PA to possess this knowledge/skill upon graduation?	24	0	0
Would it make it more likely for you to employ/utilise a PA if they were able to offer this skill?	24	0	0

Figure 1. Combined Student responses to Question 1.

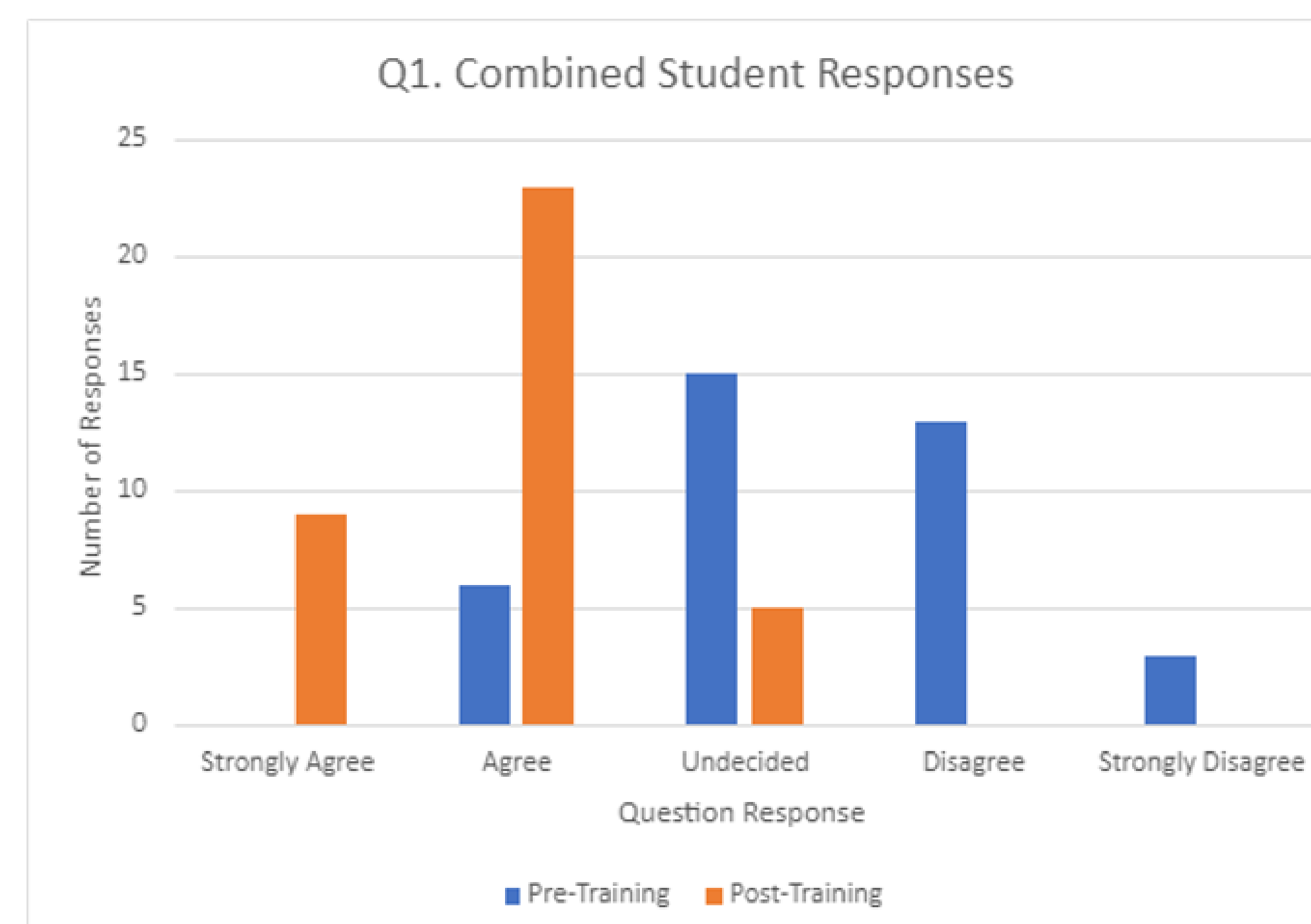
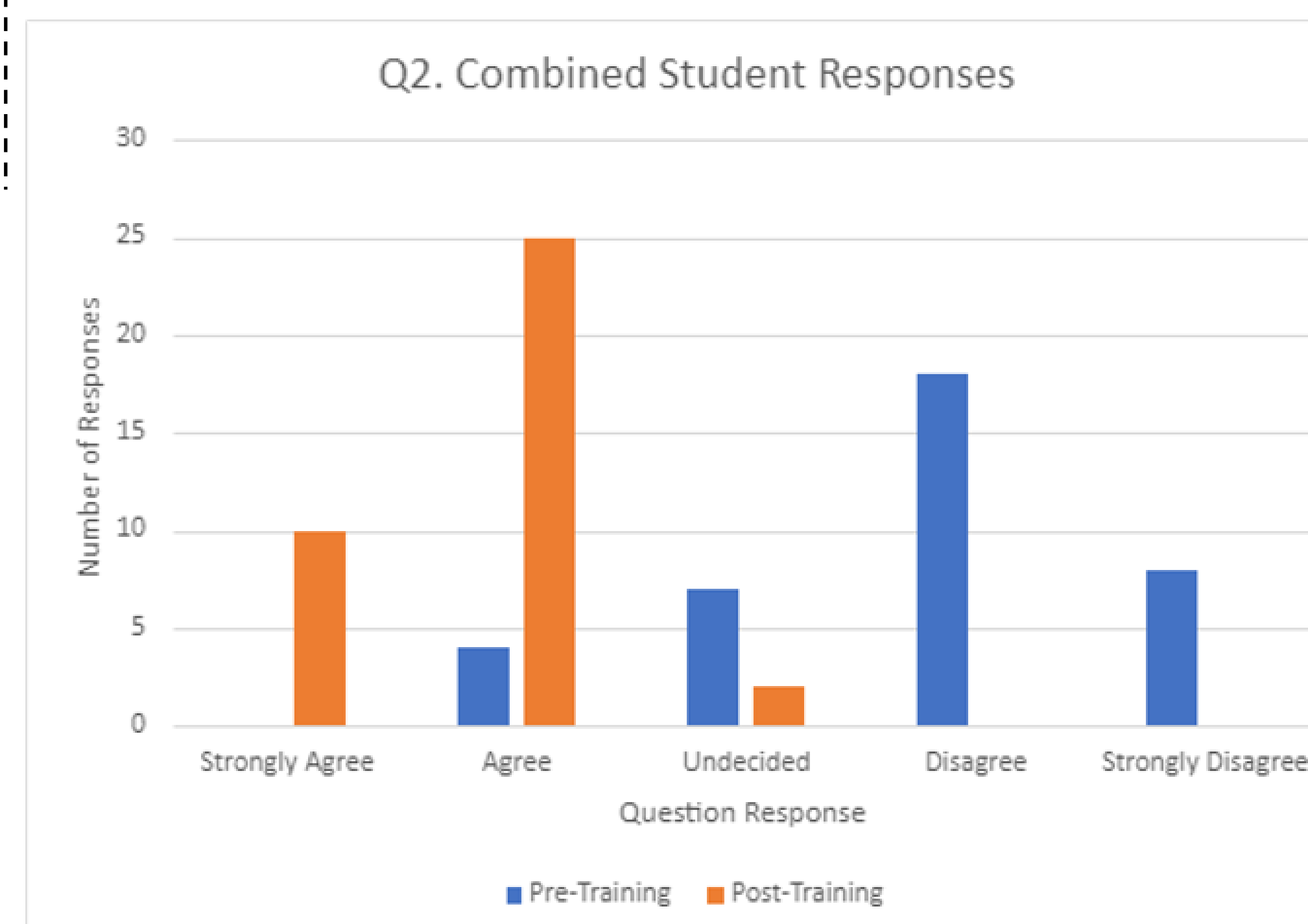


Table 2. Teaching session questionnaire results.

Assertion:	Descriptor:	Number of Responses:			
		Year 1 Pre-Training	Year 1 Post-Training	Year 2 Pre-Training	Year 2 Post-Training
Q1. I feel confident in my ability to cannulate patients.	Strongly Agree	0	4	0	5
	Agree	3	21	3	2
	Undecided	15	5	0	0
	Disagree	10	0	3	0
	Strongly Disagree	2	0	1	0
Q2. I know the steps to take with a 'difficult to cannulate' patient.	Strongly Agree	0	5	0	5
	Agree	2	23	2	2
	Undecided	6	2	1	0
	Disagree	15	0	3	0
	Strongly Disagree	7	0	1	0
Q3. I feel confident in my ability to use ultrasound to guide cannulation.	Strongly Agree	-	6	-	4
	Agree	-	21	-	3
	Undecided	-	3	-	0
	Disagree	-	0	-	0
	Strongly Disagree	-	0	-	0
Q4. I would consider using ultrasound guided cannulation in practice when competent.	Strongly Agree	-	19	-	5
	Agree	-	9	-	2
	Undecided	-	2	-	0
	Disagree	-	0	-	0
	Strongly Disagree	-	0	-	0
Q5. I enjoyed learning to use ultrasound to guide cannulation.	Strongly Agree	-	26	-	5
	Agree	-	4	-	2
	Undecided	-	0	-	0
	Disagree	-	0	-	0
	Strongly Disagree	-	0	-	0

Figure 2. Combined Student responses to Question 2.



## Results:

- Survey responses were recorded from 24 consultant doctors and revealed that 100% of those surveyed believed training PAs in USG-IVA would be beneficial for their wards. 96% advocated including this competency in the PA curriculum.
- 37 students were taught over two sessions. These sessions yielded promising outcomes, with 100% of candidates successfully performing ultrasound guided IV cannulation on a gel model. A key theme identified from the training survey results highlighted pre-training confidence with cannulation was low.
- A significant increase in cannulation confidence and perceived knowledge was observed post-training (P<0.0001).
- Students expressed enthusiasm for learning the skill, with 100% enjoying the training and 95% reporting their intention to use it in their practice once certified.
- Established benefits from literature of USG-IVA include increased clinician confidence and patient satisfaction, fewer attempts taken to successfully cannulate, reduced infection risk and lower reported patient pain.
- Increasing USG-IVA ability and capacity within the clinical team enhances the patient experience, whilst improving the effectiveness and efficiency of care delivered.

## Conclusion:

- This project achieved its aims by demonstrating an effective method to support the integration of USG-IVA into the PA curriculum and highlighting the potential benefits for patients and colleagues alike.
- The survey results demonstrated the existing demand for this skill within the local senior doctor cohort.
- USG-IVA training not only introduces a valuable new skill to PA students but also enhanced their overall cannulation confidence and knowledge, benefiting their future placements and clinical practice. Furthermore, the addition of ultrasound to the curriculum has been shown to improve anatomical knowledge and understanding among students (Kenny et al., 2022).
- Newly qualified PAs offering competency of in-demand skills such as USG-IVA will help enhance the reputation of the profession, aid the growth of the role and benefit patients and staff members.
- Based on the results and benefits observed, this study concludes that it would be highly recommended that PA course providers consider incorporating USG-IVA training into their programs.

## Acknowledgements:

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## References:

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