Palpating the PULSE of WVU Internal Medicine Residents: Improving Access to POCUS

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BACKGROUND:

Limited Adoption in Internal Medicine

- POCUS is widely used in emergency medicine and critical care but remains underutilized in internal medicine.
- Traditional ultrasound machines are impractical for internists, whereas handheld devices improve accessibility and enhance the physical exam.

Impact on Patient Interaction

- With declining bedside time due to electronic health records, POCUS facilitates efficient beside assessments, with exam averaging six minutes, fostering hands-on care and building patient rapport.

Clinical Utility in Internal Medicine

- POCUS aids in cardiac, pulmonary, abdominal, dermatologic, soft tissue, and peripheral vascular exams.
- Helps narrow differential diagnoses in undifferentiated patients.
- Critical in resource-limited settings such as rural West Virginia as well as developing countries.

SMARTER OBJECTIVE & METHODS:

1.S - Specific: Implement and integrate POCUS training into the WVU Internal Medicine Residency Program by providing three Butterfly handheld ultrasound devices, structured education, and hands-on practice as part of **Project PULSE (Point-of-care Ultrasonography Learning and Skills Enhancement).**

2.M - Measurable: Assess progress through pre/post surveys, POCUS usage tracking with eValue, and faculty reviewed exams via the Butterfly Network, with the aim of increasing logged POCUS exam by 20%.

3.A - Achievable: The project will leverage the existing WVU STEPS simulation center for structured POCUS training, Butterfly Network educational tools, and faculty mentorship. By providing three handheld ultrasound devices, the project addresses the primary barrier of equipment access.

4.R - Relevant: This project aligns with the residency program's emphasis on bedside medicine, rural and global health training, and medical education. Expanding POCUS skills among internal medicine residents enhances diagnostic efficiency and patient care, particularly in resource-limited settings.

5.T - Time-bound: October 2024 – June 2025: Initial training, handheld ultrasound distribution, ongoing clinical POCUS training, real-time feedback, and faculty review of POCUS exams.

6.E - Evaluated: The project will be continuously assessed through faculty feedback, resident surveys, and analysis of POCUS exams documented in eValue. Adjustments will be made based on engagement levels and competency outcomes.

7.R - Revised: Adjust training, workflows, and equipment based on evaluation results, ensuring long-term integration and scalability.

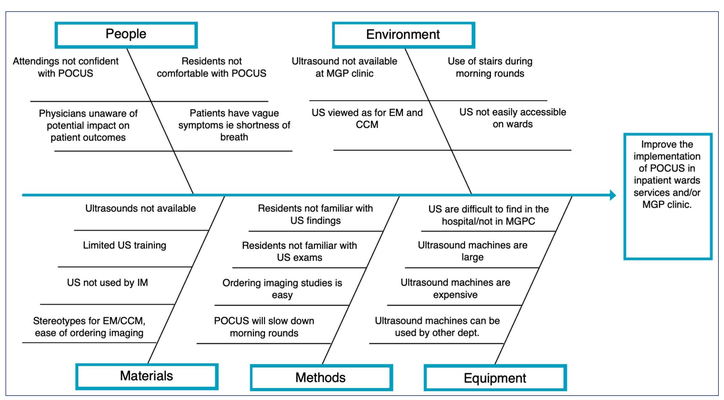

Figure 1. Fishbone Diagram. A fishbone diagram was created to identify the greatest barriers to use of POCUS in the WVU IM Residency Program. Access to portable machines for use for POCUS was identified as a major targetable barrier.

RESULTS:

Table 1. Pre-survey questions

1	I am comfortable using POCUS on patients in clinical practice.
2	I am confident in using POCUS to accurately assess, diagnose, and manage an acutely ill patient in the ICU setting.
3	I am confident in using POCUS to accurately assess, diagnose, and manage an acutely ill patient in the hospital setting (floor/step-down status, NOT in the ICU).
4	I am confident in using POCUS to accurately assess, diagnose, and manage patients in the ambulatory/clinic setting.
5	I am satisfied with the level of training I receive in the current POCUS curriculum for the WVU Internal Medicine Residency Program.
6	I am able to easily access an ultrasound machine whenever I want.
7	I am likely to use POCUS in patient interactions in which POCUS could impact patient assessment and management.
8	POCUS serves as a valuable extension of my physical exam.

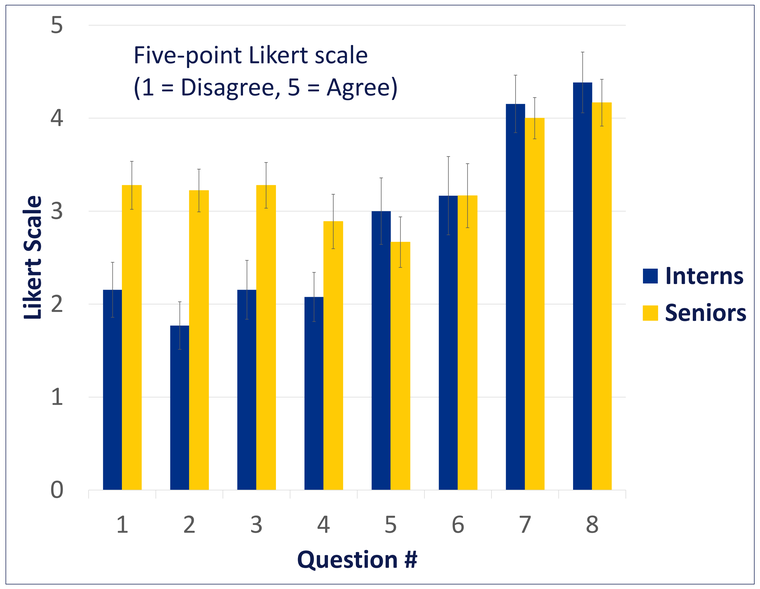

Figure 2. Survey Results. The mean accessibility score was 3.17 (SD = 1.52). Residents mostly agree that POCUS serves as an extension of the physical exam (mean = 4.26, SD = 1.12). Most prior POCUS training occurred in the inpatient setting (n = 18). The mean comfort level with POCUS in the ambulatory setting was 2.55 (SD = 1.21). Interns reported significantly lower confidence in their abilities to use POCUS in the ICU ($p < 0.001$) and general inpatient setting ($p = 0.016$) than senior residents. Interestingly, interns report more intention to use POCUS in clinical practice than senior residents ($p = 0.026$).

Table 2. Statistical analysis comparing intern and senior resident perspectives

	Interns (mean)	Seniors (mean)	t-Statistic	*p*
1	2.154	3.278	-0.744	0.016
2	1.769	3.222	-5.769	0.000
3	2.154	3.278	-2.576	0.016
4	2.077	2.889	-0.540	0.593
5	3.000	2.667	0.498	0.622
6	3.167	3.167	-0.703	0.488
7	4.154	4.000	2.351	0.026
8	4.385	4.167	-0.919	0.366

SCALE UP PLAN:

To scale up Project PULSE, we aim to expand within the IM Department by training POCUS ambassadors among senior residents, increasing device availability, and incorporating more workshops. We aim to collaborate with Hospital Medicine to develop integration for residents in training that will remain at WVU as attending physicians. In collaboration with Hospital Medicine, we aim to create a robust POCUS use for internal medicine.

IMPROVEMENT ACTION PLAN WITH ACTIONS TAKEN:

To improve Project PULSE, we conducted a pilot study within the IM Residency Program to identify key barriers to POCUS use. Using a fishbone diagram, we analyzed contributing factors. We aim to continue to use survey data to use Plan-Do-Study-Act (PDSA) cycles to refine training methods, optimize workflow, and ultimately improve resident confidence, frequency of POCUS use, and patient care.

SUSTAINABILITY PLAN:

We have a predetermined criteria and commitment for sustainability as detailed in our initial grant for obtaining handheld ultrasounds as well as through our Institutional Review Board protocol.

LESSONS LEARNED:

Internal medicine residents value POCUS but perceive insufficient accessibility and training at our institution. The implementation of handheld ultrasound devices for improvement of accessibility and training, coupled with ongoing curriculum improvements, aims to enhance satisfaction, confidence, and comfort of POCUS use in clinical practice.

Funding for Butterfly handheld ultrasounds and Butterfly Network membership provided by the WVU Department of Medicine.