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Conference abstract

# QI Project to Curriculum Design: Enhancing Internal Medicine Residents' Competency in POCUS for Volume Status, Cardiac, and Lung Assessment

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## INTRODUCTION

Point-of-care ultrasound (POCUS) is an essential bedside tool for rapid assessment of volume status, cardiac and lung function in hospital. Despite its clinical value, POCUS remains underutilized in many internal medicine residency programs due to limited formal curriculum and training. Baseline assessment at our Internal Medicine McLaren Flint program revealed low resident confidence, knowledge/skills and inconsistent use of POCUS in routine clinical practice. This quality improvement (QI) initiative aimed to transition from a training intervention to a structured curriculum to improve resident knowledge, technical skills, confidence, and clinical use of POCUS.

## METHODS

We implemented Plan-Do-Study-Act (PDSA) initiative targeting PGY-1 internal medicine residents at McLaren Flint hospital. PDSA Cycle 1: A structured curriculum was introduced consisting of a focused didactic session on IVC assessment, visual EF estimation, and lung ultrasound, followed by simulation-based hands-on training. Pre- and post-session assessments evaluated the frequency knowledge, technical skills, and confidence. PDSA Cycle 2: Residents applied POCUS skills in clinical settings over two months, performing bedside IVC, cardiac EF, and lung ultrasound examinations in clinical practice. Faculty and senior residents provided real-time supervision and feedback. Follow-up assessments look for retention, and frequency of clinical use compared to pre-session assessment.

## RESULTS

Eight PGY-1 residents participated; seven completed the two-month follow-up. All categories were assessed using a standardized 4-point scale. Following PDSA Cycl 1, IVC competency improved with knowledge increased from 2.38 to 3.25 (+36.8%), skills from 1.50 to 2.75 (+83.3%), and confidence from 1.75 to 2.87 (+64%). Visual EF assessment improved with knowledge increased from 2.38 to 2.63 (+10.5%), skills from 0.88 to 1.63 (+85.7%), confidence from 0.85 to 1.95 (+129.4%). Lung POCUS also improved with knowledge increased from 2.37 to 2.62 (+10.5%), skills from 0.88 to 1.63 (+85.2%), and confidence from 1.06 to 2.43 (+129.2%).

Similar upward trends with sustained gains were observed at the two-month follow-up (PDSA Cycle 2), including continued improvement in knowledge retention, technical skills, and confidence. Frequency of clinical use also improved across all three domains, including IVC use by 40%, lung POCUS use by 30%, and cardiac POCUS use by 54%. Overall improvements across domains exceeded the project goal of 20% change.

## CONCLUSIONS

Our QI project demonstrates that a sustainable, curriculum-based approach can successfully incorporate POCUS training into an internal medicine curriculum. Simulation-based training led to rapid gains in residents' knowledge, technical skills and confidence, while supervised routine application reinforced retention and integration into daily workflow in residency training. Future directions include expanding the POCUS curriculum to more organ systems (i.e. abdomen, vascular ultrasound), and expanding implementation to other residency programs (i.e. Anesthesia, Emergency Medicine, Family Medicine) to provide interdepartmental POCUS education initiatives.

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