

Oregon Health & Science University
School of Medicine

Scholarly Projects Final Report

Title

Evaluation & Optimization of Echocardiogram Use in the Emergency Department

Student Investigator's Name

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2026

Project Course

Scholarly Projects Curriculum

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Scholarly Project Final Report

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Project/Research Question

Compare the number of ECHOs performed in the ED to the total POCUS numbers in order to determine if ECHO is a well-utilized form of ultrasound in the emergency setting.

Type of Project

Performance improvement project.

Key words

POCUS, ultrasound, Echocardiogram, chest pain, shortness of breath

Meeting Presentations

If your project was presented at a meeting besides the OHSU Capstone, please provide the meeting(s) name, location, date, and presentation format below (poster vs. podium presentation or other).

N/A

Publications

N/A

Submission to Archive

Final reports will be archived in a central library to benefit other students and colleagues. Describe any restrictions below (e.g., hold until publication of article on a specific date).

N/A

Scholarly Project Final Report

Next Steps

Implementation of a POCUS education program for ED providers in order to increase knowledge and utilization of ultrasound, then compare ECHO data before and after POCUS education.

Please follow the link below and complete the archival process for your Project in addition to submitting your final report.

https://ohsu.ca1.qualtrics.com/jfe/form/SV_3ls2z8V0goKiHZP

Student's Signature/Date *(Electronic signatures on this form are acceptable.)*

This report describes work that I conducted in the Scholarly Projects Curriculum or alternative academic program at the OHSU School of Medicine. By typing my signature below, I attest to its authenticity and originality and agree to submit it to the Archive.

X *Kylee Huck* 2/24/26

Student's full name

Mentor's Approval *(Signature/date)*

X *Michael Triller* 03/06/26

Mentor name

Scholarly Project Final Report

Report:

Introduction

Point-of-care ultrasound (POCUS) is an inexpensive tool that can be used for early recognition of many conditions, including those of cardiac and pulmonary origin, in the emergency department. Further, chest pain and shortness of breath are common chief complaints among adult patients in the emergency department. There are many ways to evaluate these patients, including history, physical exam, laboratory studies, and formal imaging studies, and POCUS is another tool that can be added to this list.

The aim of this project is to compare the number of ECHOs performed in the emergency department to total POCUS numbers in order to determine if ECHO is a well-utilized form of ultrasound in the emergency setting. Per Buhmaid et al (2019), “Of patients with chest pain and shortness of breath in the ED, 27% (35/129) were ultimately diagnosed with conditions such as pneumothorax, pericardial effusion, pneumonia, and pulmonary edema.”¹ In the absence of rapid, efficient diagnostic tools for these acute cardiac and pulmonary conditions, these patients may not receive prompt, appropriate care and thus may experience poorer outcomes. The emergency department is the frontline for inpatient healthcare, and these providers require the most effective and efficient diagnostic tools in order to provide high-quality patient care in the acute setting².

By determining if ECHO is a well-utilized form of ultrasound in the emergency department, we can recognize potential gaps in use and consider future implementation of a POCUS education program for emergency department providers. This rapid, efficient diagnostic avenue is relatively inexpensive and accessible in the emergency setting, and thus can impact the quality of care provided for patients.

Methods

This is an observational performance improvement study of a 9-month clinical intervention performed in the emergency department. The participants include all patients who receive a bedside ECHO in the emergency department, and the comparison group includes all patients who receive any POCUS in the emergency department. We did not recruit or need to retain participants as there was no patient-specific follow-up required for this study. There are no exclusion criteria for this study. This is a convenience sample, meaning it was not mandatory for the provider to perform the study, however the emergency department providers were informed of this study and were encouraged to utilize POCUS whenever it was clinically indicated and appropriate for their patients.

The intervention for this study was a comparison of POCUS ECHOs performed in the emergency departments to all POCUS studies utilized in the emergency setting. The emergency department providers saved all bedside ultrasound studies to the EXO software which was built into the ultrasound devices. We tracked the number of ECHOs and the total number of POCUS studies (including ECHO) between the months of April 2025 and December 2025. The quality of the ultrasounds was not evaluated for this project and the providers were not provided with feedback on their ultrasound technique or results.

The analysis that was performed for this study was a Pearson Correlation, in which we compared the number of ECHOs to the total number of POCUS studies performed in the emergency department between the months of April 2025 and December 2025.

Scholarly Project Final Report

Results

Following the data collection, we evaluated the data from April 2025 through December 2025 and performed a Pearson Correlation for our data analysis. We found that there is a strong positive correlation between the number of ECHOs performed and the total number of ultrasounds performed in the emergency department (correlation coefficient $R = 0.93$). The correlation coefficient is significantly different from zero ($p < 0.01$).

Month (2025)	# of Ultrasounds	# of ECHOs
April	81	35
May	81	42
June	66	37
July	65	31
August	52	23
September	30	15
October	57	28
November	49	18
December	49	20

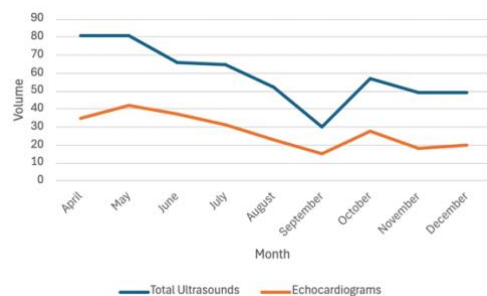


Figure 1. Number of Echocardiograms performed in 2025 compared to total number of ultrasounds by month.

We found that the total ultrasound and ECHO volumes moves together month-to-month. ECHO volume closely tracks with ultrasound trends, maintaining a consistent share of overall volume across months.

Discussion

The key takeaway from this project was that ECHOs consistently represent 35-50% of total ultrasound volume, indicating a stable service mix despite month-to-month fluctuations. The variability in patient volume does not materially change ECHO utilization rate. Of note, after a September low, both total ultrasounds and ECHOs rebounded in October, suggesting seasonal or operational impact rather than demand loss.

Potential limitations of this study include variable levels of skills and interest in POCUS, which may have resulted in fewer ultrasounds and lower quality studies. We found that POCUS is a valuable diagnostic tool in the emergency department, though should be used regularly in order to maintain an adequate skill level and enhance clinical relevance of scans.

Scholarly Project Final Report

In terms of next steps, we are interested in implementation of a POCUS education program for the emergency department providers in order to increase knowledge and utilization of ultrasound. A potential follow-up study could compare the data before and after POCUS education and look into both the quantity and the quality of the studies performed. The ultimate goal of our current project and this potential future study is to encourage the use of POCUS in the emergency department and increase provider comfort and knowledge.

Conclusions

We found that there is a strong positive correlation between the number of ECHOs performed and the total number of ultrasounds performed in the emergency department (correlation coefficient $R = 0.93$). The correlation coefficient is significantly different from zero ($p < 0.01$). The key takeaway from this project was that ECHOs consistently represent 35-50% of total ultrasound volume, indicating a stable service mix despite month-to-month fluctuations.

References

1. Buhumaid RE, St-Cyr Bourque J, Shokoohi H, Ma IWY, Longacre M, Liteplo AS. Integrating point-of-care ultrasound in the ED evaluation of patients presenting with chest pain and shortness of breath. *Am J Emerg Med.* 2019 Feb;37(2):298-303. doi: 10.1016/j.ajem.2018.10.059. Epub 2018 Oct 30. PMID: 30413369.
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3. Abrams E, Allen A, Lahham S. Aortic Dissection with Subsequent Hemorrhagic Tamponade Diagnosed with Point-of-care Ultrasound in a Patient Presenting with STEMI. *Clin Pract Cases Emerg Med.* 2019 Feb 26;3(2):103-106. doi: 10.5811/cpcem.2019.1.40869. PMID: 31061962; PMCID: PMC6497200.
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