

Oregon Health & Science University  
School of Medicine

**Scholarly Projects Final Report**

**Title**

Needs Assessment of Point-of-Care Ultrasound at a Rural Public Hospital in Mexico

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**Project/Research Question**

What are the prior exposures, assessment comfort levels and general interest in Point of Care Ultrasound (POCUS) training of the faculty physicians and residents at Hospital General San Francisco located in Nayarit, Mexico?

**Type of Project**

Needs Assessment

**Key words**

Needs Assessment Survey, Point-of-Care Ultrasound, Rural Mexico

**Meeting Presentations**

NA

**Publications**

NA

**Submission to Archive**

No restrictions

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## Introduction

With the ever-growing evolution of medicine, imaging has become a crucial component of the timely diagnosis and management of diseases. Since 1985, the World Health Organization (WHO) has recommended the use of ultrasound imaging in low-and middle-income countries (LMIC) due its portability, inexpensiveness, safety, and immediateness<sup>1</sup>. Point of Care Ultrasound (POCUS) is the use of ultrasound at the bedside to answer specific diagnostic questions and guide procedures.

There are established teaching curricula for the use of POCUS in many developed nations, including the United States<sup>2</sup>. However, a lack of continuous education remains a barrier to its utilization in LMIC<sup>3</sup>. To the author's knowledge, based on personal communication with current Mexican physicians and via literature search<sup>4</sup>, there is not a national teaching curriculum for use of POCUS in Mexico. More specifically, the faculty physicians and residents of Hospital General San Francisco in the town of San Francisco, Nayarit, do not use POCUS as a part of their practice.

Hospital General San Francisco provides a wide array of services including Emergency Medicine, Internal Medicine, Family Medicine, Obstetrics and Gynecology, Pediatrics, Orthopedics and General Surgery to the municipality of Bahia de Banderas and the municipality of Compostela, which includes roughly 30 towns in the area. As of May of 2022, there were roughly 10 residents and 20 physicians working there. The hospital's resources include basic laboratory and X-ray services. Currently there is no CT scanner; however, the hospital does have two iQ Butterfly ultrasound machines, which are kept in storage as they are not used.

Henwood et al. published a practical guide on how to develop a self-sustaining POCUS educational program in resource-limited settings<sup>5</sup>. This guide discusses crucial considerations such as needs assessment, development of a local curriculum, machine management, and quality assurance. The critical first step to this program is a thorough needs assessment, carried out in part via a quantitative survey to define and prioritize specific clinical needs while assessing experience and willingness to provide continued education among the target group of trainees.

This survey and larger needs assessment will be the first step in creating a longitudinal project at Hospital General San Francisco that has the short-term goal of providing training on basic POCUS applications and a long-term goal of transforming the basic trainings into a self-sufficient ultrasound training program based at Hospital General San Francisco.

**Project Question:** What are the prior exposures, assessment comfort levels and general interest in Point of Care Ultrasound (POCUS) training of the faculty physicians and residents at Hospital General San Francisco located in San Francisco, Nayarit, Mexico?

### **Project Aims**

**Aim 1:** Analyze faculty physician and resident prior formal or informal exposure to POCUS.

- Investigate current comfort in performing the following POCUS assessments: cardiac exam, abdominal aortic aneurysm, volume status, focused assessment of sonography in trauma (FAST) and intrauterine pregnancy.

**Aim 2:** Analyze faculty physician and resident interest in POCUS training.

- Investigate interest in learning the following diagnostic POCUS assessments: gross left ventricular function, right ventricular strain, pericardial effusion, pleural effusion, lung consolidation, pneumothorax, deep vein thrombosis, ascites/free fluid, hydronephrosis, abscesses and cellulitis.

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## Methods

The author conducted a narrative literature review on POCUS curricula and needs assessment tools<sup>1,2,3,4,5</sup>. With this information, the author developed two 14-question surveys (one for faculty, one for residents) to assess POCUS knowledge, comfort levels, interest, and applicability to medical practice. Survey items were comprised of free text, multiple choice and 5-point Likert Scale self-reported proficiency in POCUS, where 1 = “I can’t do” and 5 = “I can teach others.” Perceived applicability of POCUS-guided diagnosis and procedures were assessed using a 3-point Likert Scale where 1 = “not applicable” and 3 = “very applicable.” Additionally, demographic data were recorded regarding years in training and practice. Surveys were created in Qualtrics and distributed online from May to June of 2022. All instruments were written in Spanish and reviewed by a native speaker trained in medical Spanish. The responses were then back translated into English for analysis of the results.

## Results

A total of 17 participants completed the needs assessment survey, including eight faculty attendings and nine residents. The demographics of the faculty physicians include four specializing in Family Medicine, one in Internal Medicine, one in General Surgery, one in Pediatrics and one in Emergency Medicine. Together, the faculty physicians have an average of 14.25 years in practice. As for the demographics of the residents, there were three specializing in Family Medicine, two in Anesthesiology, one in Internal Medicine, one in General Surgery, one in OBGYN and one in Emergency Medicine. Six and three of the residents were in their fourth and third year of residency, respectively.

Results of Aim 1 (analyze faculty physician and resident prior formal or informal exposure to POCUS) are shown in Figures 1a and 1b. As seen below, 75% of attendings and 22% of residents had no former exposure of POCUS. Most faculty physicians reported “I cannot do it” regarding performing POCUS exams. As for residents, there was some comfort in performing both FAST exams and evaluating for abdominal aortic aneurysms, as 55.5% and 44.4% reported “I can do it, but I am not always sure” for both exams respectively.

**Aim 1: Analyze Former Exposure**

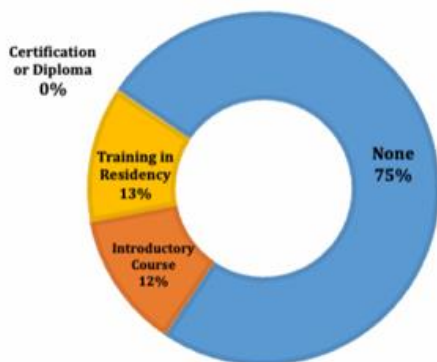


Figure 1a: Faculty Level of Pocus Training

**Aim 1: Analyze Former Exposure**



Figure 1b: Resident Level of Pocus Training

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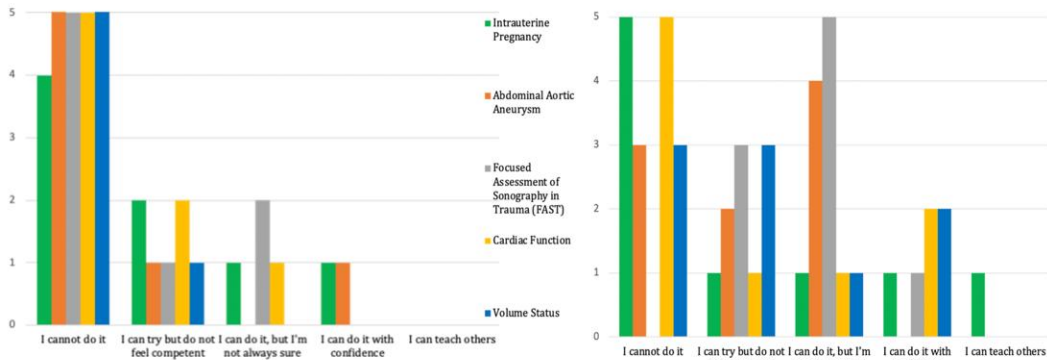


Figure 2a: Faculty Comfort performing POCUS

Figure 2b: Resident Comfort performing POCUS

Results of Aim 2 (analyze faculty and resident interest in POCUS training) show that 100% of faculty and residents reported interest in learning POCUS. 100% of faculty and residents reported interest in a formal POCUS training at Hospital General San Francisco in collaboration with the University of British Columbia. Additionally, 100% of participants responded that they would participate in an online POCUS training program. Figures 3a and 3b show faculty physician and resident perception of the applicability of POCUS as a diagnostic tool. The majority of applicants responded that all of the diagnostic tools would be applicable to their practice. Figures 4a and 4b show faculty physician and resident perception of the applicability of POCUS procedures. Attendings were more likely to report that procedural use was more applicable compared to residents, although both felt that use of POCUS would be useful in their practice. Finally, although there is a large interest and believed applicability of POCUS in their practice, 50% of faculty physicians and 43% of residents respectively believed they would never use POCUS in the future.

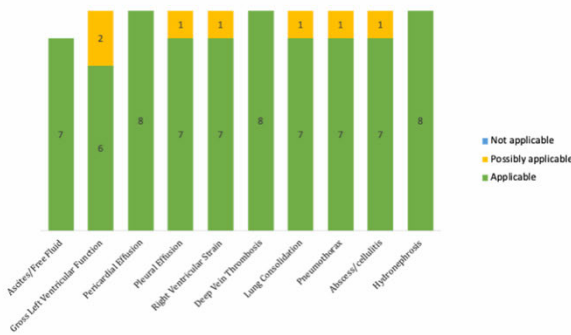


Figure 3a: Applicability of POCUS as a Diagnostic Tool for Faculty Physicians

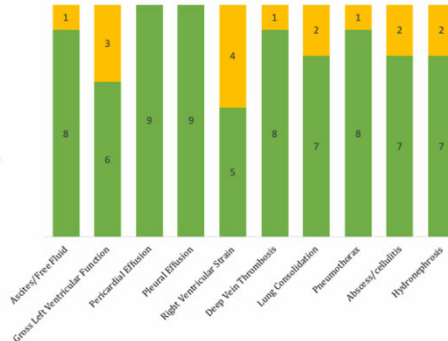


Figure 3b: Applicability of POCUS as a Diagnostic Tool for Residents

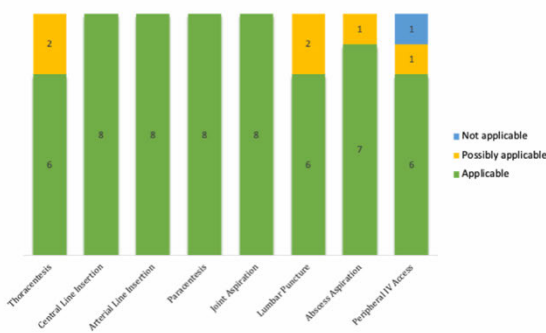


Figure 4a: Applicability of POCUS Procedures for Faculty Physicians

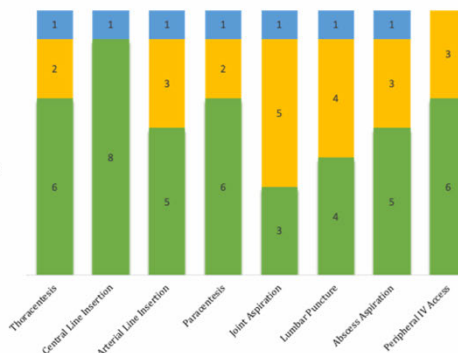


Figure 4b: Applicability of POCUS Procedures for Residents

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## Discussion

The results of needs assessment surveys for faculty physicians and residents of Hospital General San Francisco show that participants share similar experiences and attitudes regarding POCUS training, with overall unanimous interest in POCUS. Only a small number of faculty physicians, compared to a larger number of residents, have received some prior POCUS training. Overall, neither group felt comfortable with use of POCUS for diagnostic purposes or to teach others. This is not surprising, as there is no reported national POCUS curriculum in Mexican medical residencies. The only exception to this is OBGYN and family medicine residency POCUS training for evaluation of pregnancy.

All participants reported interest in a POCUS training program at their institution, both in-person and online. When discussing this interest directly with the applicants, they reported that they would enjoy a hybrid program with online classes directed by Dr. Lee and other emergency medicine physicians from the University of British Columbia. Additionally, although all faculty physicians and most residents felt their medical practice would benefit from POCUS use, about half in each group believed they would never use POCUS in the future. The needs assessment survey did not question why participants thought that they would never use POCUS in their practice, which is something this author would like to investigate in the future.

**Barriers and Limitations:** Resident participants represent only current residents rotating on their rural rotation of their last year of residency, and may not be representative of future rotating residents. Additionally, the educational curriculum may be difficult for future residents to complete given high resident turnover (four-to-six-month rotations). The data reflects self-reported knowledge only; therefore, there are many potential causes of bias. This author did not collect any objective assessments, including written or hands-on examinations, of the participants to evaluate their knowledge and skill as a part of the needs assessment. This would have been helpful to evaluate learned knowledge and skill retention following participation in the pilot POCUS curriculum and is an important area for future investigation. Finally, another limitation is that there is minimal information on local companies that could repair or service butterfly ultrasound machines.

**Next Steps:** The investigating team plans to form a hybrid online and in-person longitudinal POCUS curriculum at Hospital General San Francisco, in partnership with the University of British Columbia. Objective surveys before, during and after initiation of the POCUS training program will be crucial for investigation of the effectiveness of the implemented POCOS curriculum. Lastly, it will be important to develop a team of local clinicians to serve as trainers and mentors to future groups of healthcare providers and residents at Hospital General San Francisco.

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## Conclusions

A longitudinal POCUS educational curriculum can equip local physicians of LMIC with a tool to guide their clinical diagnoses and improve their clinical management of patients and procedural skills. The results of needs assessment surveys for faculty physicians and residents of Hospital General San Francisco show that participants share similar experiences and attitudes regarding POCUS training. Only a small number of faculty physicians compared to a larger number of residents have received some prior POCUS training.

Overall, neither group felt comfortable with its use for diagnostic purposes or to teach others. All participants reported interest in a POCUS training program at their institution, both in-person and online. Although all faculty physicians and most residents felt their medical practice would benefit from POCUS use, about half in each group believed they would never use POCUS in the future.

This assessment will be the first step in creating a longitudinal project at Hospital General San Francisco that has the short-term goal of providing training on basic POCUS applications and a long-term goal of transforming this pilot into a self-sufficient ultrasound training program.

## References (JAMA style format)

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