


# Considerations for Implementing Point-of-Care Ultrasound in a Community-Based Family Medicine Residency Program

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## ABSTRACT

**BACKGROUND:** Prior to implementing Point-of-Care Ultrasound (POCUS) training into our Family Medicine Residency Program, we sought to determine opinions on the most relevant applications according to current Family Medicine residents and recent graduates. As there are so many POCUS applications relevant to Family Medicine, it would be efficient to teach only the most relevant scans.

**OBJECTIVE:** Examine current POCUS use and the perception of future use among current residents and recent graduates of a Family Medicine Residency Program.

**METHODS:** In 2017, an electronic survey was used to examine differences in perceptions regarding the value of POCUS applications, benefits of use, and potential barriers to implementation.

**RESULTS:** Of the 88 surveys sent, 21 of 21 current residents (100%) and 28 of 67 recent graduates (41.8%) completed the survey with a total completion rate of 55.7%. The POCUS practices differed between groups. Current residents were significantly more likely than recent graduates to use POCUS for vascular procedural guidance and other procedural guidance. Recent graduates were significantly more likely to report POCUS use for abdominal aortic aneurysm screening and lower extremity Doppler screening for deep vein thrombosis. All *P* values were significant at the .05 level.

**CONCLUSIONS:** Point-of-Care Ultrasound training is generally desired by current residents. Some applications are perceived to be of sufficient utility by current residents and recent graduates. Findings would justify investment of time and effort required to implement POCUS training in Family Medicine Residency curriculums. Curriculum should focus on applications viewed as high priority based on usage rates.

**KEYWORDS:** Point-of-Care ultrasound, residents, graduates, scans

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## Introduction

Over the past decade, numerous applications of Point-of-Care Ultrasound (POCUS) have become more relevant to practicing Family Medicine. Examples include musculoskeletal (MSK) ultrasound, limited echocardiography, right upper quadrant ultrasound for biliary colic, lower extremity Doppler for deep vein thrombosis (DVT) detection, screening for abdominal aortic aneurysm (AAA), and procedural guidance (eg, joint injection, paracentesis, thoracentesis, central line placement). In addition, the focused assessment with sonography for trauma (FAST) scan has been useful in office-based Family Medicine practice to detect ascites and free fluid, such as from ruptured ovarian cysts.<sup>1–10</sup> Implementing the full scope of potential applications at once would be a daunting task.<sup>11</sup> Thus, it may be considered advisable to implement training in the application(s) deemed to be most beneficial. The need for POCUS training in Family Medicine Residency Programs has been recognized. In 2008, the American Academy of Family Physicians and the National Rural Health Association published a joint position

paper that recommended the acquisition of ultrasound examination skills for Family Medicine residents intending to practice in rural areas.<sup>12</sup>

The purpose of this study was to examine the opinions of current Family Medicine residents and recent graduates regarding the most useful POCUS applications to Family Medicine. Current residents were asked which applications they would anticipate using, and recent program graduates were asked whether they see value in potential use of POCUS in their practices. Potential benefits and barriers to using POCUS were also examined. The results of this survey would be used to delineate which POCUS applications are most relevant to Family Medicine and which applications to incorporate into the future residency POCUS training curriculum, as well as understanding perceived barriers to implementation.

## Methods

Of the 88 surveys sent, 21 of 21 current residents (100%) and 28 of 67 recent graduates (41.8%) completed the survey with a



**Table 1.** Perceived POCUS application utility.

RANKING	CURRENT RESIDENTS	RANKING	RECENT GRADUATES
Tie 1st	Vascular procedural guidance	1	LE Doppler evaluation for DVT
Tie 1st	Other procedural guidance	2	MSK Diagnostic Ultrasound
3	RUQ US for biliary colic	3	RUQ US for biliary colic
4	MSK procedural guidance	Tie 4th	MSK procedural guidance
5	LE Doppler evaluation for DVT	Tie 4th	Limited echocardiogram
6	MSK Diagnostic Ultrasound	6	AAA screen
7	AAA screen	Tie 7th	Vascular procedural guidance
8	Limited echocardiogram	Tie 7th	Other procedural guidance
9	FAST	Tie 7th	FAST

Abbreviations: AAA, abdominal aortic aneurysm; DVT, deep vein thrombosis; FAST, focused assessment with sonography for trauma; LE, lower extremity; MSK, musculoskeletal; RUQ, right upper quadrant; US, ultrasound; POCUS, Point-of-Care Ultrasound.

total completion rate of 55.7%. Residents were asked to respond to 4 prompts and were provided a list of options to choose from for each, as well as demographic questions. Prompts included the following: (1) Which of the following applications of POCUS are you currently using independently in your practice? (2) If you were able to be adequately trained in using the following applications of POCUS, how likely do you feel it would be that each application would be useful in your current or future practice setting? (3) Considering challenges to acquiring and using POCUS skills, rate the following in terms of how significant a barrier you feel each may be. (4) Considering potential benefits of acquiring and using POCUS skills, rate the following in terms of how significant a benefit you feel each may be. This study was approved by the Union Hospital Institutional Review Board, approval number 1710RP01. Informed consent was obtained by each participant prior to completing the survey.

## Results

A total of 49 participants (current residents  $n=21$ , recent graduates  $n=28$  of a Family Medicine Residency Program) completed an electronic survey in this cross-sectional, quantitative study in the winter of 2017.

### *Current POCUS use*

Recent graduates reported currently practicing in a wide range of settings, including traditional practice, outpatient only, emergency department, urgent care, walk-in clinic, and academic settings. Residents and graduates reported differences in current practice regarding POCUS use, with current residents being more likely to report use of POCUS for vascular procedural guidance ( $P<.05$ ). Recent graduates were more likely to report use of POCUS for AAA screening and lower extremity (LE) Doppler scanning for DVT ( $P<.05$ ). Other applications were largely unused.

### *Value in future practice*

Significant differences existed between the groups regarding perceived usefulness of POCUS. Current residents reported that vascular procedural guidance ( $P<.05$ ) and other procedural guidance ( $P<.05$ ) would be more useful than did the recent graduates. In addition, recent graduates reported that LE Doppler screening for DVT ( $P<.05$ ) and MSK Diagnostic Ultrasound ( $P<.05$ ) would be more useful. The POCUS applications assessed were ranked by the 2 groups, from highest perceived clinical use to least clinical use. Table 1 shows these rankings.

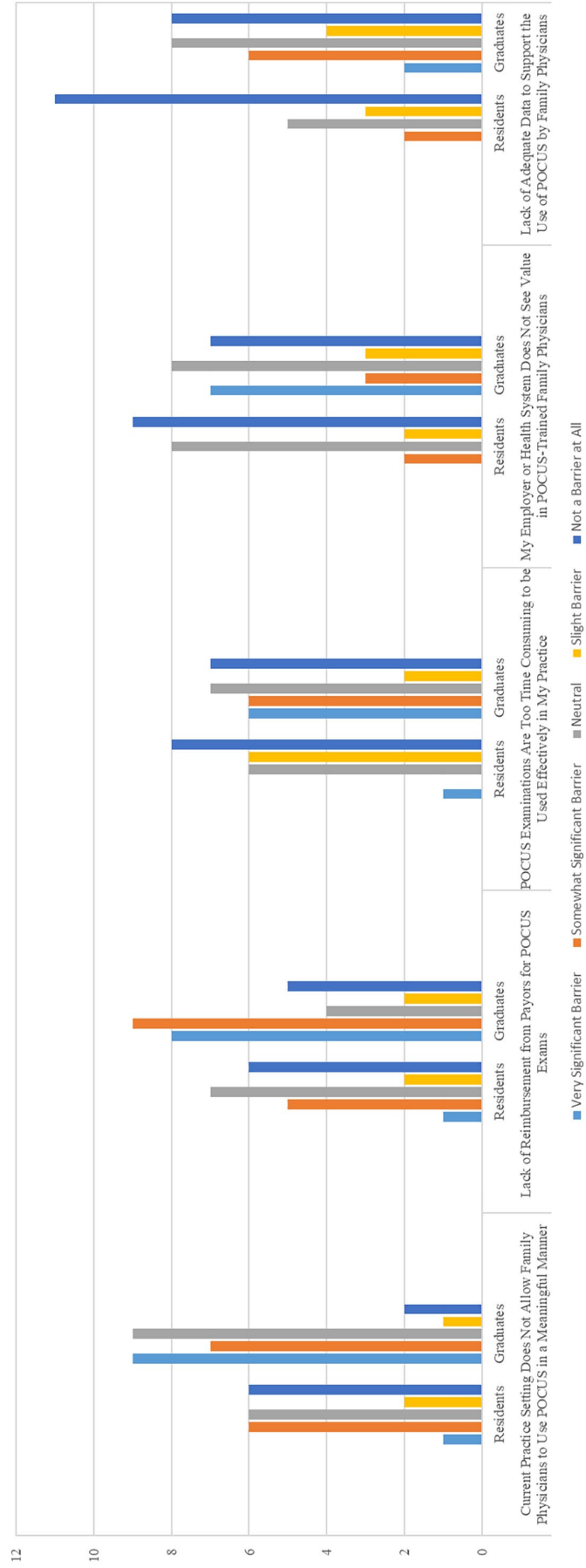
### *Perceived barriers*

Statistically significant differences existed between groups regarding “current practice setting does not allow family practitioners to use POCUS,” “lack of reimbursement from payers for POCUS examinations,” “POCUS examinations are too time-consuming,” “my employer or health system does not see value in POCUS,” and “lack of adequate data to support the use of POCUS.” Recent graduates were more likely to view these as barriers than were residents. All  $P$  values were significant at the .05 level (see Figure 1.)

Notably, residents were less likely to perceive the above categories as a barrier to POCUS implementation than were recent graduates.

## Discussion

As current residents are already largely using POCUS for the 2 applications they perceive to have the most future utility (vascular and other procedural guidance), curricular efforts should be focused on shoring up experiences in those areas and perhaps adding 1 or 2 applications that both recent graduates and current residents see as having value. Examples of this would include right upper quadrant ultrasound for



**Figure 1.** Perceived barriers to POCUS implementation. Abbreviation: POCUS, Point-of-Care Ultrasound.

evaluation of biliary colic, MSK ultrasound for both diagnostic and procedural guidance purposes, and LE Doppler evaluation for DVT. The POCUS applications viewed as having lower future use by both current residents and practicing graduates, such as AAA screening, FAST examination, and limited echocardiography, should receive lower curricular priority.

There were no statistically significant differences between the 2 groups regarding potential benefits of implementing POCUS. Both groups felt implementation of POCUS would be “very” to “somewhat” beneficial in their practice settings. This lends credence to the concept that including POCUS training in a community-based Family Medicine Residency setting would be beneficial for future family physicians and their patients.

There were several differences of opinion between current residents and practicing graduates related to perceived barriers to the use of POCUS. Specifically, practicing graduates were more likely to identify barriers related to not being allowed to use POCUS, lack of reimbursement, time constraints, and lack of data to support the use of POCUS than were the current residents. This suggests a need to speak to these barriers and their practical implications as part of the POCUS curriculum.

This study had several limitations. The primary limitation was the small sample size. The survey was only completed by a little more than half of the entire sample. In addition, the use of nonprobability sampling methods did not allow researchers to draw conclusions about causation among variables. Furthermore, the results cannot be generalized beyond the sample of voluntary participants taking part in this study.<sup>13</sup> In addition, it should be noted that the curriculum completed by these participants did not heavily emphasize POCUS, but with the obvious advantages it is something that should be given more attention in the curriculum.

Areas of further study include measuring the effectiveness of a longitudinal POCUS curriculum for Family Medicine residents in training and studying POCUS implementation on a larger scale.

## Conclusion

This study supports the idea that POCUS training is generally desired by current residents and that some applications are perceived to be of sufficient use by both current residents and recent graduates. Findings would justify the investment of time and effort required to implement POCUS training in a community-based Family Medicine Residency Program, with

curriculum efforts focused on those applications viewed as high priority based on usage rates.

## Author Note

This paper has not been published online or in print and is not under consideration elsewhere. The information in the manuscript was presented as a poster at the Family Medicine Midwest conference in October 2018 in Madison, WI.

## Author Contributions

EB and NMG designed the study, collected, and analyzed data. MW and MH contributed to data interpretation and wrote the manuscript in consultation with EB and NMG.

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