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Point of care ultrasound for the general pediatric resident: a needs assessment

Background:

Point of Care Ultrasound (POCUS) has emerged over the last ten years as an extremely valuable diagnostic tool. Improvements in cost, portability and image quality have pushed ultrasound use beyond the realms of subspecialists and into general practice. POCUS differs from the traditional method of acquiring sonographic images in that it allows pediatric clinicians to answer targeted clinical questions at the bedside, in real time. An additional benefit is that ultrasound does not expose patients to harmful ionizing radiation.

POCUS was adopted early by the field of adult emergency medicine (EM). In 2001, the American College of Emergency Physicians published the first guidelines on ultrasound standards and credentialing, and POCUS is now a core competency of EM training programs¹. Other specialties have been slower to incorporate ultrasound education into training, although that gap is rapidly closing. Policy statements regarding bedside ultrasound use during graduate medical education have been published by the governing bodies of adult critical care, obstetrics and gynecology, and hospital medicine.²⁻⁴ Regarding pediatrics, bedside ultrasound use policy statements have been published for pediatric emergency medicine fellows domestically as well as critical care and neonatology fellows in Europe.^{5,6} No guidelines exist outlining the appropriate implementation of POCUS education within pediatric residency programs.

Pediatrics as a specialty lags behind others in terms of trainee exposure to POCUS education. As of 2019 no American pediatric residency programs had a required POCUS curriculum. Only 12% had an optional curriculum, though no data was available on the number of residents who actually took part in these optional curricula⁷. The same national survey reported that 37.5% of internal medicine (IM) and 43.5% of internal medicine-pediatrics programs had formal ultrasound curricula. There is clearly a lack of exposure of pediatric trainees to POCUS, despite being generally accepted as an important diagnostic tool.

Development of a formal POCUS curriculum for pediatric trainees is difficult given the lack of established guidelines from governing bodies as well as lack of published needs assessments directing the development of educational resources. Though several needs assessments have examined undergraduate medical students and IM trainees, there is currently no published literature examining pediatric trainee's perceptions surrounding

POCUS.^{8,9} Pediatric specific ultrasound educational curricula have been proposed, but the scope of these resources is narrow and the number of participants in the studies supporting them have been small.¹⁰.

Study Aims:

Aim #1: Perform a needs assessment to elucidate attitudes and perceptions about the importance of ultrasound education in pediatric residency programs.

Study Design:

We aim to perform a needs assessment by surveying pediatric residents at multiple institutions. Our goal is to elucidate attitudes surrounding perceived importance of ultrasound skills as it pertains to general pediatric practice. We also plan to inquire about the perceived usefulness of a formal ultrasound curriculum within residency programs as well as respondent's self-reported confidence in using POCUS in practice. We will also include questions about resident's previous experience with ultrasound. Finally, we will ask respondents to identify what they think is the most important POCUS application for pediatric residents to know. The list of potential applications will be drafted from the pediatric emergency medicine ultrasound education guidelines.

This will be done by creating an online, cross-sectional survey of our key stakeholder groups. Participants will be asked to answer questions using a 5- point Likert Scale ranging from Strongly Disagree to Strongly Agree. In addition to these questions, we will also gather basic demographic data from survey respondents including level of training, age, gender, current or desired pediatric subspecialty, and level of previous exposure to ultrasound education. The responses to this survey would be kept anonymous.

Data Analysis:

Survey responses would be collected over a 6 week period. Descriptive statistics would be used to analyze the results of the survey.

Study Drugs:

No study drugs would be utilized during this study

Study Instruments:

Our survey will contain questions pertaining to the following topics:

1. Demographic data
2. Level of training
3. Desired subspecialty
4. Previous exposure to ultrasound education
5. If prior exposure, how much time was spent learning
6. How confident are you in your ability to use POCUS to answer a clinical question
7. How important do you believe ultrasound is in your clinical practice
8. Is ultrasound education an important part of pediatric residency training

9. Please select the most important POCUS application to your practice:
- a. eFAST
 - b. Focused cardiovascular imaging (pericardial effusion, structure/function)
 - c. Early pregnancy imaging
 - d. Soft tissue imaging (abscess v cellulitis)
 - e. Thoracic imaging (pneumonia, pleural effusion)
 - f. Bladder imaging
 - g. Focused abdominal imaging to identify appendicitis, pyloric stenosis, intussusception, and free peritoneal fluid
 - h. Musculoskeletal imaging to identify fractures or joint effusions
 - i. Renal imaging to identify hydronephrosis
 - j. Ocular imaging (retinal detachment, optic nerve sheath diameter for increased ICP)

Study Subjects:

Pediatric residents at participating programs will be sent a survey via email. Participation will be voluntary and there will be no monetary incentive to participate.

Potential Conflicts of Interest: None

Potential Benefits:

The results of this study will reveal important information regarding pediatric trainee's perspectives regarding ultrasound education. The results of this study may be used to direct the creation of educational material geared towards teaching pediatric residents POCUS skills.

Alternatives: N/A

References:

1. College of Emergency Physicians A. Ultrasound Guidelines: Emergency, Point-of-Care and Clinical Ultrasound Guidelines in Medicine. *Ann Emerg Med.* 2017;69(5):e27-e54.
2. Mayo PH, Beaulieu Y, Doelken P, et al. American College of Chest Physicians/La Société de Réanimation de Langue Française statement on competence in critical care ultrasonography. *Chest.* 2009;135(4):1050-1060.
3. Soni NJ, Schnobrich D, Mathews BK, et al. Point-of-Care Ultrasound for Hospitalists: A Position Statement of the Society of Hospital Medicine. *J Hosp Med.* 2019;14:E1-E6.
4. ACGME program requirements for graduate medical education in obstetrics and gynecology. *Chicago (IL): ACGME.* 2014.
http://www.acgme.org/acWebsite/downloads/RRC_progReq/220obstetricsandgynecology01012008.pdf.

5. Marin JR, Lewiss RE, American Academy of Pediatrics, Committee on Pediatric Emergency Medicine, Society for Academic Emergency Medicine, Academy of Emergency Ultrasound, American College of Emergency Physicians, Pediatric Emergency Medicine Committee, World Interactive Network Focused on Critical Ultrasound. Point-of-care ultrasonography by pediatric emergency medicine physicians. *Pediatrics*. 2015;135(4):e11113-e1122.
6. Singh Y, Tissot C, Fraga MV, et al. International evidence-based guidelines on Point of Care Ultrasound (POCUS) for critically ill neonates and children issued by the POCUS Working Group of the European Society of Paediatric and Neonatal Intensive Care (ESPNIC). *Crit Care*. 2020;24(1):65.
7. Reaume M, Siuba M, Wagner M, Woodwyk A, Melgar TA. Prevalence and Scope of Point-of-Care Ultrasound Education in Internal Medicine, Pediatric, and Medicine-Pediatric Residency Programs in the United States. *J Ultrasound Med*. 2019;38(6):1433-1439.
8. Stone-McLean J, Metcalfe B, Sheppard G, et al. Developing an Undergraduate Ultrasound Curriculum: A Needs Assessment. *Cureus*. 2017;9(9):e1720.
9. Kessler C, Bhandarkar S. Ultrasound training for medical students and internal medicine residents--a needs assessment. *J Clin Ultrasound*. 2010;38(8):401-408.
10. Good R, Orsborn J, Stidham T. Point-of-Care Ultrasound Education for Pediatric Residents in the Pediatric Intensive Care Unit. *MedEdPORTAL*. 2018;14:10683.