

Refining the Wild Wild West of Point-of-Care Ultrasound at an Academic Community Hospital

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DESCRIPTION OF THE PROBLEM

Point-of-care ultrasound (POCUS) describes the performance and interpretation of ultrasound by non-radiologist clinicians at a patient's bedside. POCUS use has grown dramatically over the past two decades, with many departments throughout the hospital adopting and adapting its use. POCUS applications include applications traditionally found within the radiology suite such as simple procedural guidance (thoracentesis, paracentesis, arthrocentesis) and diagnostic ultrasound (biliary, renal, pregnancy). Applications are also drawn from other specialties, including cardiology (intravascular volume assessment, ventricular function), ophthalmology (retinal and vitreous assessment), and anesthesiology (nerve blocks).

The utility of POCUS has been recognized by medical schools and has been integrated throughout the medical school curriculum [1]. The AMA first acknowledged POCUS in 2009 as appropriate for physicians across specialties to perform [2]. The ACR approved a resolution regarding POCUS in 2013, affirming the utility of POCUS but stressing the importance of training, credentialing, quality assurance, and documentation [3]. Other medical specialties (American College of Chest Physicians, American Society of

Echocardiography, American College of Emergency Physicians, and others) have published similar policy statements and training guidelines [4-6].

POCUS AT OUR HOSPITAL

Regions Hospital is a tertiary care trauma center with 454 beds and an academic program that includes an active emergency medicine residency, as well as clinical education of medical students and other residents. In 2013, the Chief Medical Officer of the hospital appointed a multidisciplinary committee to improve and standardize the practice of POCUS throughout the hospital. Although POCUS was already used extensively in the emergency department (ED), there was opportunity for improvement. In addition, there was growing interest in using POCUS elsewhere in the hospital.

As ultrasound comes into more frequent use by more providers in different specialties in more locations, it will be important . . . that we have standards around privileging, training, quality/peer review, as well as clarity around billing/reads. (Regions Hospital Chief Medical Officer, personal communication, December 3, 2013)

Ultimately, the mandate of the committee was true standardization around all aspects of POCUS. We

wanted to take the previous "Wild Wild West" and create a system that was more reliable and consistent.

Issues that needed to be addressed included:

1. Training and credentialing: Although nearly all emergency medicine physicians had completed ultrasound training in residency, very few other physicians in the hospital had received training in residency or fellowship. Among the physicians who wanted to begin using POCUS, there was a wide range of knowledge and experience. POCUS credentialing requirements were only described for emergency physicians.
2. Imaging standards: No imaging standards existed to guide providers. An audit of right upper quadrant ultrasounds at the time showed the number of saved images from 0 to 16, variably showing long axis and transverse views of the gallbladder with or without common bile duct images.
3. Workflow: A workflow was in place in the ED. However, this was being unreliably followed, and at times there was no mention of the bedside ultrasound in any documentation, and at other times, an interpretation note was only included in the provider encounter note. An audit at the time showed nearly

50% of studies without images or interpretation notes. Ultrasound equipment in other areas of the hospital was not linked to PACS or to the electronic medical record (EMR), so images could not be permanently stored.

4. Quality assurance: Quality assurance and peer review were not being performed regularly and there was no reliable method in place for providers to receive feedback.
5. Billing: The ED was the only department in the hospital that was coding and billing for POCUS. Based on an agreement with the radiology department, no POCUS cases were billed when a comprehensive study of the same body region was performed in the radiology suite in the same day.

WHAT WAS DONE

The POCUS Committee was initially led by the hospital chief of staff and included members from radiology, emergency medicine, cardiology, hospital medicine, critical care medicine, and hospital administration. After helping develop the charter and expectations, the hospital chief of staff who had little experience with POCUS excused himself from the committee, and it was decided that the committee would be cochaired by one physician each from radiology and emergency medicine. A charter was developed that clearly stated the issues described previously and gave the committee clear objectives moving forward. Administrative support was provided from the Medical Staff Services office. As word of the committee spread, other departments in the hospital, as well as outpatient clinics, showed interest in joining. The committee's focus

was hospital based, so it was decided that outpatient clinics would not be included.

Training and Credentialing

Published mandates and guidelines gave general guidance as to the appropriate type of training necessary for credentialing, but few publications described specifics [6]. We sought to balance ideal needs and desires with realistic expectations. Because each department would be using POCUS differently, we chose to allow individual departments to determine the training that would be most appropriate for their physicians. Training options included physician super-users from collaborating departments training more novice physicians, local and distant CME training courses, and online training courses.

Assessing competence is challenging, but most societies have suggested that the performance of a given number of examinations helps ensure provider competence. We divided POCUS into three categories—noninvasive, invasive, and cardiac. We realized that there would be physicians who would use POCUS to assess patients but would likely defer any procedural use to radiology. Because echocardiography was historically separate from radiology, we chose to have separate requirements for cardiac ultrasound [7]. The numbers of ultrasounds that are required for initial credentialing and for ongoing credentialing are documented in [Appendix 1](#). The only published ultrasound examination number requirement guidelines were from the American College of Emergency Physicians and from the Accreditation Council for Graduate Medical Education [8,9]. Given this paucity of recommendations, we were tasked with determining numbers that were

minimally adequate while remaining practical.

Imaging Standards

We next focused on developing imaging standards. Before the formation of our committee, there was wide variability in the number and type of images that were obtained by providers for each type of examination. The committee decided upon imaging requirements that would adequately allow for assessment of the most likely focused questions that were being asked by the clinician at the bedside. For example, the primary question related to renal ultrasound was whether the patient had hydronephrosis. We determined that three images of the kidney would reasonably answer the question. However, in this examination we also required images of both kidneys and the bladder to better match a formal radiology protocol. This was not commonly done previously. Imaging requirements for each examination are shown in [Appendix 2](#).

Workflow

Although we had a workflow in place in the ED, we chose to reconfigure it to strengthen it and standardize it across departments. The new workflow had three steps: (1) place order in the EMR (Epic Version Epic 2014, Verona, Wisconsin, USA), (2) select the patient from the wirelessly transmitted patient work list and perform the ultrasound, (3) place an interpretation note in the EMR.

We created a list of ultrasound examinations ([Table 1](#)), which allowed for easy organization. Meanwhile, the new workflow was strengthened by creating a chart deficiency notice when a provider failed to place an interpretation note in the EMR.

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