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## Ultrasound in Emergency Medicine

### EMERGENCY DEPARTMENT ULTRASOUND CREDENTIALING: A SAMPLE POLICY AND PROCEDURE

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□ **Abstract**—Emergency physician use of bedside ultrasound has increased dramatically over the last two decades. However, many emergency departments find it difficult to gain formal hospital credentialing for bedside sonography. We present the Emergency Department (ED) Ultrasound Credentialing Policy from the University of California, San Francisco. Although the American College of Emergency Physicians has published formal guidelines on this subject, they are not written in such a way that they are readily transcribed into a document suitable for review by credentialing committees and executive medical boards. Our policy details the background of emergency bedside ultrasound, the goals of its use, the scope of emergency physician sonography, credentialing criteria, and an example of a quality assurance program. We have not changed the components of the previously published guidelines. Rather, this document has withstood the rigor of our own credentialing process and is presented as *an example* in the hopes that it may help other EDs who seek credentialing in their institutions. This document is intended as a guideline for credentialing committees and will require alteration to meet the needs of each different hospital; however, the overall framework should allow for a less time-consuming process. © 2009 Elsevier Inc.

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### INTRODUCTION

Ever since the early 1980s, the use of bedside ultrasound by emergency physicians has become increasingly popular (1). The major Emergency Medicine societies support focused sonography in the Emergency Department (ED), and the American Medical Association has similarly advocated for its use (1–3). The medical literature abounds with reports that have documented the benefits of bedside sonography performed by emergency physicians. Sample curricula have been developed, and guidelines for credentialing and use have been developed (1,4). Bedside sonography has penetrated the academic emergency environment nearly completely (5,6).

However, there are still great challenges involved with implementing ultrasound programs at most hospitals across the country (7). In 1997, Tandy and Hoffenberg attempted to aid EDs by discussing how to gain hospital approval (8). They covered the goals of an ED ultrasound program, the scope of practice, credentialing requirements, and quality improvement. Lanoix, also in 1997, discussed similar issues, and offered some strategies to help convince the hospital administration of the important role of bedside emergency sonography (9). By 2001, the American College of Emergency Physicians (ACEP) produced guidelines for emergency ultrasound, a tremendous step forward in terms of helping EDs with the credentialing process (1). Despite these efforts, there is still significant debate regarding the use of and the

credentialing for bedside ultrasound performed by emergency physicians (7). Currently, only 19% of community EDs in the United States have 24-hour-a-day availability of bedside ultrasound (10).

## DISCUSSION

At the ED of the University of California San Francisco, we set out in 2002 to establish a process for credentialing physicians in the use of emergency ultrasound. Like other EDs, we encountered significant difficulty, and relied upon the guidelines and recommendations above to form our policy. Although each was quite helpful, none was suitable to use as an example for our internal credentialing process. We attempted to contact several other large university EDs to find a written policy with which to form our own, but were unable to find one. Thus, we present our policy and procedure as a model for other hospital EDs to use as an aid to producing a viable credentialing program in their own institution.

Our document does not intend to address several shortfalls of the ACEP guidelines. For example, current guidelines recommend a certain number of sonographic studies in each area to become proficient, but do not address the need for experience with positive vs. negative studies. Further, there are not reliable studies to justify the number of sonographic studies that are currently recommended to become proficient in each of the different areas. There are also no studies to show that this credentialing process is any better than other credentialing processes. These and other shortfalls should be addressed in future research studies. It is important to realize that we in no way intended to improve upon or validate the existing guidelines. Rather, our only intent was to create a document that would explain the creation and maintenance of an emergency ultrasound program according to the current recommended guidelines that would be understood by a wide range of medical professionals in order to facilitate the credentialing process for emergency physicians.

It is further important to note that for our own particular institution, some requirements that were placed in our protocol may not meet the same goals as those in other institutions. One good example is that we arbitrarily requested a 90% accuracy rate for our credentialing physicians compared to the formal radiology report. Although there is absolutely no medical literature to support this rate, and much literature to support the notion that sometimes radiologists can not even agree with this degree of accuracy, our department nonetheless felt that unless we could achieve this level of proficiency, it wouldn't make sense to implement this process given our level of radiology ultrasound coverage. For those

institutions without regular coverage of ultrasound, it may still be an extremely useful tool with much lower rates of accuracy.

Finally, there are a number of components of our policy and procedure that may seem unusual to those with currently established programs. While going through the process of establishing a program for bedside ultrasonography, we were impressed with the extent to which providers outside the ED had a difficult time understanding the differences between formal radiologic ultrasound and focused emergency sonography, and thus, this concept is discussed in detail in our protocol. In addition, we found that many of our institution's leaders felt that we were somehow trying to use the ultrasound instead of clinical reasoning, and thus, we incorporated a brief discussion of disposition decision-making to help them better understand how the use of ultrasound improves our ability to care for patients.

## CONCLUSION

We hope this document aids other EDs in their creation of successful emergency ultrasound programs. We feel that a concise protocol that has successfully passed through a university medical system's credentialing process should be readily available to EDs that are attempting to create their own policies. Our full protocol is presented in the Appendix.

## REFERENCES

1. American College of Emergency Physicians. ACEP emergency ultrasound guidelines—2001. *Ann Emerg Med* 2001;38:470–81.
2. American Medical Association. Privileging for ultrasound imaging. 2001; Policy H-230.960. Available at: [www.ama-assn.org](http://www.ama-assn.org).
3. Society for Academic Emergency Medicine. Ultrasound position statement; 2004. Available at: [www.saem.org](http://www.saem.org).
4. Mateer J, Plummer D, Heller M, et al. Model curriculum for physician training in emergency ultrasonography. *Ann Emerg Med* 1994;23:95–102.
5. Counselman FL, Sanders A, Slovis CM, Danzl D, Binder LS, Perina DG. The status of bedside ultrasonography training in emergency medicine residency programs. *Acad Emerg Med* 2003; 10:37–42.
6. Moore CL, Gregg S, Lambert M. Performance, training, quality assurance, and reimbursement of emergency physician-performed ultrasonography at academic medical centers. *J Ultrasound Med* 2004;23:459–66.
7. Cardenas E. Emergency medicine ultrasound policies and reimbursement guidelines. *Emerg Med Clin North Am* 2004;22:829–38, x–xi.
8. Tandy TK 3rd, Hoffenberg S. Emergency department ultrasound services by emergency physicians: model for gaining hospital approval. *Ann Emerg Med* 1997;29:367–74.
9. Lanoix R. Credentialing issues in emergency ultrasonography. *Emerg Med Clin North Am* 1997;15:913–20.
10. Moore CL, Molina AA, Lin H. Ultrasonography in community emergency departments in the United States: access to ultrasonography performed by consultants and status of emergency physician-performed ultrasonography. *Ann Emerg Med* 2006;47:147–53.

11. Witting MD, Euerle BD, Butler KH. A comparison of emergency medicine ultrasound training with guidelines of the Society for Academic Emergency Medicine. *Ann Emerg Med* 1999;34:604–9.
12. Jehle D, Guarino J, Karamanoukian H. Emergency department ultrasound in the evaluation of blunt abdominal trauma. *Am J Emerg Med* 1993;11:342–6.
13. Braffman BH, Coleman BG, Ramchandani P, et al. Emergency department screening for ectopic pregnancy: a prospective US study. *Radiology* 1994;190:797–802.
14. Schlager D, Lazzareschi G, Whitten D, Sanders AB. A prospective study of ultrasonography in the ED by emergency physicians. *Am J Emerg Med* 1994;12:185–9.
15. Porter RS, Nester BA, Dalsey WC, et al. Use of ultrasound to determine need for laparotomy in trauma patients. *Ann Emerg Med* 1997;29:323–30.
16. Kuhn M, Bonnin RL, Davey MJ, Rowland JL, Langlois SL. Emergency department ultrasound scanning for abdominal aortic aneurysm: accessible, accurate, and advantageous. *Ann Emerg Med* 2000;36:219–23.
17. Rosen CL, Brown DF, Chang Y, et al. Ultrasonography by emergency physicians in patients with suspected cholecystitis. *Am J Emerg Med* 2001;19:32–6.
18. Blaivas M, Sierzenski P, Plecque D, Lambert M. Do emergency physicians save time when locating a live intrauterine pregnancy with bedside ultrasonography? *Acad Emerg Med* 2000;7:988–93.
19. Blaivas M, Harwood RA, Lambert MJ. Decreasing length of stay with emergency ultrasound examination of the gallbladder. *Acad Emerg Med* 1999;6:1020–3.
20. Shih CH. Effect of emergency physician-performed pelvic sonography on length of stay in the emergency department. *Ann Emerg Med* 1997;29:348–51; discussion 352.
21. Sankoff J, Keyes LE. Emergency medicine resident education: making a case for training residents to perform and interpret bedside sonographic examinations. *Ann Emerg Med* 1999;34:105–8.
22. Hockberger RS, Binder LS, Graber MA, et al. The model of the clinical practice of emergency medicine. *Ann Emerg Med* 2001; 37:745–70.

## APPENDIX: EMERGENCY ULTRASOUND POLICY AND PROCEDURE

### *Rationale and Background for the Use of Ultrasound by Emergency Physicians*

*General.* Ultrasonographic imaging performed at the bedside by emergency physicians has increased dramatically in clinical importance during the past two decades (1). Medical centers across the country have increasingly embraced this new tool, with 95% of emergency medicine residency programs teaching ultrasound in their curriculum, and 89% reporting a dedicated Emergency Department (ED) ultrasound machine by 2001 (5,11). This has been accompanied by a growing scientific literature on the benefits to quality of care, and the ability of emergency physicians to accurately interpret focused ultrasound examinations (12–17).

The role of ultrasound in the ED is not only to aid in diagnosis, but to help make key management decisions and facilitate rapid dispositions in a time of increasing ED crowding (18–20). The capacity of the ED to care for new patients is reduced by every patient who occupies a bed waiting for a procedure to be performed or interpreted. ED ultrasound can increase diagnostic accuracy,

safely guide procedures, and can make a critical difference in outcome in unstable patients who cannot wait for traditional ultrasound or be transported for other imaging modalities. Compared to Radiology Department ultrasound, the chief utility of emergency ultrasound is the fact that an emergency physician can utilize it in a matter of minutes at the bedside of any patient who needs it. This treating physician is familiar with all details of the patient's presentation and other diagnostic studies, and fully responsible for their subsequent management.

*Organizational Guidelines and Standards.* The American College of Emergency Physicians (ACEP) endorses the use of emergency ultrasound: “training, performing and interpreting ultrasound imaging should be included in the Emergency Medicine Curriculum” (1,21). The Society of Academic Emergency Medicine (SAEM) also endorses the use of emergency ultrasound: “specific training in the performance and interpretation of emergency ultrasound should be available to emergency physicians during residency training and equivalent training made available for practicing emergency physicians” (3). The “Model of the Clinical Practice of Emergency Medicine,” derived from a workforce study of practicing physicians along with a panel of emergency medicine experts identified bedside ultrasound as a procedure essential to the practice of emergency medicine (22). In 1994 a proposed curriculum for ultrasound training in emergency medicine was published in the *Annals of Emergency Medicine* (4). Finally, the American Board of Emergency Medicine (ABEM) certification process includes a number of ultrasound questions and images on both the written and oral examinations. This certification process is a requirement for board certification in emergency medicine by both new graduates and recertifying practicing physicians throughout their careers (21).

The American Medical Association (AMA) House of Delegates in December 2001 approved the following position statement: “The AMA recognizes that ultrasound imaging is within the scope of practice of physicians with training in the technology, and that physicians should qualify for privileging if they possess appropriate training as specified by their respective specialty association.” This provides clear direction from the House of Delegates that the specialty colleges should set credentialing standards for certification and training in ultrasound. The AMA further stated that hospital medical staff should review and approve criteria for granting ultrasound privileges based upon background and training for the use of ultrasound technology and strongly recommended that these criteria are in accordance with recommended training and education standards developed by each physician's respective specialty (2).

*Clinical Setting and Context of ED Ultrasound.* It is important to understand that emergency physicians do not perform comprehensive ultrasound examinations such as those conducted by radiologists and outlined in the American College of Radiology or American Institute for Ultrasound in Medicine guidelines. It is the intention that comprehensive ultrasound examinations continue to be performed by the Radiology Department in the current manner.

Instead, the intent and design of ED ultrasound is to provide an examination that quickly answers a direct, focused, and predetermined question at the bedside. The study is conducted by a clinician who has examined the patient, is familiar with the details of their presentation, medical history, and other diagnostic tests, and who is responsible for subsequent patient management. For example, a typical ED ultrasound would be used to answer a question such as "is there a gallstone or not?" It is not intended to provide a complete description and examination of the entire liver and biliary tree. The chief benefit of such directed use of ultrasound by emergency physicians is to immediately aid in choosing management strategies, subsequent testing, and determining priorities of evaluation and treatment, as well as increasing the efficiency and speed of the entire ED assessment process.

These examinations are one piece of information used by the clinician to focus a diagnostic workup and make decisions about initial treatment. As such, they are no different than the interpretation of a chest radiograph, a laboratory test, or an electrocardiogram (ECG). Like those other tests, ED ultrasound will not be used in a vacuum without corroborating clinical and diagnostic information, nor will the limitations of this test be ignored. In this regard, use of ultrasound by emergency physicians introduces no new principles of diagnosis or management compared to current practice.

*General Principles of Disposition.* Virtually all diagnostic tests in the ED, including physical examination, have limitations such as false negatives and false positives. Awareness of these limitations and integration of them into safe management decisions have always been an integral part of ED management. The disposition of patients who receive ED ultrasound, like those who do not receive it, is dependent on the integration of all available information about the patient by a physician who is physically present at the bedside. Thus, the disposition of the patient will never solely be dependent on the interpretation of the emergency physician ultrasound.

Under standard practice, ED patients not requiring admission, consultation, or further imaging are discharged home after meeting certain requirements. This standard practice will continue unchanged with the in-

roduction of ED ultrasound. Generally speaking, patients discharged home will satisfy the following conditions, and these conditions will not change after implementing emergency physician ultrasound: 1) Patients will be able to tolerate oral medications and fluid; 2) Outpatient pain control needs for the patient can be met; 3) Vital signs, laboratory, ECG, and imaging studies are all consistent with a stable diagnosis appropriate for outpatient management; 4) Patients will have an acceptable living situation for a given diagnosis; 5) Patients are judged likely to return for follow-up if necessary; 6) Appropriate outpatient follow-up is available for the patients; 7) Written instructions are provided to patients.

*Summary.* Accordingly, in agreement with both major specialty societies in Emergency Medicine (ACEP and SAEM) and the AMA, our ED has initiated a policy for credentialing emergency physicians in the performance of focused bedside ultrasound.

## CREREDENTIALING PROCESS

### *General*

There are two general categories of physicians who are attempting to acquire credentialing: those who have trained in ultrasound or achieved credentialing elsewhere, and those that have not been previously credentialed.

### *Physicians with Previous Training*

There are three routes by which previously trained faculty may be credentialed in ultrasound:

- 1) Physicians who are board certified in radiology with formal radiology-level ultrasound experience: their first 15 ultrasound examinations and interpretations will be reviewed and proctored by the ED ultrasound committee before final credentialing. In general, the breadth of the proctored examination types should be similar to the breadth of the sonographic study types that are being credentialed.
- 2) Physicians who are credentialed in ED ultrasound by another US hospital according to standards consistent with the ACEP guidelines: such candidates will not be required to perform credentialing examinations, but their first 15 ultrasound examinations and interpretations will be reviewed and proctored by the ED ultrasound committee before final credentialing. In general, the breadth of the proctored examination types should be similar to the breadth of the sonographic study types that are being credentialed. A

letter must be provided from the previous hospital detailing the credentialing process that was completed. Certification will be limited to those types of examinations in which the candidate was previously certified at the other institution; other ultrasound examination types where no previous credentialing was performed must be earned by the credentialing process described below.

- 3) Physicians who have had ultrasound training during residency with no previous credentialing as an attending physician: any type of training that the candidate has performed and documented according to ACEP standards in the numbers required for University of California San Francisco credentialing will be accepted for credentialing. Such candidates will not be required to perform the credentialing examinations, but their first 15 ultrasound examinations and interpretations will be reviewed and proctored by the ED ultrasound committee before final credentialing. In general, the breadth of the proctored examination types should be similar to the breadth of the sonographic study types that are being credentialed. Physicians, who have certain examination types that were not performed during previous training, or were only partially completed, will have to perform additional credentialing studies sufficient to meet the required total number for that area.

Candidates who have met one of the three above requirements will be fully credentialed once their proctored examinations have been reviewed by the ED ultrasound committee. Patient care decisions may be made based on the interpretation of such ultrasound studies in combination with the remainder of the clinical data. Interpretations will be documented on the chart in the same manner as formal radiology studies are currently documented in the chart.

#### *Physicians Not Previously Credentialed*

The process of formal credentialing for those physicians not meeting the above requirements will include formal didactic instruction, practice examinations on models, and credentialing examinations until proficiency is established. Physicians in this category must meet the following two requirements:

- 1) 40 hours of dedicated didactic instruction in emergency ultrasonography. Each physician must attend and complete an approved course on ED ultrasound in order to initiate the credentialing process. Such didactic training should entail lectures, structured reading, and performing practice ultrasound exami-

nations on models. At least 16 hours of initial formal didactic training is required prior to any use of ultrasound for practice (credentialing) examinations. Subsequently, physicians in training must complete further formal and documented didactic ultrasound teaching during the remainder of their credentialing process to complete a total of 40 hours.

- 2) 150 Credentialing ED ultrasounds. One hundred fifty total credentialing examinations are required before ED credentialing in all examination types can be approved (see below: Categories of Examinations). These examinations are performed by the physician on real patients in the ED, but the results will NOT change the medical decision-making process (i.e., the physician cannot use the information obtained during a credentialing examination to change any treatment or diagnostic plan). If an emergent condition is suspected, further workup and management should proceed as it would if the condition were clinically suspected. Formal radiology department studies must be performed in addition to the ED ultrasound unless the ultrasound is supervised and interpreted by a credentialed ultrasonographer. Patients will be informed that the examination being performed is not a traditional radiologic ultrasound, that a formal imaging study will be obtained for confirmation, and that they will not be billed for the procedure. Documentation will be entered in the patient's medical chart that a credentialing examination was performed after verbal consent, but the results of the ultrasound will not be included.

Credentialing ultrasounds will be performed only if there was an independent clinical indication for an ultrasound study and if the patient verbally consents. Patients with no clear indication for ultrasound will be ineligible for credentialing examinations. At no time will any formal studies be delayed in order to obtain a credentialing ultrasound, nor will any formal study be done for the sole purpose of confirming a credentialing examination. Formal imaging studies (e.g., computed tomography, ultrasound, magnetic resonance imaging performed by radiology department) will continue to be obtained only as clinically needed and recorded on the chart as for all routine patient care.

All physicians will preserve print or digital images of their credentialing ultrasounds. All physicians must also have a written interpretation for each study performed. During the credentialing process, the written interpretations will be kept in a location that is accessible to both the physician performing the credentialing as well as the ED ultrasound committee. Follow-up diagnostic studies will also be documented in the same location. Discrep-

ancies will be recorded and reviewed by the ED ultrasound committee.

Credentialing ultrasounds are ideally performed in the ED because that is the environment in which they will be used. However, they may also be scheduled in other hospital venues such as the radiology department or intensive care unit, if that is possible.

Privileges may be granted in each of the seven examination categories separately (see below: Categories of Examinations). If, at the completion of the credentialing examinations for a particular type of ultrasound, a candidate's accuracy is not 90% or greater, another 25 examinations in this area (for example, if only the renal ultrasounds are <90% correct, then the credentialing physician will have to repeat 25 additional renal studies with an accuracy of >90% to become credentialed to perform renal ultrasound). If satisfactory performance is not achieved after the additional 25 examinations, the ultrasound committee will recommend to the chair of the department additional supplemental training to achieve the desired performance.

## CATEGORIES OF EXAMINATIONS

Physicians will be trained and credentialed separately for each of the following seven categories:

- 1) Trauma – The trauma ultrasound is performed according to standard guidelines for Focused Abdominal Sonography in Trauma (FAST). Presence or absence of free fluid in four fields will be assessed. Twenty-five credentialing ultrasounds are required in this area.
- 2) Identification of pregnancy – The pelvic ultrasound in early pregnancy is performed to identify the presence or absence of intrauterine pregnancy (IUP). A pregnancy is defined as an intrauterine gestational sac that contains a yolk sac or fetal pole. Both transabdominal and transvaginal approaches may be used. Twenty-five credentialing ultrasounds are required in each area (transabdominal and transvaginal – however, in many cases, these will be performed on the same patient).
- 3) Cardiac – the cardiac ultrasound is used to identify the presence or absence of cardiac activity in a code situation, or to identify the presence or absence of a pericardial effusion. Twenty-five credentialing ultrasounds are required in this area.
- 4) Right upper quadrant abdomen – the right upper quadrant or biliary examination is used to identify the presence or absence of gallstones, gallbladder wall thickening, pericholecystic fluid, sonographic Murphy's sign, and dilatation of the common bile duct.

Twenty-five credentialing ultrasounds are required in this area.

- 5) Renal – the renal examination is used to identify the presence or absence of hydronephrosis and to identify the presence or absence of renal calculi. Twenty-five credentialing ultrasounds are required in this area.
- 6) Aorta – the aortic examination is used to identify the presence or absence of increased aortic width consistent with abdominal aortic aneurysm (>3 cm considered abnormal). Twenty-five credentialing ultrasounds are required in this area.
- 7) Procedural – procedural ultrasound is used to identify anatomy critical to the successful completion of a procedure. The physician will use ultrasound to identify the relevant structure and location, and record an image and interpretation. The procedure will be performed in the usual fashion.
  - a) Central venous line placements – 5 credentialing ultrasounds are required for each of the following regions:
    - i) Internal jugular
    - ii) External jugular
    - iii) Common femoral vein
  - b) Subcutaneous foreign body detection and abscess drainage – 5 credentialing ultrasounds required in this area.
  - c) Thoracentesis and paracentesis – 5 credentialing ultrasounds required in this area.

In the future, additional categories of examinations may be added once reviewed and approved by the ED ultrasound committee.

## MAINTENANCE OF CREDENTIALS

### *Documentation*

All ultrasound studies that are used for patient care decisions will include a written interpretation of the study documented on the ED chart. Text reports will contain standardized language to inform the reader that this was a focused ED ultrasound and not a formal traditional diagnostic ultrasound. Images will be preserved in an appropriate ED archive so that they will be retrievable for review purposes.

### *Minimum Number of Examinations*

Maintenance of credentials will require that each physician perform 25 documented ultrasounds per year. If this volume is not met, all the studies performed that

year will be reviewed by the ultrasound committee. A 90% accuracy level will be required. If this accuracy level is met, and subsequent volume is < 25 per year, the ultrasounds for that physician would be similarly reviewed for accuracy every 2 years. If the 90% accuracy level is not achieved, the ED ultrasound committee will review the performance and make recommendations to the chair of the department regarding continued privileges.

#### *Quality Assurance*

In order to constantly monitor accuracy of interpretation, a number of methods will be employed. An ED ultrasound committee, composed of the ED Ultrasound Director, the Clinical Director of the ED, the QI director of

the ED, and a radiologist ultrasonographer, will be formed and will review performance as described in this document.

All studies performed will be documented on the chart by the performing physician. Ultrasound interpretations will be reviewed by the ED ultrasound committee at appropriate intervals based on volume. Examinations performed by credentialed ultrasonographers will be randomly sampled. All incorrect interpretations will be reviewed by the ultrasound committee.

The Ultrasound committee and QI director will focus quarterly educational meetings on difficult/incorrect interpretations. The ED QI Director will provide a report to the Hospital Quality Improvement Committee at 6 and 12 months after initiation of ultrasound examinations in the ED, and thereafter at regular intervals. The report will include aggregated performance data.