

# Inpatient Notes: Why Should Hospitalists Use Point-of-Care Ultrasound?

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Over the past decade, hospitalists have begun to use point-of-care ultrasound (POCUS) to answer focused diagnostic questions at the bedside. As ultrasound machines have become more compact and affordable, access to this technology has increased. As POCUS becomes more commonly used, many hospitalists are wondering whether they should learn how to use this technology. Here, we present a few reasons why more hospitalists are picking up POCUS.

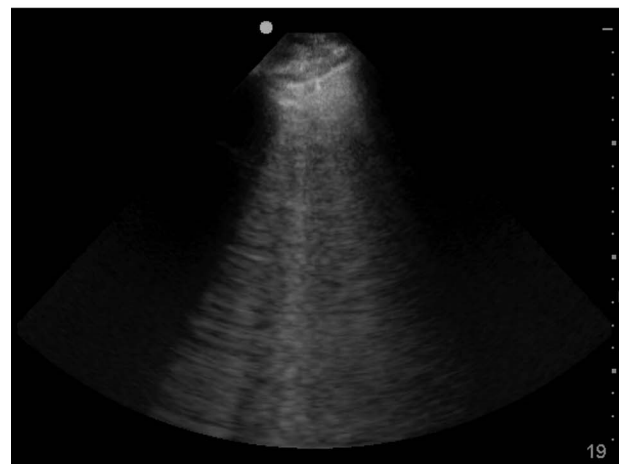
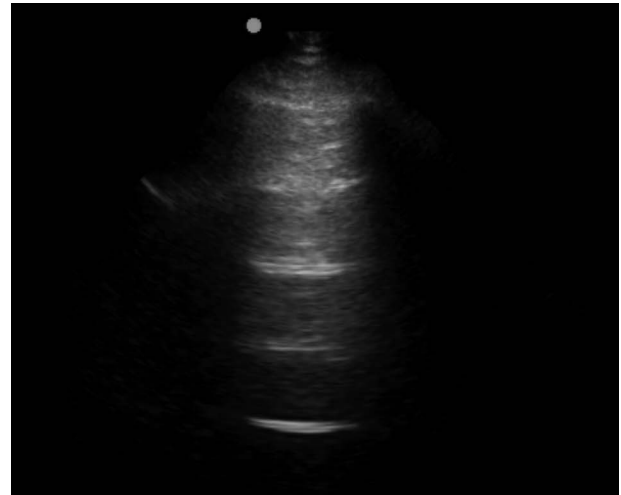
## DON'T MISS THE OBVIOUS

Adding POCUS is a simple way to improve the accuracy of the bedside evaluation. Using POCUS makes it much easier to detect important abnormalities. Tappable pleural or pericardial effusions, large deep venous thrombi, and severe cardiac dysfunction are some of the abnormalities that can be rapidly detected with POCUS.

Consider a patient with a history of chronic obstructive pulmonary disease (COPD) and heart failure who presents with shortness of breath. Because of diagnostic uncertainty, these patients often receive treatment for both acute COPD exacerbation and decompensated heart failure. However, pulmonary edema from heart failure and bronchoconstriction from COPD manifest very differently on lung ultrasound (Figure), and hospitalists can quickly make this distinction at the bedside with POCUS. Lung ultrasound has been shown to offer similar or even better diagnostic accuracy than chest radiographs for pleural effusion, pulmonary edema, pneumonia, and pneumothorax (1-3). Further advantages include avoidance of ionizing radiation from x-rays or computed tomography scans, as well as immediate availability of results. Not only is POCUS more sensitive than a chest radiograph for diagnosis of pleural effusion, it can both identify pleural fluid that is more likely to be exudative and detect loculations—which has important therapeutic implications.

POCUS can accurately detect lower extremity deep venous thrombosis (DVT). A meta-analysis demonstrated that POCUS, performed by emergency medicine physicians after brief training, had a pooled sensitivity and specificity exceeding 95%. Compare this with the traditional physical examination, where a difference in calf size greater than 2 cm is the most accurate finding of DVT, with sensitivity and specificity of only 63% and 70%, respectively. Every day, hospitalists weigh the risks and benefits of starting anticoagulation empirically versus waiting several hours for a radiology-performed lower extremity DVT study. With POCUS, hospitalists can avoid missing a large, obvious DVT and make a better-informed decision at the bedside about starting anticoagulation.

**Figure.** Ultrasound images of the lung showing A-lines and B-lines.



Top. Acute exacerbation of chronic obstructive pulmonary disease with bronchoconstriction is seen as a series of horizontal white lines, called "A-lines." Bottom. Acute cardiogenic pulmonary edema is seen as several vertical, laser-like white lines, called "B-lines," which emanate from the pleural line.

## LESS TESTING, FEWER DELAYS

We hypothesize that increased diagnostic accuracy at the bedside leads to less testing, fewer delays in initiating appropriate management, and reduced harm from inappropriate treatments. It stands to reason that these benefits would translate into downstream effects of decreased length of stay, resource utilization, and health care costs. Emerging evidence supports this argument. For instance, a randomized controlled trial recently found that lung ultrasound-guided diuresis by internists in patients admitted with heart failure was as-

sociated with a shorter length of stay (4). In another study, critical care physicians demonstrated that POCUS decreased use of computed tomography in the intensive care unit (5). We anticipate that future studies will continue to find benefits of POCUS in a variety of clinical settings.

### BETTER PATIENT EXPERIENCE?

The effect of POCUS on patient experience has not been well-studied. However, it draws hospitalists back to the bedside, providing patients more time with their physicians. It also stimulates additional communication between physicians and patients. When physicians explain diseases to their patients using real-time ultrasound images, patients seem to understand their condition better and the patient-provider relationship is strengthened.

### IS IT TIME FOR HOSPITAL MEDICINE TO FULLY EMBRACE POCUS?

For invasive bedside procedures, including thoracentesis, paracentesis, and central venous catheterization, POCUS has become the standard of care. Thus, many hospitalists have already embarked on the POCUS journey. Now, it is time for hospitalists to embrace this technology as the diagnostic standard for certain conditions, particularly those that are common or potentially lethal. As experience with POCUS grows and the technology becomes more widely available, we expect it to become a routine part of the bedside examination.

Fortunately, POCUS is relatively easy to learn. Most medical students and internal medicine residents already receive some tutoring in this area. There are a variety of training courses and educational resources available for hospitalists who want to learn its use or further enhance their skills. In fact, the Society of Hospital Medicine now offers a certificate training course in POCUS.

In conclusion, we believe that use of ultrasound by hospitalists will continue to modernize the bedside evaluation and streamline the diagnostic process. We encour-

age residency training programs to teach POCUS, practicing hospitalists to incorporate it into daily practice, and hospitals and hospital medicine programs to provide easy access to the necessary technology.

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### References

1. Llamas-Álvarez AM, Tenza-Lozano EM, Latour-Pérez J. Accuracy of lung ultrasonography in the diagnosis of pneumonia in adults: systematic review and meta-analysis. *Chest*. 2017;151:374-382. [PMID: 27818332] doi:10.1016/j.chest.2016.10.039
2. Pivetta E, Goffi A, Lupia E, Tizzani M, Porrino G, Ferreri E, et al; SIMEU Group for Lung Ultrasound in the Emergency Department in Piedmont. Lung ultrasound-implemented diagnosis of acute decompensated heart failure in the ED: A SIMEU multicenter study. *Chest*. 2015;148:202-210. [PMID: 25654562] doi:10.1378/chest.14-2608
3. Soni NJ, Lucas BP. Diagnostic point-of-care ultrasound for hospitalists. *J Hosp Med*. 2015;10:120-4. [PMID: 25408226] doi:10.1002/jhm.2285
4. Mozzini C, Di Dio Perna M, Pesce G, Garbin U, Fratta Pasini AM, Ticinesi A, et al. Lung ultrasound in internal medicine efficiently drives the management of patients with heart failure and speeds up the discharge time. *Intern Emerg Med*. 2018;13:27-33. [PMID: 28803375] doi:10.1007/s11739-017-1738-1
5. Oks M, Cleven KL, Cardenas-Garcia J, Schaub JA, Koenig S, Cohen RI, et al. The effect of point-of-care ultrasonography on imaging studies in the medical ICU: a comparative study. *Chest*. 2014;146:1574-1577. [PMID: 25144593] doi:10.1378/chest.14-0728