

# The Montefiore 10: A Pilot Curriculum in Point-of-Care Ultrasound for Internal Medicine Residency Training

Improved equipment size, lower costs, and availability of training have facilitated the rise of point-of-care ultrasound (POCUS), now in widespread use by physicians from many medical specialties.<sup>1,2</sup> Despite 62% of US medical schools reporting undergraduate POCUS training, only 25% of surveyed internal medicine residency programs offer formal training in POCUS.<sup>3,4</sup> Although there is no standard curriculum for ultrasound training in internal medicine in the United States, the Canadian

Internal Medicine Ultrasound Group recently published a consensus on POCUS applications during residency.<sup>5</sup>

Uncertainty about content priorities for ultrasound training is among the many challenges facing implementation of this technology in internal medicine programs. In this letter, we describe our pilot POCUS curriculum, which is delivered over the course of an academic year to postgraduate years 1 to 3 internal medicine trainees during their inpatient months (TABLE).

We selected 10 POCUS skills and applications, which were divided into four 1-hour sessions. These sessions were repeated throughout the year to ensure exposure to the introductory curriculum. The emphasis of this focused curriculum mostly is on binary questions that provide a foundation for further training or self-learning. When applied to patients, these 10 skills and uses serve as a starting point for further formal diagnostic testing or management. For example, the introductory curriculum includes identifying a pericardial effusion, but not assessing for tamponade physiology. Similarly, screening for severe left ventricular dysfunction is included, while more advanced echocardiography skills are not.

DOI: <http://dx.doi.org/10.4300/JGME-D-17-00683.1>

TABLE

The Montefiore 10: An Introduction to Point-of-Care Ultrasound (POCUS) for Internal Medicine Residents

Session	POCUS Content	Clinical Application	Additional Details
1: Vascular	1. Identifying vascular anatomy of the neck, chest, and groin	Ultrasound-guided central venous catheter placement	...
	2. Ultrasound-guided peripheral intravenous catheter placement	For use in patients with challenging peripheral venous access	Includes simulation training using ultrasound-compatible peripheral intravenous catheter model
2: Lung	3. A-line versus B-line pattern	Diagnosing an alveolar interstitial syndrome (eg, pulmonary edema) <sup>1</sup>	...
	4. "Lung sliding"	Evaluation for pneumothorax <sup>2</sup>	...
	5. Recognizing a pleural effusion	Consideration of diagnostic or therapeutic thoracentesis	Incorporated with No. 3 and No. 8 as part of the volume status examination
3: Cardiac	6. Recognizing a pericardial effusion	Consideration of urgent evaluation for cardiac tamponade	...
	7. Is left ventricular function severely reduced?	Diagnosing systolic heart failure	Includes parasternal long axis, parasternal short axis, apical 4 chamber, and subxiphoid views
	8. Inferior vena cava: dilated or collapsed? If dilated, is respiratory variation present or absent?	Assessment of volume status	2-dimensional mode only
4: Abdomen	9. Recognizing ascites	Consideration of diagnostic or therapeutic paracentesis	Includes identifying anterior abdominal wall vasculature
	10. Urinary bladder scan	Diagnosing urinary retention	Includes calculations to estimate bladder volume

Proper use of ultrasound transducers and basics of image optimization are reviewed at each session. All sessions included didactic training in a conference setting, followed by bedside hands-on training using inpatient volunteers. Program leadership provides curricular time for these sessions, which are taught by an internal medicine core faculty member with more than 5 years of experience using and teaching POCUS. Trainees are provided immediate face-to-face feedback on scanning technique and image interpretation.

The sessions were well received by the residents, who were eager to learn basic POCUS applications. We found that “The Montefiore 10” curriculum serves as a valuable introduction to a growing field. Further research is needed to assess POCUS trainee competency using this method of training.

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