

## Rationale

There is no consensus among Critical Care Ultrasound (CCUS) experts about how to best assess learners and assure competence. An ideal assessment tool is simple and readily integrated into clinical practice, but existing tools are time-intensive to use and interrupt clinical workflow, making assessment of trainees difficult. Herein, we describe the creation of a novel assessment tool by CCUS experts that can be readily integrated into clinical workflow to assess critical care fellows at the bedside.

## Methods

We developed a tool for assessing fellow competence in CCUS based on Entrustable Professional Activities (EPAs). An EPA is a complete clinical task that can be entrusted to a trainee once he/she has demonstrated the competence to perform it unsupervised. Assessment of an EPA is done using an ordinal rating scale of the level of supervision a trainee requires. Experts in the field of CCUS were recruited for participation in a consensus meeting to define the core EPAs for CCUS performed by critical care fellows. Recruitment was done via email, and experts were identified through authorship on publications, leadership at conferences, and reputation identified by Yale experts. Participants were eight intensivists who practice throughout the United States and Canada and who have received local, national, and international recognition for their expertise. Participants met online by video conference. A nominal group technique was used with the following steps for reaching consensus: individual idea generation, round-robin recording of ideas, serial discussion of ideas, preliminary voting, discussion of preliminary voting, and final voting. A web-based assessment tool was created based on the EPAs defined by the group. This tool was implemented to assess fellows in the Yale Pulmonary and Critical Care Fellowship program.

## Results

The experts defined seven diagnostic and four procedural EPAs that should be considered core EPAs in CCUS for fellows. The diagnostic EPAs are: Use CCUS to evaluate a patient with 1) shortness of breath/respiratory failure, 2) hypotension/shock, 3) cardiac arrest, 4) acute kidney injury/renal failure, 5) a pleural effusion, 6) clinical concern for intraabdominal free fluid, and 7) clinical concern for deep venous thrombosis. The procedural EPAs are: Perform ultrasound-guided 8) thoracentesis, 9) paracentesis, 10) central line placement, and 11) arterial line placement. A web-based tool (Figure 1) was created to record assessments of trainees performing the EPAs and other variables that will be used to evaluate the validity and reliability of the tool.

## Conclusion

Experts in CCUS reached consensus to define eleven core EPAs for trainees. A novel tool based on these EPAs was implemented to assess fellows in the Yale Pulmonary and Critical Care Fellowship program. Future work includes ongoing evaluation of our EPA-based tool for reliability and validity.