

Priya Jain, PGY3  
CRC  
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## **Development of an Ultrasound Training Curriculum within the CHONY Residency Program: An Educational Scholarly Project**

### **Purpose and Rationale:**

Ultrasonography, the process of using simple high frequency sound waves to create images of the internal body, is emerging as a powerful tool in the assessment of patients. It offers physicians an opportunity to extend traditional physical examinations as well as a procedural aid in many fields of medicine. It has been clearly recognized, though, that this technology is not exclusive to radiologists or cardiologists as was in the past, but Emergency Departments and Intensive Care Units have fully demonstrated its utility at the bedside - the safety and portability of the machine allows physicians to gain rapid and detailed information regarding abdominal organs and the cardiovascular system. Now, ultrasound is being used much more widely in Internal Medicine, much as a procedural aid as well as diagnostically for a variety of diseases – so much so that in some parts of Europe ultrasound training is a minimum requirement for Internal Medicine accreditation.

Within the world of Pediatric Medicine, ultrasound has proven to be useful in many similar settings as used for adults. It is already widely used in Pediatric Emergency Medicine to support the clinician's decision-making process, as well as in the PICU where the risk of transporting the patient out of the ICU can be high, and bedside procedures are frequent. There is also new evidence supporting the use of ultrasound to diagnose pneumonia, as an alternative to x-rays or other radiation-based imaging modalities, as well as studies being done to assess its utility in decreasing number of failed attempts at lumbar punctures.

As of now, the only residency programs that require ultrasound training are emergency medicine and anesthesiology, but many Internal Medicine programs are adding this to their training as well. As pediatrics residents, we are only introduced to ultrasound in the ED or PICU, where fellows are being trained in point-of-care and procedural use. In such fast paced and often high acuity setting, we are afforded very little time to learn this tool, and mastery of a skill is essentially impossible because many residents do not know even the basics (i.e. how to use the machine, different probes, orientation).

### **Hypothesis:**

By introducing and teaching the basic concepts of ultrasound use to residents during residency training, they will be more empowered to use the modality in the clinical setting as a diagnostic aid as well as attempt more procedures in the acute setting that may not have been afforded to them without having such training.

### **Specific Aims:**

- 1) The development of several teaching sessions spread throughout the year, to teach resident the basics of ultrasound modality, including a foundational understanding of how the modality works, knowing how to use the machine, the purpose of different probes, orientation of different views, and the reading of a few basic and classic findings on ultrasound.
- 2) Providing a platform for mastery of 2-3 specific skills useful throughout a general pediatrics residency, such as bladder scans to assess a patients fluid balance, finding and identifying veins/arteries to aid in vascular access, and possibly use in lumbar punctures.
- 3) Integration with the current ultrasound elective to be able to further skills of those residents wanting more training, to allow this elective to prepare residents for more than just the basics.
- 4) Involvement of residents in current studies in LP research going on at our institution.

### **Study Design:**

1 year to completion (with possibility of passing down to further resident)

#### Part One:

- Start with a needs based assessment to determine residents level of interest in learning ultrasound, and specific point-of-care techniques and procedures that would be most applicable
- Working with the ultrasound trained attendings/fellows and the administration, organize 2-3 lectures /workshops to introduce the modality to residents
- Determine which techniques would be most applicable to residents for mastery, and in which years of training each should focus
- My own training in the basics of modality to be able to facilitate the teaching of co-residents

#### Part Two:

- Teaching of specific skills for mastery, likely including procedural access as well as bladder scans on floors
- Integration with current ultrasound elective
- Start to promote use on floors

#### Part Three:

- Assessment of curriculum and use up to date - challenges/benefits/changes to be made.
- Development of teaching session/workshop of common ultrasound uses in ED/PICU (FAST exam, central line placement, pneumothorax, diaphragm movement)
- Possible integration with ongoing ED research of ultrasound use in LPs

Part Four:

- Assessment of curriculum by survey of residents and faculty involved to determine efficacy of curriculum implementation and changes that could be made in future.

**Future Studies**

1. Reduced need for urinary straight catheterizations in patients on the general pediatrics wards for assessment of fluid status.
2. Ultrasound use in pediatric residents leads to fewer attempts for successful lumbar puncture in the ED.
3. Increase in number of procedures attempted by residents in which ultrasound was being used as a procedural aid.

**References:**

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