

# Introducing Ultrasound to Medical School Curriculum

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Ultrasound is an important diagnostic tool in the emergency department. It also is one of the procedural competencies required by the Accreditation Council for Graduate Medical Education (ACGME) Residency Review Committee. Many residents enter an emergency medicine residency with little ultrasound experience. For some residents it can be challenging to learn the proper probe placement, spatial awareness, tissue densities/appearance on ultrasound and normal vs. abnormal findings. Some residents pick up these skills quickly while others struggle throughout residency to become proficient at ultrasound. The varied skill levels lead to different results depending on who does the scan. This is known as operator dependency. Operator dependency can lessen the impact of bedside ultrasound if it cannot be phased out or improved. J. Christian Fox, MD, RDMS, director of the University of California Irvine (UCI) Emergency Medicine and Ultrasound Student Clerkships, is hoping that this will soon become a reality. He, along with SonoSite and the UC Irvine School of Medicine, is joining forces to introduce ultrasound to medical students from day one. UCI is the first medical school in the country to integrate ultrasound into all four years of medical school.

I sat down with Dr. Fox following one of his night shifts to discuss his efforts to bring this curriculum to UCI.

### ***What inspired you to consider adding this new curriculum for incoming medical students?***

For seven years I have been the clerkship director for the emergency ultrasound elective, and based on the feedback I was getting from these students once they graduated going into their various specialties I realized that this tool has far reaching benefits, outside of emergency medicine.

### ***Can you explain the new ultrasound curriculum for incoming medical students at UCI?***

UCI will be the first medical school in the country to vertically integrate ultrasound into all four years of medical school.

In addition, Clinical Foundation are courses you expect to find ultrasound, like physiology and anatomy, throughout the entire four years of medical school. In the first two years it involves the history and physical exam. This is where the medical students will have consistent and repeat exposure to didactic and hands-on material. Previously, when this was attempted it was not feasible because of lack of equipment. It did not make sense to have 25 students around one machine. Now we will have ample equipment so the students will have plenty of one-on-one time with the machine and standardized patient. The goal is that at the end of the first year of medical school a student will be able to fire up the machine and identify all soft tissue types and solid organs, all the “normals.” Then throughout the second year, the students are exposed to ultrasound cases that are integrated into their curriculum. This is where all the pathology comes in. By the time they reach third year on the wards and in clinics, the “operator dependency” that is inherent in ultrasound has been removed and they naturally reach for the ultrasound as an extension of the physical exam. We feel that this will lower the threshold for them [the students] to pick up a wide array of pathology, empowering them in ways simply not possible prior to this curriculum.

### ***Who was involved in making this idea become reality?***

Other schools have tried to integrate ultrasound into curriculum. Where they have come short is lack of unified support throughout the basic science curriculum. I have had unbelievable, unanimous support from not only the dean of the medical school, but the senior associate dean of educational affairs, the associate dean of basic sciences and the associate dean of clinical sciences (who happens to be an emergency medicine physician and partner and California Chapter of the American Academy of Emergency Medicine (Cal-AAEM) board member, Shahram Lotfipour, MD, MPH).

The other side of the equation is having equipment. SonoSite has been incredibly excited about being part of this transformational project.

***How do you think this will change the face of medicine and, more specifically, the physical exam?***

Take, for example, the way we currently perform the physical exam on the patient with abdominal pain; we push on [the patient's] stomach, they have pain, and the patient says, "Ow." We then think back to anatomy and remember which organs are there. With ultrasound we have the ability to peer under the skin and see the organs of interest and can make a diagnosis more quickly and more accurately and in some cases avoid unnecessary use of computed tomography. This has far reaching implications on the way we practice

medicine.

Most people reading this have probably dabbled in ultrasound and realize there is a learning curve to it. We try to overcome this curve during residency. Imagine the abilities of our residents to diagnose something difficult like appendicitis with simply ultrasound, a skill they learned during medical school. The time spent working with residents to bring them all to an equal playing field with ultrasound skills will be much less thanks to curriculum such as UCI's. This extra time can be spent honing a resident's ultrasound skills in novel ways we have yet to accomplish.