

## **How To Choose Ultrasound Equipment For Training Medical Students**

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The choice of ultrasound equipment for training medical students depends on multiple factors. The size of the ultrasound class, budget and space requirements are some of the considerations for the type of ultrasound unit to be considered. The goals of the program should also be taken into account when deciding on an ultrasound machine. Will the unit be used for a single application or will it be used to train students in multiple applications including cardiac, vascular and abdominal studies? Ultrasound units will differ in their utility and flexibility.

Compact or portable ultrasound units may prove to be the best choice for multiple reasons. Since they are portable, they can be carried to different educational venues including the classroom or anatomy lab, bedside, simulation center or clinic. Portable units tend to be less expensive than full-size all-purpose units found in hospital radiology or cardiology departments. They also will have a simpler interface for beginners in ultrasound training.

The optimal ultrasound unit must have satisfactory temporal and spatial resolution so that anatomic detail is not sacrificed in favor of size or price. Be sure to involve ultrasound experts and faculty from your institution in this decision so that adequate sonographic quality is guaranteed. "Pocket" ultrasound units that are currently available may not be the best choice for training students since they do not have sufficient quality for multiple applications. They also do not allow teaching of image formation since they do not include

controls and functions for these purposes. Simple control functions including image gain, depth, focal zone control and frequency range are necessary for teaching “knobology” and image optimization. In addition, these simple units do not have adequate color and pulsed Doppler capability or noise suppression.

The number of units will depend on the size of the ultrasound class. This will depend on how many students will train on the unit at any given time. Optimal student to ultrasound unit ratio is 3-5:1 although some schools will have 1 unit per 10 students.

All major ultrasound vendors should be invited to “partner” with the school or university. Discussions with vendors should include the type of ultrasound configuration required. Vendors with experience with other medical school programs will be able to assist in choosing an appropriate unit and configuration. The configuration will depend on the types of applications or exam types that will be performed. A set of transducers will also be chosen depending on the number of applications. Once the configuration is established, pricing for the package becomes the critical issue.

The package should include applications support for teaching faculty how to use the ultrasound unit. Multiple sessions are usually required for training faculty on a new ultrasound device. Applications specialists can be very helpful in setting up the unit and connecting to PACS and classroom monitors. Many of these applications specialists have teaching experience and enjoy exploring different exam types with faculty to facilitate comfort with the unit. Device service and maintenance should also be included. Some vendors also offer image storage and management or PACS solutions and

software for image transmission. A list of ultrasound vendors can be found in the Equipment section of this portal.

Other options for obtaining equipment for a new ultrasound curriculum include the purchase of used equipment or borrowing equipment from another area or department. Used equipment may be available from vendors and any discussion should include terms of warranty and maintenance. Used equipment may be an important consideration for a program with a limited budget. For a fledgling program with no budget for ultrasound equipment, borrowing units from another department or area may be a consideration. Faculty from radiology, emergency medicine or cardiology may be able to work out terms to utilize existing equipment to train medical students. In a university setting, faculty and sonographers may have preexisting materials and lecture series that are used for training residents and fellows. These facilities may be able to incorporate medical students into their curriculum.

There are many steps to integrating ultrasound into a medical curriculum. Acquisition of ultrasound units is an important consideration requiring time and expertise in addition to faculty, space and budget. Many vendors offer experience and support for this endeavor. In addition, new programs can contact one of the volunteers or mentors associated with an existing program that is listed in the portal for assistance.