Audience: MS1/MS2 (preclinical years)

Sequence of modules (some of which may be self study)

Prior knowledge assumed: knobology, basic scanning sessions/skill, cardiac anatomy/physiology assume this is a revisit and reinforcement of previously seen concepts but in a new context.

Timed with introduction of basic content, though assumes some familiarity. Where is this in terms of dissect (if that is a component of curriculum). Modules allow for small “bites” of information so students can slowly build a knowledge base. Goal for repeating basics when more advanced session is introduced.

Additional difficulties/considerations: needs/resources for faculty development

Initial module

Goals of anatomy portion: identify anatomical structures as you might see them on a prosection, spatial relationships. Potential to do this component as self-study module with hands-on experience with the machines as part of an interactive learning session.

Format of Initial module:

Assume prior knowledge of basic cardiac anatomy and physiology, basic knobology and some familiarity with ultrasound. Target audience is preclinical medical students (MS 1/2)—could also be applied to other health education programs (PA students, certification program, etc)

Location of module:

Structure of module: split groups into several smaller sessions they rotate through (some lecture based, some hands on, some physical exam based).

* With limited ultrasound resources, could use online type modules/sonosim machines and SPs to introduce and/or assess student knowledge. For the purposes of this module, assume that machines are not a limitation. Could be adapted for other teaching environment as needed.
* Break the information into several smaller sessions.
* Review the basics if significant time has elapsed since first seeing the material. Could take the form of an assessment quiz, prework reading, five minutes at start of session, review module with questions. Will vary depending on the structure of the rest of the curriculum.
* Consider prework centering around a set of “key questions” that consist of basic science knowledge that is essentially a summary of the basic information and give students an opportunity to review any of those “key questions” that may not have been clear. Could also be an online quiz (IRAT) that faculty teachers have access to results of so the review component can be tailored to student weaknesses.
* When students come in: customized review session based on some type of prework and some type of formative assessment to identify learner strengths and weaknesses. Logistics depend on size of class.
* Next, break into smaller group sessions of ideally 5-7 students. Can also be adapted to fit size of class.
* TBL review session to facilitate peer-teaching and address any issues prior to scanning session. Abbreviated TBL (no more than 30 min). individual quiz, then group quiz to peer-teach. Could also adapt this to a larger group session with clickers for quiz questions.
* Scanning session: ideally in small groups where everyone gets the hands on experience of obtaining images. Focus on seeing LA, RA, RV, LV, 4 valves, aorta. Cover apical 4 chamber view and parasternal short and long axis.
  + Apical 4 chamber: LA, RA, RV, LV, tricuspid, mitral valves
  + Parasternal Long: aorta, LA, RA, RV, LV, mitral and aortic valves
  + Parasternal Short: aortic and pulmonic valves are the primary focus, may also see RVOT, tricuspid valve, RA, LA
* Helpful to project machine images onto larger screen so whole group can see. Also consider use of 3D models, pictures, or prosections to accompany the echo views to assist students with orientation.