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Time (f)or Competency



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Seventy years ago, Susan's 92-year-old father's first teaching job was in a one-room schoolhouse in Fayetteville, Maine. He recently came across the "Register" that he was required to keep of his students' daily attendance. He explained that attending an adequate proportion of school days was the sole determinant of whether or not a child was promoted to the next grade. "Apparently, actual accomplishment was not considered," he laughed.

Indeed, time spent in training is an essential component of the development of skill and expertise—time in rank, time on service, and time devoted to learning and performing the skill in question. Linked with time spent in training, appropriately robust experience to develop expertise requires repeated exposure to and performance of tasks essential to the skill over that time—amounts of consults/evaluations, accumulation of procedures, numbers of echocardiograms. It is important to recognize, however, that *competency* in the skill is the outcome of interest. Time and numbers are merely surrogate markers.

The Core Cardiovascular Training Statement (COCATS 4)—Task Force 5—outlined the expected behaviors and work product for echocardiographers.¹ Levels of training from most basic echocardiographic knowledge (level I) to most advanced knowledge suitable for an echocardiography lab director (level III) are clearly defined by duration of echo-specific training as well as specified numbers of procedures (transthoracic, transesophageal, and stress echocardiography) performed by the trainee. The task force clearly recognized that competency-based evaluations and assessments of echocardiographic knowledge base are essential elements in the certification of skill. However, as lab/program directors responsible for the providing certification letters over many years, it has been our experience that the "focus" of the fellowship trainees (and sometimes of their mentors as well) is frequently geared toward meticulous documentation of "time served" and "procedures performed," as evidence for the proverbial notches in their belts. Suitable evaluation of the individual candidate's competency is potentially at risk for being overlooked.

Necessity is the mother of invention, however, and the ongoing COVID-19 crisis may prove instrumental in shifting the focus of echocardiography training evaluation from time and numbers to consideration of alternative measures of skill. Dr. Jose Madrazo rightly and extensively illustrates this important point in his letter in this issue of *Journal of the American Society of Echocardiography*.² As with the Johns Hopkins program, training programs across the country are faced with significant decline in the volume of all forms of echocardiographic evaluation as clinical focus shifts toward the care of an overwhelming number of patients with COVID-19. Dr. Madrazo notes that social distancing measures, so crucial to thwarting the spread of SARS-CoV2, additionally hamper opportunities for hands-on training

as well as face-to-face mentoring and supervision between expert echocardiographer and trainee. He makes numerous worthwhile recommendations for alternative experiential and evaluative tactics. These must be considered for implementation in the certification process, especially during a pandemic that is here to stay for the foreseeable future. We applaud his recommendations and reiterate a need for a shift toward competency-based assessment.

The recent 2019 American College of Cardiology/American Heart Association/American Society of Echocardiography Advanced Training Statement³ focused on select competencies and echo procedure volumes for level III advanced training. The document is unique in its greater focus on delineating strategies for the evaluation of competency, in addition to recommended numbers of advanced echo techniques and procedures performed. It recognized that the endorsed volumes for specific advanced echo techniques and procedural guidance to achieve level III have been developed by the expert committee consensus, in consultation with echocardiography training authorities across the country. In all instances, these procedure volumes are noted to be recommendations only. They serve as recognition that diverse trainees develop competency at different levels of experience—some quickly, others requiring more procedural practice. Perhaps it is an appropriate time for a similar shift toward competency-based assessment when certifying level I and level II training as well.

To that end, the advanced training document delineates several evaluation tools that can be utilized for robust competency documentation³:

1. Examination
2. Direct observation
3. Procedure logbooks
4. Simulation
5. Conference presentation
6. Multisource evaluation
7. Echo lab Quality Improvement and Quality Assurance projects

To supplement the procedural logbooks and decrease in face-to-face direct observation of skills, alternative evaluation methods are readily available. We admit that faced with weaker trainees, it can be easier to recommend "more studies" rather than giving uncomfortable and negative feedback regarding their current level of accomplishment. As noted,² "distant" overreading of fellow-interpreted studies can be as valuable, or even more so, than direct observation. More conscious effort must be expended on the part of the expert mentor to virtually review all aspects of each study overread in order to provide the trainee with as comprehensive an assessment and education as occurs in side-by-side reading. Whenever distancing norms permit, every effort should be expended to maintain direct supervision, with at least one or two trainees in direct contact with the mentor using proper personal protective equipment. In addition to evaluation of interpretive skills, it remains possible to evaluate the breadth and depth of trainee knowledge through participation in and presentation of didactic conferences. Today's sophisticated video conferencing mechanisms allow for a remarkable level of interaction under difficult circumstances. We endorse additional novel video conference applications, including interactive case reviews and case series presented to the fellowship group.³ Finally, while formal National Board of Echocardiography board examination remains a final tool

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to assess knowledge base, allowing trainees more time and access to board review courses, board review questions, and seminars in both print and online format will only serve to enhance the comprehension and critical thinking of echocardiography-focused fellows.

In terms of the performance of echocardiography techniques—transthoracic, transesophageal, and stress modalities—it is undeniable that frequent access to individual scanning of patients with a multitude of pathologies is essential. In the face of a relative dearth of clinical subjects, as well as concerns regarding prolonged interpersonal exposure and possible coronavirus transmission, programs (and certification authorities) must adapt, with utilization of simulators and other techniques focused on recognition of technical adequacy and pitfalls in acquisition of previously acquired study images. Several simulation systems are available for purchase. These systems can often analyze probe position and angling in three-dimensional space far more effectively than with a human mentor. Although the views and the simulator “patient” are idealized, fellows benefit tremendously from exposure to repeated simulator scanning to perfect their technique in all echocardiographic windows. Pathologic cases can also be programmed, with appropriate clinical scenario and the opportunity for the operator to evaluate diverse pathologies in multiple views. Both transthoracic and transesophageal performance are included on most simulators, and the trainee may be evaluated directly by a mentor or more remotely using extensive recording of probe motion and images obtained by the simulator. Stress echo cases—using both practice sets² or via simulator—can be virtually “performed” and/or reviewed in similar fashion.

Ongoing participation in echo laboratory quality assurance projects, even when done on a remote basis, increases the sophistication of understanding of proper performance and application of echocardiographic techniques—essential for both level II and level III training. Remote evaluation of clinical requests for echo examina-

tions and application of appropriate use criteria principles further broaden a trainee’s knowledge base. Recognition of the appropriate application and mentored interpretation of an increased number of point-of-care ultrasound studies is an additional and unique skill that has been enhanced in the COVID-19 pandemic.² Furthermore, exposure to the echocardiographic findings of COVID-19 patients and the unique clinical scenarios (such as elevation in biomarkers) that mandate at least a limited echocardiographic evaluation of the COVID-19 patient will be an essential part of overall competency in the future.

The COVID-19 pandemic and the clinical exigencies that accompany it have merely magnified the difficulties with a time-based and numbers-/volume-based documentation of echocardiographic skill. The pandemic has conversely provided extensive opportunities for innovation and expansion of traditional educational and assessment strategies. Most importantly, the desired outcome of true echocardiographic competence at all levels of training can be achieved despite the change in the training paradigms.

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