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AAIM Perspectives

AAIM is the largest academically focused specialty organization representing departments of internal medicine at medical schools and teaching hospitals in the United States and Canada. As a consortium of five organizations, AAIM represents department chairs and chiefs; clerkship, residency, and fellowship program directors; division chiefs; and academic and business administrators as well as other faculty and staff in departments of internal medicine and their divisions.

ECG as an Entrustable Professional Activity: CDIM Survey Results, ECG Teaching and Assessment in the Third Year

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As a discipline, medical education has begun to focus on defining competencies that medical students need to master before graduation. In leading this initiative, the Association of American Medical Colleges (AAMC) published in 2013 a shared taxonomy for competencies in medical education.[1] As a next step, AAMC convened a working group charged with developing a defined list of competencies: *Core Entrustable Professional Activities for Entering Residency: Curriculum Developers' Guide*.[2] The document defined entrustable professional activities (EPAs) as "… units of professional practice, defined as tasks or responsibilities that trainees are entrusted to perform unsupervised once they have achieved sufficient specific competencies."[2] The core of the document was the delineation of 13 EPAs; competencies were developed for each EPA and milestones for each competency.

The ability to accurately interpret electrocardiogram (ECG) abnormalities can be seen as a core competency for a medical school graduate that falls within EPA 3 ("Recommend and interpret common diagnostic and screening tests") of the AAMC document.[2] Interpretation of cardiograms is critical for graduating seniors entering residencies in internal medicine, emergency medicine, general surgery, family practice, and anesthesiology.[3] However, specific guidelines from AAMC, Liaison Committee on Medical Education, and Accreditation Council for Graduate Medical Education (ACGME) regarding ECG training and assessment are lacking.[4-7] Prior research in internal medicine and emergency medicine residents has reported a suboptimal ability to accurately interpret ECGs and a low level of self-confidence in ECG reading ability.[8,9] We recently completed a series of studies and found that the ability of medical school and physician assistant graduates to correctly interpret basic and critical ECG rhythms is less than predicted.[7,10]

Given the limitations in ECG interpretation in medical students and housestaff, it is critical to determine where ECG training occurs in medical school and how it is assessed. A national survey performed in 2005 by the Clerkship Directors in Internal Medicine (CDIM) provided data regarding the instruction in and assessment of basic ECG interpretation competency in the third-year internal medicine clerkship at US and Canadian medical schools.[3] At that time the CDIM study

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revealed that more explicit and formalized instruction and assessment methods in ECG interpretation were needed.[3]

As it has been almost a decade since the initial CDIM survey, and given the limitations in ECG interpretation found in our recent studies, we decided to replicate and expand upon the initial CDIM survey. This manuscript addresses the responses to a set of questions included in the 2013 CDIM annual survey. In particular, potential survey questions were developed to enhance focus on ECG instruction and assessment on the clerkship, barriers to teaching ECG interpretation, and the identification of specific ECG patterns that clerkship directors believe all students should master before completion of the third-year internal medicine clerkship.

PERSPECTIVES VIEWPOINTS

- Electrocardiogram (ECG) interpretation is an entrustable professional activity.
- Insufficient time is devoted to teaching ECG interpretation skills on the Internal Medicine clerkship.
- Insufficient time is devoted to assessing student ECG interpretation skills.
- Increased teaching time and more practice reading ECGs would be beneficial.
- Sequential assessment of ECG interpretation ability during medical school is necessary.

METHODS

In June 2013, CDIM conducted its annual, online, confidential survey of its US and Canadian member medical schools. The designated clerkship director from each medical school was invited by e-mail to participate. Nonresponders were contacted up to 3 additional times by e-mail and once by telephone. The Institutional Review Board at Case Western Reserve University determined that this study did not require exemption status, Institutional Review Board approval, or further review.

Potential survey questions were submitted in Fall 2012. The authors of the present manuscript submitted to CDIM for consideration an 18-item survey on ECG teaching and assessment in the third-year internal medicine clerkship. The CDIM Research Committee selected topics for inclusion based on the importance of the topic to CDIM as well as on clarity, quality, and appropriateness of the questions posed. The accepted questions were edited, revised, and organized by the CDIM Research Committee before being presented to the CDIM Council, which provided further revisions and final approval. There were 68 total survey items in the 2013 CDIM Survey, of which 13 focused on ECG assessment and interpretation.

RESULTS

The CDIM survey was completed by 94 of the 123 schools to which a survey was sent, for an overall response rate of 76%. The demographic results for the respondents are as follows (note: calculations are based on a denominator of 94, though some respondents did not answer specific demographic or other questions, and so the percentages do not always add up to 100%): mean age was 48 years; the male-to-female ratio was 1:1; and 46% identified themselves as general internists. Institution type included 56% public schools and 34% private schools. The academic rank of respondents was assistant professor, 19%; associate professor, 44%; and professor, 23%.

ECG instruction was reported to occur in the third-year internal medicine clerkship in 85% of the schools. Ten percent of the respondents stated that ECG instruction was not taught during the internal medicine clerkship, and 5% of the respondents did not respond to this question. Which ECGs were taught during the clerkship varied widely. Presented in descending order of frequency, responses to who selected the ECG patterns to be taught were 51% clerkship directors, 37% members of the cardiology division, 23% ward attending, and 8% based on ACGME competencies expected of an intern.

The average total amount of time devoted to ECG instruction in the internal medicine clerkship has not changed significantly since the CDIM survey conducted in 2005, at which time most schools reported spending an average of 1-6 hours on formal ECG didactics during the clerkship.[3] The amount of time currently devoted varied widely, however, ranging between 1 and 10 hours. One-third of respondents dedicate 3-4 hours to ECG instruction, 28% of schools spend 5-6 hours, and 18% devote 1-2 hours. A very small minority of schools (4%) spend more than 6 hours on ECG instruction per clerkship (**Figure**).

Multiple pedagogical techniques were utilized to teach ECGs, including 62% lecture, 55% small group sessions, 30% assigned readings, 22% formal teaching rounds, and 18% Web-based modules.

Whereas 37% of the respondents stated that the average number of ECGs a student was formally asked to interpret during the clerkship was >10, 24% of the respondents noted that they did not know how many ECGs a student at their school formally interpreted during the clerkship. Other respondents indicated 1-2 ECGs 1%, 3-4 ECGs 4%, 5-6 ECGs 9%, and 7-8 ECGs 6%.

ECG instruction has remained constant at 48% of the schools over the last 5 years (15% of respondents did not answer this question) and has undergone changes in