

Education

FACULTY PREDICTION OF IN-TRAINING EXAMINATION SCORES OF EMERGENCY MEDICINE RESIDENTS

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Abstract—Background: The Emergency Medicine In-Training Examination (EMITE) is one of the only valid tools for medical knowledge assessment in current use by emergency medicine (EM) residencies. However, EMITE results return late in the academic year, providing little time to institute potential remediation. **Objective:** The goal of this study was to determine the ability of EM faculty to accurately predict resident EMITE scores prior to results return. **Methods:** We asked EM faculty at the study site to predict the 2012 EMITE scores of the 50 EM residents 2 weeks prior to results being available. The primary outcome was prediction accuracy, defined as the proportion of predictions within 6% of the actual score. The secondary outcome was prediction precision, defined as the mean deviation of predictions from the actual scores. We assessed several faculty background variables, including years of experience, educational leadership status, and clinical hours worked, for correlation with the two outcomes. **Results:** Thirty-two of the 38 faculty (84.2%, 95% confidence interval [CI] 69.6–92.6) participated in the study, rendering a total of 1600 predictions for 50 residents. Mean resident EMITE score was 81.1% (95% CI 79.5–82.8%). Mean prediction accuracy for all faculty participants was 69% (95% CI 65.9–72.1%). Mean prediction precision was 5.2% (95% CI 4.9–5.5%). Education leadership status was the only background variable correlated with the primary and secondary outcomes (Spearman's $\rho = 0.51$ and -0.53 , respectively). **Conclusion:** Faculty possess only moderate accuracy at predicting resident EMITE scores. We recommend a multicenter study to evaluate the generalizability of the present results. © 2014 Elsevier Inc.

Keywords—residency education; graduate medical education; core competency; milestones; in-training examination; medical knowledge

INTRODUCTION

The Emergency Medicine In-Training Examination (EMITE) represents one of the few validated tools for assessment of the medical knowledge (MK) core competency (1–4). The EMITE is likely the most commonly used MK assessment tool among all emergency medicine (EM) residency programs. Other MK assessment tools such as the mock oral examination, standardized direct observation tool, Council of Emergency Medicine Residency Directors question bank, and observed structured clinical examination are not in widespread use, or lack internal or external validity (4). A score of 80% on the EMITE as a postgraduate year 3 (PGY-3) resident predicts a 95% chance of passing the American Board of Emergency Medicine (ABEM) Qualifying Examination, a necessary step for board certification (5,6). MK is important as both a core competency and as a milestone category. The Emergency Medicine Milestones Working Group specifically states that a Level 4 (out of 5) MK milestone is that a resident “obtains a score on the annual in-training examination that indicates a high likelihood of passing the national qualifying examinations” (7).

As a formative assessment tool, however, the EMITE is limited by its infrequency. It is administered only once a year in February, with results available only 2 months prior to the end of the academic year. Therefore, EM educators who rely on this tool to identify major gaps in MK may be wasting valuable residency training time by not identifying at-risk learners who could benefit from remediation earlier. If EM educators could accurately predict EMITE scores (a valid marker of MK) of residents earlier, they could institute earlier interventions to improve MK.

The ability to predict ITE scores, however, is limited. Conference attendance does not correlate with either EMITE or internal medicine (IM) ITE scores (8,9). Thundiyil et al. did find a moderate correlation between United States Medical Licensing Examination Step 2 scores and EMITE performance, but this was true only for PGY-1 and -2 residents (10). IM residents do not accurately predict their own ITE scores, usually underestimating them (11). Hawkins et al. found that IM faculty could not accurately predict IMITE scores on the basis of their clinical assessments (12). Furthermore, senior IM residents could not accurately predict scores of IM interns (12). No similar data currently exist in EM.

The purpose of our study, therefore, was to assess the ability of EM faculty to predict EMITE scores of residents. The primary outcome of the study was prediction accuracy, defined as the proportion of faculty-predicted scores that were within 6% of the actual EMITE score by resident.

METHODS

Study Setting and Population

The study site was an academic, university-based EM residency program established in 1973 with 50 PGY-1–4 residents and 38 full-time and part-time faculty members. The hospital serving as the main clinical training site is an urban, tertiary care center with Level I trauma designation and over 85,000 patient visits annually.

Study Protocol

We e-mailed an online survey via SurveyMonkey® (SurveyMonkey.com, Palo Alto, CA) to all 38 faculty members requesting their participation 1 month prior to release of the EMITE scores. We sent e-mail reminders on days 2, 4, 6, and 8. We gave each participant a three-digit unique identifier number. The survey itself queried participants on their EMITE score prediction (0–100%) for each of the 50 residents for the 2012 examination. We provided national medians for each PGY class from the 2011 EMITE results to help guide

score predictions. The study received exempt status via expedited review by the institutional review board.

Outcomes and Variables

We defined the primary outcome (prediction accuracy) as the proportion of EMITE scores (for all 50 residents) predicted by a given faculty member that lay within 6% of the actual score. We defined prediction accuracy as $\pm 6\%$ because it represented the average standard deviation (SD) of the 2011 EMITE scores. Furthermore, as the SEM on the EMITE for a given score is $\pm 3\%$, we felt that a prediction within 3% of this range on either side was reasonable to classify as accurate. The secondary outcome was prediction precision, defined as the mean deviation of a given faculty member's predictions from the actual scores. We assessed several background characteristics of faculty for correlation with prediction accuracy. Background characteristics included years of clinical experience, site of residency training, educational leadership status, clinical hours worked, and number of written clinical shift evaluations submitted. We defined site of residency training as a binary variable indicating whether the participant completed residency at the study site institution. We defined educational leadership status as present or past status as any level residency director, simulation director, or medical student clerkship director. We calculated clinical hours as the mean clinical shift hours per month working with residents from January to April 2012. We counted written clinical shift evaluations if they were submitted from the start of the 2012 academic year until the day prior to study initiation.

Analysis

We used Stata software (Ver. 11, College Station, TX) to calculate descriptive statistics. Where we compared two proportions, we analyzed significance with 95% confidence intervals (CIs) for difference in proportions using the Wilson method. We used Spearman's rank correlation test to calculate correlations.

RESULTS

Thirty-two of the 38 faculty participated in the study (84%, 95% CI 69.6–92.6%). Participants completed a total of 1600 score predictions for 50 residents. Table 1 describes background characteristics of faculty participants. Half of the participants completed residency training at the study site and a quarter qualified for educational leadership status.

Table 2 summarizes median resident EMITE scores. Mean resident EMITE score was 81.1% (95% CI

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