Student Ability Estimates in High- and Low-Performing EMS Education Programs

Remle P. Crowe, MS, NREMT, Rebecca E. Cash, MPH, NRP,
Severo A. Rodriguez, PhD, NRP, Ashish R. Panchal, MD, PhD

Background: Despite efforts to standardize and accredit EMS education, program practices vary widely. A minimal amount of research exists regarding program quality and student cognitive ability measures. Our objective was to assess the relationship between program performance and student cognitive ability estimates measured through the National EMS Certification examination. We hypothesized that students graduating from high-performing programs would exhibit higher mean cognitive ability scores.

Methods: National EMS Certification cognitive examination results for 2013 graduates of paramedic and EMT programs were analyzed. Using a modified Margolis method, programs were classified as high-performing if the program first-time pass rate was greater than or equal to the 2012 national average or low-performing if this measure fell below the benchmark. The 2012 benchmark was 68% for paramedic and 65% for EMT. Students' first-attempt mean ability estimates (MAE) were calculated using Rasch logit ability measures transformed to a 0–1000 scale. Content area MAE were assessed for: 1) Airway/respiration/ventilation, 2) Cardiology/resuscitation, 3) Trauma, 4) Medical/obstetrics/ gynecology, and 5) EMS operations. Descriptive and comparative statistics (t-test) were calculated.

Results: In 2013, 11,177 students graduated from 746 paramedic programs, and 67,716 students graduated from 2,242 EMT programs. Nearly two-thirds (65%, n = 7,262) of paramedic students attended high-performing programs while this figure was 59% (n = 40,237) for EMT students. First-attempt MAE for all paramedic students was 462 and 599 for EMT students. The MAE of paramedic students from high-performing programs was significantly greater than that of students from low-performing programs (515 vs. 365, $p < .01$). First attempt MAE for EMT students from high-performing programs was 639 and 540 for students from low-performing programs ($p < .01$). Paramedic students from high-performing programs demonstrated significantly higher cognitive ability in each content area with the largest difference in medical/obstetrics/gynecology (529 vs. 361, $p < .01$) and the smallest difference in EMS operations (497 vs. 398, $p < .01$). Similarly, EMT students from high-performing programs demonstrated higher cognitive ability in each content area with the largest difference in medical/obstetrics/gynecology

(658 vs. 551, p < .01) and the smallest difference in EMS operations (640 vs. 561, p < .01).

Conclusions: Students graduating from high-performing EMS education programs exhibited significantly higher first-attempt cognitive ability scores overall, and across all content areas. These differences may be used to target interventions for improvement of low-performing programs.