UC Irvine

Title

Trends in Emergency Medicine Resident Procedural Reporting Over a 10-Year Period

Permalink

https://escholarship.org/uc/item/1d47m5r1

Authors

Gottlieb, Michael
Jordan, Jaime
Kryzaniak, Sara
et al.

Best of Best Research and Innovation Abstracts

1 Facilitating Adaptive Expertise in Learning Computed Tomography, A Randomized Controlled Trial

Leonardo Aliaga, Rebecca Bavolek, Benjamin Cooper, Amy Matson, James Ahn, Aaron Kraut, David Duong, Mike Gisondi

Background: Adaptive expertise is the ability to transfer existing skills to novel situations. Error Management Training (EMT) improves transfer of skills and adaptive expertise by making learners solve difficult problems and produce errors before being shown how to solve them. While EMT been used in procedural skills training, its impact on transfer of cognitive skills in medical training is underexplored.

Objective: To compare the effects of EMT and Error Avoidance Training (EAT) on the transfer of cognitive skills, using head computed tomography (CT) interpretation as a model. We hypothesized that EMT, compared to EAT, would improve skills transfer when used to teach head CT interpretation to emergency medicine (EM) residents.

Methods: We conducted a prospective, randomized controlled study in six EM residency programs. Residents completed an online head CT curriculum using either an EMT or EAT strategy, followed by a head CT interpretation test we previously validated. Two experimental cohorts (EMT-1 and EMT-2) scrolled through head CT cases without guidance and tried to identify critical findings before receiving didactic explanation. The EMT-1 cohort encountered difficult questions leading to errors whereas EMT-2 encountered easy questions. The EAT cohort received didactic instruction before scrolling through head CT cases. The post-test included novel cases to assess transfer and familiar cases to assess direct application. Our primary outcome was transfer of head CT interpretation skill. We compared post-test scores by ANOVA.

Results: We enrolled 119 residents (Table). The EMT-1 cohort outperformed both EMT-2 and EAT cohorts on the novel cases assessing transfer, with a large effect size (Figure). There was no difference on the direct application cases.

Conclusions: EMT improves transfer of head CT interpretation skill. These findings support its efficacy to develop adaptive expertise with other cognitive skills in EM education.

Table. 119 residents completed intervention and post-test.

	EMT-1	EMT-2	EAT
Total	36	41	42
PGY-1	14	13	12
PGY-2	10	13	14
PGY-3	10	12	11
PGY-4	2	3	5

EMT = Error Management Training
EAT = Error Avoidance Training

	Transfer Cases Mean (95%CI)	Direct Application Cases Mean (95%CI)
EMT-1	56.3 (50.3-62.3)	77.1 (75.2-79.0)
EMT-2	42.0 (34.2-49.8)	77.5 (74.5-80.4)
EAT	36.4 (30.2-42.6)	75.8 (72.8-78.8)

ANOVA: $F_{(2,116)} = 9.062, p < 0.001$ Eta squared $= 0.14$	$F_{(2,116)} = 0.428, p = 0.65$
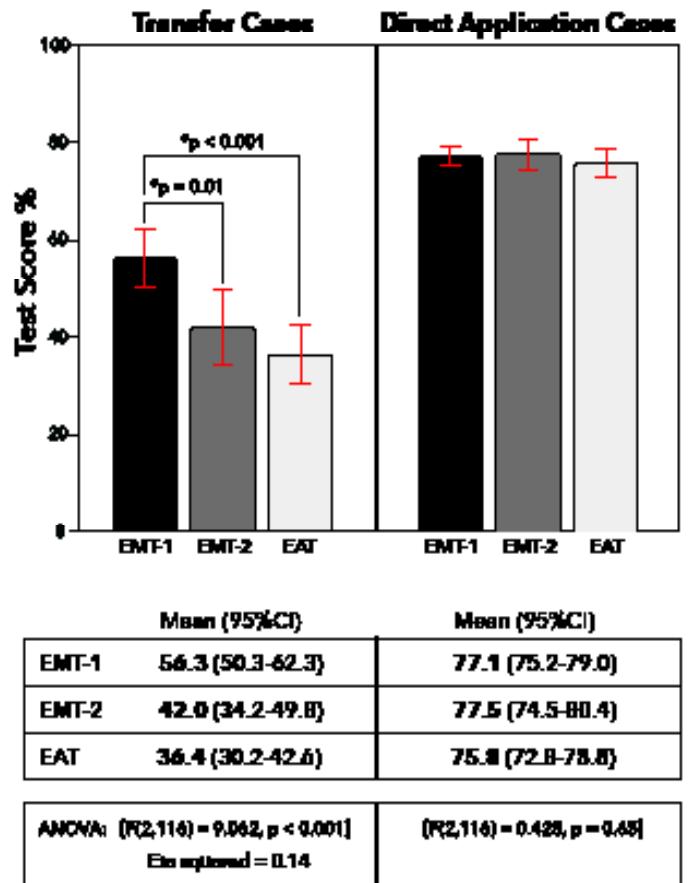
Figure. The FAIL CT study: a multicenter randomized controlled trial.
*Tukey's Test used for post-hoc comparisons
FAIL, facilitating adaptive expertize in learning computed tomography; *EMT,* error management training; *EAT,* error avoidance training.

2 Trends in Emergency Medicine Resident Procedural Reporting Over a 10-Year Period

Michael Gottlieb, Jaime Jordan, Sara Kryzaniak, Alexandra Mannix, Andrew King, Robert Cooney, Megan Fix, Eric Shappell

Background: Procedural competency is expected of all emergency medicine (EM) residents upon graduation. The ACGME requires a minimum number of essential procedures to successfully complete training. However, data are limited on the actual number of procedures residents perform and prior studies are limited to single institutions over short time periods.

Objectives: This study sought to assess the number of procedures completed during EM residency training and evaluate trends over time.

Methods: We conducted a retrospective review of EM resident procedure totals across 8 ACGME accredited residency programs over the last 10 years (2013-2022). Sites were selected

to ensure diversity of program length, program type, and geography. All data from EM residents graduating in 2013-2022 were eligible for inclusion. Data from residents from combined training programs, those who did not complete their full training at that institution (i.e., transferred in/out), or did not have full data available were excluded. We determined the list of procedures based upon the ACGME Key Index procedures. Sites obtained procedure totals for each resident upon graduation. We calculated the mean and 95% CI for each procedure.

Results: We collected data from a total of 914 residents, with 881 (96.4%) meeting inclusion criteria. The mean number of procedures and distribution by year are included in the Table. The least frequent procedures included pericardiocentesis, cricothyroidotomy, cardiac pacing, vaginal delivery, and chest tubes. Most procedures were stable over time with the exception of lumbar punctures (decreased) and point-of-care ultrasound (increased).

Conclusions: In a national sample of EM programs, procedure numbers remained stable except for lumbar puncture and ultrasound. Data were limited by the retrospective nature, self-report, and inability to distinguish simulated vs live patient procedures. This information can inform residency training curricula and accreditation.

Table. Mean procedural numbers per resident by graduation year.

CI, confidence interval; *, ultrasound data were not available for 83 residents

3 Trends in Core Clerkship Grading Among Emergency Medicine Residency Applicants

Amanda Doodlesack, Andrew Ketterer

Background: Several studies have documented variability in clerkship grading systems, distributions and criteria used by US medical schools. As the United States Medical Licensing Exam (USMLE) transitions to pass/fail, transparency in applicants' remaining comparative data is increasingly important.

Objectives: To understand trends in core clerkship grading by looking at the number of US medical schools that have moved from a 3+ tier to a 2-tier (pass/fail) grading system and percentage of students given the top grade during the academic year (AY) 2020-21 compared to AY 2009-10. We hypothesize trends towards pass/fail grading and an increased percentage of top grades.

Methods: Medical School Performance Evaluations (MSPEs) from 145 US medical schools in 2021-2022 provided the grading systems used by each school and grade distributions for each of the core clerkships. Core clerkships included internal medicine (IM), surgery, obstetrics and gynecology (OB/GYN), pediatrics, and family medicine (FM). The number of schools using a 2-tier (pass/fail) vs. ≥3-tier grading system were compared to AY 2009-10. The percentages of students receiving the top grade for each clerkship were also compared to 2009-2010.

Results: In AY 2009-10, 5.0% of US medical schools used a 2-tiered system, compared to 12.4% in 2020-21. The percentage of students receiving the top grade in IM increased from 26.07% to 34.73%, surgery from 30.44% to 37.54%, pediatrics from 32.93% to 38.45%, OB/GYN from 31.71% to 37.37%, and FM from 35.27% to 38.30%.

Conclusions: US medical schools are increasingly adopting a 2-tier grading system. There also was a notable increase in the percentage of top grades given across all core clerkships comparing 2009-10 to 2020-21, suggesting a trend of grade inflation. With schools moving to pass/fail or giving out more top grades and the transition of USMLE Step 1 to pass/fail, it is becoming more difficult to differentiate medical students as they apply for residency.

Figure 1. Percentage of students receiving top grade by clerkship AY 2009-10 versus 2020-21.

Table 1. Number of United States' medical schools using each grading system.

	3+ tiers	2-tiers	Total # schools
AY 2009-10	113 (95.0%)	*6 (5.0%)*	119
AY 2020-21	127 (87.5%)	18 (12.4%)	145