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Using Gamification and Technology to Encourage Independent Study

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among US seniors matching into EM.

Methods: This was a retrospective observational review of NRMP data published and between 2007 and 2014. Permission was obtained from the NRMP. The data was analyzed using ANOVA and Fischer’s exact to determine statistical significance.

Results: There was no statistical difference in the average number of programs ranked by EM applicants among the years studied (p=0.93). Among time intervals, there was a difference in the number of EM applicants who were AOA (p=0.043). This statistical phenomenon was due to the drop in the number of AOA students in 2011. No statistical trend was identified over the time period studied. A net trend in overall Step 1 and Step 2 scores for EM applicants was observed. However, this did not outpace the national trend increase among all US seniors.

Conclusions: NRMP data from 2007-2014 demonstrates trends among EM applicants that are similar to national trends in other specialties for USMLE board scores, number of programs ranked and AOA membership. EM does not appear to have become more competitive relative to other specialties with regards to these metrics.

NRMP ¹ Data for EM ² Applicants from 2007-2014				
	2007	2009	2011	2014
AOA (%)	12.36%	10.93%	9.13%	12.04%
Mean number of programs ranked (SD)	7.8 (3.4)	8 (3.5)	8.5 (3.5)	9.2 (3.7)
Mean Step 1 score, EM (SD)	218.9 (18.8)	220.6 (18.2)	219.7 (18.1)	228.9 (17.3)
Mean Step 2 score, EM (SD)	225.1 (20.3)	227.6 (20.6)	232.3 (18.8)	241.4 (15.7)
Mean Step 1 score, all ³ (SD)	220.4 (20.3)	224.3 (19.6)	225.2 (20.6)	230 (18.8)
Mean Step 2 score, all (SD)	224.5 (22.3)	229.7 (21.8)	234.3 (20.4)	242 (16.6)

- 1 = National Residency Match Program
- 2 = Emergency Medicine
- 3 = all US seniors who matched in the NRMP main residency match

58 Use of Simulation to Assess Resident Performance of Medication Reconciliation and Disclosure of Error

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Background: According to the Institute for Healthcare Improvement, up to 50% of all medication errors in hospitals and 20% of adverse drug reactions (ADR) are a result of improper knowledge and recording of a patient’s medications; medication reconciliation (Med Rec) is an important component of patient safety and should be part of a standard history. ACGME milestones include Med Rec in SBP3 (Technology) as a level 1 skill and disclosure of error in ICS1 (Patient centered communication) as a level 4 skill.

Objectives: Our objective was to determine how frequently our residents perform Med Rec using a simulated

case. We also included an ADR to observe our residents disclosing an error. Our hypothesis was that junior residents would more frequently perform Med Rec but once the ADR was identified, senior residents would more readily disclose the error.

Methods: We developed a simulated case of a patient with an inferior STEMI. A triage note was developed using our EMR and provided to the residents at the time of the case. The note included an incomplete medication list. A nurse confederate and a bag of the “patient’s” medications were in the simulation room. The “patient” was taking tadalafil for BPH. Nitroglycerin (NTG) was given by the nurse when ordered by the resident or “per protocol”. After administration of NTG, the patient had persistent hypotension and worsening ST elevation (ADR to NTG due to tadalafil). If the resident did not recognize the ADR, the “cardiologist” asked about the patient’s medications. A faculty member observing the encounter noted the level of training of the resident, performance of Med Rec and disclosure of error.

Results: 26 of 36 (72%) of residents participated in the simulation (PGY1 - 9, PGY2 - 9, PGY3 - 8). 8 (31%) residents performed Med Rec (PGY1 - 3 (33%, p=1.0), PGY2 - 4 (44%, p=0.38), PGY3 - 1 (16.5%, p=.36)). Once the ADR was recognized, 12 (46%) residents disclosed the error to the patient (PGY1- 4 (44%, p=1.0), PGY2 - 5 (56%, p=0.68), PGY3 - 3 (37.5%, p=0.68).

Conclusions: Overall, residents infrequently performed Med Rec in this simulated case and a minority disclosed the error to the patient. There was no difference in performance of Med Rec or disclosure of error by level of training despite the ACGME level of skill designations. Direct observation of these skills in a simulated setting allowed milestone based assessment of these skills without actual patient harm.

59 Using Gamification and Technology to Encourage Independent Study

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Background: Each year residency directors are faced with the challenge of finding new ways to motivate their residents to spend their free time studying independently. One potential solution is combining gamification with new technologies. Gamification uses game mechanics (leaderboards, head-to-head competition, tournaments, etc.) to incentivize residents to study and make the learning process more enjoyable. New technological innovations such as smart phones and tablet devices enhance access to and portability of educational tools. There has been little published in the medical literature on the utility of gamification in medical education.

Objectives: To use competition to encourage the use of an online question bank. We hypothesized that competition

would lead to increased usage of the study program.

Methods: Emergency medicine residents at Barnes Jewish Hospital/Washington University School of Medicine are split into 6 “families” for educational exercises. Each “family” has 8 members, with 2 representatives from each class (PGY 1-4). Data were collected from September-December, 2014.

In this prospective observational trial, each resident was granted free access to the Rosh Review, an online study tool that consists of emergency medicine-specific questions. The program is accessible via computer or mobile device application. Calendar months were divided into alternating “Family Challenge” months and control months. During “Family Challenge” months, the number of correctly answered questions was tallied and weekly scoreboards were disseminated via email. The winning family was that which correctly answered the most questions at the end of the month. Only correctly answered questions were counted in order to control for honest effort when completing questions. There were no prizes.

Results: During the “Family Challenge” months of September and November a total of 6,692 correctly answered questions were completed compared to a total of 3,508 (p=0.009) during the control months of October and December. Table 1 compares the number of correctly answered questions organized by residency family and month.

Conclusions: Our study showed that gamification can be used to increase the use of an online study tool by emergency medicine residents. Showing competitors a scoreboard each week motivated them to complete more questions.

Table. Number of Correctly Answered Questions by Family.

	September*	October**	November*	December**
Sopranos	372	166	404	700
Huxtables	325	101	415	536
Fockers	844	218	756	150
Corleones	424	184	396	193
Bluths	1125	481	820	363
Joneses	478	170	333	246
Total	3568	1320	3124	2188

*Family Challenge” month

**Control month

(EM) residency programs devote an immense amount of faculty time predicting which applicants will be most successful in residency and rank them accordingly on their program’s Rank Order List (ROL). However, few studies have investigated if ROL position, presence of a medical student rotation at their respective program prior to matching, or USMLE rank within a class are predictive of residency performance.

Objectives: To examine the correlation of initial rank position, USMLE scores and presence of a medical school rotation to a resident’s final rank at the end of residency in order to guide future ranking processes.

Methods: All full-time EM faculty at Los Angeles County + University of Southern California, Harbor - UCLA (Harbor), Alameda County - Highland (Highland), and the University of California - Irvine (UCI) ranked the classes of 2013 and 2014 at time of graduation. From these anonymous surveys, a graduation rank list was created. This graduation rank list was then compared to each class’s USMLE Step 1 rank within a class, rank order list, and presence of a medical student rotation using Spearman’s rho.

Results: A total of 93 residents, spanning 2 graduating classes, at 4 EM residency programs in California were evaluated. Residents’ initial ROL was not correlated with final graduation rank order (Rho=0.14, p=0.19). This was true for the pooled sample as well as individual programs. Interestingly, among the subgroup of individuals who had rotated as a medical student at their respective programs, ROL did significantly correlate with final ranking (Rho=0.31, p=0.03). We did not observe a significant correlation between USMLE step one scores and graduation rank (Rho= 0.15, p=0.14).

Conclusions: This multi-center study showed that USMLE Step 1 score rank within a class and position on initial rank order list did not predict resident performance at time of graduation. However, ROL was predictive of future residency success in the subgroup of residents who had completed a sub-internship at their respective programs. These findings should guide the future selection and ranking processes of emergency medicine residencies.

61 When do Sub-Interns Prefer to Interview?

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Background: Traditionally, all 4th year sub-interns rotating in Emergency Medicine at LAC+USC were invited back for their residency interview during interview season (Nov-Jan). This required students to travel back to Los Angeles at a later date to interview and filled a large number

60 What Predicts Resident Performance?: A Multi-Center Study Examining the Association Between Resident Performance, Rank List Position, and USMLE Scores

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Background: Each application cycle, emergency medicine