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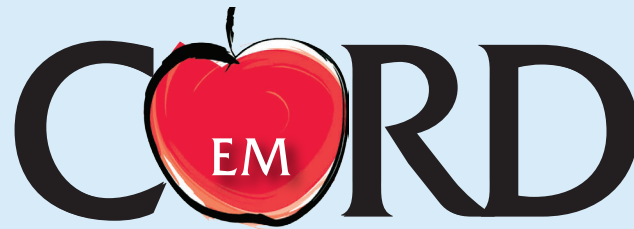
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# CORD *Abstracts Special Issue*

Supplement to

## *Western Journal of Emergency Medicine:*
### Integrating Emergency Care with Population Health



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## *Advances in Education Research and Innovations*

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The Council of Emergency Medicine Residency Directors Advances in Education Research and Innovations Forum presented a peer-reviewed selection of emergency medicine graduate and undergraduate educational research and innovations in both oral and poster formats at CORD Academic Assembly 2018. Emphasis was placed on novel research questions and designs. Innovation submissions included curricular designs, computer applications, faculty development, recruitment processes or similar topics.

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## Research Abstracts

### 1 A Novel Curriculum for Ophthalmology Training of Emergency Medicine Residents (COPTER)

*Bouman A, Goyal N, Guyer C, Goyal A, Huitsing H, Dowers C, Clark C, Noll S, Harrison M, Stokes-Buzzelli S/Henry Ford Health System, Detroit, Michigan; Kresge Eye Institute, Wayne State University School of Medicine, Detroit, Michigan*

**Background:** Emergency Medicine (EM) physicians must effectively manage ophthalmologic emergencies, yet many EM residencies teach Ophthalmology via the traditional off-service rotation model. Training during medical school is limited and variable.

**Objectives:** Replacing an apprenticeship model of ophthalmology training with an innovative longitudinal curriculum may improve EM residents' competency in treating eye complaints.

**Methods:** The Curriculum for Ophthalmology Training of Emergency Medicine Residents (COPTER) is designed to cover all the Ophthalmology content in the Model of EM over 18 months. It consists of three, 4½-hour sessions employing didactics and hands-on training in diagnosis, equipment use, and procedures.

A knowledge test was administered to 16 PGY1 EM residents before and immediately after participation in COPTER session 1; the test was re-administered 8 months later (before session 2) to assess knowledge retention. These residents also completed a survey at the end of PGY1 to assess self-perceived competency in the diagnosis and management of select ophthalmologic complaints. The same survey was administered to 16 upper-class residents who had completed a 2-week ophthalmology rotation during their PGY1 year ("Pre-COPTER") and was re-administered after they completed one session of COPTER ("Mixed Curriculum.") Paired t-test and Wilcoxon Rank Sum test were used to analyze the data.

**Results:** Residents displayed improved knowledge immediately after a COPTER Session (p=0.0012 compared to pretest), and this improvement was sustained 8 months later (p=0.0261). There was a statistically significant increase in self-perceived competency in evaluating medical eye complaints (p=0.0493) and in acute glaucoma management (p=0.0221) between the Pre-COPTER and the Mixed Curriculum.

**Conclusions:** An innovative, multi-modal ophthalmology curriculum improved EM resident knowledge of the diagnosis and management of ophthalmologic emergencies. When compared to an apprenticeship/rotation model, this curriculum also enhanced self-reported competency in managing medical eye complaints. COPTER may improve the care of patients with ophthalmologic emergencies.

**Table 1.** Outline of a COPTER session. There are three unique sessions with one session scheduled every 6 months, covering the entire model of EM twice in a three-year residency program.

| | PGY1 Track | PGY2 Track | PGY3+ Track |
|---|---|---|---|
| 12:00pm – 1:00pm | Large-group Didactic<br>COPTER Session 1: The Red Eye ◆ COPTER Session 2: Eye Trauma ◆ COPTER Session 3: Other Inflammatory Conditions & Infections | | |
| 1:00pm – 2:00pm | Small-group Breakout* | Small-group Breakout* | Small-group Breakout* |
| 2:00pm – 2:15pm | Snack break, move to next session | | |
| 2:15pm – 3:15pm | Small-group Breakout* | Small-group Breakout* | Small-group Breakout* |
| 3:15pm – 3:30pm | Snack break, move to next session | | |
| 3:30pm – 4:30pm | Small-group Breakout* | Small-group Breakout* | Small-group Breakout* |

\* Table 2 describes the content of each breakout session. *COPTER*, Curriculum of Ophthamology Teaching of Emergency Medicine Residents; *EM*, emergency medicine; *PGY*, post-graduate year.

**Table 2.** COPTER breakout session menu.

| Name | Content | Audience | Equipment needed |
|---|---|---|---|
| Vision Assessment & Eye History | How-to measure and document visual acuity[1], Must-ask historical questions | PGY1 | Video: https://youtu.be/bFmv4XYRN58, Snellen chart, Pinhole occluder |
| General Eye Examination | Orbital anatomy, Pupil assessment – size, shape, direct & consensual reflex[1], Swinging light test, Outside-in systematic examination | PGY1 | Video: https://youtu.be/bFmv4XYRN58, Flashlight |
| Direct Ophthalmoscopy | How-to use equipment, Visualizing disc and macula, Papilledema | PGY1 | Direct ophthalmoscope, PanOptic™ ophthalmoscope, Ophthalmoscopy simulator |
| Intraocular Pressure Measurement | How-to measure[1], Normal range, Do not measure when perforation suspected | PGY2 | Tono-Pen® with tip covers, iCare® Tonometer with probes, Cornea simulator |
| Slit Lamp | Knobology & focusing, Patient positioning, Corneal abrasion (blue light), Cells and flare | PGY1, PGY2, PGY3+ | Slit lamp, Video: https://youtu.be/w9wMJ6job_0, Volunteer[2] |
| Ultrasound | Probe choice and machine settings, Normal anatomy, Examining patient with swollen-shut eye | PGY2 | Ultrasound machine, Volunteer[2] |
| Advanced Ultrasound | Abnormal findings, Retinal detachment, Posterior vitreous hemorrhage, Optic nerve sheath diameter measurement | PGY3+ | Ultrasound machine, Image bank, Volunteer[2] |
| Foreign Body Removal | When to suspect it, Eyelid eversion, How-to use equipment, Checking for globe perforation | PGY3+ | Foreign body simulator, Slit lamp, Tuberculin syringe, Cotton-tip applicator, Burr drill, Video: https://youtu.be/DQZn8WRGBeQ |
| Lateral Canthotomy | Indications, How-to perform | PGY3+ | Cadaver, Video: https://youtu.be/tgQaKVGynFA, Video: https://youtu.be/cLsLBU4L1Ko |

\*Residents are asked to document these on every patient with an eye complaint.

### 2 A Simulated Standardized Video Interview: Alleviating Student Concerns while Effectively Simulating Content

*Kiefer C, Shaver E, Sharon M, Davis S, Dilcher B, Davis T, Charles P, Wehner P, Cottrell S, Ferrari N/West Virginia University School of Medicine, Morgantown, West Virginia; Marshall University Joan C. Edwards School of Medicine, Huntington, West Virginia*

**Background:** The standardized video interview (SVI) was introduced as a new requirement for Emergency Medicine (EM)

applicants in the 2017-2018 cycle. As with all new requirements, there is a paucity of available materials to assist students in preparation, understandably causing an increase in applicant anxiety associated with the new requirement.

**Objectives:** This study aimed to evaluate whether participation in a simulated SVI would improve student comfort and whether the simulated format effectively mirrored the actual exercise, with a hypothesis that the simulated SVI would be effective in improving comfort and mirror the format of the actual SVI.

**Methods:** Medical students applying to EM at 2 allopathic schools were given the opportunity to complete the simulated SVI via a private YouTube channel. The simulated SVI contained 6 questions on professionalism and interpersonal communication (Figure 1). Videos were reviewed by two faculty members and detailed feedback was provided in written format (Figure 2). Students completed a survey prior to participation in the

**Interpersonal and Communication Skills:**

1. Think about a "difficult" patient that you have recently cared for.

What is your standard approach to dealing with a "difficult" patient? What specific verbal and non-verbal techniques do you find most helpful in these situations?

2. Give an example of a time where you cared for an ill pediatric patient and had to communicate a critical message to the parent/guardian.

What is the specific example of the message that you delivered? How was the message received? What techniques do you think made your message received in the way it was?

3. Imagine that you are the newly appointed resident leader of a hospital committee with a mission to decrease the time from ED arrival to OR arrival for patients seen in your Emergency Department with small bowel obstruction requiring emergent surgery. Your committee members are a combination of surgery residents and emergency medicine residents, the majority of them senior to you in experience. The surgery residents are blaming the ED for lag time in diagnosis and the EM residents are blaming the surgery residents for delay in calling back their consults.

How would you most effectively entertain the opinions and suggestions of all committee members to effectively carry out the committee's mission?

**Knowledge of Professional Behavior**

1. As a medical student on your EM rotation, you notice that the senior resident assigned as your teaching resident for the shift smells of alcohol but is not acting overtly intoxicated.

Think about how you would handle this situation. Would you report the suspicion that the resident is under the influence of a substance at work? If you would report, who would you report it to and how would you most effectively convey your concern?

2. Tell us about an incident where you witnessed or were directly involved in a medical error. Respecting patient confidentiality, briefly describe the incident you most clearly recall. What role did you play in dealing with the error at hand? What was the outcome of the error reporting process?

3. You are caring for a patient that was tested for HIV in your Emergency Department via a standing protocol. The *screening* HIV test shows a positive result. There is an established pathway for a research assistant to follow-up on patient results the next day, which means that the provider ordering the test is not required to report the results to the patient. As the ordering provider, would you chose to report the positive result to your patient? If you would report the positive result, understanding that some of the screening tests are falsely positive and must be confirmed by additional testing, how would you reveal this sensitive information to your patient?

**Figure 1.** Simulated SVI Questions Related to the Competencies of Interpersonal and Communication Skills and Professionalism.

**Communication Style:**
We liked your communication style, very natural and conversational; very direct and thoughtful in your answers; no awkward pauses or "ums"—which is awesome! Don't rock, make sure you can look relaxed yet remain still.

**Quality of Answers:**
1. Difficult patient encounter
IVDU with CHF, didn't like to talk to large groups. Explaining your patience with the patient and how it helped you to get to your ultimate end goal was well received—establishing rapport is of utmost importance in EM and we think you established that point very well!
2. Pediatric patient encounter
Discussed end of life care and cessation of aggressive medical intervention based on the wishes of the patient that the mom found difficult to hear
3. Committee interactions
Allowing each person to be heard and feel respected are really great points, taking away "blame" and making everyone feel that they are on an equal playing field is a good general "ground rule" for success.
4. Reporting an impaired colleague
Acknowledged the difficulty of the situation of addressing substance abuse, particularly as a student dealing with a resident. Recognizing that you have the responsibility for patient care and safety no matter what level of training you are at is very noble. Don't be afraid to stand a hard line on this subject—it's NEVER acceptable to be at work under the influence of any substance and you will never be wrong in saying so directly.
5. Medical error
Acknowledging that you were not directly involved, but still recognized that communication is key to preventing medical error and being open and honest is of utmost importance in revealing medical errors.
6. Screening test results
We like how you related this question to the importance of rapport development with your patient and the fact that this is really important in Emergency Medicine
explaining confirmatory and screening processes is important and you did this well.
Taking time to sit down and talk and confirm this rapport is really important and well stated.

**Professionalism:**
Overall appears professional
Answers are direct and well thought out
**Appearance:**
Professional appearing, no major distractions
**Video and Sound Quality:**
Background is white, which is good, but design on the background is a bit distracting?
Perhaps finding a solid white background would be best to avoid any unintended distractions

**Figure 2.** Example of detailed written feedback provided to participating students.

simulated SVI and a follow-up survey after completing the actual SVI. Pre-SVI questions were focused on preparation and attitudes related to the SVI, while post-SVI questions focused on effectiveness and accuracy of the simulated SVI.

**Results:** Sixteen students completed the simulated SVI, with 16 (100%) completing the pre-survey and 14 (88%) completing the post-survey. A majority of students (14) felt that the SVI process increased anxiety associated with the application process, and reported that they felt a need to prepare for the SVI. Upon completion of the actual SVI, 9 (64%) reported the simulation decreased anxiety, and 11 (79%) felt the questions accurately simulated those in the actual SVI. Twelve (86%) students felt the simulation exercise alleviated their primary concerns regarding the SVI.

**Conclusions:** A simulated SVI with focused feedback appears to largely alleviate anxiety related to the new requirement for EM bound students. Despite a lack of specific information regarding the content of the SVI and details of the scoring rubric, our simulated SVI mirrored the questions in the actual SVI. Potential limitations of this study include the small sample size, and a lack of information on the question format in the actual SVI prior to creating our simulation.

## 3  A Wellness Assessment of Residents' Significant Others

*Zdradzinski M, O'Shea J, White M, Lall M /Emory University School of Medicine, Atlanta, Georgia*

**Background:** Resident physicians have high rates of burnout and mood disorders. The effect of residency on residents' significant others (SO's) has not been previously explored.

**Objectives:** To assess the overall well-being and stress levels of residents' SO's, as well as potential factors that detract from SO's wellness.

**Methods:** An anonymous electronic survey was sent to residents with requests that they forward it to their SO for completion. SO was defined as a spouse, domestic partner, romantic partner, or close family/friend who serves as their primary source of personal support. The survey assessed the effect of residents' work hours and scheduling, personal and professional sacrifices of SO's to accommodate their resident's career, and the effects of residents' stressors at work on their personal lives. SO's were also asked to provide specific ideas to the residency program that could improve their wellness. Responses were primarily reported on a 5-point Likert scale, while others were open-ended.

**Results:** The survey was sent to 61 emergency medicine residents, and we received 12 responses from SO's. All who responded reported being in a romantic relationship with the resident for an average of 6.6±3.3 years, and 59% were married. 42% of SO's reported that they also work in healthcare, and 42% reported making professional sacrifices to enable their SO's current residency position. A majority (83%) reported that their relationship was under more stress in residency, and 67% reported seeing increased depression, anxiety or neuroticism in their resident. SO's rated the lack of scheduling flexibility (4.5±0.9 out of 5) and night shifts (3.9±1.2) as the biggest sources of stress. Residents' stresses from work (i.e. bad outcomes, difficult patient or colleague interactions) were not a major source of stress at home (2.2±1.6). SO's suggestions for improving wellness primarily focused on improving flexibility and advanced notice of schedules, providing more consistent work hours, and improving note-writing efficiency to decrease the post-shift administrative burden.

**Conclusions:** Significant others' wellness is strongly affected by their residents' professional responsibilities. Efforts to improve SO wellness could focus on resident efficiency and improved scheduling parameters.

## 4  An Interprofessional Paging Training Program for a Fourth Year Internship Readiness Course

*Mutter M, Pedersen K, Martindale J /University of Virginia School of Medicine, Charlottesville, Virginia; University of Virginia Health System, Charlottesville, Virginia*

**Background:** Effective responses to pages from nurses regarding acute inpatient concerns is an essential skill for a medical intern. However, few senior medical students receive adequate training. Previous studies have shown mock paging to be a valid and reproducible method for improving paging performance. Studies have not evaluated the feasibility for these programs to be used between a nursing student and medical student.

**Objectives:** The purpose of this pilot study was to determine 1) feasibility of developing a mock paging program between master's level nursing students and 4th year medical students during a 4th year internship readiness course; 2) if this program increased medical student performance over time with post-paging feedback from the nursing student; and 3) if the program improved the medical students' self-reported preparation to answer pages.

**Methods:** This was an observational prospective design in an academic center, using a within subjects method with repeated measures. Six cases and checklists surrounding common inpatient scenarios were developed and refined by faculty physician and were administered by phone to 40 fourth year medical students by master's level nursing students. A Friedman 2-Way Non-Parametric ANOVA was used to determine if there were differences in performance across cases. Students were surveyed about their level of preparedness before and after the paging program, and 3 months into residency. Interrater reliability of checklists was determined by a Fleiss' Kappa statistic, with 10 master's level nursing students listening to 4 prerecorded cases.

**Results:** Data from a total of 216 phone calls were analyzed for 36 students. A statistically significant increase ($p<.001$) in student-reported preparedness for responding to nursing pages was seen comparing pre-course survey to post survey, as well as pre-course survey to final survey. However, no statistically significant improvement of checklist scores was observed over the curriculum. Interrater reliability for 4 of the 6 cases was greater than .6 for each case.

**Conclusions:** A pilot mock paging program instituted between 4th year medical students and master's level nursing students shows an improvement in self-reported preparedness to answer pages, but it does not show improvement over time in

checklist item completion. Limitations include size and lack of controls for preparedness measures.

# 5 Anticipated Versus Actual Use of EMRA Match Filters

*Jarou Z, Davis B, Kellogg A, /Denver Health Medical Center/University of Colorado, Denver, Colorado; Technology Services, American College of Emergency Physicians, Irving, Texas; Baystate Medical Center/ University of Massachusetts, Springfield, Massachusetts*

**Background:** EMRA Match is a collaborative, crowd-sourced, searchable, filterable emergency medicine residency program directory endorsed by EMRA, CORD, CDEM, and ACEP. In 2015, third and fourth year medical student members of EMRA were surveyed to determine which program attributes they considered most important when selecting a residency program. The program attributes indicated as being most important to students were included as search filters in EMRA Match.

**Objectives:** The purpose of this investigation was to evaluate the use of filters on EMRA Match, and to compare actual use to anticipated use from the student preferences survey conducted prior to the addition of the filtering function.

**Methods:** The 2015 student survey used to develop EMRA Match evaluated the importance of 16 attributes that could be used to select an emergency medicine residency program. Preference for geographic location, length of training, and program accreditation type were omitted as the importance of these has previously been validated. EMRA Match currently contains 23 filters that could be applied to search for residency programs. The overall number of searches and use of each filter was tracked for all visitors to EMRAMatch.org. There were ten program attributes for which both survey perceived importance, prior to the launch of EMRA Match, and actual usage patterns were available.

**Results:** Between June and November of 2017, 202,307 searches made. Applying a new filter also counts as a search. Forty-thousand searches were made by 1310 users with EMRA.org accounts. Twenty-one percent of logged in users applied filters to their searches. Overall, the actual usage of filters was less than anticipated. Between one-third and 40% of students used the ACGME/AOA Accreditation, Name or Location, and Program Length filters. Students used the Step 1 Cutoff, Percent Osteopath, and Training Environment filters more than anticipated, and the Shift Length and Shifts Per Month filters less than anticipated.

**Conclusions:** The actual usage of filters on EMRA Match differs from what would have been anticipated based on prior survey data. Further efforts may be required to educate students that using filters can help them develop a targeted application strategy. These results may also warrant updating the EMRA Match user interface to make it easier to apply the most popular filters.
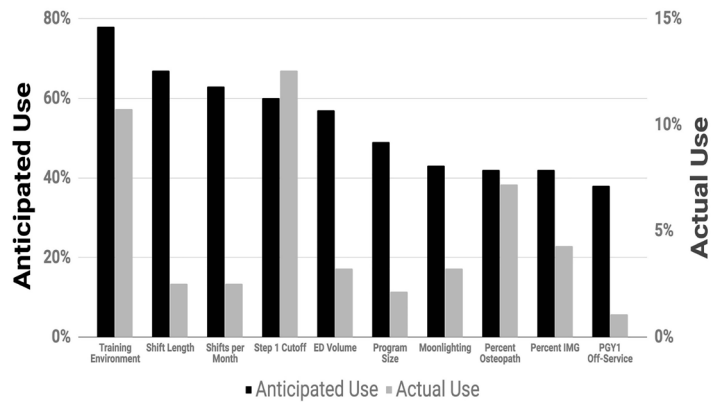


**Figure 1.** Anticipated versus actual use of filters by logged-in users of EMRA Match.
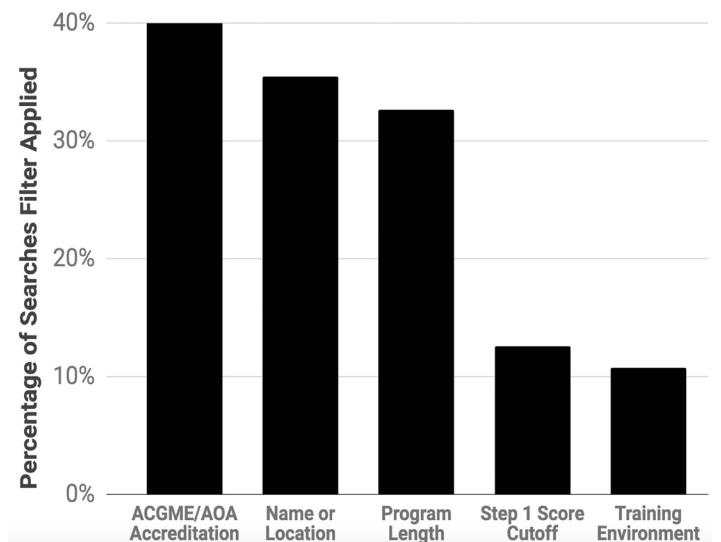


**Figure 2.** The top five filters applied by logged-in users of EMRA Match.

# 6 Applicant Attitudes Towards the Standardized Video Interview - An Interim Analysis

*Winfield-Dial A, Chhabra N, Schindlbeck M, Bowman S, / John H. Stroger Hospital of Cook County, Chicago, Illinois*

**Background:** The Standardized Video Interview (SVI) was developed by the Accreditation Council for Graduate Medical Education (ACGME) with the goal of allowing applicants to include objective information beyond traditional academic measures. The SVI is comprised of six questions with the goal of evaluating applicant knowledge of professional behaviors, and interpersonal and communication skills. During the 2018

Electronic Residency Application Service (ERAS) application cycle the SVI pilot was administered to applicants applying to Emergency Medicine residency programs.

**Objectives:** This survey aims to assess Emergency Medicine residency applicant attitudes towards the Standardized Video Interview.

**Methods:** A survey was developed and piloted at an urban ACGME-approved emergency medicine residency. This survey was subsequently distributed to residency candidates at the conclusion of their interview day. Respondents were asked a series of questions regarding their demographic data and thoughts regarding the added value of the SVI to their ERAS application. Participation was optional and responses were anonymous. This is an interim analysis of completed surveys.

**Results:** A total of 80 candidates completed the survey representing a 100% response rate. 58% were male, 38% were female, and 4% did not respond. Candidates were 58.7% Caucasian, 15% Asian, 12.5% African American and Hispanic respectively. SVI scores ranged from 6-26. 46.25% (n=33) of respondents felt their score was worse than they expected and 25% (n=20) stated they were aware of how they would be scored. Only 7.5% (n=6) felt the SVI added information about their knowledge of professional behaviors and 11.25% (n=9) felt that it added information about their interpersonal and communication skills that was not available elsewhere on their application. Only 3% of survey respondents felt the SVI should remain a portion of the ERAS application.

**Conclusions:** Candidates overall were not aware of how the SVI was scored and approximately half had scores that were worse than expected. Overall, most respondents felt the SVI was not an accurate representation of their interpersonal and communication skills or their knowledge of professional behaviors. The vast majority do not think it should remain a part of the ERAS application.

## 7 Are ACGME Duty Hour Restrictions Associated with Improved Academic Performance?

*Kiefer C, Shaver E, Sharon M, Davis S, /West Virginia University School of Medicine, Morgantown, West Virginia*

**Background:** The ACGME duty hours were implemented with the anticipation that restricting clinical hours would lead to improved patient safety and medical knowledge. Although several studies have evaluated the impact of decreased clinical duty upon patient safety and wellness, little previous work in Emergency Medicine (EM) has assessed the impact of restricted duty hours upon medical knowledge. No prior study has evaluated performance on the

in training examination (ITE) to assess medical knowledge longitudinally during training.

**Objectives:** This study evaluated the impact of restricted clinical duty hours on academic performance and medical knowledge as measured by ITE score. We hypothesized that increased time available for studying would improve performance on the ITE.

**Methods:** We conducted a retrospective, observational study where ITE scores from a single EM residency were analyzed during 3 distinct time periods: program inception to the first duty hours restrictions 1994-2003 ('baseline'), and the periods following each reduction in duty hours: 2004-2011, and 2012-present. Resident performance on the ITE was tabulated and compared across study periods. Differences in average ITE scores between the 3 periods were analyzed using the Kruskal-Wallis test with Dunn's test used to assess significant differences in post hoc means while controlling the overall error rate.

**Results:** Overall, 425 ITE scores were available for analysis over the 3 study periods. A significant increase in test performance ($p < 0.01$) was observed between the baseline and both duty hour restriction time periods (71.26%; 76.02%; and 75.24%, respectively). No significant difference ($p > 0.05$) in performance was observed between the two duty hour restriction periods.

**Conclusions:** Resident performance, as measured by ITE score, improved during the period following the initial duty hours restrictions (2004-2011) compared to performance prior to duty hour implementation (1994-2003). There was no improvement in ITE performance associated with the further restrictions in 2011. Limitations to this study include the fact that it was conducted at a single site which may limit the generalizability of the findings, and did not include data on the actual amount of time residents engaged in studying during the study periods.

## 8 Are Standardized Video Interview Scores Predictive of Interview Performance?

*Willis J, Surles T, Silverberg M, Kendall S, LoCascio H, Gernsheimer J, Schechter J, Regan A, Smith T /SUNY Downstate, Brooklyn, New York*

**Background:** The Standardized Video Interview (SVI) was developed by the AAMC to be used in ERAS applications for residency. The goal for the SVI is to aid program directors to identify applicants who do not perform well on other objective markers and increase the chance of an interview. The SVI tests interpersonal communication and professionalism which are factors evaluated in an interview. There is controversy whether the SVI score is valuable to the application and how it should be used. One proposed use of the SVI is to predict how an applicant will interview.

**Objectives:** The objective is to determine if SVI scores predict how an applicant performs in an interview. We believe that the SVI score will correlate with interview scores.

**Methods:** Traditionally, at SUNY Downstate interviewees are scored based on their objective data (USMLE, Dean's Letter, LORs) as well as an interview evaluation (IE) which reflects the their performance at the interview. This application season all interviewers have been blinded to the SVI score and was not used in applicant selection. Applicant were interviewed by 5 faculty and the median of the IE's were used. Retrospectively, the SVI score is compared to the IE by a third party. This third party did not participate in interviewing and used de-identified data. The SVI and IE scores were converted to percentages and ranked to standardize the data. The null hypothesis that there is no statistically significant correlation was tested. A Spearman Rank Correlation Test with an alpha = 0.05 and 2-tails was used.

**Results:** 57 applicants were interviewed thus far in the 2017-18 season. The demographics at this time are similar with 30 male and 27 female. The medical school is skewed because 23 are from SUNY Downstate due to initial home interview days. The results of the analysis produced an r squared of 0.2 showing poor correlation and a p value of 0.175.

**Conclusions:** The p value fails to reject the null hypothesis and shows the scores are not statistically correlated. Therefore in this early data the SVI is testing something different than the interview performance. This is a small sample and with more data there may be more correlation. We did not account for other factors the SVI predicts such as performance in residency or prediction of match success. As Emergency Medicine is the first speciality to use these scores more research needs to occur to determine their value.

## 9  Career Outcomes of Graduates of EM/IM and EM/IM/CC Residency Programs

*Scott N, Rodos A, Coletti C, Martin D, Carter C, Tyo C, /Hennepin County Medical Center, Minneapolis, MN; University of Illinois at Chicago, Chicago, Illinois; Christiana Care Health System, Newark, Delaware; The Ohio State University, Columbus, Ohio; University of Maryland, Baltimore, Maryland; University of Illinois at Chicago, Chicago, Illinois*

**Background:** The most recent effort examining the career outcomes of graduates of Emergency Medicine / Internal Medicine (EM/IM) residency programs was published 9 years ago. Previous literature lacks a detailed description of the clinical practice of EM/IM graduates. Outcomes for Emergency Medicine / Internal Medicine / Critical Care (EM/IM/CC) graduates have never been described. A current understanding is important for medical students, residents, program leadership, and institutions supporting these programs.

**Objectives:** The objective of this study is to provide an updated and detailed description of the career outcomes of EM/IM and EM/IM/CC graduates, including current clinical practice, frequency of fellowship training, practice setting, board certification status in EM and IM, and satisfaction with training.

**Methods:** This study is a cross-sectional survey. Select questions from previous studies were utilized. Content validity evidence was established by expert review and response process validity was established by use of pilot participants. All graduates from EM/IM and EM/IM/CC training programs through 2017 were eligible. Statistics are descriptive. The study was approved by the institutional review board at Hennepin County Medical Center.

**Results:** 158 EM/IM and 24 EM/IM/CC graduates responded, constituting a response rate of 63% for graduates with available contact information. 12 training sites are represented. 34% of EM/IM graduates entered fellowships, of which critical care and pulmonary/critical care were most frequently chosen. After training, 70% entered academic positions. 95% plan to continue board certification in EM;

**Table 1.** Current clinical practice of EM/IM and EM/IM/CC graduates.

| | Training Program | |
|---|---|---|
| | **EM/IM** | **EM/IM/CC** |
| **EM practice only** | **74 (54%)** | **4 (17%)** |
| **IM practice only** | **15 (11%)** | **4 (17%)** |
| Ambulatory | 3 | 0 |
| Inpatient | 0 | 0 |
| Ambulatory + Inpt | 1 | 0 |
| Intensive care unit | 11 | 4 |
| **EM + IM practice** | **47 (35%)** | **15 (65%)** |
| EM + Ambulatory | 9 | 0 |
| EM + Inpatient | 23 | 1 |
| EM + Ambulatory + Inpt | 3 | 0 |
| EM + Intensive care unit | 12 | 14 |

This table describes the current clinical practice of graduates of Emergency Medicine/Internal Medicine (EM/IM) and Emergency Medicine / Internal Medicine / Critical Care (EM/IM/CC) training programs. Ambulatory and inpatient care include subspecialty care in these settings.

86% plan to continue in IM. Table 1 describes current clinical practice. 87% report being "extremely satisfied" with their residency training. 90% feel that obtaining a position with both IM and EM clinical practice required "somewhat" or "much more" effort than a position with either one alone.

**Conclusions:** Graduates report high rates of satisfaction with their training. Fellowship training in critical care and academic practice are frequently chosen. EM-only and practice in both EM and IM is common. Most EM/IM/CC graduates practice in

both an EM and ICU setting. Limitations include a lower-than-desired response rate, missing contact information, and possible overrepresentation of graduates in academic practice.

## 10  Clinician Understanding and Perceptions of Starting an Emergency Medicine Residency Program

*Islam N, Warrington S, Torres-Lugo C, Shivdat J, Sleigh B /Orange Park Medical Center, Orange Park, Florida*

**Background:** Research on new emergency medicine (EM) residency programs has focused on procedures and metrics with limited information on clinicians involved. There is a lack of data on community Emergency Department (ED) clinicians' attitudes, perceptions, and knowledge relating to developing an EM residency program.

**Objectives:** Primary objectives were to explore the perceptions, attitudes, and knowledge of clinicians working in a community ED at two institutions developing an EM residency program. Secondary objectives included identifying potential related barriers.

**Methods:** This was an IRB-approved anonymous and voluntary electronic survey-based study of clinicians (physicians, midlevel providers, and nurses) working in two community EDs. Surveys tailored to each group of clinicians consisting of multiple choice and open-ended questions were emailed to all clinicians working in either ED, with exclusion criteria being any temporary or non-ED personnel. Descriptive statistics were used along with manual qualitative content analysis for emerging themes.

**Results:** Twenty-three clinicians (10 physicians, 4 nurses, and 9 midlevel providers) responded representing less than 20% of the population. Seventeen felt metrics would worsen with a residency, and 9 felt teamwork would improve. Sixty-one percent thought patient safety would not change and 30% felt it would worsen.

Most ED physicians are looking forward to working with EM residents and feel that it will greatly increase their career satisfaction. All nurses and most midlevel providers perceive an EM residency will not change their career satisfaction.

Physician knowledge gaps were primarily related to ACGME requirements such as duty hours. Non-physicians had many knowledge gaps ranging from awareness of residents being physicians to uncertainty of what residents were allowed to do and length of training.

One theme identified in midlevel response was a concern of job security and experience with one noting "less patients, less time with attendings, and less procedures." A theme identified from nurse responses was that their concerns regarding the residents would not be addressed.

**Conclusions:** Despite significant non-response bias, the information obtained is helpful in identifying knowledge gaps and potential barriers prior to starting an EM residency at two community EDs.

## 11  Correlation Between Emergency Medicine Resident Self-Assessed and Faculty-Assessed Grit-S Scores

*Olson N, Olson A, Lank P, Williamson K, Hartman N, Branzetti J, /San Antonio Military Medical Center, San Antonio, Texas; UT Health Science Center San Antonio, San Antonio, Texas; Northwestern University, Chicago, Illinois; Advocate Christ Medical Center, Oak Lawn, Illinois; Wake Forest School of Medicine, Wake Forest, North Carolina; New York University, New York, New York;*

**Background:** Accurately assessing trainees' fortitude and resolve can be a challenge for educators. The investigation into novel assessment tools is ongoing. The predictive power of traditional evaluations is debatable; new assessment tools are being investigated. Grit, defined as "perseverance and passion for long-term goals," has emerged as a means to quantify an aspect of personality. Grit-S is a validated 8-question test scored on a 1-5 scale (5 is the highest score); the average of the responses represents a person's Grit. The Grit-S Score has been demonstrated to predict educational attainment when studied in other populations and has been shown to be accurate with an informant report version. The ability for faculty to accurately assess Grit in trainees could prove helpful in identifying learner needs and avenues for further career development.

**Objectives:** Our objective was to determine the correlation between an emergency medicine (EM) resident self-assessed and faculty-assessed Grit-S Score. We hypothesized that there would be a high correlation between the scores.

**Methods:** This was a national prospective, multicenter trial involving ten EM residencies. Study subjects were PGY 1-4 EM residents and resident-selected faculty at each site. The Grit-S survey was administered to participating EM residents; an informant version was completed by their self-selected EM faculty. A correlation coefficient was computed to assess the relationship between residents' self-assessed and the residents' faculty-assessed Grit-S Score.

**Results:** A total of 303 residents participated in the study; 103 residents were excluded who did not have a faculty assessed Grit-S Score. The mean resident self-reported Grit-S Score was 3.63 (Fig. 1) and the mean resident faculty-assessed Grit-S Score was 4.23. There was no correlation between the two Grit-S Scores ($r = 0.13$, $n = 333$, $p = 0.064$) (Fig. 2).

**Conclusions:** There was no correlation between the resident and faculty-assessed Grit-S Scores; however, faculty overestimated the Grit-S Scores of residents. Our findings corroborate the challenges faculty face with accurately assessing aspects of residents that they are supervising. While faculty may not be able to accurately assess the Grit-S Score of residents, Grit may still be a useful predictive personality trait that could help shape future training.
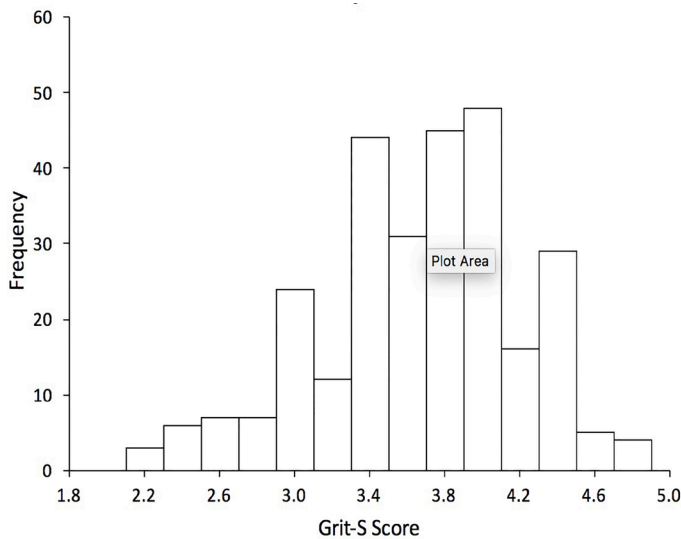
Figure 1. Resident self-reported Grti-5 Score.
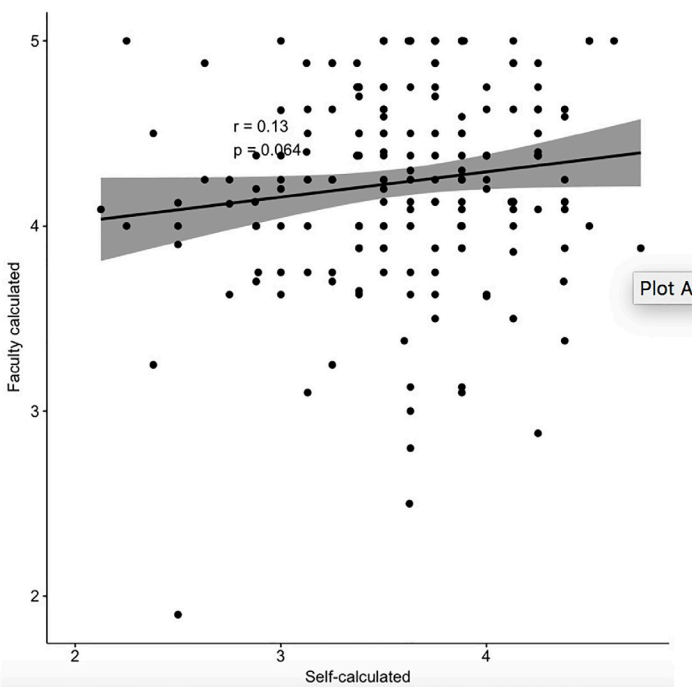


Figure 2. Correlation of residents' self-reported Grit-S Score and the residents' faculty-assessed Grit-S Score.

**12** **Do EM Resident Self-assessed Milestone Levels and that of the Clinical Competency Committee Consensus Align Over Time?**

*Mulcare M, Tichter A, Nguyen B, Clark S, Gogia K, Carter W, /New York-Presbyterian/Weill Cornell Medicine, New York, New York*

**Background:** Self-assessment is an important skill for physicians to determine ongoing learning needs over the course of a career. Graduate medical education training programs should incorporate self-reflection into the biannual evaluation process in order to assist residents with development of this professional skillset. A mechanism for feedback on this process is needed.

**Objectives:** To assess the agreement between the Clinical Competency Committee (CCC) assignment of milestone levels for an individual resident (gold standard) and the resident's self-assessment of the same milestones over eight evaluation periods during four years of training.

**Methods:** We analyzed milestone assessment for a single class of 12 residents across the four years of their emergency medicine training. Milestone levels as assigned by the CCC and resident were assessed overall and at eight evaluation time points (PGY-1 midyear (MY), PGY-1 end-of year (EOY), PGY-2 MY, PGY-2 EOY, PGY-3 MY, PGY-3 EOY, PGY-4 MY, and PGY-4 EOY) using weighted kappa statistics (with 95% CIs) and agreement.

**Results:** 79% of residents completed self-assessments over 4 years allowing for comparison to CCC milestone evaluations. Overall, agreement ranged from 21% to 46% with 18 of 23 milestones having moderate agreement between the CCC and the resident and 5 milestones having fair agreement [Table 1]. While inter-rater reliability was low at each of the eight time points, agreement between the

Table 1. Overall inter-rater agreement of milestone data by milestone.

| Milestone | Kappa | 95% CI | Agreement |
|---|---|---|---|
| Emergency Stabilization | 0.452 | (0.359 – 0.538) | 21% |
| Observation and Reassessment | 0.457 | (0.368 – 0.543) | 25% |
| Airway Management | 0.433 | (0.324 – 0.532) | 25% |
| Systems-based Management | 0.452 | (0.350 – 0.547) | 28% |
| Other Diagnostic Therapeutic Procedures: Vascular Access | 0.338 | (0.203 – 0.468) | 29% |
| Medical Knowledge | 0.425 | (0.278 – 0.544) | 29% |
| Patient Safety | 0.438 | (0.340 – 0.537) | 29% |
| Anesthesia and Acute Pain Management | 0.508 | (0.419 – 0.602) | 30% |
| Technology | 0.383 | (0.264 – 0.483) | 30% |
| Accountability | 0.384 | (0.288 – 0.487) | 32% |
| Multi-tasking (Task-switching) | 0.462 | (0.377 – 0.556) | 33% |
| Patient Centered Communication | 0.392 | (0.284 – 0.510) | 33% |
| Pharmacotherapy | 0.512 | (0.427 – 0.598) | 34% |
| Disposition | 0.467 | (0.366 – 0.575) | 34% |
| Other Diagnostic and Therapeutic Procedures: Goal-directed Focused Ultrasound (Diagnostic/Procedural) | 0.406 | (0.263 – 0.554) | 34% |
| Professional values | 0.38 | (0.274 – 0.509) | 36% |
| General Approach to Procedures | 0.472 | (0.335 – 0.590) | 37% |
| Other Diagnostic and Therapeutic Procedures: Wound Management | 0.558 | (0.458 – 0.644) | 38% |
| Performance of Focused History and Physical Exam | 0.432 | (0.326 – 0.559) | 39% |
| Diagnostic Studies | 0.521 | (0.426 – 0.626) | 41% |
| Practice-based Performance Improvement | 0.549 | (0.443 – 0.660) | 42% |
| Team Management | 0.525 | (0.428 – 0.634) | 43% |
| Diagnosis | 0.589 | (0.481 – 0.682) | 46% |

CCC and resident increased from 23% to 52% over four years of training [Table 2].

**Conclusions:** Overall, inter-rater reliability between CCC and resident self-assessment of milestone proficiency was low. There was a positive trend toward improved agreement between the CCC and the resident self-assessment over the four years. Additional work is needed to understand whether the low to moderate agreement is consistent with other institutions, and if it is due to the evaluation process or a lack of feedback to or coaching of the residents.

**Table 2.** Inter-rater agreement of milestones by year of training.

| Residency Level | Kappa (95% CI) | Agreement |
|---|---|---|
| **PGY-1** | | |
| Midyear (*fall*) | 0.127 (0.044 – 0.207) | 23% |
| End-of Year (*spring*) | 0.115 (0.049 – 0.183) | 26% |
| **PGY-2** | | |
| Midyear (*fall*) | 0.051 (-0.011 – 0.118) | 28% |
| End-of Year (*spring*) | -0.014 (-0.077 – 0.053) | 25% |
| **PGY-3** | | |
| Midyear (*fall*) | -0.001 (-0.088 – 0.086) | 30% |
| End-of Year (*spring*) | 0.105 (0.035 – 0.183) | 36% |
| **PGY-4** | | |
| Midyear (*fall*) | 0.018 (-0.044 – 0.096) | 44% |
| End-of Year (*spring*) | 0.057 (-0.017 – 0.145) | 52% |

# 13 Does Learning-Trivia Format Affect Learner Perceptions and Preferences?

*Olson A, Muck A, /UT Health San Antonio, San Antonio, Texas*

**Background:** Trivia is a common tool used by educators to engage learners during didactic sessions. Compared to standard lecture formats, application of "Serious Games" has been shown to increase learner participation, pre-session study, and performance. There are a variety of trivia formats which may lead to different learner perceptions.

**Objectives:** Our objective was to compare learner perceptions between three formats: Jeopardy!, Pub Trivia, and an App-based format (see fig. 1 for descriptions). We hypothesize that these formats will not carry equal learner perceptions.

**Methods:** Formats were compared over three separate sessions, each session covering separate Emergency Medicine (EM) topics. Convenience samples of residents in our PGY 1-3 EM program attending weekly conference were used. Learners were surveyed about each trivia, and asked to directly compare the formats. Indirect comparisons between responses were analyzed via one-tailed pooled variance t-testing, while direct comparisons were split into proportions which were compared to a null preference hypothesis.

**Results:** In indirect comparisons, the Pub Trivia format encouraged whole group participation more than Jeopardy! (but not App-based). Pub Trivia also maintained group focus significantly more than Jeopardy! or App-based trivia, and was a more efficient use of time than Jeopardy!. The questions and answers in Pub Trivia were significantly clearer than those in the App-based trivia. Overall, Pub Trivia was significantly preferred to App-based trivia. In direct comparisons, the questions and answers in Jeopardy! were perceived to be clearer than in Pub Trivia. See fig. 2 for graphical presentation of results.

**Conclusions:** The perception of Pub Trivia encouraging group participation and helping maintain focus during the session may be a result of decreased time pressure, allowing more time to be spent in-group discussing answers. However, learners preferred the clarity of Jeopardy!, which may suggest that the open-ended nature of Pub Trivia may open these sessions to distracting disputes. This study was limited by small sample size, single-person content creation, and single center study. Going forward, given a preference for Pub Trivia over the other formats, we will implement more of this format, with attention to question and answer clarity to reduce disputes.



| Jeopardy!™ | Pub Trivia | App-Based (Kahoot!™) |
|---|---|---|
| • Multiple questions of various point values with one correct answer<br>• Frequently 2 rounds of increasing point values<br>• Teams compete to buzz in first to answer questions<br>• Correct answers earn positive points, incorrect answers deduct points<br>• Final Jeopardy™ question allows for wager of accrued points | • Multiple rounds with questions that may one or more correct answers<br>• Teams record answers on paper answer sheet, which is collected AFTER each round and graded<br>• No deduction for wrong answers | • Series of multiple choice questions<br>• Teams respond via smartphone<br>• For each question, start with fixed maximum<br>• Teams record answers on paper answer sheet, which is collected AFTER each round and graded<br>• No deduction for wrong answers |

**Figure 1.** Trivia formats.
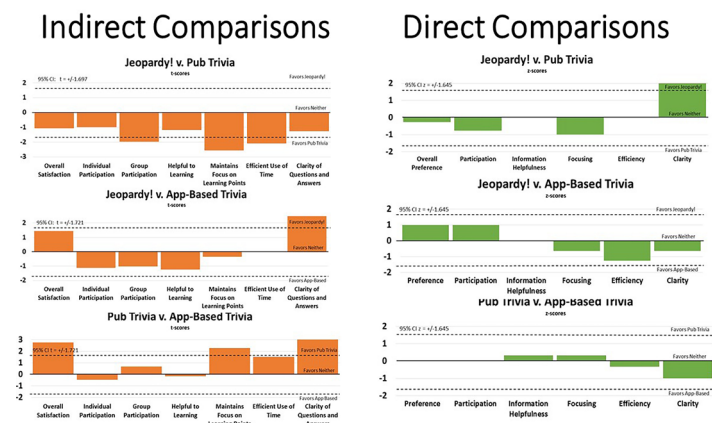


**Figure 2.** Graphical representation of results.

## 14 Does Utilizing the New Innovations Mobile Application Shortcut Increase Compliance?

*Esposito A, Biggs D, Walsh B, Fiesseler F, Castillo D, / Morristown Medical Center, Morristown, New Jersey*

**Background:** Logging procedures is an integral part of resident training and evaluation but it can be burdensome. Providing residents with a quick and easy way of logging their procedures may improve overall compliance.

**Objectives:** We hypothesized that providing residents with a mandatory training session on the use of a shortcut for logging procedures on their smartphones would increase compliance with logging procedures.

**Methods:** We evaluated the procedure logging trends of residents enrolled in a three year residency program (total number of residents = 25). Weekly procedure logging was evaluated the last week of each month for three months. The first interval was a "baseline" week prior to any interventions, the second interval was a week following a "reminder email" from the chief residents about the importance of logging procedures, and the third interval was after a mandatory "training session" on the smartphone shortcut. The training session was a 10-minute demonstration held during our mandatory weekly conference during which all residents were asked to install the New Innovations shortcut on their smartphones. The total number of procedures logged by residents and the percent of residents who logged procedures during each time interval was calculated, as were differences and 95% confidence intervals (CI).

**Results:** During the "baseline" week, 81 procedures were logged by 47% (CI: 27, 67) of the residents. During the "reminder email" week, 137 procedures were logged by 76% (CI: 59, 96) of the residents. During the "training session" week,115 procedures were logged by 76% (CI: 59, 93) of the residents. See Figures 1-2. While the "reminder email" significantly increased the percent of residents logging procedures, the mandatory training session did not appear to have an impact on the logging compliance.

**Conclusions:** Despite its' seeming attractiveness, we found no additional benefit in procedure logging compliance with the New Innovations mobile shortcut.

Percent of Residents Logging Procedures

Weekly Procedures Logged
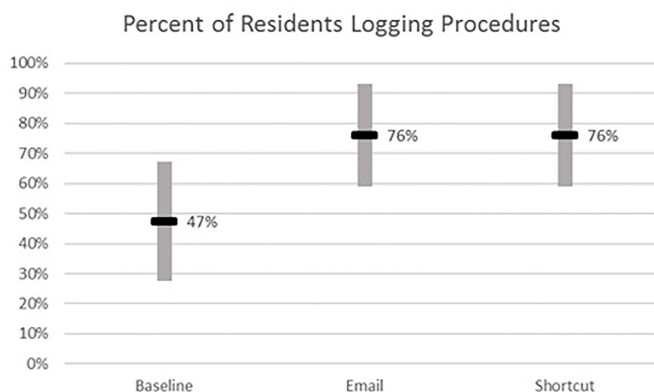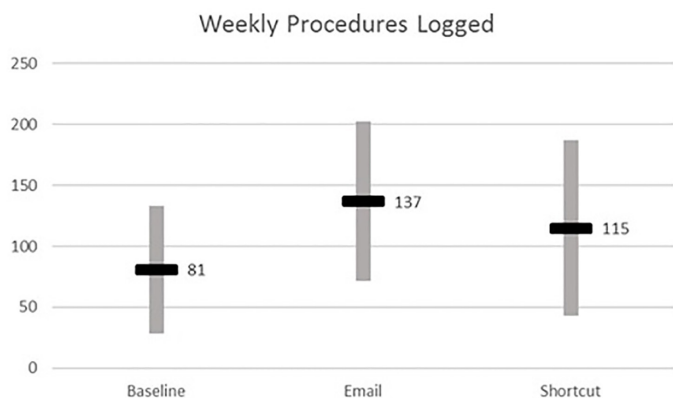
## 15 E-learning in the Emergency Medicine Clerkship: Implementation of iPads and the Impact on Student Learning

*Hillman E, Patel R, Manguvo A, Gaddis M, /University of Missouri-Kansas City School of Medicine, Kansas City, Missouri; University of Central Florida, Gainesville, Florida*

**Background:** Learning outcomes rather than processes of education are emphasized in competency-based curricula. This allows for flexibility when implementing new methods of teaching, in particular, e-learning, which encompasses the use of personal tablet devices. Available literature, although limited, indicates that e-learning is as effective as traditional teaching methods, with the potential benefit of improving learner satisfaction and learning effectiveness. Given the established benefits of e-learning combined with the problems of reduced faculty time for teaching and below-average National Board of Medical Examiners Emergency Medicine Advanced Clinical Exam (NBME EM ACE) scores, our EM clerkship transitioned to a paperless clerkship utilizing the iPad tablet device.

**Objectives:** The primary purpose of this study was to determine whether the use of iPads as an e-learning platform increased medical student knowledge gains as measured by NBME EM ACE performance. The secondary purpose was to assess student satisfaction. We hypothesized that, having access to the iPad would enable students to be more efficient and effective learners, thus increasing medical knowledge and satisfaction.

**Methods:** 102 EM clerkship students were assigned an iPad for the duration of their rotation. Clerkship iPads were customized with an internally-created iTunes University (iTunesU) course and other relevant medical applications, textbooks and bookmarks. All iPads were identical in appearance, set-up, and available resources. Frequency of iPad use was tracked using the free application, Moment. Following the rotation, students completed a survey regarding their iPad usage. Students' NBME exam performance and frequency of iPad usage were linked to survey responses.

**Results:** 43 of 102 students completed the survey. While frequency of iPad use did not correlate with NBME exam performance (p=.974), clerkship satisfaction and perceived effectiveness improved (Fig. 1,2). Students preferred electronic resources for course delivery as compared to print media (p=.025).

**Conclusions:** Successfully incorporating e-learning into an existing curriculum requires significant time and planning. While the benefit to medical knowledge gains cannot be assumed, iPad introduction was positively received with encouraging usage and effectiveness.
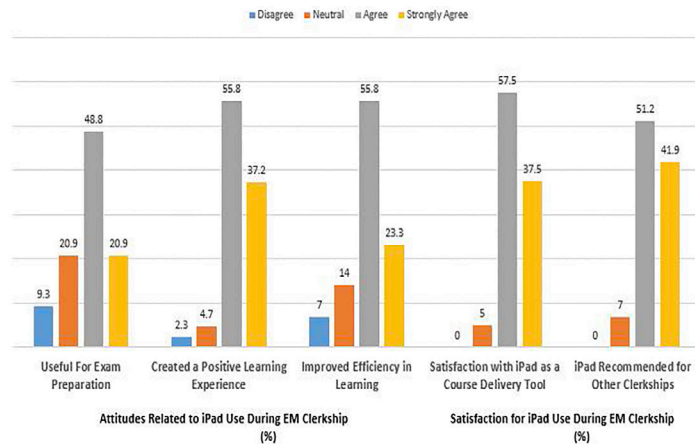


**Figure 1.** Attitudes and Satisfaction With iPad Usage During EM Clerkship.
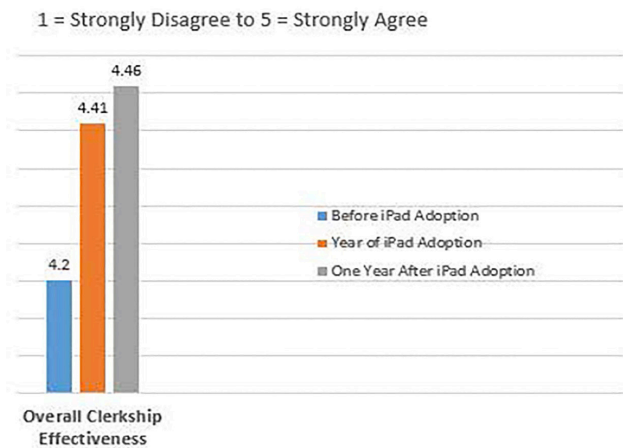


**Figure 2.** Overall Clerkship Effectiveness.

## 16  Emergency Medicine Milestones Self-assessments Evaluations are Considerably Different from the Clinical Competency Committee Scores

*Biggs D, Esposito A, Walsh B, Fiesseler F, Gohsler S, / Morristown Medical Center, Morristown, New Jersey*

**Background:** Emergency medicine residents are evaluated by core faculty on 23 milestones. Resident self-assessment of the milestones may aid in the learning process and discrepancies between a resident's self-assessment and the core faculty's assessment may emphasize additional areas of concern.

**Objectives:** We sought to determine how residents at each level of training would rate themselves on each of the 23 milestones compared to the CCC and established guidelines.

**Methods:** All residents in a three-year residency were evaluated by the core faculty in the usual fashion at the twice-annual clinical competency committee meeting (CCC). The core faculty were provided with guidelines of ACGME definitions for each evaluation score. Blinded to the CCC evaluation scores, all residents were asked to evaluate themselves on the same 23 milestones, given the same ACGME guidelines, and also give themselves an "overall" score. Core faculty assessment scores were compared to individual resident's self assessment on each milestone. We then calculated average differences and 95% confidence intervals (CI) for each of the 23 milestones by training levels.

**Results:** All 25 residents in the program were evaluated by the CCC and completed self-assessments for the 23 milestones. There were statistically significant differences between core faculty and resident self-assessment on 14 of the 23 milestones (see Figure 1). Additionally, there were significant differences between the average scores by the core faculty and the overall self-assessment score for the residents each of the three years of training (see Figure 2). Interestingly, third year residents rated themselves significantly below the core faculty's assessment (3.9 vs 4.2, difference 0.3 (CI: 0.1, 0.5), while first and second year residents rated themselves significantly above the assessment (1st years: 2.9 vs 1.6, difference 1.3 (CI:1.2, 1.4); 2nd years: 3.5 vs. 3.0, difference 0.5 (CI: 0.3, 0.7).

**Conclusions:** There were significant differences between the CCC assessments and resident self-assessment on 14 out of 23 milestones. In general, residents tend to rate themselves higher than the core faculty, and the discrepancies decrease over the course of their training. This information might enhance the learning process and help guide faculty in resident education.
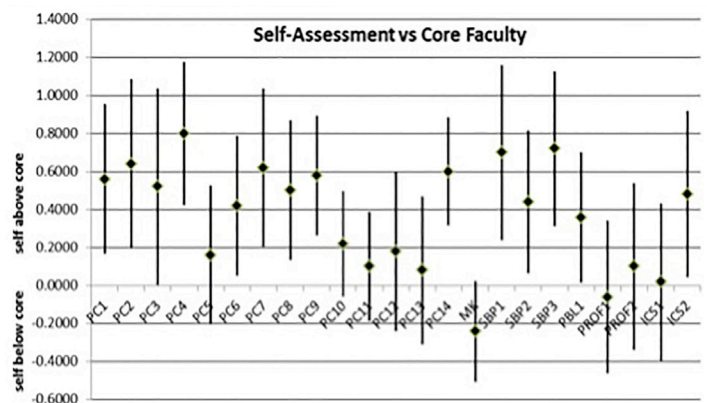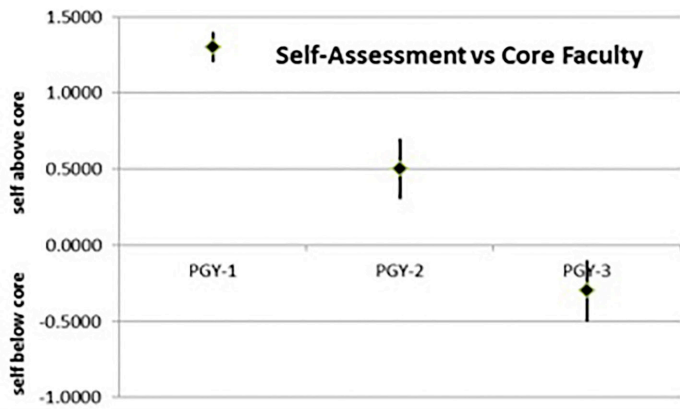
## 17 Emergency Medicine Residency Applicant Assessment of Competitiveness and Application Behavior

*Christensen R, Carle D, Jarou Z, King K, Druck J, / Maricopa Medical Center, Phoenix, Arizona; Quillen College of Medicine, Johnson City, Tennessee; Denver Health Medical Center, Denver, Colorado; University of Texas Health Science Center at San Antonio, San Antonio, Texas; University of Colorado School of Medicine, Aurora, Colorado*

**Background:** The average number of emergency medicine (EM) residency applications per student has increased 50% (from 32.2 to 48.2) over the past five years. There are many possible reasons for over application, including a lack of understanding of competitiveness by applicants.

**Objectives:** The purpose of this study is to evaluate the recommended and actual application behaviors of competitive, less competitive, and very competitive EM residency applicants.

**Methods:** A maximum of 200 third and fourth year medical students attending EMRA's Medical Student Forum at the 2017 ACEP Scientific Assembly were invited to complete an IRB-approved survey using PollEverywhere. Students were asked how many applications theoretically competitive, very competitive, and less competitive applicants should submit, as well as asked to identify their self-perceived level of competitiveness and the number of applications that they would or have submitted.

**Results:** Respondents were 56% MS4, 42% MS3, and 1.5% were medical school graduates; 47% were MD, 45% DO, and 8% US IMG. Between 94% and 100% of students responded to each question. Most students believed that theoretically very competitive applicants should apply to 21-30 programs and theoretically competitive applicants should apply to 31-40 programs. For theoretically less competitive

applicants, the most frequent response was also 31-40 programs however there was a much wider range of responses.

**Conclusions:** There appears to be strong agreement between students on the recommended application behaviors of competitive and very competitive applicants, with less agreement on the optimal application strategy for less competitive applicants. When comparing survey respondents' actual behavior with their recommended behaviors for theoretical applicants, it is clear that applicants are not following their own advice, with a number of applicants of all self-perceived competitiveness categories applying to for up to 100 programs or more. More research is necessary to determine why students do not personally follow the advice they would give others. A major limitation of this study is that student survey respondents were asked to assess their own level of competitiveness without collecting objective information to corroborate that their assessments are valid
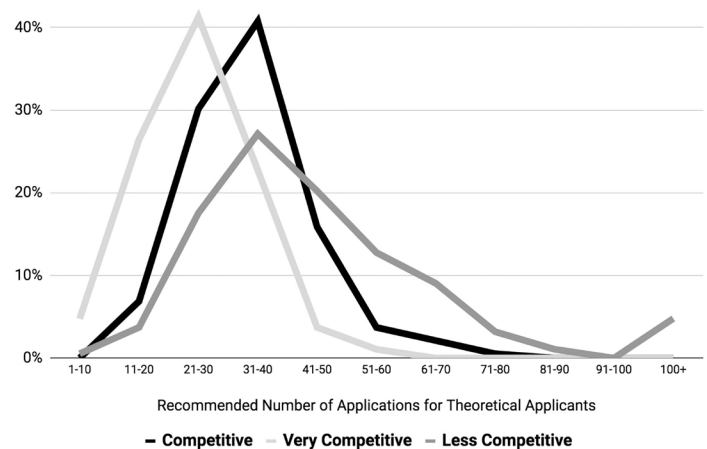


**Figure 1.** The number of applications that students (by percentage of total respondents) recommend theoretical applicants submit when applying for emergency medicine residency programs (n = 188).
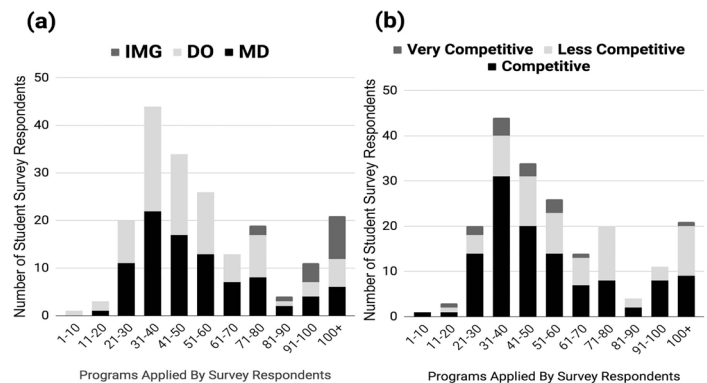


**Figure 2.** The number of applications that medical students applying to emergency medicine residency programs would or have submitted by (a) applicant type (n = 196) and (b) self-perceived competitiveness (n = 188).

## 18 Experience Introducing Physician Assistant Students into a Medical Student Emergency Medicine Clerkship

*Turner J, Corson-Knowles D, Besinger B, Rebman R, Hobgood C, Palmer M, /Indiana University School of Medicine, Indianapolis, Indiana*

**Background:** Physician assistants continue to play an increasingly important role in our healthcare system. However, physician assistant student (PAS) training in the emergency department has not been previously described.

**Objectives:** The objectives of our study were to determine the impact of the introduction of PAS into a learning environment that already serves medical students (MS) and residents, and to assess the readiness of PAS to participate in an established MS emergency medicine clerkship.

**Methods:** A survey was constructed by a team of emergency physicians and PAS educators with expertise in medical education and based on competencies endorsed by the school of medicine and the PAS program at our institution. The survey contained 18 questions in two domains: 11 questions asking about the effect of PAS on the emergency department learning environment and 7 questions comparing the skills of PAS with MS. It was distributed to emergency medicine faculty and residents shortly after the introduction of PAS into two academic emergency departments. Data from MS evaluations of the clerkship and shift evaluations were also collected.

**Results:** The majority of preceptors were either neutral or positive regarding the impact of PAS on the overall learning environment with only 9% believing PAS negatively impacted the learning milieu. Fifty-two percent felt that the presence of PAS offered a valuable interprofessional educational experience for MS and 67% felt the experience was valuable for residents. Sixty-one percent of preceptors felt that PAS were well prepared

**Table 1.** Medical Student Evaluations of Clerkship.

| Student Evaluation of Clerkship | September 2013-April 2014 | | September 2014-April 2015 | |
| --- | --- | --- | --- | --- |
| | ED-A | ED-B | ED-A | ED-B |
| "Rate the overall quality of your educational experience in this clerkship"[1] | 3.67 (N) | 3.81 (N) | 3.66 (56) | 3.68 (57) |
| "I had an opportunity to follow a variety of different patients with different medical conditions."[2] | 4.69 (N) | 4.58 (N) | 4.71 (56) | 4.67 (57) |
| "Faculty members provided me with sufficient feedback on my performance."[2] | 4.29 (N) | 4.5 (N) | 4.32 (56) | 4.35 (57) |
| "Faculty provided effective teaching."[2] | 4.59 (N) | 4.73 (N) | 4.59 (56) | 4.6 (57) |

[1]Scale 1-4
[2]Scale 1-5

to handle the ED environment, and preceptors rated PAS performance as similar to MS in a majority of competencies. However, 53% of preceptors believed PAS fund of knowledge was not equivalent to MS. Medical student evaluations of the quality of the clerkship were similar before and after the introduction of PAS. The quantity of MS evaluations decreased from an average of 15.7 per month to an average of 14.7 per month following the introduction of PAS.

**Conclusions:** The impact of introducing PAS to a MS emergency medicine clerkship is viewed as being mostly positive, though preceptors did express some concerns. More research is needed to understand and optimize the learning involvement for all learners.



**Figure 1.** Impact of PA students on ED staff, learning environment, and workflow.
*ED*, emergency department; *PA*, physician's assistant; *IPE*, Interprofessional education

## 19 Faculty and Resident Perception of Emergency Department Feedback

*Siddiqui M, Baliga S /Henry Ford Hospital, Detroit, Michigan*

**Background:** One of the core components of resident development is feedback of clinical performance. Prior studies have evaluated faculty and resident satisfaction with feedback in the emergency department (ED). However, there are no recent studies that evaluate how feedback is conceptualized and what topics residents and faculty find most useful when giving or receiving feedback. Such information would provide an understanding of the current state of this essential educational opportunity and help guide a feedback improvement plan.

**Objectives:** The purpose of our study is to ascertain the perception of feedback delivered from faculty physicians to residents during and after an ED shift.

**Methods:** We performed an observational study comparing perception of feedback between ED faculty and residents through an online survey. Specific aims include comparing perception of feedback as it is performed currently between faculty and residents as well as how each group believes feedback should be performed to be the most effective and useful.

**Results:** Twenty-eight faculty members and twenty-seven residents completed the survey. Responses were compared using Chi-squared tests and Fisher's Exact tests. Faculty and residents differed significantly on multiple factors. Notably, 82.2% of faculty believed they provided feedback on most shifts versus 37% of residents believed this (p=0.001). 71.4% of faculty respondents believe they provide feedback both during and after a shift while 22.2% of residents agree with this statement (p=0.006). Also, 85.7% of faculty believe both residents and faculty should initiate feedback, while only 48.2% of residents agree with this (p=0.003). Other factors that differed significantly between the two groups include when feedback is and should be given, and what feedback is and should be focused on.

**Conclusions:** Feedback is an essential component in resident development, however faculty and residents differ significantly on their perception of the current state of feedback as well as what effective and useful feedback means. By informing of faculty and residents regarding this gap in the perception of feedback, we hope to develop a method of improving feedback in our program.

## 20 FOAM in the EM Clerkship: Clerkship Director Attitudes and Practices Using FOAM in Emergency Medicine Clerkships

*Welsh L, Parekh K, Brumfield E, /University of Washington, Seattle, Washington; Vanderbilt University Medical Center, Nashville, Tennessee*

**Background:** Free Open Access Medical Education (FOAM) is increasingly utilized by emergency medicine (EM) practitioners. Prior research has focused on FOAM use by EM residents and program directors. Little is known about FOAM use within EM clerkships.

**Objectives:** This study describes current clerkship director (CD) attitudes and practices using FOAM. It explores how CDs recommend FOAM resources to students as a supplements to existing clerkship resources.

**Methods:** Participants: All US CDs listed in the Society for Academic Emergency Medicine (SAEM) clerkship database, accessed July 2017, were emailed an anonymous online survey.

Survey Design: In addition to demographic data, the 18 question survey addressed current curricula, CD personal use of FOAM, attitudes and practice patterns using FOAM in the clerkship curricula. Survey items were grounded in Schifferdecker et al.'s adoption of computer-assisted learning in medical education as a conceptual framework. Questions were created via an iterative process using cognitive interviews with current CDs and pilot testing.

**Results:** Of 150 invited participants, 37.3% (56/150) started the survey and 54 surveys were complete. The majority of respondents were male (66.7%,36/54) with a mean of six years average experience as CD (SD=4.4 years, range 0-20 years). Many (66.7%, 36/54) use FOAM in their own learning, citing ease of access and general education as major reasons. Textbooks were the most commonly recommended resource (71.4%, 40/54) but FOAM resources were also frequently recommended (Figure 1). Only 20 respondents felt that their current clerkship offerings were sufficient for medical student learning. While 79.6% (42/54) agreed/strongly agreed that FOAM is a helpful curricular supplement, 61.1% (33/54) expressed concern over medical students' ability to critically evaluate FOAM content (Figure 2). Still, 67.98% (38/53) of respondents reported willingness to use a curated, high quality online asynchronous learning curriculum if developed.
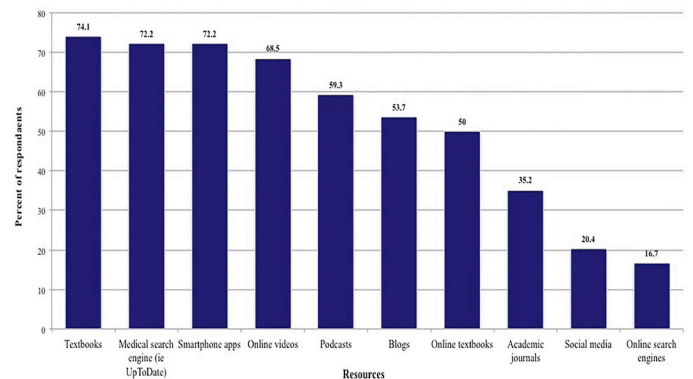


**Figure 1.** Supplement resources recommended by clerkship directors.
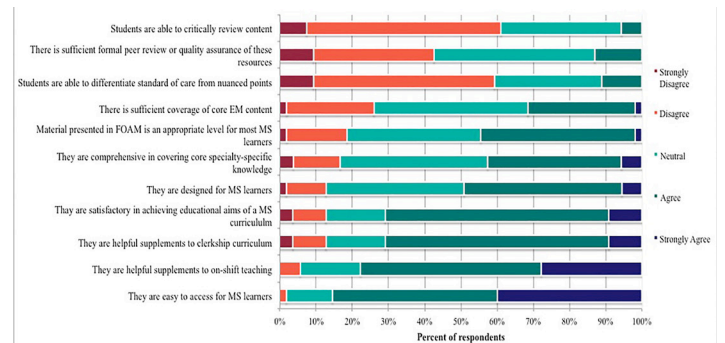


**Figure 2.** Clerkship directors' attitude.

**Conclusions:** While many CDs recommend FOAM resources to students and feel it is a helpful supplement to current curricula, they doubt students' ability to critically appraise the resource or if the material is appropriate for novice learners. This suggests a need for continued development of high-quality, peer-reviewed FOAM resources for medical students.

## 21 Gender Bias in Nursing Assessment of Emergency Medicine Residents

*Bod J, Chandler I, Goldflam K, Tsyrulnik A, Della-Giustina D /Yale School of Medicine, New Haven, Conneticut*

**Background:** Implicit gender bias in medical training has been suspected both on the part of physicians and of nurses interacting with trainees. Previous investigations have demonstrated gender bias in nursing assessments of OB/GYN residents and faculty evaluations of Emergency Medicine residents.

**Objectives:** We aimed to determine if gender bias exists in nursing assessments of Emergency Medicine residents.

**Methods:** We used a single-center, retrospective design to examine nursing assessments of PGY-1 to PGY-4 Emergency Medicine residents in an urban Level I Trauma center's academic training program. Surveys were sent to nursing staff, who submitted anonymous evaluations of residents using a 5-question assessment tool. Responses were graded using a five point scale for questions 1-4. Question 5 was a binary yes/no question. The survey asked about a resident's bedside manner, communication skills with patients, communication skills with nurses and other non-physician staff, medical knowledge and clinical skills, and whether the nurse evaluator would want this resident to take care of them or their family member as an ED patient. Analysis was conducted using linear mixed models.

**Results:** A total of 325 assessments were collected over a one year period. There were 140 evaluations for female residents (43%) and 185 for male residents (57%). 61 unique residents were included in the analysis. For Question 1, which assessed a resident's bedside manner, there existed a statistically significant difference in scores by gender (p = 0.035) when comparing male (mean score 4.1) vs female (mean score 3.62) residents. The four other questions demonstrated a trend toward female residents scoring lower than male residents, but none reached statistical significance.

**Conclusions:** While our study looked at a small sample of resident assessments over a one year period, we found a statistically significant gender difference evident in 1/5 questions. Faculty and residents should be aware of possible gender bias when interpreting results of nursing assessments.

## 22 Interprofessional Simulation Improves Comfort With Communication Among Emergency Department Personnel

*Cao M, Turner J, Morgan Z, Dylan C, /Indiana University School of Medicine, Indianapolis, Indiana*

**Background:** Patient care in the ED involves communication between personnel from multiple health care professions. Training in multidisciplinary teams has engaged both Interprofessional Education (IPE) and simulation, with the majority of literature focused on learners in medicine, nursing, and/or pharmacy. Few studies have included respiratory therapy or paramedicine, two key professions in the ED environment.

**Objectives:** The purpose of this study was to evaluate the impact of IPE simulation on communication comfort between personnel from different professions.

**Methods:** Voluntary participants consisting of EM residents, nurses, pharmacy residents, respiratory therapy (RT) students, and paramedics were divided equally into interprofessional teams. Each team rotated through high-fidelity simulations with three different ED scenarios (trauma, medical, and error disclosure). Participants completed an anonymous pre- and post-simulation survey consisting of both Likert scale and free text questions which included a self-assessment of their communication ability and contribution to the team, as well as questions pertaining toward interactions with the other members of the health care team.

**Table 1.** Comparison of learners' pre- and post-simulation responses.

| Item | N | Pre Mean | Pre SD | Post Mean | Post SD | Post-Pre | *p* value |
|---|---|---|---|---|---|---|---|
| **Self-Assessment** | | | | | | | |
| Confident in ability to communicate effectively about patient care | 38 | 4.03 | 0.59 | 4.42 | 0.55 | 0.395 | .000*** |
| Comfortable speaking up in situations regarding patient safety | 38 | 4.24 | 0.54 | 4.58 | 0.50 | 0.342 | .000*** |
| Comfortable requesting for help when needed | 38 | 4.53 | 0.73 | 4.74 | 0.45 | 0.211 | .073 |
| Confident in ability to be a patient advocate | 38 | 4.32 | 0.62 | 4.53 | 0.51 | 0.211 | .058 |
| Confident in ability and responsibilities as part of the health care team | 38 | 3.95 | 0.73 | 4.42 | 0.55 | 0.474 | .000*** |
| Respected by members of the health care team | 38 | 4.13 | 0.67 | 4.61 | 0.55 | 0.474 | .000*** |
| **Communication with Physicians** | | | | | | | |
| Trust and respect my opinions about patient care | 14 | 3.86 | 0.66 | 4.57 | 0.65 | 0.714 | .003** |
| Comfortable approaching with a question | 14 | 4.21 | 0.89 | 4.79 | 0.43 | 0.571 | .006** |
| Comfortable asking for feedback | 14 | 4.00 | 0.78 | 4.57 | 0.51 | 0.571 | .014* |
| Comfortable approaching about their potential error | 14 | 3.36 | 1.08 | 4.36 | 0.75 | 1.000 | .000*** |
| Comfortable approaching about own error | 14 | 3.86 | 0.66 | 4.64 | 0.50 | 0.786 | .000*** |
| Resistant to my advice about patient care | 14 | 2.93 | 1.00 | 3.14 | 1.61 | 0.214 | .551 |
| **Communication with Nurses** | | | | | | | |
| Trust and respect my opinions about patient care | 33 | 4.03 | 0.59 | 4.39 | 0.50 | 0.364 | .000*** |
| Comfortable approaching with a question | 33 | 4.55 | 0.62 | 4.73 | 0.545 | 0.182 | .083 |
| Comfortable asking for feedback | 33 | 4.18 | 0.88 | 4.55 | 0.67 | 0.364 | .008** |
| Comfortable approaching about their potential error | 33 | 3.58 | 1.00 | 4.21 | 0.78 | 0.636 | .000*** |
| Comfortable approaching about own error | 33 | 4.16 | 0.72 | 4.59 | 0.50 | 0.438 | .000*** |
| Resistant to my advice about patient care | 33 | 2.27 | 0.76 | 2.24 | 1.28 | -0.030 | .895 |
| **Communication with Pharmacists** | | | | | | | |
| Trust and respect my opinions about patient care | 32 | 4.03 | 0.65 | 4.47 | 0.51 | 0.438 | .000*** |
| Comfortable approaching with a question | 32 | 4.59 | 0.62 | 4.78 | 0.42 | 0.188 | .110 |
| Comfortable asking for feedback | 32 | 4.31 | 0.82 | 4.63 | 0.61 | 0.313 | .016* |
| Comfortable approaching about their potential error | 32 | 3.50 | 1.14 | 4.22 | 0.91 | 0.719 | .001*** |
| Comfortable approaching about own error | 32 | 4.31 | 0.64 | 4.59 | 0.50 | 0.281 | .005** |
| Resistant to my advice about patient care | 32 | 2.44 | 0.95 | 2.13 | 1.13 | -0.313 | .039* |
| **Communication with Respiratory Therapists** | | | | | | | |
| Trust and respect my opinions about patient care | 36 | 4.14 | 0.64 | 4.50 | 0.51 | 0.361 | .001*** |
| Comfortable approaching with a question | 36 | 4.58 | 0.50 | 4.64 | 0.49 | 0.056 | .324 |
| Comfortable asking for feedback | 36 | 4.39 | 0.60 | 4.58 | 0.50 | 0.194 | .033* |
| Comfortable approaching about their potential error | 35 | 3.60 | 1.01 | 4.23 | 0.65 | 0.629 | .000*** |
| Comfortable approaching about own error | 36 | 4.28 | 0.66 | 4.53 | 0.56 | 0.250 | .018* |
| Resistant to my advice about patient care | 36 | 2.39 | 1.15 | 2.19 | 1.39 | -0.194 | .242 |
| **Communication with Paramedics** | | | | | | | |
| Trust and respect my opinions about patient care | 34 | 4.32 | 0.68 | 4.56 | 0.56 | 0.235 | .009** |
| Comfortable approaching with a question | 34 | 4.53 | 0.62 | 4.65 | 0.54 | 0.118 | .211 |
| Comfortable asking for feedback | 34 | 4.26 | 0.75 | 4.50 | 0.62 | 0.235 | .073 |
| Comfortable approaching about their potential error | 33 | 3.88 | 1.17 | 4.33 | 0.78 | 0.455 | .002** |
| Comfortable approaching about own error | 34 | 4.24 | 0.82 | 4.59 | 0.56 | 0.353 | .002** |
| Resistant to my advice about patient care | 34 | 2.35 | 1.28 | 2.38 | 1.37 | 0.029 | .869 |

*Paired-sample t-tests were run to measure the significance of difference between pre-intervention and post-intervention responses, defined as p<0.05.

**Results:** Thirty-eight members from the five health care professions participated in the simulation day in July 2017. In the self-assessment, significant improvements in communication about patient care, patient safety, and confidence as a member of the health care team were found post-simulation (p < 0.0001 for all three areas). Participants felt significantly more comfortable approaching all of the other health care disciplines about error (p < 0.05). There was also an increase in overall trust and respect among the providers (p < 0.05). However, there was no significant improvement in approaching nursing, pharmacists, RTs, or medics with questions.

**Conclusions:** This IPE simulation improved personal confidence in communication and identity as a member of a healthcare team. Learners perceived an increase in trust and respect among the various health care professions represented in this study, especially in regards to error reporting.

## 23 Is the Number of Intubations Correlated with Proficiency in Milestone PC10: Airway Management?

*Biggs D, Esposito A, Walsh B, Fiesseler F, / Morristown Medical Center, Morristown, New Jersey*

**Background:** It is a well-established tenet of medicine that more frequent performance of a procedure leads to increased competency. It is unclear, however, whether more frequent performance of a procedure correlates with improved self-assessment and core faculty assessment of the corresponding Emergency Medicine milestone.

**Objectives:** We sought to determine if the number of intubations a resident has performed correlates with his self-assessment and with the core faculty's assessment of Milestone PC10: Airway Management.

**Methods:** Using the scoring system established by the American Board of Emergency Medicine, all residents (n=25) in a three-year residency completed self-assessments of the 23 milestones, including PC10: Airway Management. Core faculty also assessed all residents on the 23 milestones. The number of intubations performed by each resident was then recorded using their procedure logs. A Pearson correlation coefficient and significance level was calculated between self-assessment on PC10 and number of intubations, and also between core faculty assessment on PC10 and the number of intubations.

**Results:** All of 25 residents completed self-assessments and were evaluated by the core faculty. The correlation between self-assessment on PC10 and the number of intubations was R=0.57, (p<0.05). See Figure 1. The correlation between core faculty assessment on PC10 and the number of intubations was R=0.59 (p<0.05). See Figure 2.

**Conclusions:** Self-assessment and core faculty assessment of the Milestone PC10: Airway Management are well-correlated with the number of intubations a resident has performed. This suggests that the milestone is a reliable indicator of proficiency.



Intubations vs Self Assessment
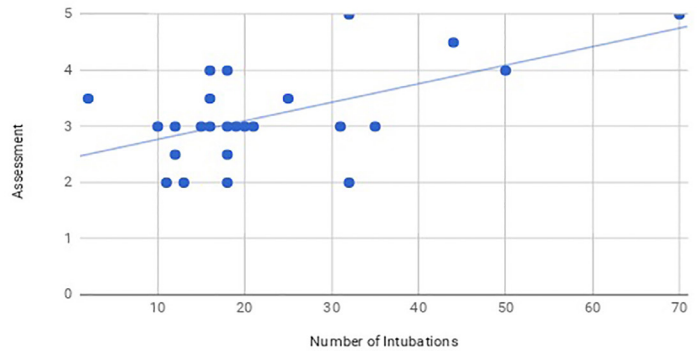


Intubations vs Core Faculty Assessment
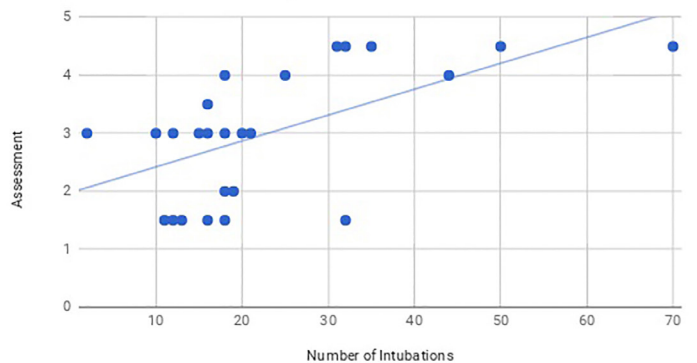
## 24 Learning Moment: Features of Online Asynchronous Learning Tools that Maximize Acceptance and Adoption by Medical Students

*Chu A, Biancarelli D, Drainoni M, Schneider J, Wang C, Sheng A, /Boston University School of Medicine, Boston, Massachusetts*

**Background:** Recently introduced in the literature, Learning Moment (LM) is a novel, unique, web-based asynchronous educational tool designed to optimize experiential learning. Medical students log concise clinical pearls for reflection and review in the form of "learning moments", which are shared with peers among an entire community. Little is known about what features such educational tools like LM should have to maximize learner engagement.

**Objectives:** We aim to identify LM features that would optimize acceptance and use by medical students.

**Methods:** We implemented LM at a tertiary care emergency department that hosts an emergency medicine residency and medical student clerkships. Students who rotated in our department from August 2016 to April 2017 were sent email invitations to participate in our study. We employed the System Usability Scale (SUS) questionnaire, a validated, industry standard to evaluate the usability of LM. We interviewed participants and analyzed their transcripts using standard qualitative methods to understand what features promoted LM's acceptance and use.

**Results:** Thirty participants out of 70 invited completed the SUS questionnaire. LM's aggregate score was 80.9, placing it in the top 10th percentile for ease of usability when benchmarked against other websites. Roughly 50% of students indicated that they would use the website frequently for learning purposes.

We conducted 13 interviews between January and March 2017. Three themes emerged from the interviews as features that optimized acceptance and adoption of LM. 1) Maximal simplicity in interface design and ease of use were key factors in student engagement. 2) The compatibility of LM's concept with students' personal learning preferences affected perceived usefulness. 3) Department-wide acceptance of LM by faculty and residents encouraged adoption into student workflow. Themes were shaped by students' time scarcity, competing priorities, and availability of more traditional learning resources.

**Conclusions:** Maximal simplicity and ease of use, compatibility with individual learning styles, and multi-level community engagement impacted the acceptance and adoption of LM by medical students. Our results inform future design and implementation of new online asynchronous learning educational technologies such as LM.

**Table 1.** Participant survey responses.

| Statements | Strongly disagree | Disagree | Neutral | Agree | Strongly Agree |
|---|---|---|---|---|---|
| Would frequently use website | 7% | 17% | 30% | 43% | 3% |
| Website was simple | 3% | 0% | 3% | 60% | 33% |
| Website was easy to use | 3% | 0% | 0% | 57% | 40% |
| Can use website without technical support | 7% | 0% | 0% | 13% | 80% |
| Website functions were well integrated | 3% | 0% | 10% | 60% | 27% |
| Website was consistent | 3% | 3% | 7% | 53% | 33% |
| People will learn to use website quickly | 3% | 0% | 0% | 37% | 60% |
| Website was very intuitive | 3% | 0% | 3% | 40% | 53% |
| Confident using this website | 3% | 0% | 3% | 37% | 57% |
| Can use website without learning anything new | 3% | 3% | 0% | 20% | 73% |

## 25 Medical Student Educational Experiences and Completion of Learning Objectives in the Emergency Department

*Murray C, Shenvi C, /University of North Carolina at Chapel Hill, Chapel Hill, North Carolina*

**Background:** The Emergency Department (ED) provides a unique learning environment in which medical students can gain experience with managing acute, undifferentiated patients. However, the fast-paced nature of the ED and preceptor variation limits standardized teaching. In order to optimize students' educational experiences we sought to better understand with whom and where teaching occurs under our current clerkship design.

**Objectives:** Identify the most effective educational interactions for 4th-year medical students during their ED rotation, specifically comparing shifts in which they worked primarily with residents or with faculty.

**Methods:** This is a prospective study of procedure cards and surveys submitted by medical students as part of their month-long 4th year clinical rotation in the ED between 05/2017 and 11/2017 at a tertiary care academic ED. Students marked which topics or procedures they had reviewed, and who had precepted them. In an exit survey, students were asked to rate how often they received individualized teaching and whether their educational goals were met when working with residents and attendings on a 10 point Likert scale. Qualitative and quantitative data were collected anonymously with IRB exemption.

**Results:** Shift card data was collected from 41 students. Attendings tended to precept visual diagnostics while residents tended to teach technical procedures. Twenty-two students completed the exit survey. Results showed that students felt they received individualized teaching from both attendings and residents (7.9 and 8.1 respectively, $p = 0.066$). Students felt their goals were met more when reporting to the residents than attendings (8.7 and 7.7 respectively, $p = 0.045$). Themes noted in the open-ended portion of the survey were that students wanted more individualized experiences with the attendings, and requested more dedicated teaching shifts.
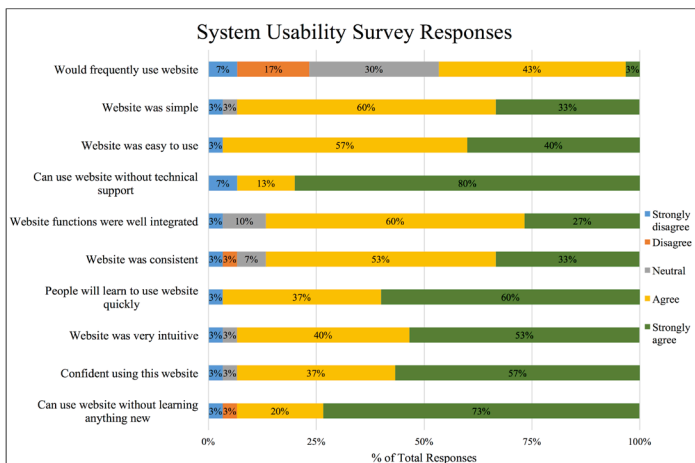


**Figure 1.** Participant survey responses.

**Conclusions:** 4th Year medical students in the ED felt they received individualized teaching on most shifts. However, they reported their education goals were met more often when working with residents. From this, we plan to foster additional resident-student interaction and further train residents in bedside teaching. Overall, a larger sample size as well as input from preceptors are needed to further optimize ED education.

**Rating of Individualized Teaching on Shift with Attendings and Residents**
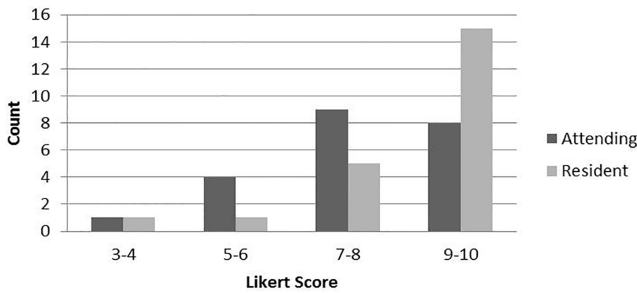


**Rating of Learning Goal Achievement on Shift with Attendings and Residents**
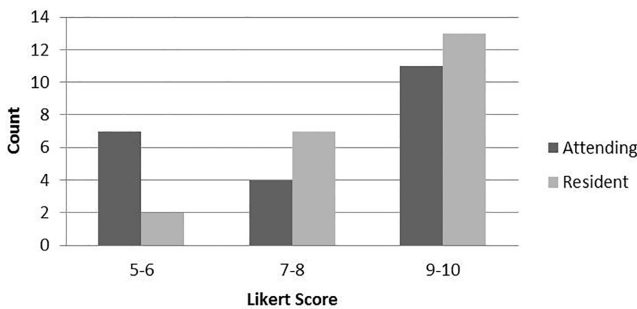


## 26 Onboarding of Mental Health Resource in Emergency Medicine Residency Programs

*Swisher L, Tabatabai R, Brown M, /Drexel University College of Medicine, Philadelphia, Pennsylvania; Los Angeles County USC Medical Center, Los Angeles, California; University of Tennessee-Murfreesboro/ Nashville, Murfreesboro, Tennessee*

**Background:** In accordance with the emphasis on resident well-being, a June 1, 2017 ACGME e-communication from Dr. Tom Nasca recommended "orientation on-boarding" as a targeted strategy to provide information on prevention, treatment and emergency resources for medical and mental health issues. At this time, there is no information regarding if or how EM programs institute wellness onboarding.

**Objectives:** To identify the type of mental health

resources and the mechanism of information dissemination which individual EM programs currently employ.

**Methods:** A request to participate and survey link was sent to program directors through the CORD program director listserv. The 7-item Qualtrics survey contained questions on process and format of wellness resource distribution to the residents. A specific request to attach residency specific wellness letters was made.

**Results:** There were 73 survey responses from 239 EM programs. Although 90% of the programs provided mental health resources during orientation, 10% did not. In providing mental health resources, 72% provided the information automatically, 25% provided the information on request and 3% did not provide mental health resources. Resources were provided by the sponsoring institution (46%), the program director during a designated session (42%) and on-demand only (6%). No mental health resources were given out by 6% of the respondents. Mental health resources were most commonly delivered in an in-person session (28%) or a weblink (20%),

**Conclusions:** Although more than 90% of responding program directors provided mental health resources during orientation, the small number of respondents casts doubt on the true incidence of mental health onboarding in EM programs. In greater than half of our responses, the sponsoring institution (rather than individual programs) more commonly provides this information. Given the July 2017 ACGME program requirements on wellbeing, it was surprising that 6% of the respondents did not know of any mental health resources being distributed to their residents.
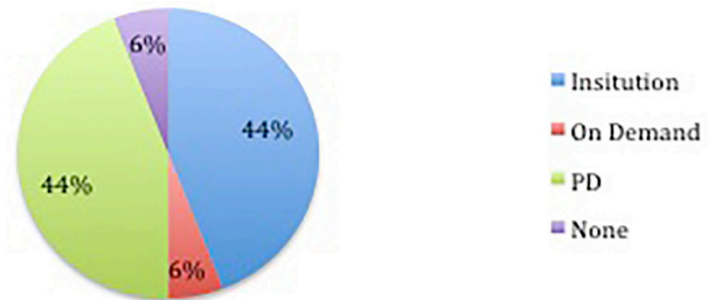


Method of Mental Health Resource Distribution
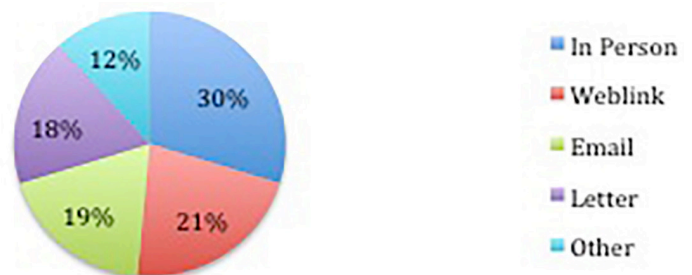


Wellness Resource Distribution Format

The next step is to evaluate the logistical transparency of mental health resources as residents not only need to know the existence of mental health resources but also understand and trust the process in order to utilize them effectively.

## 27 Patients with Vital Sign Abnormalities Discharged by EM Residents: Is it a Problem and Who is at Risk?

*Tichter A, Sayan O, Mulcare M, Farmer B, Waight G, Carter W, /Columbia University Medical Center, New York, New York; Weill Cornell Medical Center, New York, New York*

**Background:** Medical error is the third leading cause of death in the United States. Abnormal discharge vital signs (VS) are known to be associated with increased risk of 30-day mortality and re-admission. Medical errors committed by residents have been extensively studied in the context of duty-hours and fatigue, but have focused primarily on specialties with 24-hour call. Little is known about medical error rates among residents in the emergency department (ED).

**Objectives:** Among patients cared for by residents and discharged from the ED, our objectives were to:
- Measure the proportion with abnormal discharge VS
- Compare the proportion with abnormal discharge VS who were and were not cared for by residents
- Determine which VS were most commonly abnormal
- Identify predictors of abnormal VS upon discharge

**Methods:** We performed a cross-sectional, secondary analysis of the National Hospital Ambulatory Medical Care Survey for the years 2014-2015. The population included patients cared for and discharged by ED residents. The primary outcome was abnormal VS on discharge, defined as pulse>100, systolic blood pressure<90, or respiratory rate>20. Descriptive statistics were used to characterize the population. Chi square was used to compare the proportion of discharged patients with abnormal VS between resident and non-resident cases. Logistic regression was performed to identify predictors of discharge with abnormal VS.

**Results:** An estimated 14,643,483 patients cared for by residents were discharged from the ED, of which 4.76% (95%CI 2.44, 9.07) had abnormal VS. Among discharged patients in whose care residents were not involved, an estimated 4.88% (95%CI 4.35, 5.48) had abnormal VS, with no significant difference between groups (p=0.94). Pulse was the most commonly abnormal VS, with 3.31% (95%CI 1.46, 7.32) of discharge heart rates>100. There were no significant associations between any of the predictors and the primary outcome in our multivariable model.

**Conclusions:** Only a small number of ED patients cared for by ED residents are discharged with abnormal VS, with no significant difference compared with non-resident cases. Pulse is the most commonly abnormal VS, and there are no clear predictors for this relatively uncommon error.

**Table 1.** Demographic characteristics of patients who were discharged from the ED by EM residents.

| Variable | Number of Unweighted Visits | Number of Weighted Visits | Weighted Proportion of Visits (95% CI) | | Weighted Proportion Discharged with Abnormal VS (95% CI) | |
|---|---|---|---|---|---|---|
| **TOTAL VISITS** | 2,445 | 15,000,000 | 5.26% | (3.44, 7.96) | 4.76% | (2.44, 9.07) |
| **MONTH** | | | | | | |
| Jan | 114 | 530,000 | §3.59% | (1.58, 7.92) | §7.04% | (1.38,29.07) |
| Feb | 137 | 640,000 | §4.35% | (1.76, 10.32) | §0% | |
| Mar | 185 | 2,100,000 | §14.46% | (4.49, 37.80) | §10.46% | (6.40,16.62) |
| Apr | 184 | 2,200,000 | §15.05% | (5.63, 34.49) | §8.58% | (6.43,11.38) |
| May | 143 | 900,000 | §6.17% | (2.39, 15.02) | §1.77% | (0.50,6.11) |
| Jun | 200 | 1,200,000 | §8.33% | (3.96, 16.70) | §3.81% | (1.44,9.70) |
| Jul | 199 | 1,100,000 | §7.37% | (3.52, 14.77) | §3.46% | (1.51,7.74) |
| Aug | 344 | 1,100,000 | §7.32% | (3.07, 16.46) | §3.7% | (0.98,13.01) |
| Sep | 100 | 990,000 | §6.79% | (2.14, 19.56) | §0.3% | (0.03,2.81) |
| Oct | 114 | 1,200,000 | §8.03% | (3.31, 18.21) | §3.22% | (0.74,12.91) |
| Nov | 415 | 1,700,000 | §11.58% | (5.35, 23.28) | §1.62% | (0.57,4.55) |
| Dec | 310 | 1,000,000 | §6.96% | (3.25, 14.31) | §4.12% | (1.89,8.76) |
| **SEASON** | | | | | | |
| Winter | 561 | 2,200,000 | §14.9% | (7.73, 26.78) | §3.62% | (1.88-6.89) |
| Spring | 512 | 5,200,000 | §35.68% | (14.28, 64.88) | §8.17% | (4.62-14.04) |
| Summer | 743 | 3,400,000 | 23.02% | (12.99, 37.45) | §3.66% | (1.95-6.77) |
| Fall | 629 | 3,900,000 | 26.40% | (14.52, 43.11) | §1.77% | (0.67-4.60) |
| **AGE GROUP** | | | | | | |
| 15-24 | 506 | 2,800,000 | 18.92% | (16.22, 21.95) | §6.65% | (4.11,10.60) |
| 25-44 | 882 | 5,400,000 | 36.77% | (34.52, 39.07) | §2.66% | (1.37,5.10) |
| 45-64 | 694 | 4,100,000 | 28.22% | (26.11, 30.42) | §6.15% | (2.67,13.55) |
| 65-74 | 184 | 1,000,000 | 7.05% | (5.15, 9.59) | §2.63% | (0.84,7.89) |
| >=75 | 179 | 1,300,000 | 9.04% | (6.55, 12.36) | §6.69% | (2.33,17.71) |
| **GENDER** | | | | | | |
| Male | 1,111 | 6,400,000 | 43.85% | (40.66, 47.10) | 5.26% | (2.82,9.59) |
| Female | 1,334 | 8,200,000 | 56.15% | (52.90, 59.34) | §4.13% | (1.86,8.93) |
| **RACE/ETHNICITY** | | | | | | |
| White | 1326 | 7,500,000 | 51.49% | (43.34, 59.57) | 5.33% | (2.36,11.60) |
| Black | 657 | 4,700,000 | 31.79% | (23.88, 40.90) | §3.46% | (2.27,5.25) |
| Hispanic | 364 | 1,800,000 | 12.50% | (7.72, 19.63) | §2.85% | (1.12,7.06) |
| Other | 98 | 620,000 | 4.21% | (2.83, 6.24) | §13.29% | (4.17,35.05) |
| **PAYMENT** | | | | | | |
| Non-Private | 1,604 | 9,300,000 | 63.70% | (56.67, 70.27) | 3.75% | (2.20,6.32) |
| Private | 841 | 5,300,000 | 36.30% | (29.73, 43.33) | §6.54% | (2.75,14.78) |
| **HR** | | | | | | |
| <=100 | 2399 | 14,000,000 | 96.69% | (92.68, 98.54) | | |
| >100 | 46 | 480,000 | §3.31% | (1.46, 7.32) | | |
| **RR** | | | | | | |
| <=20 | 2404 | 14,000,000 | 97.70% | 96.11% 98.65% | | |
| >20 | 41 | 340,000 | 2.30% | 1.35% 3.89% | | |
| **SBP** | | | | | | |
| <90 | 0 | 0 | 0 | | | |
| >=90 | 2445 | 15,000,000 | 100.00% | | | |

*CI*, confidence interval; *HR*, heart rate; *SBP*, systolic blood pressure; *VS*, vital signs.
§ = <30 observations or relative standard error >30%

**Table 2.** Factors associated with abnormal discharge vs in multivariable model.

| VARIABLE | ABNORMAL VITAL SIGNS ON DISCHARGE | | |
|---|---|---|---|
| | ODDS RATIO | 95% CI | P-VALUE |
| **SEASON** | | | |
| **Winter** | Ref | - | - | - |
| **Spring** | 2.32 | 0.95 | 5.67 | 0.06 |
| **Summer** | 0.99 | 0.37 | 2.61 | 0.98 |
| **Fall** | 0.50 | 0.14 | 1.70 | 0.26 |
| | | | |
| **AGE CATEGORY** | | | |
| **15-24** | Ref | - | - | - |
| **25-44*** | 0.36 | 0.23 | 0.59 | 0.00 |
| **45-64** | 0.94 | 0.44 | 1.99 | 0.88 |
| **65-74** | 0.39 | 0.10 | 1.48 | 0.17 |
| **>=75** | 0.87 | 0.36 | 2.12 | 0.76 |
| | | | |
| **SEX** | | | |
| **Female** | | - | - | - |
| **Male** | 0.83 | 0.48 | 1.42 | 0.49 |
| | | | |
| **RACE/ETHNICITY** | | | |
| **White** | Ref | - | - | - |
| **Black** | 0.67 | 0.44 | 1.03 | 0.07 |
| **Hispanic** | 0.84 | 0.33 | 2.12 | 0.70 |
| **Other** | 2.93 | 1.06 | 8.08 | 0.04 |
| | | | |
| **PAYMENT** | | | |
| **Non-Private** | Ref | - | - | - |
| **Private** | 1.80 | 0.87 | 3.73 | 0.11 |

Ref, reference.
* = p< 0.05.

## 28 Priapism Education in Emergency Medicine Residency Programs

*Dai J, Franzen D, Lendvay T, Walsh T /University of Washington, Seattle, Washington*

**Background:** In the community, priapism is often managed primarily by Emergency Medicine (EM) providers. However, EM trainees may have limited experience with priapism due to involvement of Urology providers at training institutions.

**Objectives:** To characterize the current state of formalized education on priapism for EM trainees at Accreditation Council for Graduate Medical Education (ACGME)-accredited programs.

**Methods:** From October 2016 to February 2017, EM residents and residency program directors or assistant program directors were surveyed regarding their experiences with and attitudes towards priapism education. Surveys were distributed via the Council of Emergency Medicine Residency Directors (CORD).

**Results:** 227 EM residents from 34 programs, and 91 residency program directors and assistant program directors from 73 programs responded. All national geographic divisions were represented. 90% of residents and 92% of residency leadership believe that EM physicians should be able to independently manage priapism in practice.

Only 51% of residents and 75% of senior residents had primarily managed a case of priapism in training. 67% request urology consultation "most of the time" or "every time." Among senior residents, 17% felt "not at all confident" in their ability to independently manage priapism. 78% of residents deemed education in priapism management "very important" or "essential," but 36% deemed their current educational curricula "insufficient" to prepare them for independent priapism management.

Among program directors, 81% reported a formalized curriculum for priapism education. A combination of lecture and bedside teaching was most common (32%). Curricula included formal lecture in 97% of programs and simulation in 19%. 43% of residency leadership deemed simulation the most effective singular method to teach residents about priapism management. 55% of residents also preferred educational curricula that incorporated simulation.

**Conclusions:** Though most EM trainees and residency leadership believe EM physicians should be able to independently manage priapism, at least 25% of senior trainees have no experience with this entity and lack confidence in their ability to do so. Despite curricula at most programs, a need for more simulation-based education remains.

## 29 Scholarly Track Training in Emergency Medicine Residencies in 2017

*Spector J, London K, Mongelluzo J, Liu J, Fant A, /Boston Medical Center, Boston, Massachusetts; Thomas Jefferson University Hospital, Philadelphia, Pennsylvannia; UCSF Medical Center, San Francisco, California; Northwestern Memorial Hospital, Chicago, Illinois*

**Background:** An increasing number of emergency medicine (EM) residency training programs provide formal training in a variety of subspecialty topics related to EM. These 'scholarly tracks' (ST) take many forms involving an increasing number of subjects. It is unclear how many such programs exist, and how many adhere to published recommendations for optimal provision of such a curriculum.

**Objectives:** To determine how many EM programs have implemented ST, and describe the frequency and breadth of subspecialty topics that are offered.

**Methods:** EM program leadership were invited to participate in an anonymous survey via direct email. Reminders were sent 14 and 21 days after the first invitation to programs without prior response. The survey queried the presence of scholarly track programs, topics covered, program age and adherence to best practice, with basic demographics. Results were analyzed with

REDCap online management tool. This study was reviewed by IRB at the sponsoring institution and deemed exempt.

**Results:** There were 135 responses from 106 programs from 33 states in the US, the District of Columbia and Puerto Rico. Amongst the respondent programs, 44% have ST (47/106). Of those, 60% (28/47) are three-year programs, 40% (19/47) are four-year. The most common topics are Ultrasound (74%), Administration (72%), EMS (70%) and Medical Ed (68%). See figure for remainder. Amongst the 47 programs, 23 implemented ST in the last two years (49%), 15 started three to eight years ago (32%), and nine were implemented >8 years ago (19%). 38 have explicit goals and objectives (81%), though only 24 (51%) set specific criteria to graduate from a particular track. Of the residency programs without ST, 3 anticipate implementing soon, 24 (43%) will consider a program eventually, and 29 (52%) have no plans

**Conclusions:** ST are increasingly common amongst EM residency training programs in the US. Ultrasound, administration, and EMS are the most common specialties covered in these tracks. Future studies should examine the efficacy of such programs in preparation for a post-graduate career.

**Figure.** Frequency of specialties in programs with scholarly track.
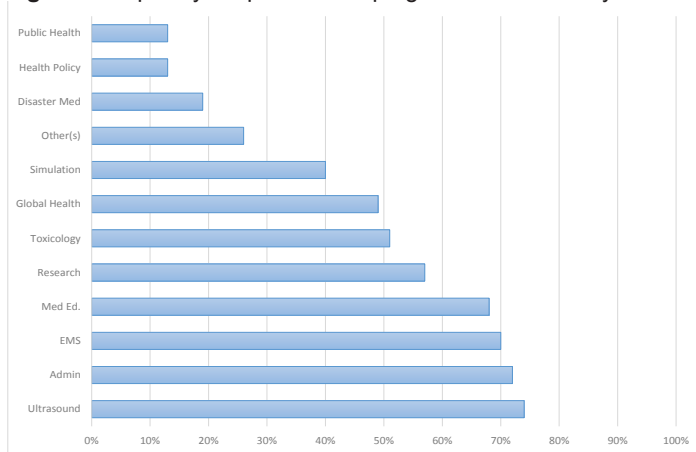


**30** **Student Use and Perceived Reliability of Emergency Medicine Advising Sources**

*Carle D, Christensen R, Jarou Z, King K, Druck J, /ETSU Quillen College of Medicine, Johnson City, Tennessee; Maricopa Medical Center, Phoenix, Arizona; Denver Health Medical Center, Denver, Colorado; University of Texas Health Science Center at San Antonio, San Antonio, Texas; University of Colorado School of Medicine, Aurora, Colorado*

**Background:** Applying to residency can be a complicated and anxiety provoking process for many students. Trusted advising resources can help students apply smarter and avoid over application.

**Objectives:** The purpose of this study is to evaluate the use and perceived trustworthiness of several in-person and organizational advising sources for emergency medicine (EM) residency applicants.

**Methods:** A maximum of 200 third and fourth year medical students attending EMRA's Medical Student Forum at the 2017 ACEP Scientific Assembly were invited to complete an IRB-approved survey using PollEverywhere. Students were asked to rate the trustworthiness of several well-known sources of advising information and to assess the helpfulness of potential future advising resources.

**Results:** Respondents were 56% MS4, 42% MS3, and 1.5% were medical school graduates. Between 91% and 100% of students responded to each question. For in-person advising, students found national EM program leaders, EM alumni from their medical school, and resident mentors to be most trustworthy (74%, 73%, 68% [very] trustworthy), and peers and Deans to be least trustworthy (62% and 46% somewhat or not trustworthy). When considering advice provided by organizations, students considered the AAMC and EMRA to be most trustworthy (77% and 54-73% [very] trustworthy). Many students had not used CORD's Blog or Student Advising Task Force (63% and 57%), however those who did found the resources to be (very) trustworthy (76% and 82%, respectively). Students do not consider online forums such as StudentDoctor. Net or Reddit to be trustworthy sources of information (54% not trustworthy). Students rated a central source for program-specific information about past interviewed applicants as most helpful for future applicants, compared to average number of applicants/interviewees at each program or consensus statements to help applicants determine their competitiveness to guide application behavior.

**Conclusions:** EM residency applicants find some advising resources to be more trustworthy than others. Many students are not aware of resources provided by organizations, including CORD and EMRA, indicating more work should be done to publicize the availability of these resources. Finally, students prefer transparent access to data, as opposed to consensus statements, to help guide their application decisions.
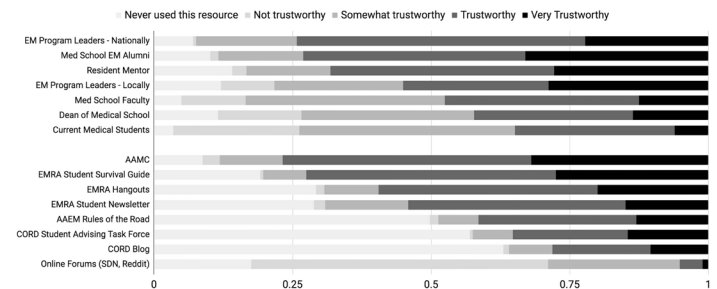


**Figure 1.** Emergency medicine applicant use and perceived trustworthiness of student advising information provided by individuals and organizations. (n=192-200)
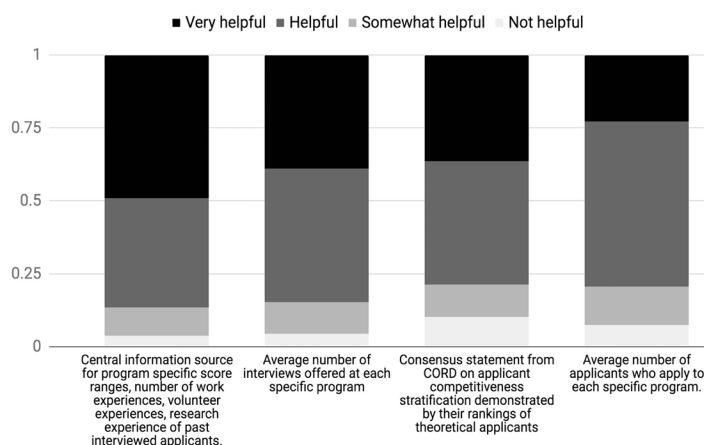
**Figure 2.** Perceived helpfulness of four possible future advising resources for emergency medicine residency applicants. ( n= 182-189)

# 31 Teaching Medical Students Emergency Medicine Focused Oral Presentations Skills

*Fisher K, Reynolds C, Hill M, Granado M, Van Meter M, /McGovern Medical School, Houston, Texas*

**Background:** Medical students often receive generalized training in oral presentations, but lack preparation for Emergency Medicine (EM)-specific presentations, which differ in length, focus, and structure. Previous research suggests that students require further instruction on EM-focused oral presentations.

**Objectives:** In our pilot study, we assessed the need for further research and training of EM-bound medical students in EM-specific oral presentations, and evaluated the efficacy of components of a multimodal curriculum.

**Methods:** Fourth-year EM-bound students from 9 different medical schools rotating in August 2017 were voluntarily enrolled. Students (n=13) anonymously completed a pre-instruction survey on prior training for oral presentations, both general and specific to EM, and their feeling of preparedness for EM presentations. Students then completed a self-paced, multimodal curriculum from existing sources during a four-week rotation (Figure 1). At the end of the rotation, students filled out unmatched surveys to rate their sense of preparedness and the effectiveness of each component of the curriculum. Data were analyzed using t-test for statistical significance for preparedness and ANOVA for curriculum components.

**Results:** Based on self-reported findings, 77% of students had previous education in oral presentations, however less than half (31%) reported receiving EM-specific training. On pre-intervention surveys, students had an average of 5.92/10 when asked how prepared they felt presenting in an EM format, regardless of whether

or not they had received EM-specific oral presentation preparation (p=0.90). Students surveyed after curriculum completion felt significantly more prepared presenting an EM case, with an average 8.18/10 (p<.05). Two students were lost to follow-up. There was no significant difference in the effectiveness between each of the components of the curriculum ($F(4,48) = 0.16$, p= 0.96).

**Conclusions:** Our study suggests that current didactic methods for EM-focused oral presentations are ineffective. After completing a multimodal curriculum, students felt more prepared for EM-focused presentations. There remains a need for development of a standardized and focused multimodal model for educating fourth-year EM-bound medical students on oral presentation skills specific to EM.

| Modality | Author | Year | Title |
|---|---|---|---|
| Primary literature | Davenport *et al.* | 2008 | The 3-Minute Emergency Medicine Medical Student Presentation: A Variation on a Theme |
| Supplemental outline | Davenport *et al.* | 2008 | Oral Presentations in Emergency Medicine |
| Video | CDEM/EMRA | 2015 | Patient Presentations in Emergency Medicine |
| Podcast | EMBasic: Steve Carroll, MD | 2012 | How to Give a Good ED Patient Presentation |
| Podcast notes | EMBasic: Steve Carroll, MD | 2012 | How to Give a Good ED Patient Presentation |

1. Davenport, Chip *et al.* "The 3-Minute Emergency Medicine Medical Student Presentation: A Variation on a Theme." *Academic Emergency Medicine*, vol. 15, no. 7, 2008, pp. 683-687
2. EMRA Education Committee/CDEM. "Patient Presentations in Emergency Medicine." 2015. https://www.emra.org/students/education/patient-presentations/
3. Carroll, Steve. "How to Give a Good ED Patient Presentation." EMBasic. 2012. http://embasic.org/how-to-give-a-good-ed-patient-presentation/

**Figure 1.** Multimodal didactic curriculum components.

# 32 The Patient Experience Curriculum: Increasing Medical Student Awareness of Patient Centered Care

*Calleo V, Camara M, Macconaghy L, Andonian D, Prince L, Welch K, Wojcik S, Sarsfield M, /SUNY Upstate Medical University, Syracuse, New York*

**Background:** Patient centered care (PCC) has been shown to increase patient satisfaction and outcomes. Despite this, few medical schools offer curriculum dedicated to improving student attitudes of PCC. Creating a module focused on teaching learners about PCC may raise awareness of the topic.

**Objectives:** This study will analyze how learners' attitudes towards PCC change after implementing a dedicated PCC curriculum. We hypothesize that upon completing this curriculum, learners will have better attitudes towards PCC.

**Methods:** This is a prospective observational study that analyzes how learners' attitude towards PCC change throughout this curriculum. A previously validated PCC scoring tool, the Patient-Practitioner Orientation Scale (PPOS), was administered to the learners at the beginning and end of the module. It grades an individual's attitude towards the doctor-patient relationship, and also examines it along two dimensions termed sharing and caring. Surveys

were anonymized upon completion. Done at a Level 1 trauma center, this study looked at 40 MS-3 students (20 male, 20 female) in the Emergency Medicine clerkship from 7/1/17-12/1/17. This module included an intro session, a standardized patient encounter/debriefing, a 4 hour patient shadowing shift, and a debriefing session. Data was collected using pre and post-module PPOS surveys.

**Results:** A T-test prepared sample analysis was performed. The mean (SD) pre and post PPOS scores were 75.6 (7.9) and 75.0 (7.9). There was no significant change in learners' overall attitudes towards PCC nor either of the sharing or caring subcategories.

**Conclusions:** We determined that implementing a 3-week curriculum dedicated to PCC does not appear to impact a learner's attitude towards PCC. There were some limitations to this study. First, this study was limited by a small number of participants. There were also 3 learners whose pre-PPOS to post-PPOS changes were outliers by over 2 standard deviations. This, combined with a low number, may have skewed the results. Despite lacking statistical significance, learners stated that this curriculum was beneficial during the debriefing. They thought this would be more impactful if it was done in both the pre-clinical and clinical years of medical school. Further studies done in both settings can see if it leads to significant changes in attitudes towards PCC.

**Table.** Paired sample test

| | | Paired Differences | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 95% Confidence Interval of the Difference | | | | |
| | | Mean | Std. Deviation | Std. Error Mean | Lower | Upper | t | df | Sig. (2-tailed) |
| Pair 1 | PreTotal - PostTotal | .0650 | 5.3501 | .8459 | -1.6461 | 1.7761 | .077 | 39 | .939 |
| Pair 2 | PreShare - PostShare | .5100 | 3.5743 | .5652 | -.6331 | 1.6531 | .902 | 39 | .372 |
| Pair 3 | PreCare - PostCare | -.4450 | 3.4778 | .5499 | -1.5573 | .6673 | -.809 | 39 | .423 |

## 33 The Standardized Video Interview: How Well Does the SVI Score Correlate With Traditional Interview Performance?

*Shah K, Chung A, Bond M, Ardolic B, Husain A, Li I, Cygan L, Caputo W, Shoenberger J, van Dermark J/Icahn School of Medicine at Mount Sinai, New York, New York; University of Maryland, Baltimore, Maryland; Staten Island University Hospital - Northwell Health, Staten Island, New York; LAC+USC Medical Center Keck School of Medicine of USC, Los Angeles, California; UT Southwestern Medical Center, Dallas, Texas*

**Background:** An on-line Standardized Video Interview (SVI) was piloted by all applicants to emergency medicine (EM) residency programs in this academic cycle. The proposed goal of the SVI is to highlight applicants' professionalism and interpersonal communication skills. It is unclear if this simulated interview (as they were not actually having a conversation with another person) format is a fair representation of an applicant's interview skills.

**Objectives:** To determine if the SVI score correlates with an actual in-person interview score.

**Methods:** Six ACGME-approved EM residency programs are participating in this prospective, observational multi-center study. Data is from interviews conducted through Nov 25, 2017. Common demographic data (gender, age, USMLE score, SVI score, etc) were obtained through an ERAS export function before interviews began. During each interview day, one interviewer (who does not participate in applicant selection) was blinded to the applicants' applications. A convenience sample of applicants was enrolled based on random assignment to the blinded Interviewer. The interviewer was asked to rate each interview on a 1-5 scale that was developed a priori. The scale was deemed to have face validity based on review by multiple residency program directors involved in the study. In addition to standard statistical methods, a linear regression was performed.

**Results:** 100 interviews were performed that had an SVI score and an in-person interview score. 3 were excluded because of prior knowledge of the applicant. Of the 97 interviews, there were 91 unique applicants. When an applicant was interviewed at more than 1 program, a mean in-person interview score was generated. SVI scores ranged from 13-28 with a mean of 19.9. Linear regression of SVI score against in-person interview score demonstrated no relationship (p=0.98). When separating SVI scores into low, middle and high scores, there was no correlation with interview score (p=0.33).

**Conclusions:** Preliminary data suggest there is no correlation between the simulated standardized video interview score and the in-person interview score. We will have substantially more data at the time of poster presentation at CORD.

Comparison of SVI sub-group with in-person interview score

| SVI Sub-group | Mean interview score | p |
|---|---|---|
| 12-17 | 3.75 | 0.33 |
| 18-23 | 3.41 | |
| 24-30 | 3.73 | |

*SVI,* standardized video interview.

## 34 Using the QSAT to Generate Multi-Source Feedback on an Adult Simulation Case

*Jong M, Kane B, Elliott N, Nguyen M, Matuszan Z, Morolla L, Johnson S, Goyke T, Gernerd D, Sabbatini S/ Lehigh Valley Health Network, Bethlehem, Pennsylvania; Emergency Medical Institute, Allentown, Pennsylvania*

**Background:** The Accreditation Council for Graduate Medical Education (ACGME) lists multi-source feedback (MSF) as a suggested evaluation method for 10 of the 23 Emergency Medicine (EM) Milestones. To date, there has been little study comparing EM resident MSF on a specific patient encounter. The Queen's Simulation Assessment Tool (QSAT) has been validated as being able to, with faculty feedback, discriminate between resident performances in a simulation setting.

**Objectives:** Using the QSAT, this simulation study seeks to determine the degree of agreement of MSF on a single simulation case.

**Methods:** This IRB approved study was conducted at a single, dually approved, four year EM residency which trains 13 residents a year. An adult simulation resuscitation case was developed with specific behavioral anchors on the QSAT, which provides feedback on a 1-5 scale in each of 5 categories. Performance on the simulation case was gathered from each of 6 participants or observers in the simulation. The resident leading the case self-evaluated. The resident received MSF feedback from each of a junior resident peer, a nurse, an EMS provider, and two attending faculty members. Reported are the mean scores and standard deviation for each.

**Results:** A total of 34 (12 female, 22 male) residents were enrolled to serve as the case leader. At the time of enrollment, 4 were PGY 2, 10 were PGY 3, and 20 were PGY 4. The single peer evaluator began the study as a PGY 1. The 34 nurses (30 female, 4 male) averaged 6.4 years of experience. The EMS provider has 13 years of experience. The faculty members have 14 and 15 years of experience respectively. Table One demonstrates that the residents routinely evaluated themselves more critically than they were evaluated by any of the other groups. If the faculty are used as the gold standards, the scores in each category for each source of MSF of the QSAT overlapped within a standard deviation.

**Conclusions:** In this single site cohort residents rated themselves lower on the QSAT than other sources of MSF did. It appears that the QSAT can be used to provide MSF wherein each source of feedback is similar to that of a faculty member. If the relationship is further validated, this may allow for MSF on specific resident performance from a variety of sources which would mirror a faculty evaluation of that encounter.

**Table One.** Reported means and standard deviations (N of 34 for all cells)

| Role / QSAT Category | Self | Faculty 1 | Faculty 2 | Peer | Nurse | EMS |
|---|---|---|---|---|---|---|
| **Primary Assessment** | 4.06 (.49) | 4.88 (.33) | 4.94 (.24) | 4.79 (.48) | 4.56 (.50) | 4.76 (.50) |
| **Diagnostic Actions** | 3.79 (.69) | 4.62 (.49) | 4.56 (.66) | 4.18 (.80) | 4.29 (.68) | 4.41 (.61) |
| **Therapeutic Actions** | 4.06 (.81) | 4.50 (.66) | 4.12 (.98) | 4.26 (.55) | 4.62 (.59) | 4.47 (.71) |
| **Communication** | 4.09 (.67) | 4.88 (.41) | 4.88 (.33) | 4.62 (.55) | 4.68 (.59) | 4.71 (.58) |
| **Overall Assessment** | 3.88 (.59) | 4.74 (.45) | 4.47 (.79) | 4.38 (.65) | 4.41 (.50) | 4.50 (.75) |

## 35 USMLE Scores Do Not Predict Ultimate Clinical Performance in an Emergency Medicine Residency Program

*Sajadi-Ernazarova K, Ramoska E, Saks M, / Drexel University College of Medicine, Philadelpha, Pennsylvania; Crozer Chester Medical Center, Upland, Pennsylvania*

**Background:** "High-stakes" multiple choice exams such as the United States Medical Licensing Examination® (USMLE) are widely used to gauge mastery of basic and clinical science knowledge. Scores on these exams are important screening and applicant ranking criteria, used by residency. This study attempts to clarify the relationship between performance on two USMLE exams (Step 1, Step 2CK) with global clinical performance in an Emergency Medicine (EM) residency program.

**Objectives:** We tested the hypothesis that USMLE scores do not predict clinical performance after residency training.

**Methods:** All graduating residents from our University-based EM residency program between the years 2008 and 2015 were eligible for inclusion. Residents that had incomplete USMLE records, were terminated, transferred out of the program, or did not graduate within this timeframe were excluded from the analysis.

Clinical performance was defined as a gestalt of the residency program's leadership (program director, associate program director, and assistant program director) during the specified years. They were initially blinded to each other's grouping selections and classified the residents into three sets: top clinical performer, average clinical performer, and lowest clinical performer. Dissimilarities of the rankings were adjudicated during a consensus conference. The residents' files were then accessed and the residents' USMLE scores were obtained.

**Results:** During the eight years of the study period, there were a total of 115 graduating residents: 73 men (63%) and 42 women. Nearly all of them (109; 95%) had allopathic medical degrees; the remainder had osteopathic degrees. Table 1 shows the distribution of the final consensus ranking of the residents. The inter-rater reliability of the initial rankings was strong with an ICC = 0.845 (p < 0.01).

There was a poor, but statistically significant, correlation between our ranking of clinical performance and the Step 2CK score. There was not a statistically significant correlation between clinical performance and the Step 1 score. (See Table 2).

**Conclusions:** Neither USMLE Step 1 nor Step 2CK were good predictors of the actual clinical performance of residents during their training, we feel that their scores are overemphasized in the resident selection process.

**Table 1.** Final ranking of residents

| Category | Number | Percentage |
|----------|--------|------------|
| Top | 38 | 33.0% |
| Middle | 44 | 38.3% |
| Bottom | 33 | 28.7% |

**Table 2.** Correlation between clinical performance and examination scores

|  | USMLE Step 1 | USMLE Step 2CK |
|--|--------------|----------------|
| Correlation Coefficient | 0.067 | 0.205 |
| P Value | 0.49 | 0.04 |
| N | 109 | 106 |

**36 USMLE Step 1 Minimum Score Thresholds as an Applicant Screening Filter by Emergency Medicine Residency Programs**

*Jarou Z, Davis B, Kellogg A, /Denver Health Medical Center/University of Colorado, Denver, Colorado; Technology Services, American College of Emergency Physicians, Irving, Texas; Baystate Medical Center/ University of Massachusetts, Springfield, Massachusetts*

**Background:** The number of residency applications per applicant has risen dramatically. A 2016 survey of residency program directors by the AAMC showed that 75% of residency programs across all specialties use filters or minimum thresholds when selecting applicants to interview, including 54% of emergency medicine (EM) programs.

This agrees with a 2014 survey conducted on the CORD listserve which found that of programs using filters, 56% filter by Step 1 failures or minimum score. Students cannot make targeted and informed residency application decisions without transparent data to assess their competitiveness for a given program.

**Objectives:** The purpose of this investigation is to describe the use and minimum thresholds of USMLE Step 1 scores by emergency medicine residency programs.

**Methods:** Data regarding the USMLE Step 1 score below which programs would generally not grant an interview and invitation of applicants who have failed Step 1 in the past 3 years were extracted from EMRAMatch.org, a collaborative, searchable, filterable residency directory created by EMRA, CORD, CDEM, and ACEP. The data on EMRA Match was initially populated through a survey via the CORD listserve and programs are automatically prompted to update their information.

**Results:** Of the 239 residency programs listed, 100% provided information regarding consideration of applicants who had previously failed Step 1 and 85% responded with minimum thresholds for Step 1 scores. Overall, 30% invited applicants with previous Step 1 failures to interview. One-third of programs indicated that all applicants are considered regardless of their Step 1 score, while 17% of programs used a minimum of 200, 17% used 210, 13% used 220, and 1.5% used 230. Another 17% of programs declined to disclose a minimum threshold indicating that while filters are used, they will not share this information.

**Conclusions:** Sixty-five percent of EM programs filter by Step 1 score, higher than previously reported. One method to address over application to residency programs is to provide applicants with the information needed to assess their competitiveness. Efforts should be made to encourage the 17% of programs that do not currently disclose their minimum thresholds to do so. For applicants who have previously failed Step 1, they should be encouraged to target programs that have interviewed applicants with Step 1 Failures.
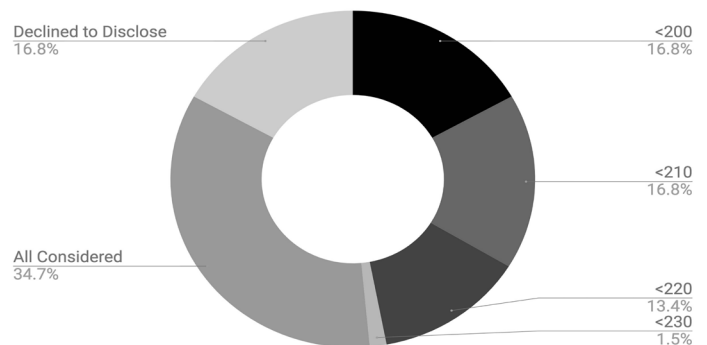


**Figure 1.** The use, disclosure, and distribution of minimum USMLE Step 1 score thresholds by emergency medicine residency programs for consideration of applicants.

**Table 1.** Consideration of applications who have previously failed USMLE Step 1 and use of minimum score thresholds by EM residency programs by accreditation type.

| Step 1 Minimum Threshold | ACGME | AOA | Overall |
|---|---|---|---|
| *Response Rate* | *n = 189* | *n = 13* | *n = 202* |
| <200 | 33 | 1 | 34 |
| <210 | 32 | 2 | 34 |
| <220 | 25 | 2 | 27 |
| <230 | 3 | 0 | 3 |
| All Applicants Considered | 66 | 4 | 70 |
| Declined to Disclose | 30 | 4 | 34 |
| **Consideration of Step 1 Failures** | **ACGME** | **AOA** | **Overall** |
| *Response Rate* | *n = 207* | *n = 32* | *n = 239* |
| Yes | 68 | 3 | 71 |
| No | 139 | 29 | 168 |

## 37 Utilizing Departmental Policy to Promote Faculty Evaluation of Residents

*Rosenblum J, Chhabra N, Schindlbeck M, /Cook County Health and Hospitals System, Chicago, Illinois*

**Background:** It is a requirement of Emergency Medicine (EM) residency training programs accredited by the Accreditation Council for Graduate Medical Education that faculty evaluate resident performance in a timely manner and document this evaluation. Residents are expected to incorporate this feedback into daily practice. Although feedback is essential for performance improvement, lack of receiving enough of it in a timely manner remains an issue among residents.

**Objectives:** We aimed to determine if implementation of a departmental policy requiring faculty to complete at least one electronic resident evaluation per shift would lead to an improvement in the number of evaluations per month. Faculty were advised that failure to comply would result in the loss of privilege to work with residents.

**Methods:** We conducted a pre- and post-intervention retrospective observational study at our institution. The participants were 28 full-time EM attendings who had been on staff for at least the past two consecutive years. We compared the number of evaluations per shift each faculty completed for nine months before and nine months after the new policy went into effect in February 2017. We compared the months of February to October 2016 and February to October 2017 to control for seasonal variability in evaluation completion. We then calculated the pre-intervention and post-intervention averages per faculty and calculated absolute and relative

changes. Comparisons were made using a paired t-test.

**Results:** We found that every month after the policy was implemented had an increased average number of evaluations completed per attending. The pre-intervention average faculty evaluations per shift was 0.334 which increased to 1.216 post-intervention for an absolute increase of 0.882 (p<0.01). No faculty lost the privilege of working with residents.

**Conclusions:** Our results indicate that implementing a policy requiring faculty to complete a certain number of evaluations per shift with a potential punishment of the loss of privilege to work with residents can lead to a significant increase in the number of evaluations provided to residents. Important limitations of this study are the small sample size and the short duration of observation.
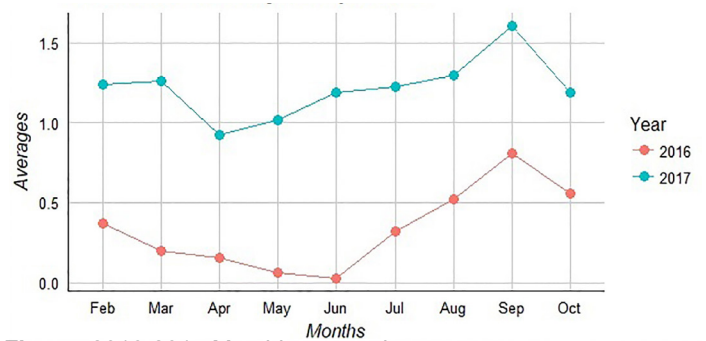


**Figure.** 2016-2017 Monthly comparison.

## 38 Validation of a Question Bank as Preparation for the Emergency Medicine In-Training Examination

*Tomaselli P, Governatori N /Thomas Jefferson University, Philadelphia, Pennsylvania*

**Background:** The American Board of Emergency Medicine (ABEM) In-Training Examination (ITE) is designed to determine resident preparedness for ABEM certification. ABEM highlights the correlation between ITE and Qualifying Examination scores and this statement has been validated in the literature.3 Board review courses and clinical performance have not been shown to be effective predictors of ITE performance 1,4 while United States Medical Licensing Examination (USMLE) scores have demonstrated some correlation.5 There has not been consistency, however, as to which resource best prepares residents for the ITE. When surveyed, residents prefer question-based preparation over text-based resources.2 In our study we examined resident performance using a question bank to see if there was a measurable outcome on ITE performance.

**Objectives:** Our hypothesis was that improved performance using a question bank will lead to higher scores

on the ITE. We focused on the analysis of two independent variables: first, the percentage of practice questions completed, and second, practice exam score in order to determine if there was a correlation with actual ITE score.

**Methods:** The following data were collected and de-identified for thirty-five residents at a three year residency training program: practice question bank exam score, percentage of question bank completed and actual score on the 2017 ITE exam. The data were analyzed using three separate linear regression models in order to determine statistical significance using residual versus fit graphs and Q-Q normality plots. Residents who did not take the ITE were excluded.

**Results:** The strongest correlation (highest coefficient of determination at 43.7%) was the model combining practice score with percent complete. Each predictor on its own was also found to be still significant, albeit on a slightly lower level of significance (31.2% and 27% respectively). All models achieved an alpha of 0.01 or 99% significance.

**Conclusions:** These results suggest that a questions bank may be useful for predicting performance on in-training exam scores. Major limitations of the study include small sample size and the use of one particular question bank. Further research is necessary to compare different study preparation materials.

## 39 What Factors Go Into Attending Physicians' Decisions About the Roles and Responsibilities of Emergency Medicine Residents in a Free-standing Pediatric Emergency Department?

*Mitzman J, Reynolds M, Way D/The Ohio State University Wexner Medical Center & Nationwide Children's Hospital, Columbus, Ohio*

**Background:** Emergency medicine (EM) residents are required to learn how to care for patients of all ages. To provide pediatric experience, some residency programs arrange rotations with separate, independent pediatric emergency departments (PED). A previous study has shown that EM residents who rotate in a PED, see more patients and perform more procedures than their family medicine and pediatric resident colleagues.[Chen EH, et al, 2004; Dowd MD, et al, 2005] However, in a separate PED study, the pediatric residents saw more critically ill patients than their EM resident colleagues.[Chen EH, et al, 2007] We aimed to assess: How do supervising faculty in the pediatric emergency department decide which residents get to do what?

**Objectives:** The purpose of this study was to profile PED faculty and EM resident opinions on EM resident participation in a PED. More specifically, we wanted to know what factors go into a faculty member's decision to allow residents to: see patients, perform procedures, and work autonomously in the pediatric ED. We also wanted to compare faculty and resident understanding of these factors.

**Methods:** Residents (n=52) from our EM program complete pediatric experiences in a free-standing children's hospital staffed by 60 pediatric emergency physicians. Recent graduates, rising PGY 2s & 3s and faculty were surveyed about factors that influenced resident autonomy and resident participation in patient care.

**Results:** Both resident and attending physicians believe that previously established relationships are a factor in the degree of autonomy residents are offered and how often they perform procedures. Residents however, seemed to weigh the importance of relationships more heavily than the attendings. Residents believe that a longitudinal rotation model contributes to building the attending-resident relationship, while attending physicians believe this model makes it more difficult. Residents also report that resident personality plays a significant role in autonomy and procedures, while faculty report this was not at all a factor in their decisions.

**Conclusions:** Residents and faculty report multifactorial decision making with regard to procedural opportunities and learner autonomy in the Pediatric ED. The two groups' perceptions about which factors are important were quite different.

**Table 1.** Frequencies and percentages of 25 EM residents and 35 PEM faculty responses to questions about factors faculty employ to regulate the participation in patient care of an emergency medicine resident during rotations in a pediatric emergency department.

| Factors | Decision to See Patients | | Decisions to Offer Autonomy | | Decisions to Allow Procedures | |
|---|---|---|---|---|---|---|
| | Residents (n=25) | Faculty (n=35) | Residents (n=25) | Faculty (n=31) | Residents (n=25) | Faculty (n=30) |
| **Patient-related factors** | | | | | | |
| · Patient Acuity / Procedural Difficulty | 24 (96%) | 5 (14%) | 23 (92.0%) | 3 (10%) | 23 (92%) | 10 (33%) |
| · Parental attitudes/ consent | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 3 (10) |
| **Resident-related factors** | | | | | | |
| · Resident ability, knowledge and skill | 20 (80) | 4 (11) | 24 (96.0) | 6 (19) | 24 (96) | 10 (33) |
| · Level of Training or Experience | 23 (92) | 8 (23) | 24 (96.0) | 12 (39) | 25 (100) | 15 (50) |
| · The education needs of the resident | 0 (0) | 7 (20) | 0 (0) | 1 (3) | 0 (0) | 0 (0) |
| · Resident's program affiliation (type, institution) | 9 (36) | 1 (3) | 10 (40.0) | 1 (3) | 0 (0) | 0 (0) |
| · Resident's presentation- ie. Confidence | 21 (84) | 1 (3) | 22 (88.0) | 1 (3) | 24 (96) | 9 (30) |
| · Resident's personality | 17 (68) | 0 (0) | 17 (68.0) | 2 (6) | 16 (64) | 0 (0) |
| **Environmental related factors** | | | | | | |
| · Availability of EM Fellows | 20 (80) | 0 (0) | 18 (72.0) | 0 (0) | 22 (88) | 0 (0) |
| · How busy the department is (Flow) | 1 (4) | 1 (3) | 0 0() | 3 (10) | 0 (0) | 4 (13) |
| · Competition with other learners | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 0 (0) | 8 (27) |
| **Faculty related factors** | | | | | | |
| · None- All residents are treated the same | 1 (4) | 22 (63) | 0 (0) | 0 (0) | 0 (0) | 0 (0) |
| · Attending familiarity and trust of the resident | 24 (96) | 3 (9) | 24 (96.0) | 24 (77) | 25 (100) | 8 (27) |

## *Innovations Abstracts*

### 1 "UltraSimageddon:" An Intra-city Emergency Medicine Residency Competition

*Olson A, Olson N, Chin E, Gelabert C, Sisson C /University of Texas Health San Antonio, San Antonio, Texas*

**Background:** Interactive educational methods are gaining favor over lecture-based didactics for emergency medicine (EM) education. Simulation(Sim) and ultrasound(US) are useful for reducing lecture-based teaching and integrating the growing emphasis in graduate medical education on knowledge application, direct observation, standards-based evaluations, and team-based care. Collaborative, team-based activities can improve communication skills and teamwork. Cities with multiple residencies have an opportunity for collaboration and resource sharing.

**Educational Objectives:** Our goals for the "UltraSimageddon" project were to increase the collaboration between intra-city EM residencies, create a non-lecture based learning experience, facilitate hands-on team-based medical care, and explore the residents' reception of Sim and US curricular integration.

**Curricular Design:** The "UltraSimageddon" project had two organizers: the Sim and US program leaders at two academic EM residencies in San Antonio, TX. EM residents from both programs rotated and competed at stations that involved Sim cases using high fidelity simulators, US skills assessments, and EM board-style questions. Learning objectives and point-valued checklists were created for each station; scores were totaled. The final event of the day was a "Simwars"-style competition that integrated Sim and US skills. After the cases, a short debriefing was completed on non-medical skills involved in the cases. An online survey was sent to the residents after the experience to assess the event.

**Impact/Effectiveness:** Overall, 95% of respondents would like to see this type of collaborative educational activity in the future (21/22). The median response was 4/5 regarding the usefulness of the experience on a 1-5 Likert scale.

We were successful in creating an enjoyable, collaborative active experience between two EM residencies that involved Sim and US and challenged medical and non-medical skills. This type of project can be replicated at other institutions. The short concise post-sim debriefings focused on non-medical skills, but could be adjusted according to different preset objectives. Continued improvements of these events require resident buy-in; their feedback is essential to improving future iterations of the project.

### 2 A Novel Eye Model for Simulation in Lateral Canthotomy

*Nielson J, Coleman K, /Virginia Tech Carilion, Roanoke, Virginia*

**Background:** We sought to develop an inexpensive simulation model that could be used for instruction of the emergency medicine model of practice for lateral canthotomy. Ophthalmologic emergencies present an opportunity for severe morbidity. Lateral canthotomy provides an opportunity for intervention and can be vision saving if performed promptly. With the temporal relationship of increased intra-ocular pressure (IOP) associated with Orbital Compartment Syndrome (OCS), especially secondary to traumatic injuries with associated retro-bulbar hematoma there is a need for Emergency Providers (EPs) to have the ability to perform potentially vision saving procedures. While an important skill, it is infrequently performed with an estimated 0.088% incidence among craniomaxillofacial (CMF) emergencies. The ability to gain and maintain competency can be difficult and expensive often relying on cadaveric models. We aim to provide an inexpensive, high fidelity simulation model to give providers the opportunity to gain and maintain competency with lateral canthotomy.

**Educational Objectives:** Gain familiarity and psychomotor skills for competently addressing a lateral canthotomy procedure.

**Curricular Design:** Using easily obtained items and animal eyes, we constructed an inexpensive model for lateral canthotomy. For this model, eyes from recently harvested bovine and ovine specimens were used. Each model was less than ten dollars (US) to build. The models can be maintained in a refrigerated environment for at least 3 days. Desiccation due to refrigeration can be repaired with insufflation of the anterior chamber and/or vitreous with crystalloid solution. The models were used in small groups to walk learners through the procedure

**Materials:**
- Wig/beautician model heads may be obtained in beauty supply shops, online or in craft stores
- Animal eyes-local butchers and slaughterhouses can provide recently decapitated heads for dissection. In our example, a local butcher shop processed deer carcasses and provided the heads without charge. Bovine or porcine heads can also be used.
- Industrial epoxy and glue. For this model we used Gorilla Glue® as it provides a bubble filled, expansive matrix that stabilizes the eye tissue in its orbit.
- Cyanoacrylate- for adhering the rubber components together

- Syringes with 27ga needles- to re-fil dessicated orbits
- Bicycle intertube- size varies depending on eyes used.
- Rubberbands 1-2mm thick
- Rubber tourniquet material
  **Steps:**
- Create orbits in mannequin heads with drill bit and depth to be matched to the size of the eye (Image 1).



- Cleanly dissect eyeballs from orbits removing all excess tissue
- Cut a small section (1 per eye) of bicycle tubing. Cut a 2 cm length of tourniquet band (1 per eye). Cut 6cm segments of rubberbands (1 per eye).
- As shown in (Image 2) glue the pieces of rubberband and tourniquet in layered fashion at a point that will sit lateral to the eye when inserted.
- Dry the posterior portion of the eyes with compressed air and insert them into the tubing gluing them in place.

**Impact/Effectiveness:** Ophthalmologic procedures performed in everyday emergency medicine practice are difficult to simulate, and infrequent procedures such as lateral canthotomy can be difficult to teach and train others to master. This model provides a resource for faculty to safely guide learners through the details of lateral canthotomy. It affords trainees the rare opportunity to perform these techniques in a safe environment.

To reiterate the infrequency of this procedure only 10% of our participants have performed a lateral canthotomy in practice. 76% of the participants felt more comfortable performing the procedure after using the model, including those that had performed the procedure previously.



## 3 Asynchronous Curriculum Socially Synchronized: Adult Learning Via Competition

*Smart J, Muck A, Olson A, /University of Texas San Antonio Health Sciences Center, San Antonio, TX*

**Background:** Widespread in Emergency Medicine (EM) residencies, Asynchronous learning is a method to move education outside of classic classroom settings. Prior asynchronous curricula in our three-year EM residency focused on learners covering information in isolation and then taking a quiz to achieve a mark of completion. Learners then moved on to the next quiz, often with no reinforcement of their knowledge. We believe there is a lost opportunity to solidify knowledge and engage active learning by integrating a social aspect and gamification model to traditional Asynchronous Curriculum.

**Educational Objectives:** Our objectives were to encourage adult-style learning, increase resident engagement through gamification, and to improve long-term knowledge retention via spaced repetition.

**Curricular Design:** We created a website, AlamoCityEM.com, with a wide array of monthly options of open access medical education resources and traditional EM textbook chapters. Each option has an estimated time for completion. Residents select a total of 4-hours worth of material. In an innovative step, rather than utilize a pedagogy model of quizzes, residents are treated as adult learners and submit 12 facts or clinical pearls they learned from the material.

The learning points from all residents are then used to create

monthly trivia competitions held during didactic conference. Divided into three "Houses" at the beginning of the academic year, residents compete as a team. These competitions allow for review of that month's material and encourage spaced repetition as well as active social learning to solidify knowledge.

Timely completion of the material is encouraged with late residents causing the entire team to lose points for that month's competition and the first House finished receiving bonus points. The competition spans the academic year with the House winning the most months being declared the victors.

**Impact/Effectiveness:** Post-implementation of this Asynchronous model, our residents now have completion rates of > 90% prior to deadline compared to ~30% before intervention. Residents on standardized surveys also report not only markedly increased enjoyment of the curriculum but also rank it as more valuable for improvement in both clinical practice and Board preparation. This socially synchronized asynchronous curriculum model offers a new method of engaging residents as adult learners.
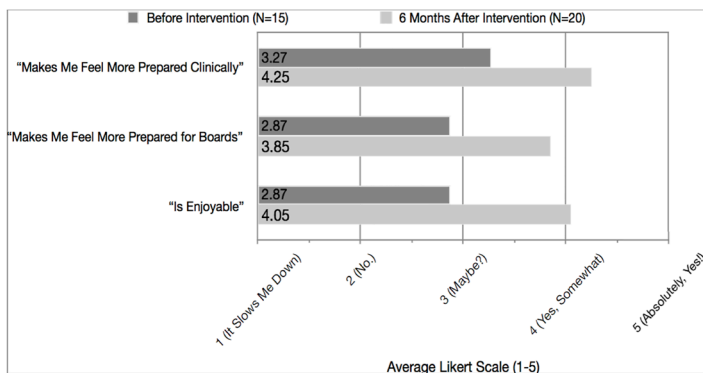


## 4 Creation of a Milestone driven Simulation based Resuscitation Course

*Mannix A, Hoffman J, Desmond C, Sergel M, /Rush University, Chicago, IL; Cook County Hospital, Chicago, IL; Northshore University HealthSystem, Chicago, IL*

**Background:** To assess resident growth and development, the Accreditation Council for Graduate Medical Education (ACGME) and The American Board of Emergency Medicine (ABEM) have collectively established a set of twenty-three milestones for Emergency Medicine (EM) Residents. Biannually, residents are assessed on these milestones by residency leadership. Difficulty can arise when the faculty evaluating these milestones cannot recall specific examples of milestone achievement for each resident. A simulation curriculum to directly evaluate these milestones may improve assessment reliability.

**Educational Objectives:**
- To develop a prioritized list of resuscitation-oriented milestones as defined by EM attending physicians.

- To create a milestone driven simulation cases for EM residents to improve their readiness for EM resuscitation.
- To improve EM residents' ability to perform vital resuscitation skills, while advancing their clinical skills and ability to care for critically ill medical patients.
- To improve direct observation of critical milestones performed by EM residents for residency leadership.

**Curricular Design:** Attending physicians at four EM residency programs were surveyed regarding the most important milestones associated with resuscitation care, establishing the top 10 resuscitation oriented milestones. Using these 10 milestones, we created a two-day simulation based resuscitation course, to evaluate second year EM residents' preparedness for caring for critically ill patients. Day one included 4 milestone-driven simulation cases, followed by a formative evaluation. Day two included a summative evaluation for each individual resident on a standardized case that evaluated all the established milestones. These evaluation forms were created by 4 EM attending physicians, correlating simulation critical actions to specific milestones and numbered levels.

**Impact/Effectiveness:** In combining simulation and milestones, this resuscitation curriculum allows for the direct observation and evaluation milestones, in a safe environment. The information gathered can be used by residency leadership to report milestones to the ACGME. Long-term goals include expanding the curriculum to other post-graduate levels, and validating this milestone based assessment tool.
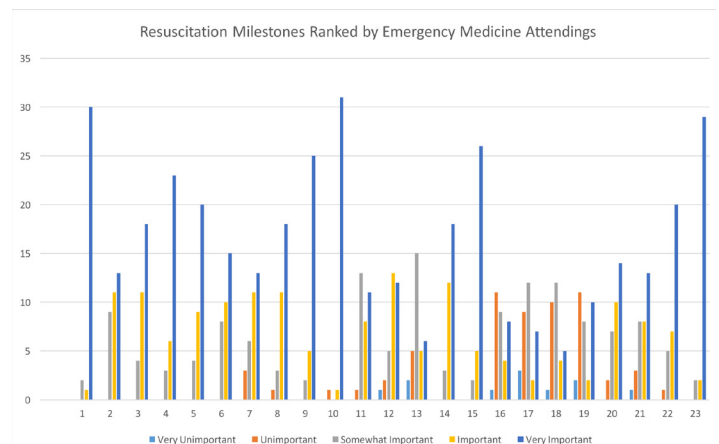


**Figure 1.** To prioritize resuscitation milestones, all 23 Milestones were ranked by Emergency Medicine Attending using a 1-5 Likert based scale based on their importance.

## 5 Faking the Friendly Skies: A Simulated In-Flight Emergency

*Abbott L, Ladkany D, Palmer J, Adelman S, Wood S, Bhat R, Carlberg D, Borhart J, /Georgetown University, Washington, District of Columbia*

**Background:** Approximately 1 in 604 flights is

complicated by a medical emergency. Physicians called upon to treat passengers in-flight find themselves in the unfamiliar surroundings of an airliner cabin with limited resources, space, and equipment. Simulation of in-flight emergencies has been shown to improve medical student fund of knowledge and comfort level when responding to these unique situations.

**Educational Objectives:** Our goal was to simulate an in-flight emergency for residents in a space similar to that of an airliner cabin using only equipment typically available on a plane or in a standard airline medical kit. After participating in this simulation, residents would be familiar with 1) the contents of an in-flight emergency kit, 2) crowd-sourcing to obtain additional supplies, 3) the challenges in providing care on a plane, and 4) possible flight diversion.

**Curricular Design:** We designed an in-flight pediatric anaphylaxis simulation. Any necessary equipment needed to either come from the in-flight emergency medical kit, which the team had to request, or be crowd-sourced from other passengers. Passengers on the plane provided useful adjuncts, including a glucometer and an Epi-pen. Upon recognizing anaphylaxis, the team administered epinephrine, diphenhydramine, and IV fluids. Flight diversion was discussed with the pilot. During the scenario the team faced many challenges, including working in a limited space with immovable chairs and a narrow central aisle. They had to interface with fellow passengers, some of which were helpful, while others were irritated or inebriated. Residents also needed to recall pediatric medication dosing as their smartphones were nonfunctional. The overall assessment of resident performance was made by direct observation during the simulation.

**Impact/Effectiveness:** Participants were surveyed to assess the efficacy of the simulation. Feedback was uniformly positive, with 6 of 7 respondents rating the simulation as "excellent" and 1 of 7 rating it as "good." No learners considered the simulation "poor," "fair," or "average." One learner described the case as a "good review of a common, real-life situation." We believe simulation of in-flight emergencies will provide residents with a framework for approaching this common resource-limited scenario.



## 6 Foundations EKG: An Open Access Flipped Classroom Critical EKG Curriculum

*Burns W, Wilson D, Hartman N, Deutsch A, Weygandt P, Grabow Moore K, /Northwestern University, Chicago, IL; Wake Forest University, Winston-Salem, North Carolina; University of Massachusetts, Springfield, Massachusetts; Johns Hopkins University, Baltimore, Maryland; Emory University, Atlanta, Georgia*

**Background:** Electrocardiogram (EKG) interpretation is critical to Emergency Medicine (EM) practice. Hartman et al found 28%, 39%, & 54% of PGY1s, PGY2s, and PGY3/4s respectively passed a validated test of critical EKG interpretation. Despite this educational gap, Ginde et al found that 36% of residencies lack formal EKG curricula. Free Open Access Medical Education (FOAMed) resources for EKG interpretation exist but are not focused on the specific needs of the junior learner.

**Educational Objectives:** We sought to demonstrate the value of a flipped classroom, critical EKG curriculum for junior learners that incorporates curated FOAMed content into didactic instruction. Additionally, we (1) provide an interpretation framework to help residents develop mastery and rely on when confronted with complex EKGs and (2) ensure open-access to the curriculum for all residency programs or interested individual learners.

**Curricular Design:** The 2016-2017 Foundations EKG curriculum was organized around 5 concise reviews of core EKG principles and 20 challenge EKG cases. Topics included the 15 critical EKG diagnoses reported by Hartman et al and 5 additional topics. Cases included a brief history, EKG(s), standard interpretation stem(s), and FOAMed links. Using a flipped classroom approach, learners were assigned EKGs weekly for independent review. During a subsequent 10-minute didactic session faculty or senior resident facilitators guided a review of core concepts and interpretation of EKG(s).

**Impact/Effectiveness:** Our curriculum was offered to any interested residency program. In February 2017, program leaders and learners from 6 sites were surveyed by collecting anonymous responses to 5-point Likert scale questions and a free response section. All leaders, 5/5 (100%) with 1 leader excluded as a course creator, and 54 of 76 learners (71%) completed the survey. We found high satisfaction among both leaders and learners (Table 2). Additionally, learners believed the curriculum to be level-appropriate, were satisfied with the standardized format, and noticed a beneficial clinical impact.

Survey responses from all Foundations leaders/learners showed significant interest in an EKG curriculum for advanced PGY2/3 learners. In response, we added 28 new cases for a total of 48 and divided the curriculum into Fundamental and Advanced courses for the 2017-2018 academic year.

**Table 1.** Curriculum overview.

| Foundations EKG Curriculum Schedule | | |
|---|---|---|
| Session | Challenge EKG # | EKG Core Content Review |
| 1 | Core 1 | **How to Read an EKG (NSR)** |
| 2 | Core 2 | **Approach to Ischemia** |
| 3 | EKG 1 | Anterior STEMI |
| 4 | EKG 2 | Posterior STEMI |
| 5 | EKG 3 | Inferior STEMI, RV STEMI |
| 6 | EKG 4 | LBBB/Pacer (Sgarbossa) |
| 7 | EKG 5 | STEMI Mimics (Hyperkalemia, Pericarditis) |
| 8 | EKG 6 | STEMI Mimics (Isolated aVR, Benign Early Repolarization) |
| 9 | Core 3 | **Approach to Syncope** |
| 10 | EKG 7 | WPW |
| 11 | EKG 8 | Brugada |
| 12 | EKG 9 | Long QT |
| 13 | EKG 10 | PE/RV Strain/RVH |
| 14 | EKG 11 | LVH/HOCM |
| 15 | Core 4 | **Approach to Bradyarrhythmias** |
| 16 | EKG 12 | 2nd Degree Type II, 3rd Degree AV Block |
| 17 | Core 5 | **Approach to Tachyarrhythmia (Sinus Tach)** |
| 18 | EKG 13 | Atrial Fibrillation/Flutter with RVR |
| 19 | EKG 14 | SVT |
| 20 | EKG 15 | VT/VF |
| 21 | EKG 16 | RBBB/LBBB |
| 22 | EKG 17 | TCA Overdose |
| 23 | EKG 18 | Digoxin Toxicity |
| 24 | EKG 19 | Pacemaker Malfunction |
| 25 | EKG 20 | Cerebral T Waves |

**Foundations EKG I course (previously "EKG Fundamentals")** is available as part of the **Emergency Medicine Foundations** curriculum. Open access to curriculum challenge and answer documents is available on the course website:
**www.emergencymedicinefoundations.com**

**Table 2.** Survey data.

| Learners | | |
|---|---|---|
| Survey Item (1- Strongly Disagree, 3- Neutral, 5- Strongly Agree) | Agree or Strongly Agree | Mean |
| The EKG challenges are appropriate for my level of learning. | 85% (46/54) | 4.20 |
| The EKG challenges are helpful for learning fundamental knowledge. | 80% (43/54) | 4.09 |
| I like using the standard interpretation format for EKG challenges. | 78% (42/54) | 4.00 |
| The Foundations EKG curriculum helped me interpret EKGs on shift. | 70% (38/54) | 3.96 |
| Steve Smith's Blog is beneficial for understanding key concepts for EKG challenges. | 72% (39/54) | 4.09 |
| I am highly satisfied with EKG Fundamentals. | 80% (43/54) | 4.09 |
| I would recommend the EKG Fundamentals curriculum to other learners. | 78% (42/54) | 4.07 |
| [I am interested in] participating in an Advanced EKG curriculum targeted towards PGY2-3 learners. | 80% (152/190) | 4.05 |
| Leaders | | |
| I am highly satisfied with EKG Fundamentals. | 100% (5/5) | 4.80 |
| I would recommend the EKG Fundamentals curriculum to other leaders. | 100% (5/5) | 4.80 |
| [Our program is interested in] participating in an Advanced EKG curriculum targeted towards PGY2-3 learners. | 89% (16/18) | 4.33 |

## 7  Innovation per DiEM (Design in Emergency Medicine): A Longitudinal Medical School Design Co-Curriculum Led by Emergency Medicine Mentors for Real Emergency Department Issues

*Zhang X, Pugliese R, Hayden G, Rudner J, Rodriguez C, Lee H, Papanagnou D, Ku B, Tykocinski M, /Thomas Jefferson University, Philadelphia, Pennsylvania*

**Background:** Innovations that revolutionize healthcare are typically derived from non-traditional research and collaboration from seemingly disparate disciplines. The use of design principles in tackling complex health issues is gaining significant traction. If the inclusion of design in healthcare is to become a new standard, medical education, too, must evolve to prepare future clinicians on design thinking methods.

**Educational Objectives:** 1) To introduce both medical students and EM faculty to design thinking methods; 2) To apply design thinking to address common clinical and workflow challenges that are intrinsic to the ED; 3) To create a 'design in medicine' curriculum that exposes clinicians to real-world design experience that can be adopted at other institutions.

**Curricular Design:** Twenty first-year medical students from the Sidney Kimmel Medical College were enrolled in eight 3-hour experiential design sessions in 2017. Student teams were matched with EM physician-mentors, acting as stakeholders and content experts in their respective academic interest (i.e. education, clinical operations, ultrasound). Didactic content includes: 1) empathy building; 2) idea generation; 3) prototyping; 4) testing; 5) the user experience; 6) service design; 7) idea presentation; and 8) business canvas planning. Teams were tasked with applying design thinking methods to specific ED problems (i.e. patient-physician identification, managing patient expectation, point-of-care ultrasound). Each team project was evaluated using the Kirkpatrick Model through self-evaluation, group presentations, essays, and project deliverables (Table 1).

**Impact/Effectiveness:** Innovation per DiEM is a unique design curriculum that focuses on EM challenges with active EM clinician mentorship. Both students and faculty mentors report new senses of accomplishment and better understanding of design through the application of novel frameworks (i.e., user/patient experience design, clinical workflow optimization). The authors plan to evaluate each project longitudinally with the long-term goal of achieving level four on the Kirkpatrick Model (i.e., organizational outcomes): 1) improved patient satisfaction; 2) decreased resource utilization; and 3) integration of a design curriculum in medical education.

**Table 1.** Applying Kirkpatrick's Learning Evaluation to Learners on a Sample Project Challenge: "Assisting Patients with Improved Provider Identification" from "Innovation per DIEM' course. Source: Kirkpatrick Partners. (2009-2016). The Kirkpatrick Model. Retrieved November 17, 2017 from https://www.kirkpatrickpartners.com/Our-Philosophy/The-Kirkpatrick-Model

| Sample Project Challenge: "Assisting Patients with Improved Provider Identification" | Innovation per DiEM | | | |
|---|---|---|---|---|
| | Measurement of Evaluation | Who is Evaluated? | Evaluation Description | Method/Tools |
| **Empathize:** Patients do not recognize their providers in the Emergency Department (ED).<br><br>**Problem Definition:** How can we keep patients better informed about their providers during their ED stay?<br><br>**Ideate:** Creating a feasible interface with real-time updates on the patients' providers during their care including their name, face, and role.<br><br>**Iteration and Prototyping:** Constructing low-technology prototype (i.e. role-playing a patient-physician scenario with polaroid photographs of providers on the wall) with formative feedback from design course faculty and members.<br><br>**Testing:** In-situ ED studies on provider recognition based on polaroid photographs of the ED providers with user-interface feedback. | Level 1 – Reaction | Learner | Measuring the degree to which participant reacted to the training. | Daily evaluation<br>Post-event evaluations |
| | Level 2 – Learning | Learner | Measuring the degree to which participants acquire knowledge, skills and attitude from the training. | Reflective essay of design thinking<br><br>Survey of self-perceived skills<br><br>Oral presentation |
| | Level 3 – Behavior | Learner | Measuring the degree to which learners apply what they learn | Longitudinal post-course survey for utilizing design thinking in clinical environment. |
| | Level 4 – Results | Learner & Patient | Measuring the effect of the targeted project outcomes on healthcare delivery | Patient satisfaction survey (i.e., Press Ganey)<br><br>Staff satisfaction survey (i.e., AHRQ Patent Safety Survey)<br><br>Learner-based reflective surveys for future design projects |

## 8  Low-cost Priapism Model for Emergency Medicine Simulation: Detumescence Using Intracavernosal Suction (DICS)

*Fritzges J, Nguyen M, Elliott N, /Lehigh Valley Health Network, Bethlehem, Pennsylvania*

**Background:** Priapism is a relatively uncommon ED complaint. However, it is imperative for an ED physician to know how to rapidly relieve this painful threat to male genitourinary health. Providers must ask personal, and sometimes uncomfortable, questions to their patients to determine the etiology (low-flow vs high flow) and then conduct the proper procedure. Having familiarity with the steps involved and practicing the procedure in a simulated environment aids future providers when they will one day be tasked with treating a priapism without immediate urologic backup.

**Educational Objectives:** To construct a low-cost, realistic model of a human penis that can be used in emergency medicine simulation to teach residents penile nerve blocks, priapism cavernosal aspiration, and other minor procedures (i.e.: zipper entrapment).

**Curricular Design:** Plaster of Paris molds were made using a commercially available phallic model. Flexible silicone was dyed with flesh-colored pigment and poured into the molds. Two wooden dowels were inserted to represent the space occupied by the corpus cavernosi. Once cured, the penises were removed and the dowels were extracted. The corpus cavernosi were made from balloons with tubing from posterior nasal packing that was inserted and tied shut. These balloons were inserted into the spaces left by the wooden dowels. Priapism was replicated by insufflating "blood" (water/corn starch/red food coloring mixture) from a syringe through the tubing. This is then detumesced via manual needle aspiration after a penile nerve block has been performed.

**Impact/Effectiveness:** Currently, there is a lack of readily available task trainers for male urologic emergency procedures. For the cost of less than $15 per model, our device provides a surprisingly realistic trainer for these rare procedures. Each model is reusable, as only the "corpus cavernosi" balloons need to be replaced per learner. Additionally, each one can be used for myriad urologic procedures.

## 9    Removing the Writer's Block: The Clinical Image Write-a-Palooza

*MacVane C, Kring R /Maine Medical Center, Portland, Maine*

**Background:** Scientific writing is an essential component of academic practice in emergency medicine (EM), yet formal methods for teaching this skill are lacking. In addition, traditional didactic lectures on manuscript preparation do not allow learners to practice new skills in a mentored setting. Further, many residency programs struggle to meet scholarly activity requirements, especially where robust resources are lacking.

**Educational Objectives:** To develop a structured, mentored academic writing skills workshop incorporating adult learning theory. Goals included: enhancing resident understanding of the process of preparing a clinical image for submission; enhancing faculty knowledge of the role of academic mentors; working in teams to prepare a clinical image submission; and completing the process of manuscript submission, revision, and publication.

**Curricular Design:** We developed a novel format using adult learning theory principles, team-based learning, and flipped classroom strategies. Workshop preparation began with assignment of brief reading for both residents and faculty, with residents focused on the basics of image and case preparation and faculty focused on academic mentoring. The 2-hour workshop consisted of a brief review of readings; discussion regarding manuscript and image preparation, formatting, author guidelines, and submission logistics; and team-based work, including 6 assigned roles, on preparing the submission. Handouts included examples; summaries describing team member roles; instructions for image preparation and manuscript submission; citation examples; and cases for submission. Mentors and a medical librarian were present at the workshop.

## 10    See One, Articulate One, Simulate One - Teaching Procedural Skills in Small Training Groups

*Fox B, Haber J, /University Medical Center of Southern Nevada, Las Vegas, Nevada*

**Background:** Skills lab training is a common modality for teaching procedural skills in emergency medicine residency curriculum. There is no formalized way to teaching these procedures. In addition, there is variability in the size of learning groups, and teacher-student ratios. Peyton's four-step approach to skills-lab training has gained much recognition in medical education literature, however it is designed to follow a 1:1 teacher-to-student ratio, which is not practical for most training sessions. A modified Peyton's four-step approach was developed to allow for smaller group training, ensuring engagement of all learners, and maintaining the core steps of Peyton's original approach.

**Educational Objectives:** To increase engagement and efficacy during small group skills training lab for emergency medicine procedures.

**Curricular Design:** The modified Peyton's approach (table 1) was applied to a 4-station skill lab training session which included the following procedure stations: tube thoracostomy, cricothyrotomy, pericardiocentesis, and transvenous cardiac pacing. There were a total of 5 groups, consisting of 3-6 learners per group, who rotated through each of the 4 stations. There was one faculty instructor per station. Learners included emergency medicine residents, off service residents, and 4th year medical students. A survey was distributed to all learners after the training session to evaluate engagement and efficacy.

**Impact/Effectiveness:** 100% of learners (n=26) stated that they improved their skills during the training session. Out of this response, 65% strongly agreed that the session improved their skills. 57.7% (n=5) strongly agreed that they were continuously engaged. The majority of the remaining leaners (n=10) agreed that they were continuously engaged. 88.5% (n=23) strongly agreed that repetitive observation was helpful and no learners had disagreed. All leaners agreed that teaching the skills was helpful in learning. The majority of learners agreed that they feel comfortable performing the procedures after the session. (Figure 1) The modified Peyton's four-step approach for small groups is a practical method for teaching procedural skills and will likely increase engagement and efficacy of small group training sessions.

**Table 1.** Modified Peyton's[1] approach for small group teaching.

**STEP 1:**
> The teacher demonstrates the skill at a normal pace without any comments (Demonstration)

**STEP 2:**
> The teacher repeats the procedure, this time describing all necessary sub-steps (Deconstruction)

**STEP 3:**
> The teacher performs the procedure following the instructions of Trainee 1, while all other Trainees are observing (Comprehension, tutor's performance and observation)

**STEP 4:**
> Trainee 1 now performs the procedure with Trainee 2 providing instructions, while the other trainees are observing (Comprehension, trainee performance and observation)

**STEP 5:**
> Trainee 1 receives feedback by peer trainees, followed by tutor feedback (Feedback)

**STEP 6:**
> All trainees move though the model of providing instruction and performing the procedure, followed by feedback, until all trainees have completed the procedure and received feedback. (Circulation, completion, and conclusion)

[1] Nikendei et al. BMC Medical Education 2014, 14:68

End of Skills Session Survey
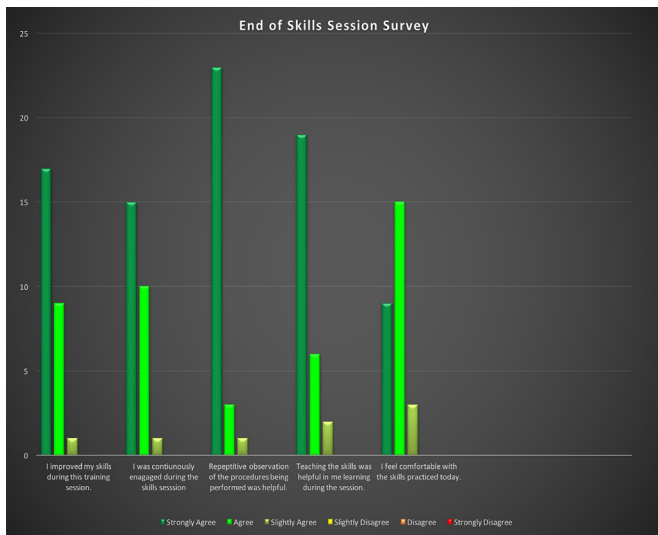
## 11 Statewide Oral Boards Examination: A Quarter of a Century of Practice

*Amin D, Thomas N, Bowman S, Smith L, Fernandez R, Sergel M, /Cook County Health and Hospital Systems, Chicago, Illinois*

**Background:** Oral board examinations are a mandatory requirement for national board certification in emergency medicine (EM). Many EM residency programs have incorporated some aspect of oral boards preparation as part of the standard educational curriculum. There is an inherent bias in conducting the exam with someone that a resident is familiar with at their home institution. The American Board of Emergency Medicine (ABEM) does not allow the examiner and examinee to have any familiarity so over 25 years ago Cook County Emergency Medicine began to host the 7 EM programs in illinois at annual statewide oral board examinations.

**Educational Objectives:** Create a curriculum for oral boards practice that would simulate the true environment of the national oral board examinations.

**Curricular Design:** We begin with sending invitations to the 7 accredited emergency medicine programs in Illinois. Each program offers a volunteer faculty from their institution for each senior resident that will be participating. Additionally, each institution submits an oral boards case to our inventory to allow us to use in future examination days. Cook County emergency medicine faculty leaders work over months to create a schedule grid spanning over 2 days to allow all senior residents to be examined by a faculty examiner they do not know. Each examinee is tested with two single cases and a triple case presented to them by 3 different faculty, emulating the national oral board examination. The testing is timed and in private rooms. The scores are tabulated and sent to individual EM programs to distribute to their residents.

**Impact/Effectiveness:** The Illinois statewide oral board examination curriculum has been a success for over 25 years. Cook County Emergency medicine has always hosted it and we truly believe it is an invaluable experience for the senior residents. The statewide approach for oral boards practice is more effective in emulating the environment of the ABEM oral board examinations. Senior residents are expected to study, prepare, dress professionally and take the day as serious as the actual exam. This approach to oral boards preperation could easily be replicated in other cities/states to benefit an even larger number of EM residents across the country.

## 12 Student Simulation Observer Form: A Novel Tool to Enhance the Observer Role in Simulation-Based Education

*Moadel T, Pollack S, Cassara M, /Zucker School of Medicine at Hofstra/Northwell Health, Manhasset, NY*

**Background:** While simulation at most programs is characterized by learners taking an active role within a simulation scenario, many programs utilize the observer role. It has been reported that learning outcomes and role satisfaction of observers is improved by the use of observer tools, however, few studies document the development or use of simulation-based observer tools in UGME or GME.

**Educational Objectives:** The Student Simulation Observer Form (SSOF) aims to: (1) Provide a structured form for use by learners, (2) guide observers to examine teamwork and communication behaviors and (3) facilitate learner development of a differential diagnosis and deliberation on clinical management while observing peer group participation in a simulation scenario. (4) Provide specific prompts for faculty facilitators to incorporate observer discussion and feedback for peers during a post-simulation debriefing session.

**Curricular Design:** The SSOF was created by expert consensus, with 6 questions on teamwork, communication, differential diagnosis and clinical management (Figure 1). The tool was piloted with 18 fourth-year medical students on an emergency medicine (EM) rotation, during a high-fidelity simulation session that occurred during each of 2 clerkship blocks. Students were broken into groups of 3-4 and randomly selected to participate in one of two simulations, observing the other. Observers were given the SSOF. After each simulation, participants and observers gathered for a faculty-moderated debriefing session, where faculty members prompted observer contribution with use of the SSOF. Students were surveyed on their experience with the SSOF after the session.

**Impact/Effectiveness:** Eighty-nine percent of participants stated the SSOF helped them identify important issues while observing. Ninety-four percent stated that receiving peer feedback by using the SSOF was a positive experience. All participants reported the overall experience was positive and would participate again in both participant and observer roles.

This pilot has demonstrated that SSOF can be incorporated into an EM simulation curriculum to engage observers and can be beneficial to simulation participants by facilitating peer feedback. The SSOF can be applied more broadly to both graduate and undergraduate simulation curricula to leverage the observer role for benefit of observers and participants alike.

**Student Simulation Observer Form**

Was there a clear team leader in the group?

Did team members communicate effectively
    With each other?
    With the patient?
    With consultants?
    With the nurse?

List 2 things that the team did very well:

List 2 things that the team could have improved on:

List 5 items in your differential diagnosis for this patient:
1.
2.
3.
4.
5.

List at least 2 questions that you have regarding clinical management for this particular patient:

## 13 Talk it Out: A Novel Use of Training Groups with Emergency Medicine Residents

*Carroll M, Chung A /Ichan School of Medicine at Mount Sinai, New York, New York*

**Background:** In response to the alarming rates of physician burnout, in July 2016 the ACGME updated the Common Program Requirements and now mandate residency programs provide services and resources to support resident well-being. To address this requirement, we developed training group sessions for Emergency Medicine (EM) residents to mitigate burnout and enhance resilience. Training groups are small groups in which participants learn through their interaction with each other while processing mutual experiences. Training groups have traditionally been used in Psychiatry residency programs to help residents process secondary traumatic experiences and emotions. To the best of our knowledge, this is the first use of training groups for EM residents.

**Educational Objectives:**
- Provide a confidential and safe environment to discuss stressors
- Reduce burnout through normalization and shared experience
- Enhance resilience by learning and practicing coping techniques

**Curricular Design:** We collaborated with the Department of Psychiatry to design 12 60-minute sessions over the academic year during weekly resident conference. Residents are divided into groups by PGY level. Each training group is led by one psychiatrist and one psychologist who remain with that group for the entire year. All discussions are confidential and no information is shared with the residency leadership unless a risk of harm is identified. The faculty pair initiate each session and then 1) continue discussion from prior sessions, 2) prompt new discussion, or 3) allow residents to determine the content. Through targeted discussion grounded in the fundamentals of cognitive behavioral theory, faculty help residents to identify stressors and sources of burnout specific to each class year's specific needs. Once stressors are identified, the group works to develop approaches that build resilience. We will assess the effectiveness of the training groups by using two validated tools, single item-measures of emotional exhaustion and depersonalization to measure burnout and the Connor-Davidson Resilience Scale.

**Impact/Effectiveness:** Integrating training groups into an EM resident curriculum has not previously been described in the literature. This innovation allows EM residents, under the guidance of trained psychiatrists and psychologists, to fight burnout and to develop resilience to stressors during residency training.

## 14 Teaching the Art of a Great Hand Off in the Emergency Department

*Bright L, /Johns Hopkins Medical Institute, Baltimore, Maryland*

**Background:** Transfer of patient care, "sign-outs," is recognized as an area within medical practice where errors occur and patient safety is at risk. As with all medical practice, the act of transfer of patient care, or "sign-out," should be taught to residents to ensure their competency, and thus help to decrease errors during training and beyond. A sign-out curriculum and retention of this skill has been identified as a priority and requirement in resident training by the ACGME. Unfortunately there is no established curriculum or validated method to guide teaching this skill in Emergency Medicine. Using IPASS as a guide, we developed a curriculum that addresses this lack of training and can be easily integrated into

the regular conference didactic.

**Educational Objectives:**

• Create a curriculum that can be easily integrated into the conference didactic time for Emergency Medicine.

• Use OPAs as assessment tools for improvement

• Integrate IPASS into an EM environment

• Train residents to give competent sign outs consistently

**Curricular Design:** A "sign out" method for the residents to was adapted from IPASS to Emergency Medicine.

The curriculum was created to teach the residents to incorporate this new EM IPASS method while in the ED. The curriculum is simple and has three parts; lecture, simulation, and small group discussion. Two two-hour sessions are taught a year. First part: The lecture includes a literature review of errors related to sign outs is, our EM IPASS sign-out system is introduced.

The second part takes in small groups consisting of a faculty mentor, senior and junior residents. The faculty mentor provides a written case that is given to one of the residents. The resident has ten minutes to review it, then "signs" the patient out to the group. After the provided case is signed out, the group has a discussion on the sign-out and whether they felt they could assume care with the information given, using the EM IPASS tool as a guide. The third part consists of faculty directly observing residents during sign-out and filling out a real-time assessment tool (OPA) of the Emergency Department hand-off using a pre-prepared checklist.

For the future, there will be ongoing sessions with small group practice with simulated sign-out, as well as ongoing assessment of resident performance during their clinical shifts. The goal is to use the assessment tool to validate that residents' sign-outs can be standardized after a comprehensive teaching curriculum. Residents complete a pre and post curriculum survey for feedback. Observations of sign-out will continue through the first three years of the residency program (a four year program) to assess retention if the curriculum.

**Impact/Effectiveness:** The data points that reflect the Effectiveness of the curriculum are as follows:

• OPA data: Marked improvement in flow of the sign out, thoroughness, and comprehensive understanding of the patient care after sign out

• Time of Sign Out: an unexpected data point (documented) was the amount of time sign out took after shifts.

• Resident survey data: Data questions that consistently received 5 on a Leikert scale;

• Safety of sign out has improved

• Does the curriculum give you the tools to give a comprehensive sign out

• Is a curriculum important to teach residents sign out

• ACGME data point:

The question stating Do you think pertinent data is not lost during sign out? response from our residents. Our program consistently scored between 73-78 %. Six months after the curriculum and new sign out tool was implemented, our score was 95% for the first time.

**I**llness severity
**P**atient summary
**A**ction list
**S**ituation awareness/contingency planning
**S**ynthesis by the receiver

Illness Severity
-includes illness severity (stable, unstable, watch) / working diagnosis
-disposition
-vital signs

Patient Summary
-pertinent past med hx
-H&P – pertinent
-PE - pertinent
-labs / radiology initial

Action List
-active issues
-interventions
-outcomes (corrected vital signs, new lab values)

Situational Awareness / Contingency Plan
-Current plan
-Active issues that require follow up
-contingency plan (BP does not respond to appropriate IVF resus, start pressors)

Synthesis by the Receiver
-able to accurately summarize illness, active issues, and plan

JH ED Resident Sign Out

New format – definition of scale on second page

Resident name: _____    Faculty: _____

****MUST BE IN THIS ORDER**** (not that the below was eventually stated)

1. Did the resident sign out the "working" diagnosis/ stable vs unstable?

   Please circle one:  1   2   3   4   5

2. Did the resident sign out the disposition? (Pending is an appropriate option)

   Please circle one:  1   2   3   4   5

   -if pending dispo, was a working differential signed out?

   Please circle one:  1   2   3   4   5

3. Did the resident sign out a focused History of the patient's present concern?

   Please circle one:  1   2   3   4   5

4. Did the resident sign out a focused past medical history?

   Please circle one:  1   2   3   4   5

5. Did the resident sign out focused physical exam?

   Please circle one:  1   2   3   4   5

6. Did the resident sign out pertinent lab /radiology findings?

   Please circle one:  1   2   3   4   5

7. Did the resident sign out active issues with interventions / outcomes?

   Please circle one:  1   2   3   4   5

8. Did the resident sign out the active plan and pending issues?

   Please circle one:  1   2   3   4   5

9. Did the receiving resident acknowledge pending issues / plan?

   Please circle one:  1   2   3   4   5

## 15 The 30 Minute Minimum: Implementation of a Shorter Resident Lecture Format in a Large Emergency Medicine Residency Program

*Hedayati T, Bowman S, Amin D /Cook County Health and Hospitals System, Chicago, Illinois*

**Background:** Providing residents an opportunity to speak at scheduled didactics is an invaluable learning experience. Preparing a didactic session imparts several skills to resident speakers: audience assessment, topic choice, research, selection of teaching points, and presentation design.

EM programs are required to submit annual updates which define "Teaching Presentations" as a "lecture/or presentation of at least 30 minute duration" to meet criteria of resident scholarly activity. The origin and rationale for this duration-based definition are unclear. Satisfying this requirement occupies a large proportion of the required 5 hours per week of scheduled didactics in large programs. In our program of 69 residents, 30 minutes per resident to deliver a teaching presentation equals 34.5 hours per year, over 2 months of the entire didactic schedule.

**Educational Objectives:** The objectives for this curricular innovation include:

- Describe, demonstrate, and teach an established short lecture format to residents.
- Evaluate effective resident application of this format to EM topics.
- Provide more time for faculty presentations and other teaching modalities.

**Curricular Design:** 51 EM1-3 residents were assigned to give a 10 minute/20 slide maximum didactic session, in a modified version of the PechaKucha™ format. EM-1 topics corresponded to assigned monthly core content reading. EM-2 and EM-3 residents selected their own topics subject to faculty approval to ensure focus and appropriateness for the format. Residents were provided tools for effective presentation development and delivery and provided examples of the format. Lectures were evaluated in real-time using an online tool developed specifically for the format.

**Impact/Effectiveness:** Most residents prefer shorter lectures and have difficulty maintaining concentration beyond the initial minutes of a lecture, consistent with previous research. Shorter lectures increase resident satisfaction and facilitate learning. The next steps in determining the success of this curricular innovation is to determine its efficacy in knowledge translation for learners as compared to traditional methods, delineate its limits as an educational tool, and ascertain its value in terms of resident satisfaction.

## 16 The CORD Student Advising Task Force (SATF) Osteopathic Emergency Medicine Applying Guide

*Karr E, Smith L, Jarou Z, Lutfy-Clayton L, Hillman E, Kellogg A, Stobart-Gallagher M, Pelletier-Bui A, / University of Massachusetts, Baystate Medical Center, Springfield, Massachusetts; University of Colorado, Denver Health, Denver, Colorado; University of Missouri-Kansas City School of Medicine, Kansas City, Missouri; Einstein Healthcare Network, Philadelphia, Pennsylvania; Cooper Medical School of Rowan University, Camden, New Jersey*

**Background:** In the 2016 match, osteopathic medical school graduates (DOs) filled 13.8% of ACGME Emergency Medicine (EM) residency positions. When compared with allopathic graduates, a smaller percentage of osteopathic graduates applying to EM successfully matched into ACGME programs (76% versus 91%). Osteopathic students often cite poor access to quality EM advising as a major hurdle to their ACGME application.

In order to disseminate and standardize advising recommendations, The Council of Residency Directors (CORD) Student Advising Task Force (SATF) formed an osteopathic student advising working group who developed consensus-based recommendations, supported by existing data, to guide prospective osteopathic EM applicants and their advisors.

**Educational Objectives:**

- Provide a unified document of consensus advice for DO students in order to maximize their success in the ACGME match.
- Equip faculty with the knowledge and resources needed to provide high-quality advising to this population of students.

**Curricular Design:** The SATF osteopathic advising working group identified best practice recommendations derived from NRMP data, existing literature, advising resources, and group consensus. The working group included osteopathic and allopathic-trained program leaders and osteopathic residents. These recommendations have been distributed to advisors and residency leaders via the CORD website, listservs, and the Vocal CORD blog. Key recommendations can reviewed in Table 1.

**Impact/Effectiveness:** The CORD SATF developed these recommendations based on a perceived need for consistent and specific advising aimed at osteopathic applicants. The recommendations aim to serve as a foundation for osteopathic students and their advisors to better understand and prepare for the application process and succeed in matching into EM. These recommendations have been endorsed by CORD, Clerkship Directors in Emergency Medicine (CDEM), and the Emergency Medicine Residents' Association (EMRA). Thus far, these recommendations have been viewed over 1500 times on the Vocal CORD blog. In the future, we hope to utilize SATF-generated survey data to further support and strengthen

these recommendations and subsequently distribute them to a wider audience.

**Table 1.** Best practice guidelines for osteopathic emergency medicine applicants

| Key Recommendations | Comments |
|---|---|
| Get help from those in the know | • Find academic EM mentors and advisors<br>• Get involved in an EM interest group<br>• Join EMRA, SAEM, RSA or other professional organizations |
| Take the test that counts | • The USMLE exam allows direct comparison to your allopathic peers |
| Rotate where you want to train | • Rotate by mid-September of your final year in 2 ACGME - affiliated residency programs |
| Get two SLOEs | • Group SLOEs written by leadership teams representing residency programs carry the highest weight |
| Apply wisely | • 30-40 programs (based on perceived application competitiveness)<br>• Strongly consider programs with a history of accepting osteopathic applicants |
| Focus applications | • Look in geographic areas that statistically match higher percentages of DO applicants (New York, Pennsylvania, Texas, Ohio, and Michigan) |
| Interview and rank 10 programs | • Data has shown that applicants who rank 9-10 programs had an approximately 90% match rate in EM |

## 17 The Effects of Stress Inoculation Training in a High Stress Simulated Medical Environment

*Shin R, Nichlany A /New York Presbyterian Queens, Flushing, New York*

**Background:** Acute stressors in the field of emergency medicine have been shown to have a large impact in medical decision making. Studies have shown that stressful stimuli during critical care resuscitation tend to negatively affect performance of health care providers. Implementation of stress inoculation training (SIT) has been well studied among athletes, military and emergency response teams. Emergency physicians may benefit from a deeper understanding of the physiological stressors that affect medical performance. Feedback obtained will allow doctors to provide optimal care and ultimately improve patient safety.

**Educational Objectives:** Our primary objective is to identify the potential benefits of SIT and its effect on a simulated patient care environment. We also have secondary measures which will monitor the correlation of heart rate and decision making ability in real time. Our hypothesis is that with the use of SIT our physicians will be able to better handle stressful situations in the simulated environment and should translate to improvement on the job performance with a focus on patient care and safety.

**Curricular Design:** This is an educational study where we will recruit emergency medicine residents at our institution to participate as team leader in 20 minute multi patient simulation cases, which will include common interruptions in the true-to life ER setting. A grading rubric will be used to evaluate critical actions, missed diagnoses, communication and leadership skills. We will then introduce interventions for stress inoculation therapy with lectures to all the participants. These lectures will include techniques that focus on cognitive and physiological control. We will then observe each resident in another 20 minute simulation case, and data will be extracted from the two sessions to observe any changes, utilizing stress inoculation therapy as a method to improve resident's performance.

**Impact/Effectiveness:** With the introduction of SIT, we hope to observe improvement in medical decision making during the two simulated emergency scenarios. SIT is applicable to all emergency medicine training programs as it will allow future ER physicians to identify their weaknesses during stressful clinical scenarios and modify their behaviors accordingly.

## 18 The POCUS Atlas - A Novel Crowdsourced Ultrasound Archive

*Riscinti M, Macias M, Solari C, Kilpatrick J, /SUNY Downstate/Kings County, Brooklyn, New York; University of California, San Diego, San Diego, California*

**Background:** Point-of-care-ultrasound (POCUS) has become an essential skill in Emergency Medicine with concordant integration throughout resident and medical student education. This has been accompanied by the organic growth of many POCUS oriented FOAMEd (Free and Open Access Medical Education) resources including websites, podcasts and blogs. Despite this abundance of resources, it remains difficult for learners and educators to find high quality POCUS clips that demonstrate exemplary pathology. We have created The POCUS Atlas to fill this educational need.

**Educational Objectives:**

Create a crowdsourced, open-access atlas of high quality POCUS images edited by ultrasound fellowship trained Emergency Medicine faculty.
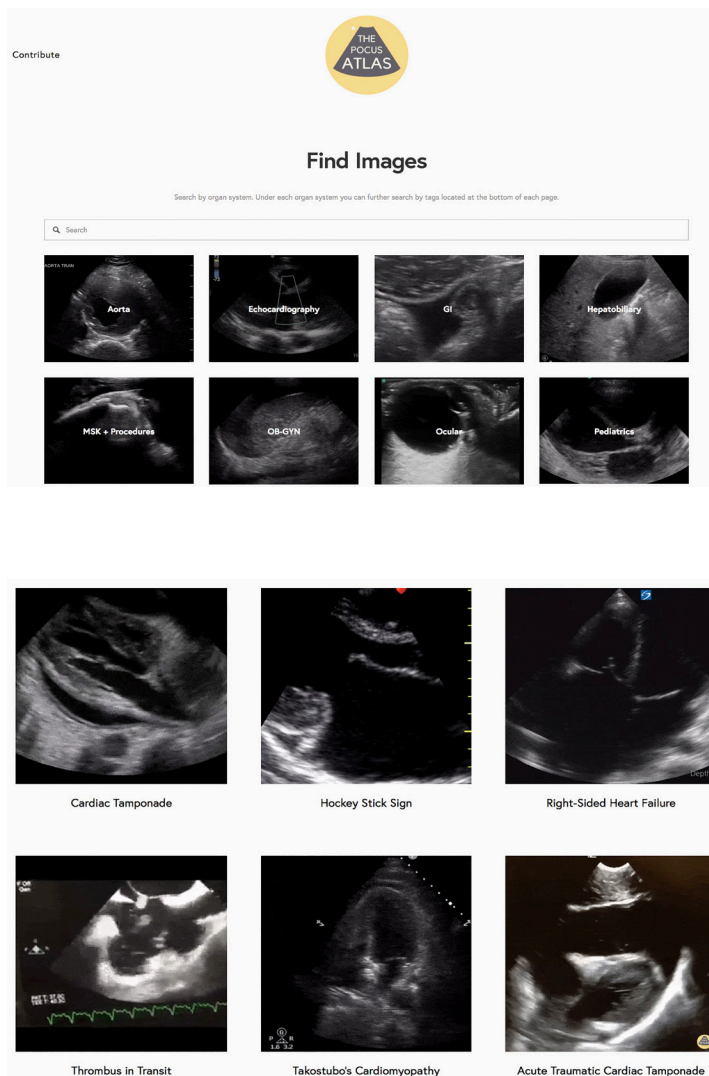
Encourage captions that highlight the clinical case, ultrasound physics or operating characteristics of each case.

Provide opportunities for POCUS learners and educators to share their images with the academic community.

**Curricular Design:** The POCUS Atlas (www. thepocusatlas.com) capitalizes on FOAMEd principles to

democratize POCUS education by allowing learners and educators of all levels to rapidly find high quality clips of normal, abnormal, common, or rare pathology. The intended use is for bedside teaching or download for use in educational content without copyright concern. The atlas was built via crowd-sourcing with contributions from around the world. Each submission is reviewed and edited by our team and exemplary submissions are uploaded to the atlas. Clips and cases are hosted on our site and shared throughout FOAMEd channels and social media.

**Impact/Effectiveness:** The POCUS Atlas has over 200 publications and has been viewed by more than 5,000 unique users with over 15,000 page views in the first year. The atlas continues to expand and has partnered with ultrasound departments to encourage submissions as educational exercises for their learners. We are also transitioning our library to a mobile app, integrating our image library into other FOAMEd resources and assisting medical schools in creating POCUS curriculums.



Contribute

THE POCUS ATLAS

**Find Images**

Search by organ system. Under each organ system you can further search by tags located at the bottom of each page.

Aorta | Echocardiography | GI | Hepatobiliary
MSK + Procedures | OB-GYN | Ocular | Pediatrics



Cardiac Tamponade | Hockey Stick Sign | Right-Sided Heart Failure
Thrombus in Transit | Takostubo's Cardiomyopathy | Acute Traumatic Cardiac Tamponade

## 19 There's An App for That: A Mobile Procedure Logging Application Using Quick Response Codes

*Folt J, Goyal N, Lam P, /Henry Ford Hospital, Detroit, Michigan*

**Background:** The Accreditation Council for Graduate Medical Education (ACGME) requires that emergency medicine residents accurately log all procedures, and failure to do this is a frequent source for citations. Studies show that only 60% of procedures performed are eventually logged. Most current web-based procedure logging platforms require accessing a workstation, logging in, selecting the procedure and inputting patient information. This can be cumbersome to implement during a shift, and procedures may not get logged, or are logged inaccurately. We designed a mobile, web-based application that uses Quick Response (QR) codes to input patient information quickly and accurately.

**Educational Objectives:** Design an alternative to web-based procedure logging that increases the logging rate of procedures performed during residency and decreases the transcription errors that occur with traditional data entry.

**Curricular Design:** A mobile-friendly, web-based app was designed to integrate with our procedure log database. It is behind the health care system's secure firewall and maintains the necessary information privacy standards. Users may set the application to automatically log in allowing quick access. The app scans the QR code displayed on each patient's arm band or identification sticker, automatically extracting patient name, birthdate, medical record number and sex. The user selects the procedure performed and the app uses data analytics to recommend logging additional procedures (Dialog box: "People who logged this procedure also logged") Source code for our app is freely available for anyone to customize to their requirements.

**Impact/Effectiveness:** A mobile, web-based procedure log application using QR codes allows for portability, decreases the time needed to enter data, and eliminates transcription errors. Average time spent logging a procedure decreased from 79 seconds to 27 seconds after implementation. In addition, typographical errors were found with an error rate of 15% for last name, 9% for age, and 2% for sex when using the traditional web-based method. These errors were eliminated using the mobile application. A similar app can be easily integrated into any residency program in a health care system that has adopted QR code technology for patient identification and is required to maintain a procedure log.

effectiveness of our educational intervention. Participants will be 62 EM residents from a single institution. All residents will be provided their own Dashboard (FIGURE 1) via email with viewing instructions. However the intervention group will additionally receive targeted feedback from faculty during their semi-annual review sessions using Key Performance Indicators from the Dashboard based on a synthesis of ACGME milestones, reportable quality metrics, and data registries such as the ACEP Clinical Emergency Data Registry (TABLE 1). Impact will be determined via satisfaction forms, self-assessment surveys, and changes in clinical performance as measured by the Dashboard.

**Impact/Effectiveness:** We believe that use of our Dashboard during semi-annual review sessions can empower resident education by providing objective clinical data to inform milestone assessments as well as prepare our residents for practice in an increasingly data-driven world.

## 20  Using a Clinical Dashboard to Empower Resident Education: Does Incorporating Objective Feedback Into Semi-Annual Evaluations Improve Insight and Impact Clinical Behaviors Among Residents?

*Chung A, Sun J, Li K, Peng P, Apakama D, Genes N, Richardson L, /Icahn School of Medicine at Mount Sinai, New York, New York*
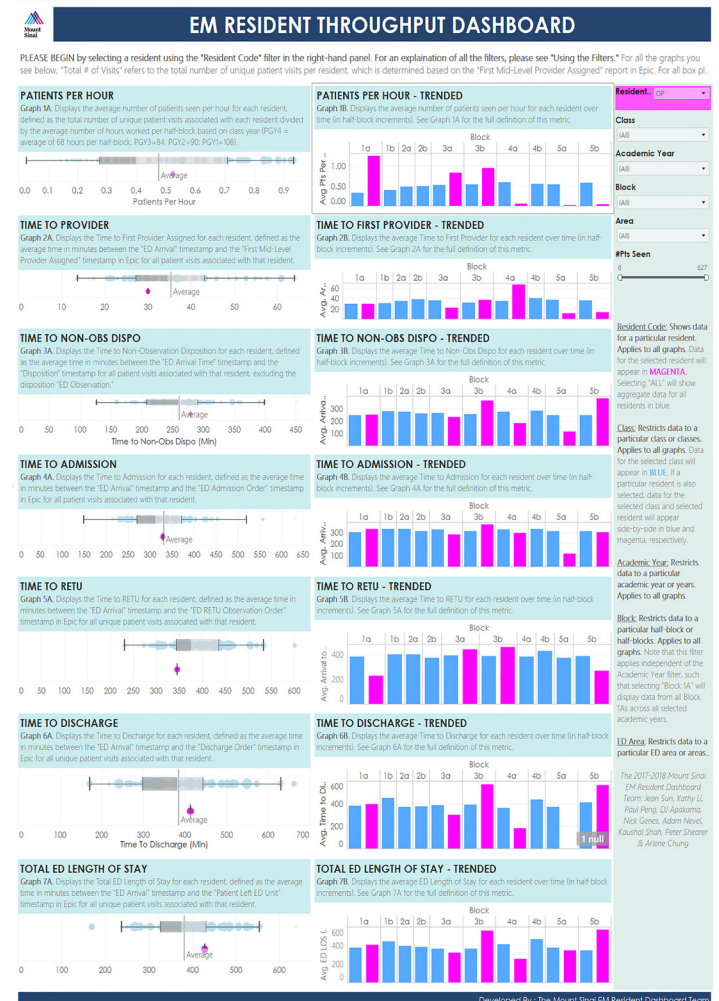
**Background:** Since the implementation of the Next Accreditation System in 2014, residency programs have struggled to provide meaningful milestone-based data for their residents that demonstrates measurable outcomes. Many programs have adopted end-of-shift or end-of-rotation evaluation forms, but encounter barriers such as poor faculty compliance or performance inflation. Some programs have recently adopted clinical dashboards to display certain metrics, such as door-to-provider time, but often there is no explanation of how the data was derived or how the resident should incorporate the information into a milestone-based assessment of their performance. To the best of our knowledge, this is the first study investigating a novel approach to address this educational need using an EM Resident Clinical Dashboard to integrate performance metrics and milestone assessments directly into semi-annual review sessions for residents.

**Educational Objectives:** Following the Kirkpatrick model, will will determine if the use of our Dashboard to provide feedback during semi-annual review sessions 1) improves resident and faculty satisfaction with the semi-annual review and feedback process; 2) improves the accuracy of residents' self-assessment of their clinical performance; and 3) significantly impacts the clinical behaviors of individual residents.

**Curricular Design:** We propose a single blinded randomized controlled pilot study to determine the

| Key Performance Indicators | Corresponding State or Federal Metrics & Measures | Corresponding EM Professional Society Metrics & Measures | Corresponding ACGME Milestones & ABEM Models of Clinical Practice |
|---|---|---|---|
| **ED Admission Rate** | *NHAMCS:* ED Visits Resulting in Hospital Admission | *EDBA Proportion Metrics:* Total Number of Patients Admitted from the ED | *ACGME Milestone #7: Disposition (PC7):* Establishes and implements a comprehensive disposition plan that uses appropriate consultation resources; patient education regarding diagnosis; treatment plan; medications; and time and location specific disposition instructions. |
| **ED Handoff Documentation** | *JCAHO National Patient Safety Goals #2E: Implement a Standard Approach to Handoff* | *ACEP: Safer Signout Protocol* | *ACGME Milestone #18: Technology (SBP3): Uses technology to accomplish and document safe healthcare delivery.* |
| **ED Arrival to Provider Time** | *NHAMCS: Wait Time at ED Visits: Time Spent Waiting to See a MD, DO, NP, or PA* | *EDBA Timestamp and Interval Metrics: Arrival to Provider Contact Time* | *ACGME Milestone #8: Multitasking (Task-switching) (PC8): Employs task switching in an efficient and timely manner in order to manage the ED.* |
| **ED Arrival to Disposition, Discharge, and Departure Times** | *NQMC #010135: Time from ED Arrival to ED Departure for Admitted ED Patients* *NQMC #010431: Time from ED Arrival to ED Departure for Discharged ED Patients* | *EDBA Timestamp and Interval Metrics: Disposition Decision Time* | *ACGME Milestone #17: Systems-Based Management (SBP2): Participates in strategies to improve healthcare delivery and flow. Demonstrates an awareness and responsiveness to the larger context and system of health care.* |
| **Patients per Hour** | | *EDBA Productivity Metrics: Pts per Hour* | *ABEM Models of Clinical Practice 20.4.2.2: Patient Flow and Throughput* |
| **Sepsis Scorecard\*** | *NYDOH Sepsis Adherence Measures: Six metrics based on National Quality Forum Measure NQF#0500 and Centers for Medicare and Medicaid Services Measure CMS SEP-1\** | *ACEP#27: Sepsis Management: Septic Shock: Antibiotics Ordered* | *ABEM Models of Clinical Practice 10.1.7: Sepsis/Bacteremia* |

**NQMC:** Agency for Healthcare Research and Quality National Quality Measures Clearinghouse; **NHAMCS:** Centers for Disease Control and Prevention National Hospital Ambulatory Medical Care Survey; **JCAHO:** Joint Commission on Accreditation of Healthcare Organizations National Patient Safety Goals; **EDBA:** ED Benchmarking Alliance Consensus Summit; **NYDOH:** New York Department of Health; **ACGME/ABEM:** American College of Emergency Physicians/American Board of Emergency Medicine

\*Includes the following six metrics for patients with severe sepsis/septic shock: 1) Initial Lactate Drawn in <1 Hour; 2) Antibiotics Given in <1 Hour; 3) Two Blood Cultures Drawn Before Antibiotics; 4) Two Blood Cultures Drawn in <1 Hour; 5) IV Fluid Bolus Initiated in <1 Hour; and 6) 30cc/kg IV Fluid Bolus Given.

## 21  Using an 'Oral Board' Exam to Assess for EPA 10 in the Emergency Medicine Rotation

*Carmelli G, Sinert R, Fan L, /SUNY Downstate Medical Center/ Kings County Hospital Center, Brooklyn, New York*

**Background:** The Association of American Medical College encourages medical schools to use 13 Entrustable Professional Activities (EPAs) as a framework for assessing student preparedness for residency. The Emergency Medicine (EM) clerkship provides an appropriate clinical setting to observe, practice and therefore assess EPA 10: "recognize a patient requiring urgent or emergent care and initiate evaluation and management." This important skill is one in which many medical students have shown difficulty with. Medical schools use various techniques to evaluate for EPA 10, some using simulation, while others using an objective structured clinical exam. Oral exams have been studied in other specialties, but haven't been studied in EM or in evaluating for EPA 10.
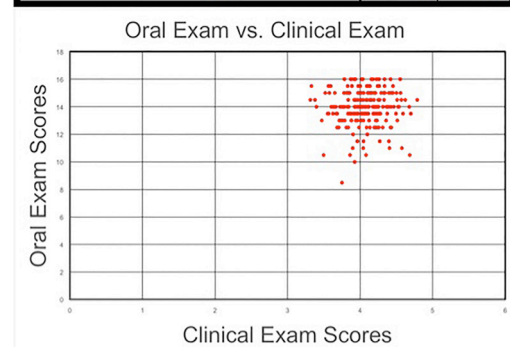
**Educational Objectives:**
- Develop an assessment method that can evaluate students in EPA 10.
- Design case scenarios that can be used to evaluate student performance.
- Identify critical actions and create an assessment tool for evaluation of student performance.

**Curricular Design:** The 'oral board' exam is used by the American Board of Emergency Medicine to certify practitioners as competent in all aspects of EM care. We decided to use this style of exam to assess for EPA 10 during our EM rotation. We created 3 case scenarios, which were given by faculty and/or selected senior residents at the end of the rotation. The cases are: 1) Trauma with pneumothorax and intraperitoneal bleeding, 2) Chest pain secondary to a pulmonary embolism, and 3) Altered mental status with UTI/sepsis. All cases require the student to evaluate the ABC's, initiate appropriate treatment, obtain adequate help, and communicate with other providers.

**Impact/Effectiveness:** To assess whether the oral exams evaluate different or redundant variables to that of the medical students' clinical scores or their NBME shelf exam scores, we calculated a Spearman Rank Order Correlation. Comparing the oral exam to the shelf exam produced a p-value of 0.558, so the correlation was not statistically significant. Furthermore, comparing the oral exam to the clinical scores produced a p-value of 0.457, also not statistically significant. Therefore, there was no statistically significant correlation between the oral and shelf exams, or the oral and clinical scores. This confirms that the oral exam evaluates different, non-redundant variables than the clinical and NBME shelf scores.

| Correlations | | | Oralexam | Clinscore |
|---|---|---|---|---|
| Spearman's rho | Oralexam | Correlation Coefficient | 1.000 | .049 |
| | | Sig. (2-tailed) | . | .457 |
| | | N | 233 | 233 |
| | Clinscore | Correlation Coefficient | .049 | 1.000 |
| | | Sig. (2-tailed) | .457 | . |
| | | N | 233 | 233 |



Oral Exam vs. Clinical Exam (scatter plot: Oral Exam Scores vs. Clinical Exam Scores)

## Best Innovations & Soundbites from the 2018 CORD Abstracts Oral Presentations

**1** **Addressing Pitfalls of the Flipped Classroom: An Approach to Purposeful Small Groups and Improved Learner Preparation Using EM Fundamentals**

*Shappell E, Ahn J, /University of Chicago, Chicago, Illinois*

**Background:** The flipped classroom approach to resident conference has recently grown in popularity. While designing an intervention using this approach can seem simple, difficulties arise in (1) creating purposeful in-class activities and (2) ensuring learners complete assignments prior to conference.

**Educational Objectives:** To (1) create in-class activities that facilitate high-quality discussion as rated by faculty and (2) increase learner completion of pre-conference assignments compared to the previous year.

**Curricular Design:** We created EM Fundamentals, a flipped classroom curriculum featuring seventeen topics. Each topic has consensus-derived learning objectives, curated pre-conference resources, and novel in-class activities. In years past activities were designed by facilitators, which was met with mixed results. Based on this need for increased structure, faculty with educational expertise designed sessions using an array of educational strategies (e.g. think-pair-share, team quiz, mind maps) to target transfer of tacit knowledge. In attempt to increase pre-conference assignment completion, an automated service was used to schedule email reminders to participants. Discussion quality, learner completion of pre-conference work, and satisfaction with small group activities were evaluated with surveys.

**Impact/Effectiveness:** Fourteen of 16 residents (88% response rate) and 6 of 8 faculty (75% response rate) returned surveys. Satisfaction was rated on a 7-point scale from "extremely satisfied" to "extremely dissatisfied." All faculty were extremely satisfied with small group sessions (n = 6, 100%). Faculty were either extremely (n = 3, 50%) or moderately (n = 3, 50%) satisfied with the discussion created by group activities. Residents reported completion of pre-conference assignments 48% of the time, a modest improvement from the year prior (41%). Most residents were extremely (n = 6, 43%) or moderately (n = 6, 43%) satisfied with small group sessions; the remainder reported slight satisfaction. Realization of the flipped classroom's potential is promoted by careful design of activities by faculty with educational expertise; however, ensuring learner preparation remains a challenge. Future study will include additional incentives, direct monitoring of preparation, and knowledge

assessment using a web-based platform that is currently under development.

**2** **Emergency Medicine Foundations Asynchronous Learning Pathways: Analysis of Learner Participation and Preferences**

*Grabow Moore K, Shappell E, Wheaton N, Weygandt P, Shayne P, /Emory University, Atlanta, Georgia; University of Chicago, Chicago, Illinois; UCLA Ronald Reagan - Olive View, Los Angeles, California; Johns Hopkins University, Baltimore, Maryland*

**Background:** Individualized interactive instruction (III) is a mechanism for emergency medicine residencies to employ asynchronous learning as part of resident conference. The flipped classroom is a popular model for resident education where pre-conference learning may qualify as III; however, resident completion of pre-conference assignments remains a challenge.

**Educational Objectives:** To maximize learner completion of pre-conference assignments by offering multiple modalities (asynchronous learning pathways, ALPs) in the Emergency Medicine Foundations curriculum. Secondary objectives included characterizing learner preferences and satisfaction with the curriculum.

**Curricular Design:** Emergency Medicine Foundations (EMF) is an open access flipped classroom curriculum focusing on core content. We created a course website to host curated multi-modal resources for asynchronous learning including traditional and high-yield textbook readings as well as multimedia resources (Table 1). Each pathway covers similar learning topics and requires 1-2 hours to complete. ALP content coordinates with weekly Foundations Meetings, wherein learners engage in small group case-based learning.

**Impact/Effectiveness:** In the 2016-2017 academic year, 19 sites participated in EMF. We anonymously surveyed enrolled residents in February 2017, and 190 of 275 (69%) responded. Of these learners, 89 reported use of ALPs by their programs. Residents preferred multimedia resources (77%) over traditional text (49%) or high-yield text (35%) (Table 2). The majority of learners (54%) utilized resources from multiple pathways. 83% of learners completed at least 50% of their asynchronous assignments with 71% dedicating between 30 and 60 minutes weekly. Learners also reported high levels of satisfaction with Foundations ALPs and perceived positive impact on clinical performance. Our study supports continued use of asynchronous learning to supplement conference time and suggests that providing multiple modalities and limiting assignments to 60 minutes may best suit resident learners.

**Table 1.** Learning pathways example.

| Foundations Learning Pathways | | | | |
|---|---|---|---|---|
| Unit | Topics | Traditional Textbook | High-Yield Text | Multimedia |
| GI | GI Bleeding Esophageal and Stomach Disorders | Rosen's: GIB 245-253 Esophageal Disorders, GERD, PUD 1170-1180 OR Tintinalli's: GIB, Esophageal Emergencies, PUD 503-517 | River's: GI Bleed, Esophageal Do, PUD, Perforation p176-186 OR Tintinali Manual: GIB, Esophageal Emergencies, PUD 207-217 | Hippo Videos: Esoph & GIB AND FOAMed: EB Medicine: UGIB UMD: PUD |

**Table 2.** Survey data.

| Learner Preferences | | |
|---|---|---|
| **Which of the following Learning Pathway resources do you use on a regular basis to prepare for Foundations Meetings?** | | |
| Rosen's Textbook (15, 17.0%), Tintinalli's Textbook (28, 31.8%), River's Written Board Review (8, 9.1%), Tintinalli's Manual (23, 26.1%), Hippo Videos (68, 77.3%), Other Multimedia Assignments (20, 22.7%) | | |
| **On average, what percentage of your chosen Learning Pathway assignment do you complete prior to each Foundations Meeting?** | | |
| 0% (1, 1.1%), 25% (14, 15.7%), 50% (33, 37.1%), 75% (29, 32.6%), 100% (12, 13.5%) | | |
| **On average, how much time do you spend on Learning Pathway assignments prior to each Foundations Meeting?** | | |
| 0 minutes (2, 2.2%), 15 minutes (5, 5.6%), 30 minutes (18, 20.2%), 45 minutes (15, 16.9%), 60 minutes (30, 33.7%), 75 minutes (4, 4.5%), 90 minutes (14, 15.7%), Other (1, 1.1%) | | |

| Resident Satisfaction with Foundations Learning Pathways | | |
|---|---|---|
| **Survey Item** (1- Strongly Disagree, 3- Neutral, 5- Strongly Agree) | **Agree or Strongly Agree** | **Mean** |
| Overall, I am highly satisfied with Foundations Learning Pathways. | 87/89 (98%) | 4.29 |
| Learning Pathway assignments helpful for learning fundamental knowledge within our specialty. | 84/89 (94%) | 4.29 |
| Learning Pathway assignments have a positive impact on my clinical performance during Emergency Department shifts. | 79/89 (89%) | 4.16 |
| Learning Pathway assignments required a reasonable amount of independent work prior to each Foundations Meeting. | 75/89 (84%) | 4.06 |
| I like being able to choose the Learning Pathway that suits me best. | 79/89 (89%) | 4.24 |

## 3 Red-Flags are Waving: Recommendations for the Emergency Medicine Applicant At-Risk of Not Matching--on behalf of the CORD Student Advising Task Force

*Harris K, Smith L, Pelletier-Bui A, Hillman E, Kelly S, Hess J, Kellogg A, /University of Arkansas Medical Sciences, Little Rock, Arkansas; University of Massachusetts - Baystate Health, Springfield, Massachusetts; Cooper Medical School of Rowan University, Camden, New Jersey; University of Missouri-Kansas City School of Medicine, Kansas City, Missouri; University of Maryland, Baltimore, Maryland; University of Wisconsin School of Medicine and Public Health, Madison, Washington*

**Background:** Each year, the number of Emergency Medicine (EM) applicants exceeds the number of residency positions available. Identifying applicants who are at higher risk of not matching can be challenging, and applicants and advisors struggle with how to manage these scenarios. The Council of Residency Directors (CORD) Student Advising Task Force (SATF) recognized the need to categorize common application red-flags and create a set of recommendations to be used as a guide for applicants and their advisors.

**Educational Objectives:**
- Identify and categorize common application red-flags which put an applicant at-risk of not matching.
- Provide evidence-based advising recommendations to assist at-risk applicants in overcoming those hurdles.
- Identify which applicants need to pursue a backup plan.

**Curricular Design:** Using existing advising resources, National Resident Matching Program data, and group consensus, members of the CORD SATF identified three broad categories which placed applicants into the at-risk group. Recommendations to address these red flags were developed and compiled into an advising guide and made available online to students and advisors.

The advising recommendations are summarized in Table 1. In general, the best defense is a good offense. The personal statement should be used to address red-flags. All students with identified red-flags are best served by early discussion with their advisors on application strategy and the need for a backup plan. Residency programs are known to use filters to efficiently review applications. If applicants have red-flags that are commonly used as application filters (such as USMLE failure), they will need to be particularly strategic in selecting programs. Students with professionalism issues and those that have a combination of factors, such as lower board scores plus a weaker transcript are advised to proactively pursue a backup plan.

**Impact/Effectiveness:** The CORD SATF developed advising guidelines to help applicants and advisors address red-flags in the EM residency application. This guide is available online through the CORD website has been endorsed by CORD, Clerkship Directors in Emergency Medicine, & Emergency Medicine Residents' Association with plans to strengthen recommendations through survey data in the future.

**Table 1.** Red-flags & recommendations for the at-risk EM applicant.

| Red Flag | Key Recommendations |
|---|---|
| **Academic Struggles** | |
| Failure of USMLE or COMLEX | • Retake and pass as soon as possible<br>• Consider a course in test-taking strategy<br>• Plan to take USMLE Step 2 CK early<br>• Determine a backup plan |
| Failure of Pre-clinical Course or Repeating Pre-clinical Year | • Successfully retake/complete the course work |
| Failure of Clerkship | • Successfully repeat the clerkship<br>• This is often interpreted as a result of professionalism deficiencies therefore it is important to explain the circumstances surrounding the failure in your personal statement and/or MSPE |
| Negative Feedback on Medical Student Performance Evaluation (MSPE) | • Carefully review your MSPE<br>• Take ownership of negative feedback and be able to discuss steps taken to improve |
| **Professionalism Concerns** | |
| Academic Misconduct | • Explain your case in your personal statement, however it is likely that you may not be able to match into emergency medicine.<br>• Determine a backup plan |
| Misdemeanor/Felony History | • Take time to truly reflect on the experience, identify how you could have handled the situation differently and what you have learned from the past<br>• Utilize the narrative text-box within ERAS regarding misdemeanors/felonies |
| **Unexplained Gap in CV** | |
| Time off during medical school or other large gaps in CV | • Explain in your personal statement or MSPE |

## 4 The CORD Student Advising Task Force (SATF) Emergency Medicine Re-Applicant Residency Guide: Helping Applicants on the Second Go Around

*Edens M, Druck J, Kellogg A, Hillman E, Desai S, Kukulski P, Pelletier-Bui A, /Louisiana State University Health Sciences Center-Shreveport, Shreveport, Louisiana; University of Colorado School of Medicine, Aurora, Colorado; University of Massachusetts - Baystate Health, Springfield, Massachusetts; University of Missouri-Kansas City School of Medicine, Kansas City, Missouri; University of Kentucky, Lexington, Kentucky; University of Chicago, Chicago, Illinois; Cooper Medical School of Rowan University, Camden, New Jersey*

**Background:** Applying for residency is stressful, but even more so for the applicant who has already been through the process and not matched. The unmatched applicant is immediately faced with questions and uncertainty and there is a scarcity of advising resources to guide the un-matched EM applicant. The Council of Residency Directors (CORD) Student Advising Task Force (SATF) is comprised of program leaders, clerkship directors, and residents with a special interest in student advising. The SATF created advising recommendations for re-applicants. The purpose of the recommendations is to serve as a vetted instructional guide for EM re-applicants.

**Educational Objectives:**
• To review why applicants are unsuccessful in the EM match

and provide recommendations on how an applicant can strengthen his/her application.
• To discuss the options for students who were unsuccessful in the EM match.

**Curricular Design:** Members of the CORD SATF worked over a period of 10 months to draft advising recommendations; available data was used to support recommendations where possible. Two main areas for directed advising were identified. First, what should an applicant do in the year following the unsuccessful match to better position themselves the second time around. Second, what caused the unsuccessful match and what, if anything can be done about it?

**Impact/Effectiveness:** An advising guide for EM re-applicants was created by the CORD SATF and is available online through the CORD website. The recommendations are endorsed by CORD, the Clerkship Directors in Emergency Medicine (CDEM), and the Emergency Medicine Residents' Association. The guide has been highlighted in the Vocal CORD blog, which has garnered 184 views to date. In the future we are hoping to strengthen the recommendations by generating survey data obtained from residency program leaders and advisors, and we will work to distribute the guide to leaders in undergraduate medical education.

**Table 1.** Best practice guidelines for the re-applicant in emergency medicine.

| Part I: What to do the next year | Key Recommendations |
|---|---|
| | 1. Participate in the Supplemental Offer & Acceptance Program (SOAP) for EM<br>• Almost impossible, will require a backup plan |
| | 2. Take a year "off"<br>• Research - difficult to complete a project in one year<br>• Pursue a graduate degree (i.e. MPH) |
| | 3. Extend medical school training<br>• Expensive, not always an option. A good option for those late to EM<br>• Applicant available to fill a last minute opening after the match |
| | 4. SOAP into another discipline (most common)<br>• Options: transitional prelim, surgery prelim, medicine prelim, medicine or family categorical<br>• Choose option that allows for additional EM experience early (July-Sept) to allow for updated SLOE |
| **Part II: Improving the Re-Application** | **Key Recommendations** |
| | Take time for honest reflection. Critically review your application with a trusted advisor to determine why you did not match. Was the problem one of the following? |
| | 1. USMLE/COMLEX Scores<br>• Failures and "low but passing" scores makes an EM match very difficult<br>• Take Step 3 early<br>• Address the low score in your personal statement |
| | 2. Number of Applications<br>• Apply to additional programs not originally on your list<br>• Plan to apply to at least 40 programs |
| | 3. Wrong type of programs<br>• Apply more broadly |
| | 4. Medical Student Performance Evaluation (MSPE/Dean's Letter)<br>• Speak with the Dean's office and see if there was ever negative comments you can explain or that can be changed based on new information. |
| | 5. Professionalism issues<br>• Address head-on in your personal statement<br>• If you have a misdemeanor or felony, take responsibility and ownership of your mistake. Include a brief narrative that explains what you have learned |
| | 6. Letters of recommendation<br>• Obtain a new SLOE<br>• Replace or remove a potentially negative SLOE |
| | 7. Interview issues<br>• Ask for honest feedback from an advisor<br>• Practice, take a course |

may help facilitate automatic pervasive real-time tracking of resident progress, identifying competency-based developmental progression or deficits and allowing for early initiation of tailored educational interventions. Automation also provides an opportunity to include novel data streams, such as clinical documentation, in tracking resident progression.

## 6 Using the ACGME's CLER Pathways to Excellence Framework in Assessing Residency Competency in a Patient Safety Curriculum

*Spillane L, Marks L, Pasternack J, Lowy R, Nobay F, / University of Rochester, Rochester, New York*

**Background:** The ACGME CLER Pathways to Excellence has created well-defined priorities for a culture of patient safety which include: reporting, education, creation of a supporting culture, resident experience, and monitoring of engagement in safety practices. Procedural sedation in the pediatric population is a high-risk situation with myriad potential safety issues. Many adverse outcomes can be mitigated by following pre-procedure protocols, and by participating in event reporting systems (ERS) to prevent future mishap.

**Educational Objectives:** To assess resident's retention of our patient safety curriculum, using the ACGME Pathways to Excellence framework in Safety, in the setting of a high-risk pediatric procedure.

**Curricular Design:** The annual competency assessment for EM residents included a simulated patient encounter requiring procedural sedation for a child. The residents were handed a syringe containing 10 times the weight-based ordered dose along with the empty drug vial. Residents were observed for adherence to patient safety practices including; appropriate equipment/ room preparation, medication time-out, procedural time out, and response to airway compromise during the event. Following the simulation, residents were asked to log an error/near miss report in the institutional on-line ERS. The quality of these reports was evaluated for accuracy of event description, ability to identify contributing factors, and inclusion of suggestions to prevent future occurrences.

**Impact/Effectiveness:** The annual competency assessment for EM residents included a simulated patient encounter requiring procedural sedation for a child. The residents were handed a syringe containing 10 times the weight-based ordered dose along with the empty drug vial. Residents were observed for adherence to patient safety practices including; appropriate equipment/ room preparation, medication time-out, procedural time out, and response to airway compromise during the event. Following the simulation, residents were asked to log an error/near miss report in the institutional on-line ERS. The quality of these reports was evaluated for accuracy of event description, ability to identify contributing factors, and inclusion of suggestions to prevent

## 5 Tracking Resident Cognitive Maturation with Natural Language Processing

*Lui A, Chary M, Yoneda N, Parikh S, /New York Presbyterian Queens, Flushing, New York*

**Background:** Cognitive maturation, the development of the ability to manage patients independently, is an important goal of graduate medical education. In contrast to assessments of procedural competency or knowledge base, there is no structured transparent scalable way to track the cognitive maturation of residents. An important component of residency training is the solicitation of evaluations by attending physicians to gauge a resident's performance and provide actionable feedback. These evaluations provide insight into cognitive maturation, but their analysis is time-consuming and subjective.

**Educational Objectives:** We developed software to analyze freetext evaluations of residents that attendings conducted after each clinical shift in the Emergency Department. The software uses natural language processing to automatically identify areas for improvement or commendation, based on milestones set by the Accreditation Council for Graduate Medical Education and American Board of Emergency Medicine. Our underlying conceptual hypothesis is that linguistic markers track the development of medical decision making, which we term cognitive maturation.The software is written in Python and freely available, with extensive documentation, on GitHub.

**Curricular Design:** In this proof-of concept study we simulated faculty evaluations from 100 residents over the course of one year. The resident performance was created from four archetypes, the rock star, the late bloomer, the laggard, and the work horse. The tone of the faculty evaluation was created from four faculty archetypes: laconic, effusive, disapproving, or diligent. It correctly identified 22/25 notes where the "laggard" archetype predominated.

**Impact/Effectiveness:** Ours is the first demonstration of natural language processing to use faculty evaluations to track the cognitive maturation of residents. This innovation

future occurrences.

**Results:** Six of twenty (6/20) teams failed to follow standardized safety procedures, which resulted in a potentially life-threatening medication error. One team failed to identify the medication dosing error despite patient decompensation. Interestingly, though 19/20 teams eventually knew about the medication error or near miss, only 63% of all residents chose to report the significant medication error/near miss in ERS. Most residents who reported the error demonstrated insight into how the identified error occurred; however, 65% of residents failed to offer any suggestions for mitigating future errors. Using the CLER pathway to excellence framework in safety, this assessment highlights educational gaps in Pediatric Procedural Sedation. Our patient safety curriculum will be modified to help residents recognize errors/near misses and act to prevent future error.

## *Best of the Best Research Oral Presentations*

# 1 Assessment of Accountability and Professionalism Competencies by Emergency Medicine Residency Programs

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**Background:** Non-technical skills (NTS), such as professionalism and accountability, are vital to providing high quality patient care. While NTS are mandated core competencies for Emergency Medicine (EM) residents, the methods used to evaluate performance and determine NTS competency are not standardized, bringing the validity of measurements into question.

**Objectives:** To determine the type and frequency of methods US-based EM residencies use to assess the NTS competencies of Accountability and Professionalism, as well as how often graduating residents meet NTS competency goals.

**Methods:** The study group, all of whom are involved in resident education, created a cross-sectional survey exploring assessment and competency in Accountability and Professionalism. The survey was piloted and modified for content and clarity through iterative feedback from EM physicians not involved in the study. In August 2017, the final survey was sent online to the Clinical Competency Committee (CCC) chair or Program Director of the 185 ACGME-accredited residencies. Results were summarized using descriptive statistics and parametric confidence interval estimates.

**Results:** 121 programs (65.4%) completed the survey. The most commonly used methods of assessment for both competencies were faculty shift evaluation (89.7%; 95% CI 85.1, 93.2), CCC opinion (86.8%; 95% CI 81.8, 90.8), and faculty summative assessment (76.4%; 95% CI 70.6, 81.6). Self-evaluation (46.7%; 95% CI 40.3, 53.2), gestalt (52.9%; 95% CI 46.4, 59.3%) and lack of complaints (36.4%; 95% CI 30.3, 42.8) were also used as assessment tools. 28.9% [95% CI (21.0, 37.9)] of programs use a formal measurement rubric to assess NTS. Only 11.2% [95% CI (6.1, 18.4)] of programs felt they are very effective at determining mastery of these competencies. Only 40.1% [95% CI (33.7, 46.7)} felt that greater than 95% met the milestone graduation goal, while 3.0% [95% CI (1.2, 6.1)] felt that less than 50% met this goal.

**Conclusions:** Programs rely heavily on faculty opinion, often without a formalized rubric, to determine if residents attain competency in Accountability and Professionalism. Less than half of residency programs felt that greater than 95% of their residents met the graduation goal for these competencies, suggesting a need for improvement in training and evaluation of NTS.

# 2 Comparison of Faculty and Nurse Assessment of Emergency Medicine Residents

*A Tsyrulnik, Whalen L, Goldflam K, Harrison R, Dziura J, Della-Giustina D, /Yale School of Medicine Department of Emergency Medicine, New Haven, Connecticut*

**Background:** The Accreditation Council for Graduate Medical Education requires emergency medicine residencies to use multi-source feedback when assessing their residents' clinical competencies. Few studies have compared faculty evaluations to those of nurses.

**Objectives:** To assess the reliability of a nursing evaluation instrument for resident feedback, as well as to compare nursing evaluations with attending physician evaluations using the same instrument.

**Methods:** A retrospective analysis of 224 anonymous nursing evaluations and 623 anonymous faculty evaluations of 37 residents during 2016 was performed. Participants were asked to evaluate the resident on a five-point Likert scale on four measures: overall bedside manner, communication skills with patients, communication skills with nurses and other non-physician staff, and medical knowledge and clinical skills. They were also asked to answer yes or no to the question "would you want this resident to take care of you or a member of your family?" An intraclass correlation coefficient (ICC) and Pearson correlation coefficient (PCC) were determined for each question in order to evaluate the

reliability of nursing and attending physician evaluations as well as to evaluate how well they correlate with one another.

**Results:** The ICC inter-rater agreement measures for nurse evaluators were fair to good, ranging from 0.56 to 0.68 for the 5 questions on the instrument. The ICC inter-rater agreement measure for the physician evaluators was poor, ranging from 0.15 to 0.33. For all questions, nursing and attending responses were moderately, positively correlated, with PCC ranging from 0.40 to 0.51 and p-values below 0.05.

**Conclusions:** When used by nursing staff, our evaluation instrument is a reliable means to provide resident feedback that correlates positively with attending feedback.
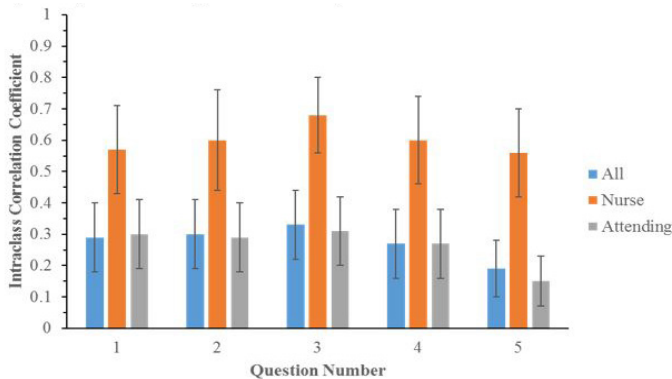


**Figure 1.** Intraclass correlation coefficient with 95% confidence interval of nurse and attending evaluators from a 360-degree evaluation of emergency medicine residents' interpersonal, communication, and clinical skills, 2016.

**Table 1.** Pearson correlation coefficients and p-values comparing nursing and attending from a 360-degree evaluation of emergency medicine residents' interpersonal, communication, and clinical skills, 2016.

| Question | Pearson Correlation Coefficient | P Value |
|---|---|---|
| 1 | 0.48 | 0.003 |
| 2 | 0.47 | 0.003 |
| 3 | 0.47 | 0.004 |
| 4 | 0.40 | 0.02 |
| 5 | 0.51 | 0.001 |

**3** **Demographic Differences Between High and Low Scorers on the Standardized Video Interview**

*A Winfield-Dial, Chhabra N, Schindlbeck M, Bowman S, /John H. Stroger Hospital of Cook County, Chicago, IL*

**Background:** For the 2018 emergency medicine residency application cycle, the Association of American Medical Colleges (AAMC) is conducting an operational pilot of a Standardized Video Interview (SVI). Applicants answer a series of questions that are designed to assess knowledge of professional behaviors, and interpersonal and communication skills. Responses are scored by third party raters that have undergone AAMC unconscious bias training. Previous field testing showed no significant group differences based on sex or self-reported race/ethnicity, however it is unknown whether these findings hold true for the operational pilot.

**Objectives:** To determine if there are differences between high and low scorers on the SVI in regards to self-reported sex, race/ethnicity, type of medical school attended, and other demographic details.

**Methods:** After IRB approval, de-identified ERAS applications to one ACGME-approved emergency medicine residency were retrospectively reviewed. Data abstracted included SVI score, sex, race/ethnicity, medical school type, age, and step 1 score. Candidates were separated into quartiles by SVI score and the highest and lowest scoring quartiles were compared using chi-squared testing.

**Results:** A total of 1500 applications were reviewed. After exclusion of 60 for lack of SVI score, the mean and SD of SVI scores were 19.55 and 2.94, respectively, which closely approximates AAMC data for the 2018 application cycle (n=3532, mean 19.1, SD 3.1). The highest scoring quartile included applicants scoring greater than 21 and the lowest scoring quartile included applicants scoring less than 18. Differences between these groups are summarized in Table 1. Significant differences included the higher prevalence of females, self-identified Asians, and US private school applicants in the top quartile of SVI scorers. Age and Step 1 scores were similar between the two groups.

**Conclusions:** Differences between high and low scorers on the SVI include an increased prevalence of females, self-identified Asians, and US Private medical school applicants. These findings need further exploration prior to universal implementation of the SVI on all ERAS applications.

**Table 1.** Differences between high and low standardized video interview scorers,

| Characteristic | Top Quartile of SVI scorers (>21) n=375 | Bottom Quartile of SVI scorers (<18) n=332 | Difference between Top and Bottom scorers (95% CI) |
|---|---|---|---|
| Sex, % (n) | | | |
| Male | 55.5% (208) | 71.4% (237) | -15.9 (-8.6 to -23.0) |
| Female | 44.5% (167) | 28.6% (95) | 15.9 (8.6 to 23.0) |
| Self-Identity, % (n) | | | |
| White | 51.5% (193) | 57.8% (192) | -6.3 (-13.8 to 1.3) |
| Asian | 19.2% (72) | 12.0% (40) | 7.2 (1.6 to 12.7) |
| Black or African American | 8.5% (32) | 5.7% (19) | 2.8 (-1.2 to 6.8) |
| Hispanic, Latino, or of Spanish Origin | 2.4% (9) | 6.0% (20) | -3.6 (-7.0 to -0.5) |
| American Indian or Alaskan Native | 0% (0) | 0.6% (2) | -0.6 (-2.2 to 0.5) |
| Other | 1.1% (4) | 2.1% (7) | -1.0 (-3.3 to 1.1) |
| Multiple | 8.3% (31) | 7.8% (26) | 0.5 (-3.8 to 4.7) |
| None Selected | 9.1% (34) | 7.8% (26) | 1.3 (-3.1 to 5.6) |
| Medical School, % (n) | | | |
| US Public | 41.6% (156) | 42.2% (140) | -0.6 (-8.1 to 6.9) |
| US Private | 34.4% (129) | 20.5% (68) | 13.9 (7.1 to 20.5) |
| Osteopathic | 14.7% (55) | 20.8% (69) | -6.1 (-12.0 to -0.3) |
| International | 9.1% (34) | 16.0% (53) | -6.9 (-12.1 to -1.8) |
| Multiple | 0.3% (1) | 0.6% (2) | -0.3 (-1.9 to 1.0) |
| Age | | | |
| Mean (SD) | 27.7 (2.8) | 28.2 (3.3) | -0.5 (-1.0 to 0) |
| Step 1 score (n) | 355 | 316 | |
| Mean (SD) | 231.1 (16.1) | 228.6 (15.7) | 2.5 (0.1 to 4.9) |

## 4 Does the Medium Matter? Evaluating the Depth of Reflective Writing by Medical Students on Social Media Compared to the Traditional Private Essay Using the REFLECT Rubric

*A Brown, Jauregui J, Ilgen J, Riddell J, Schaad D, Strote J, Shandro J, /University of Washington, Seattle, Washington; Keck School of Medicine of the University of Southern California, Los Angeles, California*

**Background:** Social media is a novel medium to host reflective writing (RW), yet its impact on depth of students' reflection is unknown. Shifting reflection on to social platforms offers opportunities for students to engage with their community and explore the nuances of peers' reflections. However, its public nature may leave students feeling vulnerable and negatively impact students willingness to reflect deeply.

**Objectives:** Using sociomateriality as a conceptual framework, we aimed to compare the depth of reflection in RW samples submitted by medical students in a traditional private essay format to those posted on a secure institutional social media platform.

**Methods:** Medical students were required to submit a RW essay as part of their emergency medicine clerkship, either on a private essay format (AY 2015) or on a closed, password protected social media website (AY 2016). Five raters used the REFLECT rubric to score 167 de-identified RW samples (78 private essays, 89 social media). Average scores for RW submitted on the two platforms were compared using t-tests. We also surveyed students regarding their comfort with the social media experience.

**Results:** There were no significant differences in average composite REFLECT rubric scores under the private essay (14.1 SD 3.07) versus social media (13.70 SD 3.06) conditions. There was also no difference in essay length or scores based on gender for either type of submission. Seventy-three percent of students responded to the survey; most (72%) reported feeling comfortable sharing their personal reflections in the social media format and 84% felt comfortable commenting on their peer's writing. Sixty two percent of students reported that reading their peers' reflections on social media prompted them to think more about bioethical challenges they had faced.

**Conclusions:** Shifting to a social media format did not affect students' average depth of reflection, and students generally felt comfortable sharing RW essays in this way. These findings suggest that social media is a viable medium for submission of reflective essays. Future work should evaluate the benefits and challenges of this curricular approach to stimulating reflection in students.

**Table 1.** REFLECT rubric scores for private essay vs social media posts

|  | Private Essay (SD) | Social Media (SD) |
|---|---|---|
| Writing spectrum | 2.97 (0.77) | 2.95 (0.80) |
| Presence | 3.12 (0.86) | 2.85 (0.82) |
| Description of disorienting dilemma | 2.98 (0.70) | 3.02 (0.70) |
| Attention to emotion | 2.28 (0.99) | 2.21 (1.00) |
| Analysis and meaning making | 2.73 (0.69) | 2.67 (0.75) |
| Composite Score | 14.05 (3.08) | 13.74 (3.08) |

**Table 2.** Social media group survey results
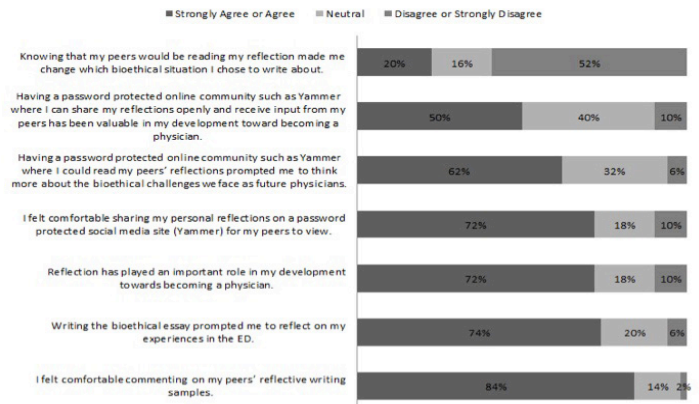


## Lightning Oral Presentations

## 1 Emergency Medicine Resident Productivity Over the Course of Residency Training: A Descriptive Analysis of Progression and Variability

*McHugh D, Gissendaner J, Kolm P, Fredette J, / Christiana Care Health System, Wilmington, Delaware*

**Background:** Residency programs are constantly seeking ways to improve the overall educational experience and understand resident productivity. Previous studies have attempted to define "efficiency" but they are dated and not in a modern practice setting. Having an improved understanding of resident productivity will allow us to better understand the overall productivity value of EM residency programs, allow for improved advisement of trainees, and attempt to improve residency staffing models.

**Objectives:** To evaluate the progression of productivity of emergency medicine residents in terms of patients/hour, RVUs/hour, and RVUs/patient. We hypothesized that residents would experience an increase in patients' acuity and productivity over the course of a 3-year residency.

**Methods:** This was a retrospective review of EM resident productivity from 2012-2017 over the course of a 3-year training program. It was performed at a level-1 community academic tertiary care referral center. Data collected included patients/hour, RVUs/patient and RVUs/hour. Mixed effects models were used to assess change in outcome over PGY levels for graduating classes during the study period. The models included the interaction between graduating class and PGY to detect patterns between classes. Statistical significance was set at p<0.05.

**Results:** There was a statistically significant increase in RVU/patient for each graduating class (p = 0.032) but the pattern of change over PGY was not the same for graduating classes (Figure 1). There was a statistically significant increase in RVU/hour (p < 0.001) and mean increased from 3.0 to 5.5 to 6.6 over PGY levels (Figure 2). Lastly, there was a statistically significant increase in patients/hour that was essentially the same for all graduating classes (p < 0.001). Mean patients/hour increased from 0.75 to 1.2 to 1.4 over PGY levels.

**Conclusions:** There is a statistically significant increase in patients/hour, RVU/patient, and RVU/hour during the course of a residency. This descriptive study will allow the emergency medicine programs to have an enhanced understanding of the overall productivity expectations from their residents.
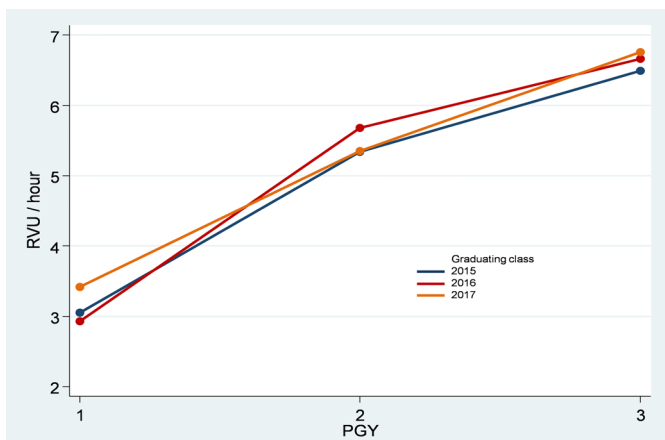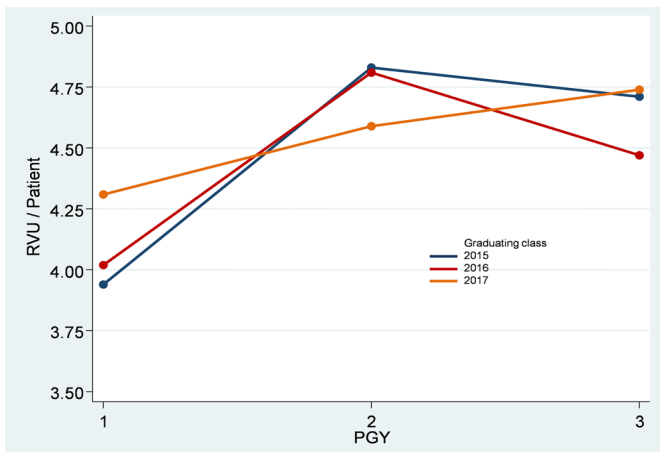




## 2 Improving the Quality and Standardization of Resident Handoffs Through Interspecialty Handoff Training

*Naples R, Zavodnick J, Altshuler M, Cowan S, Jaffe R, Margiotta M, McCall J, Wickersham A, Wolf A, Diermer G/Thomas Jefferson University, Pennsylvania*

**Background:** Transitions of care present a major risk for to patients. Formal handoff training during medical school varies. While many residency programs have implemented handoff training, it is variable, resource-intensive, and doesn't promote interspecialty standardization.

**Educational Objectives:** We developed a handoff training program for incoming interns that would improve and standardize handoffs.

**Curricular Design:** We provided handoff training during intern orientation; 120 interns participated, representing 12 of 15 programs. Pre-course online modules were used to introduce the IPASS and TeamSTEPPS concepts. The workshop began with a didactic review followed by 3 simulated hand-off scenarios: ED to floor, shift change, and transfer of service. Interns were assigned to groups of 3 and given a checklist to ensure each team member completed all activities: giving handoff, receiving handoff, observing handoff. Additionally, each team was observed by a trained facilitator (1 facilitator for every 3 groups). The observer completed a tool on handoff quality. The workshop concluded with a debriefing and evaluation (5 point Likert scale with 1 - "strongly disagree" and 5 - "strongly agree").

**Impact/Effectiveness:** Learners were highly satisfied with the workshop; most agreed the session was relevant to their needs (4.6), had clear goals (4.6), and was organized (4.6). Even among those who had received formal handoff training in medical school (56%), satisfaction was high. This group was equally likely to report increased confidence in handoff skills after the workshop (mean of 4.4 for both). Interns planned to use IPASS during their handoffs (4.6). Interns entering procedural specialties were less likely than those entering non-procedural specialties to report likelihood of using IPASS (88% vs 100%, p=0.0032) or that the session was relevant to them (81% vs 99%, p=0.001). Both felt equally more confident with handoffs after the session (83% vs 90%, p=0.27).

Large scale interspecialty handoff training using the IPASS tool is feasible for implementation. Our workshop was well-received. Interns reported increased handoff confidence. Next steps include monitoring of IPASS use through observation of resident handoff in real time to evaluate quality and assess standardization. Future research will explore how maintenance interventions can ensure continued good handoff practices.

## 3 Qualitative Analysis of Residency Applicant Perceptions of Social Media Use by Emergency Medicine Residency Programs

*Scott K, Zielinski A, Love J, Conlon L, DeRoos F, Mamtani M, /Perelman School of Medicine at the University of Pennsylvania, Philadelphia, Pennsylvania*

**Background:** Studies have demonstrated that program specific websites are important sources of information for applicants; playing a role in decision-making during the application cycle. Social media can be utilized in a similar manner, offering expanded information about the unique qualities of residencies and perhaps influencing candidates' decisions to apply, interview, and rank a particular program. There is a lack of understanding of applicants' perceptions of social media use by residency programs.

**Objectives:** We hypothesized an overall positive perception of social media use by residency programs, allowing for increased communication and provision of information. The purpose of this study was to assess overall sentiment toward residency program social media use and gain insight to applicants' perceptions.

**Methods:** We conducted a survey-based, cross sectional study of all applicants to the Emergency Residency Program at the University of Pennsylvania during the 2015-16 application cycle. Applicants were asked if they thought residency programs should have a presence on social media and to provide an explanation of their answer. We utilized descriptive and qualitative thematic analysis of responses. This study was determined to be exempt by the Institutional Review Board at the University of Pennsylvania.

**Results:** We received 275 (26.3% response rate, 41% female) responses with 52.4% stating that programs should have a social media presence (n=144) and 39.6% of applicants being unsure (n=109). We identified themes with positive, negative, and neutral sentiment. Emerging positive themes included: (1) Provision of deeper insight to programs, (2) Ease of access to program information, (3) Increased avenues for communication, (4) Important for innovation and relevance. Emerging negative themes included: (1) Use as a source of distraction, (2) Presence as unprofessional, (3) Potential for inaccuracy of content. Two neutral themes included: (1) Respondent indifference (2) Potential redundancy (Table 1).

**Conclusions:** A majority of residency applicants believe programs should have a social media presence. Our findings can serve as a resource for programs that have or are considering a presence on social media. Limitations of our study include a low response rate and inclusion of applicants to a single emergency medicine residency program.

**Table 1.** Themes of applicant perception of residency program social media use



## 4 The Use of Quick Response (QR) Codes to Improve Resident Compliance and Assessment

*Singhapricha T, Meloy P, Shah B, Lall M, Taylor T, White M, Siegelman J, /Emory University, Atlanta, Georgia*

**Background:** One of the key obligations of residency leadership and faculty is to provide trainees with timely and accurate feedback. In 2008, the ACGME introduced the Milestones project aimed to evaluate each resident on

competency based benchmarks. Although there are various methods utilized to evaluate a resident, one issue encountered is difficulty in evaluating the procedural competency of a resident. This is secondary to both resident noncompliance in logging procedures and most faculty feedback given in real time as opposed to through written evaluation. Oftentimes, milestones are assessed based on total number of procedures logged with direct observation by only a few committee members. To address these issues, we introduced a fast and easy method for residents to log their procedures as well as for faculty to evaluate their competency by using Quick Response (QR) codes placed in the Emergency Room.

**Educational Objectives:** The main objectives were to obtain more thorough faculty feedback for each resident's procedural competency, and to increase resident compliance with logging procedures by utilizing QR codes in the emergency department.

**Curricular Design:** To achieve these educational objectives, we created specific QR codes for intubations and central venous access and placed them at the physician stations at our institution. QR codes were chosen as many other fields such as business and technology use these codes as rapid ways to access and log information. The resident QR codes were linked to a Google Form in which the resident would select their name as well as answer questions about the procedure that correlated to milestone PC10-Airway Management for intubations, or milestones PC9 (General Approach to Procedures) and PC14 (Vascular Access) for central venous access. A similar form was linked for the faculty QR code, and upper level residents were allowed to fill out the form if no attending physician was present. No PHI are saved on these forms, and this process was deemed exempt by our institutional IRB.

**Impact/Effectiveness:** Compared to the previous year, procedure logging by the intern class for intubations and central venous access has increased by 52%. The feedback rate from our faculty is currently 42% and this is the first time where these procedural milestones have been consistently logged for review by the clinical competency committee.

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### *Best of the Best Innovation Abstract from 2017*

**Emergency Medicine Foundations: A Comprehensive Open Access Flipped Classroom Curriculum for Intern Learners**

*Grabow Moore K, Shappell E, White M, Shayne P, / Emory University, Atlanta, Georgia*

**Background:** The tide is turning in Emergency Medicine (EM) residency education from traditional hour-long lectures to more interactive approaches geared towards adult millennials. One challenge lies in teaching residents to be informed learners as online content expands, often without peer review. The flipped classroom approach relies on self-directed learning backed by in-person instructional time for higher order critical thinking. Medical educators must also learn to customize teaching content for learners at different levels.

**Educational Objectives:** Emergency Medicine Foundations (EMF) is a year-long flipped classroom curriculum designed for EM PGY1 residents. It provides a comprehensive framework for understanding cardinal presentations, "can't miss" diagnoses, and essential management strategies within the EM Model. Other specific aims include asynchronous content catered to diverse learning styles, easy implementation at satellite sites, and open access to all resources on the curriculum website.

**Curricular Design:** EMF is organized with a systems-based approach into 30 units (Table 1). Using Foundations Learning Pathways (Traditional Text, High-Yield Text, Multimedia), residents can choose assignments for self-directed review of core content. During weekly Foundations Meetings, interns participate in small groups to complete oral-boards style cases led by senior resident or faculty. Meetings provide the opportunity for assessment of intern knowledge, directed feedback and review of key learning points.

**Table 1.** Curriculum overview

| | Unit | General Topics | Case 1 | Case 2 | Case 3 |
|---|---|---|---|---|---|
| | | **Emergency Medicine Foundations Course Schedule** | | | |
| 1 | Abd/GI I | Acute Abdomen, Anorectal | Hernia/SBO | Ischemic Bowel | Volvulus |
| 2 | Abd/GI II | GIB, Eso and Stomach Do | Boerrhaave's | Perforation | Variceal Bleed |
| 3 | Abd/GI III | Biliary, Liver, GI Infections | Cholecystitis | Diarrhea/HUS | SBP |
| 4 | Cards I | Dysrhythmias | Torsades | Bradycardia | SVT |
| 5 | Cards II | ACS, CHF | Inferior/RV MI | CHF | VT 2/2 MI |
| 6 | Cards III | Valvular disease, Carditis | Pericarditis | PC Tamponade | Endocarditis |
| 7 | Vascular | Dissection, Aneurysm, DVT & HTN | Ao Dissection | Ruptured AAA | HTN Emerg |
| 8 | Pulm I | Non-infectious Pulmonary Disease | Asthma | PE | Hemoptysis |
| 9 | Pulm II | Infectious Pulmonary Disease | CAP with SIRS | Miliary TB | ARDS |
| 10 | Trauma I | Common Traumatic Injuries | Subdural | Tension PTX | Splenic Rupture |
| 11 | Trauma II | Specialized Traumatic Injuries | Facial Trauma | Neurogenic Shock | Multi-fracture |
| 12 | Trauma III | Specialized Trauma | Thermal Burn | PC Tamponade | PM C-section |
| 13 | Peds I | Peds Resus, Neonatal Emerg | SIDS / Arrest | Aortic Coarc | NEC |
| 14 | Peds II | Pediatric Pulm, Infections | Neonatal Sepsis | Kawasaki Disease | FB Aspiration |
| 15 | Peds III | Other Peds, Child Abuse | Febrile Seizure | Intussusception | Abuse |
| 16 | HEENT | Eye, Ear, Nose & Throat Emerg | Glaucoma | Ludwig's Angina | CRAO |
| 17 | ID | Infectious Emergencies | RMSF | HIV Pneumonia | Pulm Anthrax |
| 18 | Neuro I | Brain Emergengies | AMS/ICH | Meningitis | Seizure |
| 19 | Neuro / MSK | Nerve and MSK Emergengies | GBS | Cauda Equina | Septic Arthritis |
| 20 | Ortho | Traumatic Orthopedic Injuries | 20 Ortho Mini-Cases | | |
| 21 | Tox I | Toxidromes and Poisoning I | ASA toxicity | TCA Overdose | Ethylene Glycol |
| 22 | Tox II | Toxidromes and Poisoning II | Tylenol | OP | CCB Overdose |
| 23 | Enviro | Environmental Exposures | Snake Bite | HACE | Hypothermia |
| 24 | GYN | Ovarian and Uterine Disease, Gyn ID | Ovarian Torsion | TOA | Sexual Assault |
| 25 | OB | Pregnancy Emergencies | Ectopic Preg | Pre-eclampsia | Appy in Preg |
| 26 | Psych | Psychiatric Emergencies | Agitation | ETOH Withdrawal | Psychosis |
| 27 | Renal / GU | Renal and Urologic Emergencies | Test. Torsion | Fournier's | Priapism |
| 28 | Endo / Met | Endo, Metabolic and Nutritional Do | Hyperkalemia | DKA | Thyrotoxicosis |
| 29 | Heme / Onc | Heme, Malignancy Emergencies | TTP | Acute Chest | Tumor Lysis |
| 30 | Immuno / Derm | Immune, Skin Emergencies | SJS | Anaphylaxis | SSS |

Open access to curriculum content is available on the course website:
www.emergencymedicinefoundations.com

**Impact/Effectiveness:** Foundations was piloted at two large training programs for the 2015-2016 academic year. In May 2016, these 36 residents were anonymously surveyed. Thirty of 39 residents completed the survey (83%). Results (Table 2) showed high levels of learner satisfaction regarding the curriculum's relevance and high perceived impact on clinical performance.

Feedback from pilot sites was incorporated for the 2016-2017 academic year with expanded total enrollment to 250+ residents and 20 institutions using full or modified versions of EMF. Resident satisfaction surveys and assessment of learner knowledge will be collected. The Foundations approach may have future benefit for other EM programs, other level learners and other specialties.

**Table 2.** Pilot survey data

| Survey Item (1- Strongly Disagree, 3- Neutral, 5- Strongly Agree) | Agree or Strongly Agree | Mean |
|---|---|---|
| Overall I am highly satisfied with the EM Foundations course. | 28/30 | 4.17 |
| I believe EM Foundations was beneficial to my development as an EM practitioner. | 28/30 | 4.33 |
| I believe EM Foundations course content was appropriate for my level of learning. | 30/30 | 4.57 |
| I prefer small group oral boards style cases over traditional lecture or powerpoint review of equivalent course content. | 24/30 | 4.17 |
| Practice oral boards cases were relevant and helpful for learning fundamental knowledge within our specialty. | 29/30 | 4.53 |
| Case teaching points were relevant and helpful for learning fundamental knowledge within our specialty. | 29/30 | 4.60 |
| Foundations meetings were engaging and enjoyable. | 28/30 | 4.47 |
| Practice oral boards cases had a positive impact on my clinical performance. | 25/30 | 4.13 |
| Case Teaching Points had a positive impact on my clinical performance. | 27/30 | 4.10 |

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