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## Schedule of the Day

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<tr>
<td>11:00-11:30AM</td>
<td>Registration and Lunch</td>
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<tr>
<td>11:30-11:40AM</td>
<td><strong>Introductory Remarks</strong>&lt;br&gt;Richard M. Schwartzstein, MD</td>
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<tr>
<td>11:40-12:45PM</td>
<td><strong>Keynote Address:</strong> Optimizing Clinical Education: Forming Critical Thinkers in a Culture of Caring&lt;br&gt;<strong>Thomas R. Viggiano, MD</strong>&lt;br&gt;Associate Dean for Faculty Affairs&lt;br&gt;Mayo Medical School</td>
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<td>1:00-2:15PM</td>
<td><strong>Workshop Session 1</strong>&lt;br&gt;<strong>Option 1:</strong>&lt;br&gt;Professionalism: It is not just about you&lt;br&gt;Hope Ricciotti, MD&lt;br&gt;Jo Shapiro, MD&lt;br&gt;<strong>Option 2:</strong>&lt;br&gt;Integrating Basic Science at the Bedside&lt;br&gt;Bernard Chang, MD, MMSc&lt;br&gt;Robert Stanton, MD&lt;br&gt;<strong>Option 3:</strong>&lt;br&gt;The Art of Asking Questions: This is not your average quiz show&lt;br&gt;Richard Schwartzstein, MD&lt;br&gt;Jonathan Hausmann, MD&lt;br&gt;<strong>Option 4:</strong>&lt;br&gt;Self-Directed Learning: Moving Beyond Directed Self Learning&lt;br&gt;Andrew Lichtman, MD, PhD&lt;br&gt;Eli Miloslavsky, MD&lt;br&gt;<strong>Option 5:</strong>&lt;br&gt;Giving voice to The &quot;Silent&quot; Curriculum: Race &amp; Ethnic Relations, Cultural Sensitivity, and Explicit Reflection in Medical Education&lt;br&gt;Faculty Planning Committee: Hidden Curriculum Interest Group&lt;br&gt;<strong>Option 6:</strong>&lt;br&gt;Building Resilience in Learners at All Levels: Structural and Individual Interventions&lt;br&gt;Eileen Reynolds, MD&lt;br&gt;Fidencio Saldaña, MD, MPH</td>
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<tr>
<td>2:25-3:40PM</td>
<td><strong>Workshop Session 2</strong>&lt;br&gt;REPEAT ABOVE SESSIONS</td>
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<tr>
<td>3:50-4:25PM</td>
<td>Wrap Up &amp; Award Ceremony</td>
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<tr>
<td>4:30-5:30PM</td>
<td>Poster Session &amp; Reception</td>
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*Medical Education Day 2015*

*Schedule of the Day*
Faculty Chairs of Medical Education Day

Katharyn Meredith Atkins, MD
Andrew H. Lichtman, MD, PhD

Medical Education Day Review and Planning Committee

Katharyn Meredith Atkins, MD
Barbara Cockrill, MD
Lisa Frontado, MS EdM
Katheryne Jackson, BA
Gillian Jawahir, BA
Edward Krupat, PhD
Andrew Lichtman, MD, PhD
Jane Neil, BA
Richard Schwartzstein, MD
Amy Sullivan, EdD
AWARD RECIPIENTS

HMS Medical Education Day Abstract Award 2015

1) Assessing item quality in open-book online readiness assessment exercises using student feedback and item response time
H.C. Besche, PhD; M.I. Stefan, PhD; Y. Liu, PhD; R.W. King, MD, PhD; A. Sullivan, EdD
Award Category: UME Research - pg. 1

2) Impact of the Resident-as-Teacher Video Series in Preparing Students to be Resident Teachers
Bri Anne McKeon, MD; Celeste Royce, MD; L. Renata Vicari; Miriam Haviland MSPH; Lori Newman, MEd; Hope A. Ricciotti, MD
Award Category: UME Innovation-pg. 54

3) A Cadaveric Procedural Anatomy Course Enhances Operative Confidence and Competence
G. Sharma, MD; Mario A. Aycart, MD; Peter A. Najjar, MD; Trudy van Houten, PhD; Douglas S. Smink, MD, MPH; Reza Askari, MD; Jonathan D. Gates, MD, MBA
Award Category: GME Research- pg. 41

4) Test-Enhanced Learning Applied to the Digital World
Lisa A. DelSignore, MD; Traci Wolbrink, MD, MPH; Tanya Logveniko, PhD; Jeffrey P. Burns, MD, MPH
Award Category: GME Honorable Mention-pg. 34

5) Effective Mentorship During Residency Training: Needs Assessment and Perspectives of Residents
Award Category: GME Honorable Mention-pg. 52

6) A Compiling Analytic Software Program for the ACGME Milestones is an Efficient, Flexible and Timely Monitor of Resident Performance and Progress
D.K. Urion, M.D., FAAN; Joseph Viscomi
Award Category: GME Innovation-pg. 21
7) Committed to Leadership: A Landscape Analysis of Leadership Training in the Medical School Curriculum  
D. Wohler, B.S.  
Award Category: Student Research - pg. 83

8) Implementation and Assessment of a Near-Peer Teaching Program for Preclinical Medical Students  
Samantha Epstein, B.A.; Zoë Gottlieb, M.D.; Holly Gooding, M.D. M.S.; Jeremy Richards, M.D. M.A.  
Award Category: Student Research Honorable Mention - pg. 86

9) Increased Resident Research in the Era of Work Hour Restriction  
Jenny X. Chen, BA; Elliott D. Kozin, MD; MPH, Rosh K.V. Sethi, MD, MPH;  
Aaron K. Remenschneider, MD; Kevin S. Emerick, MD; Stacey T. Gray, MD  
Award Category: Student Research Honorable Mention - pg. 46

9) Impact of a Professional Education Program on Physician and Patient Metrics in Diabetes Care  
Garcia-Dolagaray G, BS; Romero-Ibarguengoitia, ME, MD, MS; Okeke E, MD;  
Gautam S, PhD; Kuc K, MPH; Neighbours J MEd, Caballero AE MD  
Award Category: CME Special Mention - pg. 14

10) Novel Analytics Inform Evidence-Based Improvement of Online Courses  
Marshall Thomas, PhD; Alexis Estrella, BA; Michael Parker, MD  
Award Category: Special Mention - pg. 30

11) Physicians & Biomedical Research Careers: Findings from a Study of HMS Alumni  
Ed Krupat, PhD; Gordon Strewler, MD; Carlos A. Camargo, Jr., MD, DrPH; Janice A. Espinola, MPH; Thomas Fleenor, MEd; Jules L. Dienstag, MD  
Award Category: Special Mention - pg. 90

HMS Medical Education Abstract Award Recipients
Fourteenth ANNUAL

HMS MEDICAL EDUCATION DAY
Poster and Technological Demonstrations
Abstracts Grouped by Category
Assessing item quality in open-book online readiness assessment exercises using student feedback and item response time

Henrike C. Besche, PhD,* Melanie I. Stefan, PhD#, Yan Liu, PhD***, Randy W. King, PhD**, Amy Sullivan, EdD*
*Program in Medical Education, Harvard Medical School; **Department of Cell Biology, Harvard Medical School; ***Curriculum Fellows Program, Harvard Medical School; #Center for Integrative Physiology, University of Edinburgh

As part of the ongoing curriculum reform at HMS based on case-based collaborative learning (CBCL) (1), all first year courses are now using open-book online quizzes as readiness assessment exercises (RAE). However, faculty currently lack guidelines for best practices in developing and evaluating items for open-book online quizzes. The purpose of this study was twofold: (1) to explore what characteristics of open-book quizzes appear most supportive of student learning and readiness; and (2) to examine whether data relating to response time (time taken to answer each item) can help faculty evaluate quiz quality and inform course development.

We used both qualitative and quantitative methods to assess the quizzes in the first year course Molecular and Cellular Basis of Medicine. First, we conducted interviews with 16 students to explore how they used the quizzes and in what ways the quizzes supported, or did not support, learning of course material. Second, we analyzed the median item response time (MIRT) to assess whether students were spending the expected amount of time relative to the cognitive level of the question.

Analysis of interviews with students suggests the use of RAEs indeed enhances preparation, but only if adhering to certain “Goldilocks” principles regarding grading and item design. For example, students reported that giving points for completion of each quiz with 50% or more correct provided sufficient motivation to fulfill the task, but points for number of items correct made the quiz feel more like a high-stakes test and directed their attention to getting “the right answer” rather than working through a problem to learn the material. As first year students they also voiced appreciation of the structure provided by ongoing quizzes in developing an ongoing habit of reviewing and consolidating their learning of challenging material.

For the quantitative analysis, MIRT appeared to be useful as a gauge of whether the time the students invested in solving a question was spent appropriately. For example, if it took students much longer than expected to answer a simple question, the item itself might be confusing or the related preparatory material might not be sufficiently clear. Thus MIRT can provide faculty with granular and unbiased feedback on the learners’ needs and inform course design without putting any further burden on the students. Beyond the practical benefit of MIRT analysis of open book RAEs, this method also helps to promote the core mission of the flipped pedagogy that that tries to engage each learner in the learning process as opposed to whether or not they know the right answer and thus should be of broad interest for educators involved in designing various types of learning environments from hybrid to online courses.

1Krupat E, Richards, JB, Sullivan, AM, Fleenor, TJ, Schwarzstein, RM. Assessing the Effectiveness of Case-Based Collaborative Learning via Randomized Controlled Trial. 2015, Academic Medicine, accepted for publication.
BEYOND THE SANDWICH: FROM FEEDBACK TO COACHING FOR RESIDENTS AS TEACHERS

Presenter: Deepa Rangachari, M.D., Department of Medicine, Beth Israel Deaconess Medical Center

Co-Authors: Lorrel Brown, M.D., Department of Medicine, University of Louisville; Michael Melia, M.D., Department of Medicine, Johns Hopkins University

Introduction: Evaluation in the form of “feedback” is a universally acknowledged component of teaching in the clinical setting. When done well, trainees identify feedback as a critical element of high-quality teaching. Traditionally, feedback occurs between faculty and trainee. As academic medicine has become more complex, however, faculty exposure to trainees has become fragmented. Trainees are dissatisfied with the frequency, content, and quality of feedback that they receive and are likely to seek feedback from their peers.

Approach: Senior trainees (residents) are poised to be unique effectors of feedback. When in a supervisory role, they – as compared to attending physicians – observe junior trainees (medical students, interns) with greater frequency and in a wider variety of clinical contexts. By increasing awareness of the vital role that senior trainees can play in the teaching-feedback venture and increasing their preparedness, we hypothesize that we can improve the quality and impact of feedback during clinical training. Here, we present a novel curriculum to enhance peer feedback, entitled “clinical coaching” and defined as: “a helping longitudinal relationship between coach and apprentice that provides continuing feedback on and assistance with improving performance.” Here, coach is the senior trainee and apprentice is the junior trainee. This curriculum consists of: 1) video module simulating traditional feedback contrasted with the suggested coaching approach, and 2) interactive workshop which defines and models coaching.

Results: This curriculum was implemented in May 2014. Fifty-seven internal medicine housestaff participated in a pre-curricular survey. While 69% of residents believe it is important for interns to elicit feedback, 51% report that this never happens. Most housestaff believe that preparation prior to feedback is important, but 62% of interns and 74% of residents never/rarely prepare. Participation in the interactive workshop was enthusiastic (50 participants). Thirty-nine housestaff completed the post-curricular survey, of which 13 had attended the interactive workshop and 26 had not. Recognition of interns soliciting feedback was greater amongst workshop attendees: 83% (residents) and 78% (interns) reported that interns asked for feedback >1 time per week, as compared to 53% (residents) and 67% (interns) of non-attendees. Preparation for coaching did not differ amongst intern workshop attendees vs. non-attendees (22% vs. 20% reported no preparation, respectively), but did differ amongst resident attendees vs. non-attendees (0% vs. 19% reported no preparation, respectively). Overall, 43% of interns and 50% of residents reported that feedback rarely/never translates into a specific plan of action. A majority of housestaff reported that their feedback behaviors had changed over the course of 12 months (87% of attendees vs. 58% of non-attendees), with most reporting that this change was a result of observation/modeling behavior (67%) or natural improvement with time (62%).

Conclusions: Even though housestaff value peer feedback, elicitation and preparation are inadequate; specific goals for improvement are infrequently identified. These results highlight a need to increase awareness of and preparedness for the vital role that trainees can play in evaluation and feedback. Training housestaff in coaching has the potential to transform inter-trainee relationships to the benefit of teachers and learners alike.

Assessment
DOES AN INTRODUCTORY RESEARCH COURSE INCREASE RESIDENT RESEARCH COMPETENCE AND CONFIDENCE?

Kristina Dzara, Ph.D.
Author Affiliation: MMSc-Medical Education Student, Harvard Medical School

Background: Increasing emphasis is being placed on ensuring resident research competency. This may include more formal organization of research experiences and mandatory courses to emphasize proficiency in research methodology. As part of a broader shift to encourage resident research education, accountability, and productivity, the author developed a six-week research course for PGY-II psychiatry residents at the Southern Illinois University School of Medicine. The course consisted of concise weekly topics including research design and methodology, basic statistics and data analysis, as well as IRB submission, scientific writing, and journal submission.

Methods: Residents completed pre- and post-tests, measuring objective knowledge and subjective self-assessments spanning various areas of research competency. Standard course evaluation data measuring instructor knowledge, preparation, and teaching were also obtained. The study was assessed by the IRB and exempted from further review.

Results: The course was attended by 17 PGY-II residents over 3 consecutive years (2010-2012). On the 21 question objective test, residents had a pre-course score of 13.67 and a post-course score of 15.80, improving by an average of 2.13 points (t=2.634; p=.020). Residents reported enhanced understanding of research design (t=6.853; p=.000) and basic statistical concepts (t=6.092; p=.000), improved ability to critically evaluate and interpret literature (t=6.276; p=.000), and an increase in their level of research experience (t=2.190; p=.047). Trainees evaluated the seminar instructor as knowledgeable, enthusiastic, and effective, providing an interactive course with high educational value.

Conclusions: Even a brief introduction to research methodology can enhance resident understanding of basic research concepts and confidence in conducting research. The addition of a focused course, in coordination with increased emphasis on research in residency, directly addresses section IV.B of the ACGME Program Requirements for Graduate Medical Education in Psychiatry and has the potential to influence residents’ achievement of Milestone PBLI1. Programs without structured research training for residents should consider the addition of a course with a similar curriculum, tailored to their residents’ educational needs, as part of a culture encouraging scholarly activity.

References:
1. Accreditation Council for Graduate Medical Education. ACGME Program Requirements for Graduate Medical Education in Psychiatry. July 2015.
ENHANCING FEEDBACK IN ANESTHESIA RESIDENCY PROGRAMS

John D. Mitchell, MD1; Carol Ann B. Diachun, MD2; Amy DiLorenzo, MA3; Daniel E. Lee, MD, PhD4; Suzanne Karan, MD5; Cindy Ku, MD1; Marek Brzezinski, MD PhD6; Vanessa Wong, BS1; Randall M. Schell, MD, MACM3; Stephanie B. Jones, MD1

1Anesthesia, Critical Care and Pain Medicine, Beth Israel Deaconess Medical Center
2Anesthesiology, University of Florida – Jacksonville
3Anesthesiology, University of Kentucky
4Anesthesiology and Pediatrics, University of California, San Diego
5Anesthesiology, University of Rochester Medical Center
6Anesthesia and Perioperative Care, University of California, San Francisco

Background: Improving resident performance would improve quality of patient care. Feedback from faculty is critical for enhancing resident performance. However, limited tools exist for teaching faculty how to provide feedback to residents. Our goal was to enhance feedback to residents from faculty using a video-based teaching tool at four institutions (Beth Israel Deaconess Medical Center; University of Kentucky; University of Rochester Medical Center; and University of California, San Diego).

Methods: We developed an educational program to teach faculty how to provide feedback. The program consisted of two video-based discussion sessions for faculty and one discussion session for residents. Faculty members were presented with techniques on how to provide feedback to residents on professionalism and communication. Residents were provided with information on how to ask for and receive feedback. We implemented the program at the four institutions, where faculty provide daily feedback to residents. Feedback records from three months prior to the intervention to three months after the intervention were rated by experts for quality (detailed, specific, behavior-focused, not harmful/destructive, and actionable), utility, whether it was related to professionalism/communication, and whether it had negative feedback. Pre-intervention feedback was compared to feedback during the intervention period and to post-intervention feedback using the Mann-Whitney U test.

Results: 1926 feedback records were rated (855 in the pre-intervention period, 175 in the intervention period, and 896 in the post-intervention period). Feedback had higher quality (p = 0.04) and utility (p = 0.002) from pre- to post-intervention at Institution 1 but not overall. From pre-intervention to the intervention period, the institutions overall and Institution 2 had more feedback on professionalism/communication (p = 0.01 and p < 0.001, respectively); also, Institution 3 had more negative feedback (p = 0.01) and feedback with higher utility (p = 0.04).

Discussion: We detected different changes in feedback at the institutions despite the identical intervention. The intervention may be more effective with new faculty and/or smaller discussion sessions as the discussion sessions at Institution 1 had fewer faculty who were all new staff at the time of the intervention. Future steps in this project include refining the rating system, exploring ways to sustain changes, and investigating other factors that may affect the quality and utility of feedback, such as time of year, level of training of the resident, and faculty’s experience with feedback.
MEDICAL STUDENT PARTICIPATION IN FEEDBACK USING PEER INSTRUCTION

Silvia Passeri, Ingrid Amstalden, Lindemerg Silveira, André Schenka, Eric Mazur

Introduction: Assessment feedback is not a common tool in Global medical programs despite an apparent consensus on the importance of this practice to the quality of teaching-learning process. Absence of learning assessment feedback results in students often not identifying their areas of difficulty thus preventing students from their mistakes. Scientific evidence proves the power of feedback for learning. The prevailing opinion in the literature today points out that students want and value the practice of feedback. I conjecture otherwise, however and suggest that students are not always prepared to receive this feedback. For a lot of students, this critical reflection of the teaching-learning progress is not an attractive prospect and as a result, so many students are discouraged from participating, even if though the feedback improves their performance.

Objective: The objective of this study was to identify a profile of those students who are interested in receiving feedback from the learning assessment. Methods: We invited 226 (2Y=116, 3Y=110) medical students to participate in the feedback through the teaching method Peer Instruction. We selected three specialized disciplines from the program and offered feedback immediately after the regular exam. We then analyzed the data of students both present and absent for the feedback sessions according to gender, age, performance in the regular exam and overall academic performance throughout the medical program. Data were analyzed by chi-square test (Pearson) and t-test for independent samples. Results: Out of 226 students invited, 110 (48.7%) participated in the feedback activity and 116 (51.3%) did not it. There was no statistically significant correlation between gender and feedback attendance nor was there significant correlation in terms of age (p>0.05). However, the performance for presents in the regular exam were significantly higher than for absent and the students who participated in the feedback had better overall academic performance when compared with absents (p<0.05). The correct responses of those who had been present for the feedback increased from 74% to 90%.

Conclusion: The participation of students on assessment feedback is higher among students with better performance.
PSYCHIATRY RESIDENT DEVELOPMENT AND ASSESSMENT OF PSYCHOTHERAPY COMPETENCE IN COGNITIVE BEHAVIORAL THERAPY

Christopher G. AhnAllen, Ph.D.*, David R. Topor, Ph.D., MS-HPEd.,
Elizabeth A. Mulligan, Ph.D., ABPP, Chandlee Dickey, MD
Mental Health Service, VA Boston Healthcare System
Department of Psychiatry, Harvard Medical School

Introduction: The Harvard South Shore (HSS) Psychiatry Residency Training Program is required by the Accreditation Council for Graduate Medical Education (ACGME) to train residents to achieve “basic competence” in using evidence based psychotherapies, including cognitive behavioral psychotherapy (CBT). Several strategies exist to assess competency, including objective assessment tools, review of videotapes, and group supervision (Sudak et al., 2003; Yager & Bienenfeld, 2003). Self-assessment of learning is unique by allowing residents to reflect on their progress as a learner (Calabrese et al., 2010). We examined self-assessments of CBT to determine whether residents meet “basic competence” and to understand the role of self-assessments within psychiatry psychotherapy training.

Methods: Third-year HSS psychiatry residents (N =56) were enrolled in CBT between 2009 and 2014. The CBT course, led by three clinical psychologists, is structured to include a total of 33 sessions consisting of: instruction on CBT principles, theory and practice, active learning using role-plays, clinical practice and small group supervision, self-directed learning and case conference presentations. Three self-assessments of competencies associated with knowledge of and practice of CBT were completed: first session (pre-course), mid-term (mid-course) and at the final session (end-course). Competency domains assessed were rated by residents on the following scale: 1 (novice); 2 (intermediate); 3 (basic competence); 4 (proficient). Results: On average across competencies, residents rated themselves as novice pre-course (M = 1.38, SD = .51), between intermediate and basic competence mid-course (M = 2.44, SD = .70), and between basic competence and proficiency at the end of the course (M = 3.31, SD = .51). There was variability in ratings across residents and across competencies. For example, 68% of residents rated themselves as proficient in establishing therapeutic relationships by the end of the course, whereas 22% of residents viewed themselves as proficient in functional analysis and behavioral modification strategies at this time. For the 22 residents who completed pre and end-course evaluations, end-course ratings were significantly higher than pre-course across all seven competency domains in paired samples t-tests, t(21) ranging from -7.71 to -12.21, all p < .001.

Discussion: A psychotherapy course on CBT including an array of learning techniques resulted in resident-identified competence at the basic and proficient levels using an innovative assessment technique. Residents are unlikely to have exposure to CBT psychotherapy prior to the course, highlighting the value of dedicating educational opportunities to this psychotherapy practice. Residents overestimate their competence, as typically multiple years of training and supervision are needed to obtain proficiency in CBT and the goal of this course is the development of basic competence. This suggests the importance of education about ongoing training and supervisory needs in psychotherapy for residents. Conclusion: Psychiatry residents gain competency in CBT psychotherapy knowledge and practice through educational didactics and the use of novel self-assessments during the training year facilitate understanding of resident-identified learning needs and progress.
The Crimson Care Collaborative (CCC), a network of six student-faculty clinics, was created in the hopes of increasing primary care interest among Harvard Medical School students. In the past, we have used patient satisfaction surveys to evaluate the quality of care in our clinics. Identifying important aspects of care through patient feedback has led to many quality improvement initiatives in primary care such as reducing wait times and the incorporation of interdisciplinary services. However, a low response rate to patient satisfaction surveys suggests that a new method is needed to obtain patient feedback. We have designed a quality improvement project that uses comment cards to gather more patient input.

Objectives of the Intervention

- Assess the quality of care provided
- Identify issues of concern for patients

To elicit feedback from patients, comment cards were administered to patients at CCC clinics affiliated with Massachusetts General Hospital (MGH). CCC-Chelsea (a community health center), CCC-Internal Medicine Associates (IMA, located at MGH), and CCC-Revere (a pediatric community health center) provide multispecialty services to underserved populations. The comment cards included three qualitative and three quantitative questions to assess patient experience and satisfaction of care. The comment cards were offered in three languages: English, Spanish, and Portuguese. All responses were anonymous and patients placed their comment cards in a secured box upon completion of their visit.

Findings to date

<table>
<thead>
<tr>
<th>Positive Feedback</th>
<th>Areas Needing Improvement</th>
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<tbody>
<tr>
<td>Friendliness of Staff</td>
<td>Long Wait Times</td>
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<tr>
<td>Attentiveness of Staff</td>
<td>Too Many Staff in the Room</td>
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<tr>
<td>Thorough Care</td>
<td>Long Clinic Visits</td>
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Out of the 73 patients who submitted a comment card, 33% always saw their provider within 15 minutes of their appointment time and 45% were kept informed about how long they would need to wait for their appointment to start. Patients at CCC-Revere were the least informed about their wait times. When asked to rate their provider on a scale from 0-10 (with 10 being the best provider possible), 89% of the patients reported a score of 8 or higher. CCC-IMA had the highest provider ratings compared to CCC-Revere and CCC-Chelsea. Comment cards proved to be a quick and effective way of gaining patient feedback and can be used to guide clinical training for medical students while improving patient care at CCC. Future efforts will include using the comment cards for internal and external benchmarking.
THE TELL-TALE HEART: WIRELESS CONTINUOUS HEART RATE MONITORING OF TEAMS DURING CRISIS SIMULATION IN AN IN-SITU OPERATING ROOM

Phitayakorn, R1,2, Petrusa ER1,2, Eromo E2,4, Gee D1,2, Hemingway, MW2,3, Minehart, RD2,4, Pian-Smith MCM2,4, Gordon JA5,2

1 Department of Surgery, Massachusetts General Hospital (MGH), Harvard Medical School, Boston, MA
2 MGH Learning Laboratory, MGH, Harvard Medical School, Boston, MA
3 Department of Perioperative Services, MGH, Boston, MA
4 Department of Anesthesiology, Critical Care & Pain Medicine, MGH, Harvard Medical School, Boston, MA
5 Department of Emergency Medicine, MGH, Harvard Medical School, Boston, MA

INTRODUCTION:
Participants’ emotional arousal in simulation-based OR team training can enhance learning. Monitoring emotions is also important to understand stress responses during OR crises. We hypothesized that heart rate (HR) monitoring is feasible during OR team training, that HR would be higher during cases and be different based on scenario type, professional group, and experience level.

METHODS:
192 OR professionals participated in team training. Simulation phases were Orientation, Case and Debrief. Differences in HR were analyzed by participant demographics across simulation phases. HR was correlated with GSR.

RESULTS:
Seventy four percent of simulation participants also participated in this study. Mean HR was significantly higher during Case than Orientation and Debrief (83.6 vs 76.8 and 76.0, p=0.001) for all groups combined. Maximal HR was significantly higher during Case than Debrief, but not in Orientation (108.2 vs 104.7 p = 0.02 and 106.3) No significant differences in mean or maximal HR were found for scenario type, professional group, or experience levels across each simulation phase, but there were significant HR differences for experience level within each professional group.

CONCLUSIONS:
Participants accepted HR monitoring during simulation training. Higher HR during cases indicated all were emotionally engaged. Real-time HR monitoring could be used for individually tailored simulation learning.
Relationship between Physiologic and Psychological Measures of Autonomic Activation in Operating Room Teams during a Simulated Airway Emergency

Phitayakorn R\textsuperscript{1,2}, Minehart RD\textsuperscript{2,3}, Hemingway MW\textsuperscript{2,4}, Pian-Smith MCM\textsuperscript{2,3}, Petrusa E\textsuperscript{1,2}.

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\textsuperscript{4} Department of Perioperative Services, MGH, Harvard Medical School, Boston, MA

Introduction
Emotional stability is important for individual and team performance during operating room (OR) emergencies. We compared physiologic and psychological anxiety assessments in OR teams during simulated events.

Methods
Twenty-two teams participated in a “cannot intubate/cannot ventilate” simulation. Participants completed the State-Trait Anxiety Inventory (STAI) and wore a galvanic skin response (GSR) sensor. Differences in STAI scores and GSR levels were analyzed. Anxiety scores were correlated with GSR levels.

Results
Resident physicians had significantly higher trait anxiety than the nurses, CRNAs, and surgical technicians (43.9±9.9 versus 38.3±9.3, \(p<0.01\)). Senior practitioners had significantly higher trait anxiety than junior practitioners (43.7±9.6 versus 40.0±9.9, \(p=0.03\)). All groups showed significant increases in GSR. Psychological and physiologic data did not correlate.

Conclusions
Senior practitioners and residents have higher levels of baseline trait anxiety for unclear reasons. Also, OR team training results in physiological signs of anxiety that do not correlate to self-reported psychological measurements.
IMPACT OF A PROFESSIONAL EDUCATION PROGRAM ON PHYSICIAN AND PATIENT METRICS IN DIABETES CARE

Garcia-Dolagaray G BS², Romero-Ibarguengoitia ME MD MS², Okeke E MD¹, Gautam S PhD³, Kuc K MPH¹, Neighbours J MEd¹, Caballero AE MD¹,²

(1) Professional Education Department, Joslin Diabetes Center, Boston, MA 02215, USA
(2) Latino Diabetes Initiative, Joslin Diabetes Center, Boston, MA 02215, USA
(3) CRC Biostatistics Program, Beth Israel Deaconess Medical Center, Boston, MA 02215, USA

Objectives: 1. Evaluate the impact of a professional education program on primary care providers’ (PCP) knowledge, confidence, competence, and daily practice in the management of blood pressure (BP), LDL cholesterol (LDL-C), and HbA1c in patients with type 2 Diabetes (T2DM). 2. Evaluate the impact of the program on BP, LDL-C, HbA1c, and BMI of their patients. 3. Evaluate the correlations between the different provider assessment methods.

Methods: We implemented an online education program in 2013 for PCPs in two select practices in Wisconsin and Illinois. A Self Report Survey (SRS) evaluated confidence and daily practices. Case Vignettes (CV) evaluated knowledge and competence. Both were given at baseline and after completion of the educational interventions. In addition, we analyzed clinical parameters in patients followed by these PCPs. These parameters included BP, LDL-C, HbA1c, and BMI. We log-transformed data as appropriate and performed t tests, interclass correlations, and a mixed linear regression model.

Results: 48 providers completed an initial SRS and CV. At follow-up, 45 completed an SRS and 44 completed a CV. We analyzed data for 6,513 of their patients. The daily practice SRS subscore for management of both BP and LDL-C showed a statistically significant difference from baseline to the end of the program (Mean±SD) (74.8±1.3 vs 83.0±1.2, p = 1.67^05). The SRS total score, which also includes confidence for both topics, improved as well (81.3±9.0 vs 86.2±8.4, p = 0.00013). The CV lipid knowledge and competence subscores also improved (65.5±2.7 vs 73.7±2.5, p = 0.02). However, the BP subscale and CV total score did not change (p > 0.05). Interestingly, there was no correlation between CV and confidence assessment methods because total confidence subscore for managing BP and LDL-C was higher than CV total score (baseline: 85% vs 75%, p< 0.001; follow up: 90% vs 79%, p <0.001).

Mean BP, LDL-C, HbA1c, and BMI did not change in follow up (p>0.05). However, when analyzing baseline data our regression model showed that the odds of a patient having an HbA1c, BP, or BMI at goal increased with higher provider scores on the CV (p <0.05). Similar data were seen with HbA1c and SRS scores (p<0.001). In addition, the odds of having an LDL-C at goal increased along with provider lipid confidence scores (p<0.01). Similar results were seen with BP and BP daily practice scores (p<0.05). When analyzing follow up data the odds of achieving an HbA1c at goal improved as CV total score increased (p <0.05). The same trend was seen for BP and SRS total score (p <0.01).

Conclusion: This education program significantly improved several knowledge, confidence, and daily practice indicators of BP, lipid, and DM management among the study population of PCPs. The odds of achieving select DM management goals in patients improved with increasing scores among providers. The different assessment methods yielded inconsistent correlations.
Continuing Medical Education

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TheAnswerPage.com™ (TAP) is an online medical education resource that delivers current, high-quality unbiased content in an innovative, time-saving format across multiple specialties including Anesthesiology, Perioperative Medicine, Pain Medicine, Opioid Prescribing, Palliative Care, Hospital Medicine, Medical Statistics, and Risk Management.

It is recognized that an opioid addiction epidemic exists in the United States. Although the U.S. population comprises only five percent of the world’s population, the people in the U.S. consume approximately eighty percent of the world’s opioid supply. Some states, including Massachusetts, have developed task forces to address this issue. In 2015, the Massachusetts Medical Society and Governor Baker’s Office asked TheAnswerPage to create novel content in an innovative on-line format to help doctors and healthcare professionals combat this epidemic. For Medical Education Day 2015, TheAnswerPage will be featuring our new educational opioid abuse initiative that is presently being utilized by the MMS in conjunction with Governor Baker’s Office.

TheAnswerPage was launched in 1998 in an effort to provide daily free education to doctors in training and in practice, and to address three major concerns that medical professionals share regarding on-going medical education: time, convenience, and quality. TheAnswerPage succinctly provides expert analysis of a specific topic for the busy clinician through its unique content delivery and testing methods, which include educational interactive CME crossword puzzles. TheAnswerPage’s database stores and organizes readers CME information and allows users to easily download, email, or print CME certificates at any time.

The Massachusetts Medical Society entered a joint sponsorship with TheAnswerPage in 2011. All activity has been planned and implemented in accordance with the Essential Areas and Policies of the Accreditation Council for Continuing Medical Education through the Joint Sponsorship of the Massachusetts Medical Society and TheAnswerPage.

The Answer page is read in over 120 countries, has granted well over 100,000 hours of *AMA PRA Category 1 CME Credits™* and has received thousands of “thank yous” from across the globe. Please review our book of readers’ comments!
Title: A Survey of Residents and Attendings Evaluating the Logistics and Goals of the Pre-Operative Phone Call

Authors: David Preiss, MD, PhD (Brigham & Women’s Hospital); Howard Zee, MD (University of Hawaii); Deborah Navedo, PhD (Massachusetts General Hospital Institute of Health Professions); Rebecca D. Minehart, MD, MSHPEd (Massachusetts General Hospital)

Introduction: It is common practice in academic anesthesia settings for residents to page their attending anesthesiologists the day prior to working together, in order to review cases for the next day. However, there does not appear to be standardization of when, how, and what to talk about, and the clinical and educational benefits of having these discussions may not be obvious. We conducted a survey of anesthesiology residents and attendings to evaluate the logistics and goals of their pre-operative phone call (POPC) experiences.

Methods: Following IRB exemption (Partners IRB, Boston, MA), an electronic 10-question survey was sent to a total of 303 faculty and 168 residents of all PGY-levels across two academic institutions, to inquire about their POPC experiences. Questions were both objective, such as frequency and duration of discussion, and subjective, such as opinions on the importance of the POPC to planning for perioperative events. In addition, each group was asked about their own perceptions of the other groups’ assumptions when a page or a call-back did not occur (i.e., attendings’ assumed reasons for not being paged, and residents’ assumed reasons for not calling back). Both quantitative and qualitative analyses were performed on the responses, including content analysis to identify emerging themes derived from free-text responses.

Results: 92 attendings and 80 residents responded for an overall response rate of 36.5%. Attendings and residents agreed on most objective questions such as length of POPC (between 10-30 minutes). Significantly more attendings than residents viewed the POPC as an important opportunity for residents to learn how to set up the OR (65% vs 34% ranked “very important,” p<.001 using Mann-Whitney U test) and to anticipate perioperative complications (60% vs 16% ranked “very important,” p<.001), though both reported these among the most important benefits of the POPC discussion. Assessing the residents’ skills was viewed as the least important by both groups. Qualitative analysis of the free text comments is ongoing; initial findings reveal potential discrepancies in concerns between the two groups. Overall, residents reported fewer benefits to having the POPC than the attendings, and furthermore seemed concerned that not paging their attending may reflect poorly on them.

Conclusions: Differing expectations between groups were present in understanding the utility and process regarding the POPC. Residents appeared to be more concerned about the lack of professionalism that not contacting their attendings might reflect, while attendings were planning for perioperative events. Setting expectations, and perhaps standardizing the process, in addition to clarifying the goals of the POPC, would be next logical steps.
CULTURE AND NONVERBAL EXPRESSIONS OF EMPATHY IN CLINICAL SETTINGS: A SYSTEMATIC REVIEW

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Abstract

Objective: To conduct a systematic review of studies addressing how culture mediates nonverbal expressions of empathy and communication in healthcare.

Methods: We searched 3 electronic databases (MEDLINE, PsycINFO, CINAHL) for studies examining how nonverbal communication and empathy were expressed across cultures in patient-clinician encounters. Included studies were peer reviewed, experimental or observational studies with adult subjects. Studies were excluded if patients had severe psychiatric or neurologic conditions, if health problems were addressed through non-traditional medical practice or if translators served as an intermediary in the clinical encounter.

Results: 15 studies met inclusion criteria: 7 quantitative cross-sectional, 1 randomized control trial, and 7 qualitative studies. Findings revealed that nonverbal expressions of empathy examined varied across cultures and were context-dependent. Race, nationality, gender and occupation mediated cultural differences. Racially discordant patient-physician dyads were associated with impaired exchange of clinical information and lower patient ratings of satisfaction, trust, and physician warmth.

Conclusion: Nonverbal communication plays a significant role in fostering respect and trust cross-culturally and influences empathy in the patient-clinician relationship. Culture-based norms and dynamic communication within patient-clinician dyads significantly impact the perceptive and responsive components of communication, including different expectations of and preferences for specific nonverbal expressions. While some nonverbal behaviors seem to be universally desired (e.g., open body posture, smile, warm facial expression), others can convey culturally different meanings (e.g. length and directness of eye gaze, hand gestures, touch, and silence). Furthermore, implicit cultural bias can be revealed through negative nonverbal expressions in the form of verbal dominance, closed body position, and/or reduced eye contact, which result in mixed or conflicting nonverbal communication.

Practice Implication: Medical education training should aim to improve perception and interpretation of patients’ nonverbal communications. Special attention to cultural norms, implicit biases, and awareness of patient and clinician nonverbal behaviors, will help to offset the power imbalance in medical relationships. Training efforts should also reflect the norms of diverse and local patient populations and not focus solely on the external, dominant culture. This approach will enhance trust, empathy, and effective communication in cross-cultural clinical practice.
PATIENT ENGAGEMENT IN OFFICE-BASED SURGICAL SAFETY: REVIEWING THE EVIDENCE TO DEVELOP A CHECKLIST FOR PATIENT USE

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Introduction: Checklists are tools developed to complete tasks by drawing on specific and relevant knowledge and supporting communication at critical times. Checklists designed specifically for patient use can promote patient engagement, potentially leading to improved quality of care. Physicians of all specialties, nurses, patients, patient advocates, and administrators can take an active role in checklist development and dissemination. Office-based procedure providers, for whom many of the existing checklists have been developed, can continue to enhance the quality of care that they deliver to patients by engaging in proper procedure and patient selection, provider credentialing, facility accreditation, and incorporating patient safety checklists and professional society guidelines into practice.

Methods: We performed a literature review concerning existing checklists and resources currently available to patients. Literature containing expert opinion regarding checklists, professional organization statements, and patients and providers were consulted.

Results: A template for designing a patient checklist was developed by incorporating methods from previous literature and resources regarding checklists. This template includes a development, drafting, and validation phase. Sample content for inclusion in checklists for patients with diabetes and patients undergoing anesthesia was devised. There is a lack of randomized controlled trials to determine how office-based procedures and anesthesia affect patient morbidity and mortality with and without checklist use. As a result, studies on this topic are retrospective in nature. Some of the early literature broached concerns about the safety of office-based procedures and anesthesia. However, more recent data have shown that care in ambulatory settings is comparable to hospitals and ambulatory surgery centers, especially when offices are accredited and their proceduralists are board-certified.

Conclusions: Developed by physicians with input from patients and other health care providers, this relatively novel concept of a patient’s checklist creates a role for the patient to ensure his or her own safety. With increasing attention to high quality, cost effective, patient-centered health care, patient satisfaction surveys are an increasingly important part of rating overall health care. Further development of patient checklists should be guided by specific medical conditions and acceptance by patients and providers. Providers can use these checklists as a method to gauge a patient’s understanding of an intervention, solidify the patient-physician relationship, and potentially improve patient safety.
ECHO-CT: ENHANCING GERIATRIC TRANSITIONS IN CARE EDUCATION THROUGH A MULTIDISCIPLINARY TELECONFERENCE

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Category of submission: Culture, Society and Community

Care transitions are increasingly identified as high-risk periods that can result in medical errors, poor communication and fragmentation of care. Transitions in care occur when one healthcare provider transfers the care of a patient to another provider. These transfers occur when a patient is admitted from the emergency room to the medical floor, transferred from the intensive care unit to the floor, discharged from the hospital to home, or discharged from the hospital to a skilled nursing facility. Standardization of hand-offs, verbal sign-outs and detailed discharge summaries have been shown to improve patient outcomes during care transitions, but these interventions can fail to engage the full multidisciplinary care team. Trainees and faculty currently receive little formal education regarding transitions in care despite its importance. We developed a novel curriculum for our learners through a multidisciplinary model utilizing video teleconference. ECHO-Care Transitions (CT) is a novel ‘learning laboratory’ that utilizes the ECHO (Extension for Community Healthcare Outcomes) videoconferencing model developed in New Mexico to disseminate specialized knowledge to clinicians practicing in the community. At BIDMC, we had developed ECHO models for patients with dementia and patients with hepatitis C. ECHO-CT was developed recently to address key issues in transitions in care when patients are discharged from the hospital to post-acute care sites. ECHO-CT clinic meets weekly at BIDMC to discuss the patients that were discharged over the past week to participating post-acute care sites. At these sessions, a hospitalist, geriatrician, pharmacist and social worker discuss the transitional issues that may have arisen since the patient arrived at the post-acute care site. Medical residents and medical students also attend and participate in the clinic as part of a formal curriculum in Transitions in Care. Through these multidisciplinary videoconferences, we collaborate to address key issues in transitions, including a thorough medication reconciliation, ensuring appropriate specialty follow-up for patients, closing the loop on pending labs and tests, and involving the PCP or discharging team to clarify the discharge plan, long-term goals, prognoses and issues when applicable. While investigations regarding the long-term outcomes of the ECHO-CT clinic are ongoing, to date the ECHO-CT model has discussed 702 patients discharged to 7 post-acute care sites. Education outcomes for hospitalists, post-acute care providers, residents and medical students are being assessed as well.
Abstract: Even as physicians are relying increasingly on expensive technology, more and more patients feel that their physicians lack empathy. The physicians and medical students themselves, trapped behind computer screens or under thick syllabi, often suffer from burnout. Many see the medical humanities as a powerful antidote to the de-humanization of medicine. The Carnegie Foundation recently cited the importance of humanities education in training more effective physicians, and the 2008 Task Force on the Arts at Harvard reiterated the benefit of the arts for all disciplines. Thus, in 2011, a group of HMS faculty and residents established The Committee for Arts and Humanities at Harvard Medical School, recently approved as the Arts and Humanities Initiative, in order to facilitate the training of well-balanced, creative, humanistic physicians. The Initiative has collected data, including a 2012 IRB-approved survey for the entire HMS community, which had 2,775 respondents: the majority of whom felt that medical education (67%) and patient care (75%) at HMS could be enhanced by incorporation of the arts. The Council has also executed a number of events, including Cultivating Humanism in Medicine Symposia (2011, 2013), Wintersessions at Harvard (January 2014, 2015), concerts, plays (particularly, HMS students helping stage the play "Wit"), poetry readings (including with the U.S. Poet Laureate Natasha Trethewey), and narrative medicine workshops. Surveys collected at two of these events have given both qualitative and quantitative data to support the idea of the benefit of the humanities for medical education. In the 2015 academic year, the Initiative will begin its first full season of arts opportunities for HMS students and faculty, beginning with a launch event on October 13, 2015.
A COMPILING ANALYTIC SOFTWARE PROGRAM FOR THE ACGME MILESTONES IS AN EFFICIENT, FLEXIBLE AND TIMELY MONITOR OF RESIDENT PERFORMANCE AND PROGRESS

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We sought to determine the efficacy of a compiling analytic software technology that assesses clinical progress through the Milestones on a rapid cycle, and to determine faculty and resident satisfaction with this software and its output compared to previous methods of reporting resident progress.

An analytic compiling software which codes daily observations of learners by instructors was modified to assess Child Neurology and Neurodevelopmental Disabilities residents’ performance on the CN or NDD Milestones. Supervising faculty were asked to post observations on performance they had seen on a given day, and assess for competency based upon the milestones’ criteria. The software then compiled a running set of metrics of a resident’s progress, both as an average score on individual milestones as well as groups of milestones. The software can be accessed from multiple hardware platforms (desktop, laptop, tablet, smart phone). We will demonstrate both input as well as report output.

The software readily showed resident’s performance in an easily interpreted set of graphics, and plotted progress over time well. It readily identified how a resident functioned compared to program peers in any given domain, and quickly identified areas where data or progress were lacking. This allowed the Program Director to urge attendings to provide more observation, or design rotations to make certain a given experience was available to a resident.

Residents were very enthusiastic about the way they could monitor their performance, compared to the previous system used (100% felt the feedback was “much better” or “substantially better”). They also expressed enthusiasm over the timeliness of observation and feedback that the software permitted. (100% felt feedback was “much better” or “substantially better”).

Faculty were also enthusiastic adopters. 95% of the clinical attending faculty utilized the software over the course of the year it was introduced, and required little prompting from program leadership.

The richness of the data set (each resident had on average 80 observations per half-year cycle) led both faculty and residents to feel the observations and feedback were reliable.

Conclusions: An analytic compiled software technology produces ongoing information of resident progress, which is viewed as efficient, flexible, and timely.
BARRIERS TO USING VIDEO-RECORDING IN PSYCHOTHERAPY TRAINING AND SUPERVISION

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Objective: Describe the barriers to using video-recording technology in learning and supervising psychotherapy as identified by trainees and supervisors.

Introduction: In a residency training setting for any medical specialty, both for training and billing purposes, patients are typically seen by a supervising attending. In psychiatry training, patients may be seen on the initial intake into clinic with a supervisor, but thereafter, the content of the encounters is related to the supervisor via the trainee's notes or memory of the session. Although this is the historical method of psychotherapy training, it clearly has numerous flaws. The supervisor remains legally liable for the care provided by the trainee as it is conveyed in the supervision session without ever witnessing the trainee providing care; quality control is based only on what the trainee conveys about the patient encounter during weekly supervision. While some residency programs do incorporate audio- and video-recording, there have been no studies examining the impact of video-recording on the quality of psychotherapy training. The American Association of Directors of Psychiatric Residency Training (AADPRT) does not have a model curriculum for psychotherapy education or guidelines for use of recording.

Research objectives: To assess attitudes toward, and barriers to the use of, video-recording in psychotherapy training and supervision via a survey of trainees and supervisors.

Methods: After obtaining IRB approval, an online survey was sent to current residents and psychotherapy supervisors. Current recording practices, attitudes toward recording, and anticipated barriers to using recording technology were assessed.

Results: Pending (survey due date is September 4).

Conclusions: Pending completion of the survey.
CHICKEN THIGH MICROVASCULAR TRAINING MODEL IMPROVES RESIDENT SURGICAL SKILLS
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Objectives:
Microsurgical technical skills are essential for arterial and venous anastomosis in free flap reconstructive surgery. It is difficult to teach these skills intraoperatively and several models have been developed to provide practice in the simulation environment. The chicken wing microvascular model is a high fidelity model that has been previously validated to differentiate between skill levels of surgeons. This study aimed to determine if use of this previously validated chicken wing model for microvascular anastomosis training objectively improves resident microsurgical skills.

Study Design:
Validation Study

Methods:
Thirteen resident trainees were given a tutorial session on basic microvascular anastomosis techniques and were then allowed to practice performing several microvascular anastomoses with a previously validated chicken thigh model. These anastomoses were video recorded. The time it took trainees to throw a single stitch during their first anastomosis was recorded and compared to the time it took to throw a single stitch during their last anastomosis. Comparison of first and last stitch time was completed using Student T test. All participants were surveyed regarding their experience with the simulator.

Results:
There was a statistically significant decrease between times for trainee’s first stitch compared to their last stitch, 235sec vs. 120sec (p = .0000072), with an average 48.7% (1min 55 sec) decrease in time. Junior (PGY2/3) and senior (PGY4/5) residents had similar decreases in time, 49.1% and 48.21% respectively. There was a non- significant trend of senior residents performing faster first throws than junior residents, 206 sec vs. 260 sec. 100% of residents felt they improved during the session and 92% of residents agreed or strongly agreed their final stitch was better than their last stitch. All residents agreed or strongly agreed the simulation was realistic, was effective in teaching the procedure, and would prove useful when performing a real procedure.

Conclusion:
The chicken thigh model for microvascular anastomosis demonstrated objective improvements in resident microvascular surgical skills.
CREATING AND SHARING LEARNER-GENERATED QUESTIONS THROUGH SOCIAL MEDIA: A PILOT STUDY
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BACKGROUND: Over the last 10 years, there has been increasing interest in the use of online tools to teach medical trainees and physicians at all levels. Most of the online educational material consists of videos or PowerPoint presentations that address particular medical topics. However, watching a PowerPoint presentation or online video is unlikely to be much different, or provide more benefit, than a traditional lecture. The only active learning that occurs in many online courses is through multiple-choice questions delivered at the end of the course. Social media platforms, on the other hand, allow users to participate in creating, sharing, and editing content—active strategies that could be leveraged for education. I sought to test the feasibility of developing a learner generated, question-based curriculum, and disseminate the results through social media.

METHODS: Rheumatology fellows were invited to participate via the American College of Rheumatology (ACR) Listserv. Each fellow was assigned one topic from the ACR Image Bank, a website with 1,500 rheumatology-related images. Fellows were asked to choose 3-5 images, and to create one question per image. Questions were limited to 90 characters, and the answers had to appear in the image description on the website. Once weekly, one question, corresponding image, and link to the Image Bank website was shared via the ACR account on Twitter, Facebook, and LinkedIn.

RESULTS: 28 fellows participated, creating a total of 113 questions. A post-intervention survey was answered by 24 fellows. 95% of fellows found question-generation a “valuable” or “very valuable” educational experience. 91% thought that creating image based questions was “useful” or “very useful” to learn rheumatology, and 91% of fellows expressed interest in participating in further versions of this project. 65% said that working in this project will make them more likely to participate in social media for professional use in the future. Analysis of the impact of the questions in social media are ongoing.

DISCUSSION: The majority of online medical education involves recorded lectures and PowerPoint presentations, which do not encourage active learning. Here, I show one way to leverage social media for medical education. Learners are empowered to generate educational micro-content, which is shared with their peers. The process of selecting an image and creating a question that addresses the important teaching points likely provides much educational benefit to the question-creator. At the same time, users that see the question benefit from the testing effect, the finding that material is better learned and retained when it is tested, rather than when it is simply read. Measuring the educational benefit of this strategy will be the focus of future studies.
Helping Hearts in Rwanda: A Digital E-learning Curriculum in Pediatric Cardiology for Clinicians in Low Resource Settings


Project Overview: Pediatric non-communicable diseases contribute significantly to the global burden of disease, yet many low resource settings lack access to pediatricians and pediatric subspecialists, limiting effective patient care and medical training. In Rwanda, the Human Resources for Health program aims to build capacity for clinical care with a collaboration between the Rwandan Ministry of Health and a consortium of US academic partners to support expanded residency programs in pediatrics and other specialties, with US faculty rotating to Rwanda for 3 to 12 month teaching positions. To strengthen training in pediatric cardiology within this program, we developed a digital tele-education e-learning curriculum in pediatric cardiology targeting residents and medical students in Rwanda. This e-learning curriculum will aim to effectively “flip the classroom” in Rwanda by allowing residents and medical students to learn about key pediatric cardiology topics online, and thus better utilize the costly and limited hands on bedside training time by faculty to provide increased and effective training.

Curriculum Development: To define the most relevant topics in pediatric cardiology, we utilized a modified Delphi approach. We developed a comprehensive potential topic list from the existing Rwandan post-graduate pediatric cardiology learning goals and from US pediatric residency ACGME competencies in pediatric cardiology, and surveyed US and Rwandan faculty to narrow to 10 core topics. We recruited lead authors with appropriate technical expertise from the pediatric cardiology faculty at Boston Children’s Hospital and from the pediatric faculty at the Kigali University Hospital. To provide support in developing material appropriate to low resource settings, we paired authors with pediatric generalists experienced in working in global health. Lead authors worked with the OPENPediatrics, a free knowledge sharing platform developed by Boston Children’s Hospital, to produce the curriculum. The 10 core topics are presented in a structured video-based curriculum including learning objectives, videos, and pre/posttests.

Implementation: Beginning in January 2016, resident and medical students at Kigali University Hospital, a main teaching site of the Human Resources for Health Program, will be introduced to the curriculum via multiple modalities including an on-site computer, a package available for personal laptop use, and access to the web based training package. Feasibility and impact of the use of an e-learning curriculum in a resource limited setting will be evaluated using utilization data, pre/post test score for each lesson, self-reported changes in competencies and pre/post qualitative assessment of perceptions and satisfaction with digital training materials. Following feasibility testing, this curricular model may be expanded to support training in pediatric cardiology in other low resource settings.
ASKUP: THE DEVELOPMENT OF A HIGH-EFFICIENCY LEARNING APPLICATION TO STIMULATE AND SHARE LEARNER-GENERATED QUESTIONS
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BACKGROUND
There has been increasing interest in the use of online medical tools to supplement, or replace, traditional methods of face-to-face teaching. Most online material consists of recorded videos or PowerPoint lectures, which are unlikely to be more effective than traditional lectures. Many online courses do not take advantage of findings from the science of learning, which emphasize fewer lectures, active learning, working on real-life problems, and creating and answering questions. We sought to develop an online application that employs these evidence-based learning techniques to enhance learning. We aimed to encourage the creation and dissemination of learner-generated questions, which have been shown to enhance lecture and reading comprehension for question-writers. In addition, sharing these questions allow other learners to engage in practice testing, a highly efficient technique for learning.

METHODS
We formed a collaboration between investigators at Beth Israel Deaconess Medical Center and engineers in the Teaching and Learning Technologies (TLT) program at Harvard University. Harvard College students majoring in computer science were recruited as programmers through the TLT Student Developer Program, in which students are paired with developers to create tools to transform teaching and learning within the Harvard community. Ruby on Rails was used as the programming language, and we employed Agile software development methodology as a framework to produce incremental improvements to the application based on user feedback.

RESULTS
We created AskUp (askup.net), a free, open-source web application that encourages learners to generate their own question and answer sets after any educational event (lecture, reading, video, patient encounter). Questions are stored in a question bank and can be shared with peers, who will have an opportunity to answer the questions. We piloted the application at Harvard Medical School and received useful student feedback that we incorporated in the latest version of our software. Our project also received a Spark Grant from the Harvard Initiative on Learning and Teaching.

CONCLUSIONS
With collaborations from various institutions within the Harvard campus, we created an online web application that uses evidence-based techniques to encourage active learning. Unlike most online modules—which are created by experts, time-intensive and costly to design, and difficult to maintain—AskUp is free to use and can easily be expanded to cover a myriad of topics at minimal cost. Future trials will explore the efficacy of using AskUp in various settings including college and undergraduate and graduate medical education.
HMX FUNDAMENTALS: PILOT OF ONLINE PRE-MEDICAL EDUCATION SERIES
Office of Online Learning, HMS External Education

Michael Parker, MD; Alexis Estrella, BA; Joanne Muller, MA; Kevin Brunswick, BS; Tasha Obrin, MS; Jackie Kustan, MA; Marshall Thomas, PhD

HMX, a new online learning initiative from Harvard Medical School, launched at the start of the 2014-2015 academic year with the creation of HMS External Education’s Office of Online Learning. HMX brings to bear the vast medical knowledge, clinical expertise, and academic excellence of HMS through online educational experiences directed at a variety of learners. In July 2015, our office ran an alpha pilot of our inaugural series—HMX Fundamentals. Developed with leading HMS faculty members and a skilled team of clinicians, educators, and creative production experts, the two-course series is designed to give pre-health students a head start in their first year of training. The courses focus on foundational concepts in Physiology and Immunology, taking traditionally difficult-to-learn topics and applying the latest educational research and digital technologies to enhance the student experience. We share preliminary results from this alpha pilot and examples of the materials used in the pilot here.

The HMX Fundamentals series alpha pilot comprised a mixture of videos, clinical cases, assessments, and interactive multimedia, released in a gated asynchronous format over the course of five weeks. We offered the series to incoming HMS, HSDM, and HST students on an elective basis, with no formal deadlines assigned. Detailed data was collected in the form of learning platform event logs, video viewing statistics, and student surveys. Objective measures of retention and engagement in course materials were high, particularly in comparison to other free, not-for-credit online courses. We found that many students re-watched videos to focus on interesting and compelling material. Students’ experience taking the courses was overwhelmingly positive, with many feedback responses highlighting the value of clinical connections and applications. Current team efforts focus on improving existing courses and incorporating our findings from this pilot into the design and development of future offerings.

1 In an accompanying poster, we present new analytics and visualizations developed using pilot data that will spur future innovation.
Measuring Non-technical Aspects of Surgical Clinician Development in an Otolaryngology Residency Training Program

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Abstract
Objectives: 1) To utilize the clinical practice instrument (CPI) to measure non-technical diagnostic and management skills during otolaryngology residency training, 2) To determine whether there is demonstrable change in these skills between PGY-2, 4, and 5 residents, and 3) To evaluate whether results vary according to subspecialty topic or method of administration.

Study Design: Prospective study utilizing the CPI, an instrument with previously established internal consistency, reproducibility, inter-rater reliability, discriminant validity, and responsiveness to change.
Setting: Otolaryngology residency training program

Subjects and Methods: The CPI was utilized to evaluate progression in residents’ ability to evaluate, diagnose, and manage case-based clinical scenarios. A total of 248 evaluations were performed on 45 otolaryngology resident trainees at regular intervals. Analysis of variance with nesting and post-estimation pairwise comparisons were utilized to evaluate total and domain scores according to training level, subspecialty topic, and method of administration.

Results: Total scores were significantly different among PGY-levels of training, with lower scores seen in the PGY-2 level compared to the PGY-4 or PGY-5 level (p<0.0001). Domain scores related to information gathering and organizational skills were acquired earlier in training, while knowledge base and clinical judgment improved later in residency. Trainees scored higher in general otolaryngology than in four subspecialties (p<0.003). Neither administering the examination with an electronic scoring system, rather than a paper-based scoring system, nor the calendar year of administration affected these results.

Conclusions: Standardized interval evaluation with the CPI demonstrates improvement in qualitative diagnostic and management capabilities as PGY-levels advance.

Key Words: validated instrument, residency, education, prospective study
MOVING BEYOND THE SILO MENTALITY: UTILIZING A PROBLEM-BASED APPROACH TO CATEGORIZE CAREERS

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Poster Presentation: Educational Technology

Background & Significance: Over the past decades, we have witnessed unprecedented technological exploration and innovation, which has changed our level of knowledge, created new fields and career options, while making others obsolete. To better organize the influx of information and advances, highly specialized journals, research institutes, professions, and disciplines were created. While this intense specialization serves the institutions and organizations that maintain them, these silos are becoming increasingly irrelevant to students as they make assessments about possible career avenues. To assist students with exploration of a career they may never have come across, we created Problem-Based Career Exploration. This paradigm defines an individual’s work according to the problem it addresses, and uses affiliation networks to showcase how people from various disciplines, and professions unite to address similar problems.

Innovation: In the literature, there is no standardized way of categorizing problems. We created the Outlaw Problem Index (OPI), a categorical system that ranges from the infinitesimally small to the infinitely large, based upon the ‘level’ on which disciplines/ professions potentially operate. The range was divided into twenty-one levels with each level given a numerical rating (from -10 to +10). The levels are defined as: Quantum (-10), Sub-Atomic (-9), Atomic (-8), Molecular (-7), Genetic (-6), Macro-Molecular (-5), Cellular (-4), Tissue (-3), Organ (-2), Biological System (-1), Individual (0), Familial (+1), Community (+2), Organizational (+3), Local (+4), Municipal- City/Town (+5), State (+6), National (+7), Regional (+8), Global (+9), Cosmic (+10).

Approach: Using a snowball sampling approach, 23 oral health professionals across disciplines, professions, institutions and sectors were individually interviewed about their current work. Interviews were conducted using a semi-structured interview guide. Participants were asked to define their work according to a problem it addresses. After the interview, each participant was sent a survey to complete which included a request to categorize the level(s) on which the problem they work to address operates using the OPI.

Results: Of the 23 participants (13 women, 12 men), 100% were able to define their work according to a problem it addresses. Twenty participants (87%) completed the survey, and 100% categorized their work using the Outlaw Problem Index. The mean number of levels selected from the OPI was six levels (range: 1-14 indices selected). The levels that were chosen by participants most often were: Community Level (n=15), Organizational Level (n=14), and the National Level (n=12).

Conclusion: Despite the profession and discipline, oral health professionals’ work addresses problems on a variety of levels. The Outlaw Problem Index can be used to inform the general public of the various levels on which professionals address problems in the oral health, general health, and general workforce arenas.
NOVEL ANALYTICS INFORM EVIDENCE-BASED IMPROVEMENT OF ONLINE COURSES

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One of the most promising aspects of online education is the potential for iterative and continuous improvement of instructional materials. With recent advances in online learning platforms, we are able to capture far more detailed and comprehensive records of students’ learning interactions than can be collected in traditional classroom-based courses. These data could be leveraged to discover the areas in courses where students struggle with content or lose interest. Past studies have tended to be descriptive, focusing on aggregate metrics of student engagement and stopout. In contrast, we aim to create metrics that will aid in the identification of high-value targets for course improvement efforts.

Here we present the preliminary analysis of data generated in an early pilot of HMX Fundamentals: online pre-medical courses in Physiology and Immunology offered to incoming HMS, HSDM, and HST students. Overall engagement and completion rates for both courses were high, despite the courses being optional and not for credit. This suggests that students will choose to engage in online curricula if the materials are relevant, high quality, and pedagogy-driven. We analyzed the learning platform event logs from this pilot to develop and test custom metrics and visualizations. With these tools we are able to identify and prioritize specific areas for improvement in future course iterations. Finally, we identify structural features of courses that correlate with student activity and stopout. These findings will inform the design of future courses and the improvement of existing offerings. More generally, our results represent a step towards making meaning out of the big data generated by high enrollment online courses.

1 In an accompanying poster, we present an overview of the HMX Fundamentals pilot.
Quick Medical Genetics: A YouTube channel for clinical genetics education

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Abstract

Purpose: Online videos are a potential resource for clinical genetics education. Yet, such videos lag behind textbooks, review articles, and online encyclopedias (e.g. OMIM, GeneReviews) in comprehensiveness and availability. Thus, I sought to establish a collection of clinical genetics lectures on YouTube, the most utilized source of free online videos.

Methods: A YouTube channel, Quick Medical Genetics™ (https://www.youtube.com/c/quickmedicalgenetics), was created and nine video lectures were piloted. Videos were short (< 15 min), focused on a single genetic disorder (e.g. ataxia-telangiectasia) or a family of genetic disorders (e.g. disorders of galactose metabolism), and were created with an anticipated audience of both trainees and medical professionals.

Results: The videos were viewed 1,132 times over a four-month pilot phase. The average view time was 4 min 14 sec, for a total of 4,736 minutes watched. Individuals in 96 countries watched the videos, the top 5 viewer origins being the United States, United Kingdom, India, Saudi Arabia, and Egypt. Thirty-four individuals subscribed to the channel.

Conclusions: The Quick Medical Genetics™ YouTube channel is a collection of free, easily accessible educational videos about genetic disorders. In a pilot phase, viewers from dozens of countries watched thousands of minutes of content. In order to be scalable to the large number of known genetic disorders, input from the genetics community will be necessary. Thus, I welcome videos from genetics trainees and professionals; please inquire at quickmedicalgenetics@gmail.com.
REMOTE TEACHING OF A TASK: TRIPLE TRANSDUCER SETUP

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Background: Medical technology is constantly evolving. With the advent of new devices and also considerable variability between the same device supplied by different manufacturers, medical professionals cannot possibly be fluent in the operation of every device. Even in anesthesiology, there are techniques and equipment that an anesthesiologist may never have encountered in training that are necessary on short notice. In this pilot study, we attempted to demonstrate the viability of remote teaching in acquainting anesthesiologists with unfamiliar equipment. In the literature there are case reports of real-time remote teaching, but no series evaluating the accuracy and timeliness of this novel educational technique.

Methods: Our initial pool of subjects included the incoming class of anesthesia residents, 19 in total. Each subject was placed in a room with an unopened, unassembled triple transducer and an iPad. An instructor (a senior anesthesia resident) connected with the subject via FaceTime and provided step-by-step instructions from a pre-drafted script on how to assemble the transducer. The instructors were allowed to repeat steps and provide real-time feedback to the subjects in order to facilitate proper assembly. Once a subject announced that she/he was finished, the timer was stopped and an independent party collected the transducer set-up to inspect for major errors in assembly.

Results: During this pilot phase of our study, we were able to successfully instruct 10 residents (100% of residents tested) to assemble a triple transducer via FaceTime. The average time to completion of the set-up was 8 min 21 sec with variability from 6 min 18 sec to 10 min 58 sec. The variability in time was primarily secondary to poor wifi and internet connections. There were no serious errors in any of the set-ups. The study was terminated early due to logistics and time constraints.

Discussion: The high success rate demonstrates that remote teaching via real-time media is an effective method of instructing residents in performance of a new task. The average time to completion of setup was actually over 90 secs shorter than an instruction video that is available on line on YouTube. Now that the tool has proven reliable in this setting, we plan to compare real-time instruction with more traditional methods of learning, such as watching a video or reading an instruction sheet. We would like to compare time to completion and error rate between these two groups to see if real-time feedback is at least as good as or superior to traditional teaching methods.

References:
SMARTPHONES FOR SMARTER FEEDBACK: USING PERSONAL SMARTPHONES TO PROVIDE INSTANTANEOUS DIDACTIC FEEDBACK
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Background: Medical student and resident feedback regarding teaching and didactics is critical for maintaining high quality educational programs, ensuring trainee voices are represented, and allowing teachers to understand how their efforts are perceived. While most feedback systems involve surveys completed at the end of a course, this limits the utility of feedback as it cannot be used to benefit the trainees providing it and may reflect educational needs that should have been addressed earlier. Thus real time feedback offers a solution in providing immediate information to faculty, administration, and trainees and the opportunity to enact meaningful change. In this technology demonstration, we explore how using trainees’ own smartphones and free tools from Google, anyone can easily create and run their own real time feedback system for free. At the Harvard Longwood Psychiatry Residency Training Program, we have already been using such a system for nearly one year now.

Methods: Using Google Forms, we created a brief survey asking residents about their experience and opinion of each didactic. Surveys are brief and ask only for a rating of seminar content and seminar process. Each survey session takes less than 10 seconds to complete. We provide residents (PGY1 – PGY4) each with a unique link to these online surveys and asked them to take a survey in a ten-minute window after each didactic session. As we know the time of each didactic, we can automatically associate each survey submission with the didactics it is rating based on the time. The system runs on both Apple and Android Smartphones and the Google Forms and Google Spreadsheets applications are free to use and requires minimal programming experience. In using this system for nearly one year, we have collected data on adherence, and solicited resident and faculty feedback through both individual discussions and class meetings.

Results: Resident and faculty feedback on this smartphone based didactic evaluation system has been positive. Adherence by residents in taking survey sessions after each didactic has been variable, but data suggests approximately 50% adherence overall. Through feedback, reported barriers to adherence have been forgetting / adjusting to this real time feedback model and feelings that feedback is only necessary if there is a problem. The technology demonstration will enable participants to take sample survey session on their personal smartphone, learn how it is stored in a data base, and see how real time reports are atomically generated for faculty.

Discussion: Real time feedback offers both trainees and educators novel information to optimize didactic learning. Implementing such a system is both feasible and free. The largest barrier is not related to technology, but rather the cultural shift of trainees taking multiple survey sessions on didactic days and faculty leaving time and reminding trainees to take surveys. We plan to continue to improve our system and will soon begin a quality improvement initiative to increase rates of adherence to survey sessions.
Background: Optimal design and implementation of pedagogical strategies within digital learning platforms have yet to be fully defined. The use of interspersed test questions (“testing effect”) has demonstrated improvement in knowledge gain in various educational settings, but requires further evaluation in the context of online learning and medical education. Ongoing investigation into how taking short breaks (independent of interspersed test questions) affects knowledge gain is also needed. This study sought to evaluate the extent to which answering interspersed test questions and taking periodic breaks while watching an online video affect knowledge gain.

Methods: PGY-1 and 2 pediatric residents were randomized to 1 of 3 groups: full video (control), logic puzzles, or short answer questions. Post-randomization, residents watched a video on high frequency oscillatory ventilation (HFOV) with or without breaks and answered pre- and post-tests before and after video viewing. Residents in the logic puzzles and short answer questions groups completed either logic puzzles or relevant content-based questions during breaks, respectively. Residents completed a 6-month follow-up post-test. Primary outcomes included change in test scores between and within groups.

Results: Forty residents provided data. Linear regression analysis revealed no significant increase in test scores when comparing test score differences across groups (p=0.3587). All groups demonstrated significant knowledge gain from pre- to post-tests (p<0.0001).

Conclusions: Neither answering interspersed questions nor completing an alternate mind-engaging activity during breaks while watching an online video improved knowledge gain as compared to the traditional video watching method without breaks.
USING EVENT-RELATED POTENTIALS AS A NEUROPHYSIOLOGICAL MARKER TO PREDICT LONG-TERM LEARNING

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The cognitive neuroscience of learning and memory has been well studied within the confines of laboratory environments, but fewer investigations have attempted to apply these principles into educational practice. Elucidating the memorial mechanisms used by students will allow for the development of practical classroom-based interventions, aimed to improve student performance within educational settings. Typical educational settings use final exams to capture student performance. However, final exams do not provide insight into how well learned course material will be retained after the conclusion of the course itself—something particularly important in healthcare professional education. A neurophysiological marker of long-term learning that could be assessed at the completion of a course would be useful in determining which type of teaching methods lead to long-term learning, and which methods do not. In the current study, we used electroencephalography (EEG) to measure event-related potentials (ERPs), in order to uncover a neurophysiological correlate of long-term learning in medical students. Thirty-four medical students from a gross anatomy course completed a computer-based memory task while EEG was recorded at three time points: prior to the course (Session 1), after the completion of the course (Session 2) and six months later (Session 3). During each session students were presented with anatomical terms from the course and were asked to respond as to whether they “Can Define”, are “Familiar” or “Don’t Know” each term. To analyze the data, we used a “subsequent memory” approach. Using individual behavioral responses for each anatomical term from Session 3, we measured the analogous ERPs for those terms from the Session 2 ERP data. This allowed us to determine how Session 2 ERP data could predict Session 3 behavioral performance. ERP analysis revealed a possible physiological marker of long-term learning located over the left parietal region, 800-1000 milliseconds post-stimulus onset. This area showed significantly more positive activity for items rated as “Can Define” compared to “Familiar” and “Don’t Know” six months later. These results suggest that an ERP marker observed at the completion of a course may be predictive of student retention of course content six months later. Such a marker of long-term learning would be useful to optimize teaching methods and identify students in need of remediation.

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Introduction Mind mapping is a visual, non-linear representation of ideas and their relationships, designed to help people learn more effectively. Prior studies using mind maps in medical education have shown mixed results in terms of improving critical thinking and long term recall. However, the majority of these studies limit their focus to basic principles of mind mapping, and do not address the importance of enhancing mind maps through the use of cognitive learning theory (CLT) principles. Our aim is to develop online educational modules that use the basic principles of mind mapping in combination with CLT principles to enhance the effectiveness of this tool in medical education.

Online module development In terms of CLT, we applied the principles of dual coding and cognitive load aiming to improve working memory function. We also applied the principles of retrieval based learning to improve the transfer of information into long-term memory. CLT principles were applied as follows:

**Dual coding:** The ability to code a stimulus in two different ways increases the chance of remembering that item. For example, when talking about risk factors for obstructive pulmonary disease, we use the word “smoking” plus a clip art image of a patient smoking.

**Cognitive load:** Each mind map image used to present novel information has an average of four “main branches”. This organization decreases intrinsic cognitive load by limiting the number of elements that must be processed simultaneously. For example, when talking about pleural disease, we created three main branches: fluid, air or tumor in pleural cavity. In order to decrease extraneous load, each mind map presents the information in a visual (mind map image) and spoken (audio recording) format. Decreasing intrinsic and extraneous cognitive loads allow working memory to better process all the concepts presented. This helps to better encode the information into schema structures in long-term memory.

**Retrieval based learning:** After the learner finishes reviewing a specific topic, they can access a navigation bar that allows them to indicate when they would like to re-study the mind map depending on their date of exam. The system will automatically send an email reminder with a hyperlink to access a “study mind map”. The “study mind maps” are recall exercises of concepts that the learner previously studied. We aim to use retrieval exercises to better transfer information into long-term memory.

Conclusion In summary, we have used principles of CLT to develop educational mind map modules. By enhancing this tool, we aim to simplify novel information and guide students to create schema structures in long-term memory. Learners can use these existing schema structures to aid in making sense of new information when transitioning into the clinical setting. Future studies that aim to assess the impact of mind mapping on learning outcomes may benefit from using this innovative approach.
Water Homeostasis: An Animated Journey

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Renal physiology is often cited as a significant educational challenge for medical students and trainees alike. The understanding of water homeostasis relies on core renal physiology topics that are notoriously difficult to explain through text, lending itself well an innovative educational approach.

https://waterbalance.atavist.com/water-homeostasis

This module contains high-fidelity animations* to anchor the reader to the important concepts and provide the framework for more detailed principles of physiology. The material presented is similar to a recently published Clinical Journal of the American Society of Nephrology (CJASN) review article by Drs. Danziger and Zeidel entitled “Osmotic Homeostasis”. These concepts are expanded with the use of these animations, as well as additional text and static images. Long-term retention of essential concepts covered in this animated module will be assessed among nephrology fellows by distributing either the review article itself or the module, followed by a knowledge quiz at six months following the intervention. We hypothesize that those assigned to the innovative animated module will have superior results.

This work represents the first step in creating a comprehensive library of animation-based physiology modules covering a wide range of topics, including fundamental physiology, glomerular disease, transplant immunology, and other core topics.

*These animations were created by artists at Visible Body (www.visiblebody.com), a company that develops 3D anatomical models of the human body.
DEVELOPMENT AND IMPLEMENTATION OF A CHILD NEUROLOGY OBSERVED EXAMINATION TOOL

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Background: The neurologic examination is important to the clinical care provided by generalist and subspecialty pediatricians in many disciplines; however, this examination is perceived as difficult and unfamiliar. As part of the Accreditation Council for Graduate Medical Education (ACGME) milestones requirements, pediatric residents are expected to incorporate neurologic exam skills appropriately into their evaluation of patients. As part of a comprehensive educational curriculum in child neurology for residents in general pediatrics, child neurology residents (“observers”) observed neurology examinations performed by pediatric residents (“examiners”) and provided formative feedback. There was no pre-existing validated instrument with which to guide and assess these examinations or to support giving specific verbal or written feedback to examiners.

Methods: We created an observed examination tool based upon a screening pediatric neurologic examination at a level that could be reasonably expected of non-neurologists. Content validity was established through literature review and expert consensus. Using a modified Delphi method, we incorporated input from four experienced attending clinicians, three neurologists and one general pediatrician, to arrive at the consensus examination. Each element of the examination could be scored as “performed correctly”, “performed incorrectly”, “not performed”, or “not applicable” for the patient’s age. There was a prompt for observer comments. Each examiner received the completed form and will return annually for additional observed exams. The first version of the tool was used in one cycle of approximately 60 observed exams. Feedback on the experience was elicited, and completed tools were reviewed. Modifications were made to the form to improve its usability and utility and to support establishment of predictive validity by assessing whether examiners’ ability to detect abnormal exam findings correlated with their performance on the observed examination as captured by the tool.

Results: Our method produced a concise yet complete pediatric neurologic examination; the form itself provided adequate detail to address each individual item and to structure the overall examination, as well as to provide specific feedback. On a review of 23 forms, the majority of items were “performed correctly”; however, in most cases there were at least a few “not performed,” indicating a reasonable level of difficulty with room to improve. “Performed incorrectly” was rarely marked, likely due to being prompted or corrected during the encounter. Of 23 forms, 13 had written comments, 9 of which were formative. Of 30 surveyed pediatrics residents, 22 said it was “moderately helpful” or “extremely helpful” to receive feedback on their neurologic examination skills.

Conclusions and Future Directions: The teaching of the pediatric neurologic examination to pediatrics residents was supported by the use of an observed examination tool with content validity. Inter-rater reliability will be established by assessment of standardized examination videos by multiple observers. Predictive validity will be established by the use of the second version of the tool and by its future use with examiners of multiple levels (including medical students and child and adult neurology residents).
Shared Decision Making in Medication Prescriptions: Improving Communication Skills and Professionalism for Internal Medicine Residents

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Background: The purpose of this study was to develop and implement an educational workshop for physicians-in-training to enhance communication skills and promote shared decision making with their patients in all clinical interactions, with a specific focus on decision making and counseling about medications for four target chronic conditions (diabetes, depression, hypertension, and hyperlipidemia).

Methods: We used a mixed methods approach to understanding our residents’ perspectives on SDM, improving resident knowledge about SDM, and implementing the use of a novel paper decision aid for resident training in conducting SDM conversations. We ran focus groups with residents to elicit challenges to having these conversations and to get feedback on a print decision aid tool, called a Decision Worksheet. A workshop curriculum was then developed and offered to the MGH internal medicine residents in the ambulatory curriculum. A variety of educational approaches were used including a didactic presentation of information on risk communication, introduction of the Decision Worksheet to guide conversations about chronic conditions, and role-playing exercises focused on decision making for a chronic condition with and without the Decision Worksheet. Participants were provided written cases at the beginning of each session to complete in the first 15 minutes prior to the presentation. The pre-test exercise was later examined for presence of 6 steps of shared decision making. They were also given time at the end of each workshop to complete a 20-question evaluation form that assessed their ratings of the workshop. We also tracked the number of times that Decision Worksheets were downloaded from an internal website.

Results: One hundred and ninety residents were invited to attend the workshops over a 4-month period (November 2013-February 2014). One hundred and ten were male and 80 were female. One hundred and thirty residents actually attended the workshops. Forty nine were PGY-1 and 81 were PGY 2-4. The interns rated the workshop higher than the residents (81% very useful content & 62% excellent overall rating vs. 46% very useful & 41% excellent). 89 written cases were completed during the workshops that revealed how residents would approach a discussion with a patient coming in with symptoms of moderate depression. While virtually all respondents indicated they would discuss medication and counseling with patients, only 29% would discuss behavioral treatments. In the sample note, only 40% documented that they presented an option other than medication, 62% documented discussion of risks of medications, and 35% documented discussion of benefits of medication. Only 14% documented patient’s goal or preferences and 37% documented a joint decision. For the most part, the note simply documented prescription for an antidepressant medication. The new tool, the Decision Worksheet, was stored on a primary care-focused intranet accessible to all hospital clinicians. The 4 Decision Worksheets were downloaded 1500 times in the first 8 months following their introduction online.
Conclusion: The workshop introduced internal medicine residents to a communication strategy of conducting shared decision making in routine clinical decisions, with a specific focus on decision making for chronic condition management. The focus groups and the written case exercises provided evidence that residents need training to put shared decision making into practice. The skills for inviting patients to participate, describing risks and benefits, and supporting deliberation among options are not well developed. The Decision Worksheets also generated significant interest from our general medicine clinicians and have continued to be used regularly in the course of routine primary care.
A CADAVERIC PROCEDURAL ANATOMY COURSE ENHANCES OPERATIVE COMPETENCE

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Background: Inadequate anatomy training has been cited as a major contributor to declines in surgical resident operative competence and confidence. We report the impact of a procedurally-oriented general surgery cadaveric dissection course on trainee operative confidence and competence.

Methods: After obtaining IRB approval, postgraduate year 2 and 3 general surgery residents were prospectively enrolled into two cohorts: (1) an intervention group (n=7) participating in an 8-week procedurally-oriented cadaver course, and (2) controls (n=7) given access to course materials without participation in cadaver dissection. At both the beginning and end, we utilized two evaluation instruments: (1) an oral examination using standardized templates, and (2) a questionnaire assessing operative confidence.

Results: There were no intergroup difference in baseline characteristics. Residents who took the anatomy course had significantly higher improvements in examination scores on common bile duct exploration (CBDE) (33%±8% v. 10%±7%, p=0.04), femoral endarterectomy (43%±5% v. 11%±7%, p=0.003), fasciotomies (55%±10% v. 22%±9%, p=0.04), inguinal hernia repair (20%±9% v. -14%±5%, p=0.005), superior mesenteric artery (SMA) embolectomy (38%±10% v. 2%±11%, p=0.04), and overall (31%±4% v. 8%±3%, p=0.0006) (Figure 1.) In addition, they reported higher operative confidence on CBDE (p=0.008) and SMA embolectomy (p=0.02), and a trend towards higher overall operative confidence (p=0.06.)

Conclusions: We demonstrate that a procedurally-oriented cadaver course covering a wide range of essential general surgery procedures resulted in significant improvements in self-reported operative confidence and competence as assessed by oral examination.

![Fig. 1 – Change in oral examination scores. CBDE = common bile duct exploration; EA/PA = endarterectomy/patch angioplasty; IHR = inguinal hernia repair; FHR = femoral hernia repair; SMA = superior mesenteric artery; * = p<0.05, ** = p<0.005, *** = p<0.0005]
A web-based curriculum intervention for endocrine education for internal medicine residents

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The traditional education in the endocrinology division at BIDMC (similar to many subspecialty rotations at academic institutions) is during “teaching rounds”, when attending physicians review cases that the residents see on their inpatient consult service, and use the opportunity to lecture the residents regarding a relevant topic.

A web-based educational approach is an innovative way that, when reinforced with a patient scenario, will provide a more lasting education. In the “flipped classroom” technique, students first study the topic themselves, often by using prepared video lessons. The knowledge is applied during the classroom time by solving problems and doing practical work. This technique has been studied and implemented extensively in undergraduate medical education as well as in procedural training in postgraduate medical education. However, there is a paucity of data looking at the implementation of this teaching technique in internal medicine subspecialty education, particularly in endocrinology.

Internal medicine residents who elect to rotate for three weeks through the endocrinology inpatient and outpatient consult service view a short (4-7 minute) web-based video that reviews the fundamental aspects of two topics (adrenal insufficiency and amenorrhea) prior to a thirty minute classroom discussion (led by the principal investigator). The discussion is a case-based discussion centered on a single patient presentation (which will not change throughout the investigation). Outcome assessment is based on improvement from a pre-test (administered prior to viewing the web-based video), a post-test (administered at the end of the rotation), and a retention test (administered 3 months after the rotation). The comparison group is a different group of internal medicine residents, who rotate through the endocrine service, but who do not receive the same web-based video review or the case-based teaching discussion; they receive the same pre-tests, post-tests, and retention tests as the intervention group.

This study will examine the effect of a web-based flipped classroom technique on knowledge acquisition and retention following enrollment in the endocrine rotation, as well as satisfaction with the endocrine rotation by internal medicine residents. Internal medicine residents who receive a web-based flipped classroom curriculum will demonstrate a lasting improvement in knowledge in the topics covered. Further, surveys will rate the endocrinology elective as more satisfying than those residents who do not experience the same curriculum.
ADVANCES IN PATIENT INTERVIEWING AND PHYSICIAN EMOTIONAL SELF-CARE—AN ENHANCED CURRICULUM—

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Poster Presentation
Graduate and Undergraduate Medical Education

Advances in relationship psychology about sub-personality system dynamics, in interpersonal neurobiology about how emotions impact decision-making, and in neuroscience from fMRI studies of neural correlates of emotional regulation and empathy, all point to the conclusion that interpersonal relationships are powerful and necessary to accomplishment agendas of patient care, including behavior change, shared decision-making, and assimilation by patients of evidence-based information. The nature of the skill-learning required indicates that a siloed educational approach has significant disadvantages.

This poster outlines the knowledge base and strategies that must be taught and the mentored training components needed for learners to acquire the skills of interviewing and emotional self-care which facilitate health behavior change, information transfer, and informed, shared decision making in patients. The curriculum outline indicates both educational content and educational methodology for each component— with useful references to go deeper. The poster will give attendees future access to audio-visual interview demonstrations of about 15 minutes each performed by a competent clinician, for example, with a man newly diagnosed with diabetes II with barriers to information intake, with a woman newly diagnosed with breast cancer in decision conflict, and with a woman who struggles with ambivalence over her smoking and high risk for COPD. The stage of scientific validation of the theory, strategies and tactics mentioned are indicated.
AN INTAKE SURVEY AS A TOOL TO IMPROVE CARE AT A STUDENT-FACULTY COLLABORATIVE PEDIATRIC CLINIC

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Crimson Care Collaborative Revere Pediatrics1
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Category: Poster Presentation: Graduate Medical Education, Undergraduate Medical Education

Description:
The Crimson Care Collaborative at the Massachusetts General Hospital Revere HealthCare Center in Revere, MA (CCC Revere) is a weekly after-hours student-faculty collaborative pediatric clinic. Here we report on the implementation of an intake survey and how it has enhanced our understanding of the demographic characteristics and needs of our patients and their caregivers. Parents/guardians accompanying pediatric patients are asked to complete a seven-question, multiple-choice intake survey about the patient’s age, ethnicity, language spoken at home, primary caregiver, primary caregiver’s level of education, social service needs, and time taken to travel to the clinic. In the past five months, 41 patients have completed the survey. The average age of patients seen at CCC Revere is 5.8 years, and the caregiver accompanying the patient is most frequently the patient’s mother. The patient population is multiethnic, with a distribution comparable to the general Revere population (according to 2010 census data), except that a higher proportion of patients identify as Asian / Pacific islander (22.5% vs 5.6%). Many patients speak languages other than English at home, including Arabic (26.8% of respondents), Spanish (26.8%), Khmer (14.6%), and Chinese (4.9%). 61.5% of primary caregivers graduated from high school but not college. The majority (73.2%) of patients lived within 30 minutes of the clinic. 34.4% of respondents reported needing help with social services. The most frequently reported needs were help with paying for heat/electricity (18.8% of respondents) and finding housing (15.6%). The results of our intake survey thus far indicate that we are serving a patient population representative of the general Revere population. The results identify additional languages spoken at home and education attainment characteristics that could potentially affect caregiver/patient health literacy, and specific social services needs. The latter are guiding our current efforts to link patients to additional services and resources.
ASSESSING KNOWLEDGE AND ATTITUDES REGARDING THE ROLE OF COST-CONSCIOUSNESS AMONG MEDICAL STUDENTS

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Importance: Medical student knowledge and attitudes on cost-conscious care are germane to necessary reforms in medical education.

Objective: To assess medical students’ knowledge of health care costs and attitudes toward the current state and future direction of medical education on this topic.


Main Outcome and Measures: Knowledge of the systems context of health care costs, knowledge of local healthcare prices paid by private plans for commonly ordered tests, attitudes toward the role of physicians in considering costs when making clinical decisions, and attitudes towards the role of cost-conscious care in students’ own medical education.

Results: A total of 154 (46%) students responded. While 93% of students correctly answered knowledge-based questions on the systems context of health care costs, only 39.5% of students were able to estimate the prices of commonly ordered tests within an order of magnitude. Compared with 2nd year students, 4th year students were more likely to report that they received “too little” education about cost-conscious clinical care in medical school (p<0.05). More than 90% of students believed that knowledge of costs of care was an important part of their education. Compared with 2nd year students, 4th years were more likely to believe that a blood test should only be ordered if it has the potential to change management (p< 0.05), that generic drugs should always be considered before brand name medications (p< 0.05), and that it is unethical to incorporate issues of cost into decisions about medical care (p< 0.05).

Conclusion and Relevance: Although Harvard medical students are highly knowledgeable about the systems context of health care costs, they are less prepared to apply this knowledge to the care of patients, and are specifically lacking in knowledge of the prices of commonly ordered tests. Moreover, students believe that learning how to connect knowledge of health care costs to the care of patients is important but inadequate aspect of their education. As curriculum reform efforts seek to address this gap, survey courses in health policy and opportunities to pursue joint degrees in management or public health may not provide sufficient preparation.

Graduate Medical Education
Increased Resident Research in the Era of Work Hour Restrictions

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Category: Graduate Medical Education

Note: This project will be presented at the 2015 AAO-HNS/F Annual Meeting. It has been accepted for publication in Otolaryngology – Head and Neck Surgery.

Abstract

Objectives: 1) Evaluate changes in the resident publications over time, including before and after duty hour restrictions, and 2) identify factors statistically associated with publications during residency.

Study Design: Retrospective review of bibliometric data.

Subjects and Methods: Residents that graduated from an otolaryngology residency program from 1996 to 2013 were evaluated. Thomson Reuters Web of Science was searched to determine the number of indexed peer-reviewed publications before and after implementation of resident duty hour restrictions in 2003. Resident demographics, PhD degrees, training track and post-graduation plans were collected to determine factors associated with publication rate using multivariable regression analysis.

Results: During the studied period, 75 residents completed otolaryngology residency training and published a total of 294 papers, averaging 3.92 publications per resident during training. After work hour restrictions were implemented, the mean number of publications increased from 1.21 to 5.10 (p<0.0001). First author publications, clinical publications and basic science publications were all increased (p<0.001). In regression analysis, T32 grants (β=6.98, standard error (SE) =1.87, p=0.0004) and the time period after duty hour restrictions were introduced (β=4.72, SE =1.73, p= 0.0083) were positively associated with resident publications. Gender, PhD degree, and pursuit of fellowship training were not associated with increased publications (p>0.05).

Conclusion: There has been a significant increase in resident publications over time, coinciding with the implementation of work hour restrictions. T32 grants were most predictive of increased resident publications, while PhD degrees were not significantly associated.
DEVELOPMENT OF A WOMEN’S HEALTH CURRICULUM FOR INTERNAL MEDICINE RESIDENTS: A MIXED-METHODS APPROACH

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Background: Core competencies in women’s health have been outlined by multiple professional medical societies; however, there is no standard approach to deliver women’s health education to residents. Currently, no women’s health curriculum exists for internal medicine residents at Boston Medical Center, a large, safety net academic institution.

Aims: Assess faculty and resident perceptions of resident competency, topic priorities, and optimal teaching methods in women’s health using a mixed-methods approach, to inform development of a tailored curriculum.

Methods: We interviewed 7 primary care residents and 6 core faculty clinicians in the Boston University Internal Medicine program. These one-on-one interviews were transcribed and analyzed using grounded theory with a focus on women’s health education opportunities and barriers to implementation. Additionally, we disseminated an anonymous, cross-sectional online survey to residents and faculty preceptors. The survey assesses perceptions of resident competency to manage various women’s health conditions and how information on women’s health topics should be delivered.

Results: Qualitative interviews revealed that both residents and faculty support an increase in women’s health education and endorse achievement of a minimum level of proficiency in women’s health topics for all residents, regardless of career plans. A common theme emerged that identified inconsistency in resident opportunity to participate in women’s health training as a major barrier to achieving proficiency in women’s health. Heterogeneity in exposure to women’s health education varied with residents’ gender, personal interest, and exposure to individual preceptors. Preliminary survey data, with 38 of 146 residents (26%) and 17 of 48 (35%) of faculty responding, revealed a mismatch in resident and faculty perceptions. While 36% of residents reported they were comfortable managing women’s health conditions, only 6% of faculty believed residents to be comfortable. Similarly, 20% of residents reported their skills related to women’s health topics to be good or very good, while only 6% of faculty agreed.

Conclusions: Our mixed methods suggest that successful development of a new women’s health curriculum must address the inconsistency in resident exposure and opportunity, as well as the mismatch between faculty and resident perceptions of resident skills and comfort.
DIDACTIC INTERVIEW DAY MAY INFLUENCE APPLICANT DECISION ON RESIDENCY SELECTION

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Background: Emergency Medicine residencies often offer more than one day of interviewing per week during resident interview season. Some residencies choose to hold interview days to coincide with didactics. Given that residency didactics are weekly, some interview days may occur on non-didactic days. At our residency, Wednesdays are didactic days that include resident lectures, M&M and faculty administrative meetings. Most of the department leadership, core faculty and residents have protected time on these days. In contrast, non-didactics generally have no obligate administrative or resident activities scheduled. It is unclear if the increased presence of faculty and residents and exposure to didactics affects the likelihood of a resident matching in the program. In this study, we aimed to determine if there was a difference in matched residents who interviewed on Didactic versus Non-Didactic days.

Methods: We reviewed application files of the residents who matched at our program over the past 6 years. Using the interview date sheet, we identified which residents interviewed on Didactic versus Non-Didactic days. We excluded any resident who did not interview during the regular interview season. Proportions, confidence levels, and Fisher’s exact were calculated.

Results: 858 applicants were interviewed. Four residents were excluded; three who interviewed during their 4th year clerkship, and one who transferred into the program. Of the remaining 73 matched residents, 44 (60.3% (95%CI 49-71)) residents interviewed on Didactic Days and 29 (39.7% (95%CI 29-51)) residents interviewed on Non-Didactic Days (p=0.11).

Conclusion: A majority of the residents that matched at our institution over the past six years interviewed on Didactic versus Non-Didactic days, but we did not reach statistical significance. Given the increased presence of faculty and residents on Didactic interview dates, as well as participation in weekly M&M lectures, the greater exposure of interviewees to members of the residency may prove to be beneficial in residents choosing to rank our program highly. Larger and potentially multicenter studies would be needed to explore the impact of didactics as part of the interview day as well as investigating any confounding variables such as home institution and residents who rotated previously in the Emergency Department.
EAT, SLEEP, EXERCISE: USING NEUROSCIENCE TO FOCUS ON RESIDENT WELL-BEING

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Overview: Residents have difficulty maintaining healthy eating, sleeping, and exercising habits during the rigors of residency training. Psychiatry residents are also challenged by learning the neuroscience and neurophysiology that are fundamental to understanding motivation and behavior. The novel and interactive PGY I seminar called, “Eat, Sleep, Exercise”, is designed to approach both of these concerns simultaneously.

Course Design: This is a three-week course, with each week devoted to one topic, eating, sleeping, or exercising. Prior to class residents are expected to read a review journal article and answer questions about the neuroscience and neurophysiology of the topic. The class hour begins with reading a brief case about a patient with a psychiatric condition in remission, but who is still struggling with maintaining appropriate eating, sleeping, or exercising habits. That is the hook for the resident. After the residents are engaged, to ensure adequate understanding of the reading materials, the neuroscientist teacher reviews the answers to the questions about the neuroscience underlying the topic. The second half of the hour is devoted to role playing, with the physicians practicing explaining the neurophysiology to the “patient” from the case. Other residents and a psychiatry attending observe and offer feedback about the clarity and accuracy of the information described to the “patient”. The role playing reinforces and enhances the learning of the neurophysiology. As the residents are explaining the effects of eating, sleeping, or exercising on the brain, they also have the opportunity to reflect on their own habits and the potential effects of their habits on their own brains, cognition, and mood. The session ends with each resident briefly describing what they learned during the hour.

Resident Feedback and Future Improvements: PGY I residents were at different levels of readiness for absorbing neuroscience and neurophysiology. The papers selected had various levels of neuroscience detail, thus, were harder or easier to read. In the future, the authors may write manuscripts on each of these three topics in order to ensure a more even level of content density. The residents particularly appreciated the opportunity to translate the neuroscience and role play describing it to their patients. It is not known how much of an effect discussing the topics had on their own habits, but they did find the three topics selected germane to their own lives. The faculty will include a resident to co-teach the course, with the goal of encouraging more resident introspection into their habits.

Conclusions: This brief seminar is successful as it utilizes evidence-based teaching methods (role playing, testing on information learned, and self-reflection); introduces neuroscience translation early in the residency; and is directly applicable to patient care. In addition, it focuses residents’ attention on their own well-being.
EDUCATIONAL BENEFITS OF A HEALTH COACHING PROGRAM AT A STUDENT-FACULTY CLINIC: AN EARLY EVALUATION

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Poster Presentation: Graduate Medical Education

Purpose
Since the advent of motivational interviewing (MI) in the 1980’s, the patient-centered counseling technique has been shown to be effective in promoting behavioral changes in chronic care patients, particularly in overweight or obese patients.1 These patients spend a limited amount of time in office visits, and have a need for inter-visit care. The health coaching program at the Crimson Care Collaborative (CCC) at BIDMC has been designed to support patients seeking assistance with weight management, type II diabetes, and hypertension, while also providing students an opportunity to learn and practice MI.

Methods
This pilot program included 4 medical students and 1 pharmacy student who provided weekly to biweekly individual telephone counseling to a total of 6 patients over a minimum of 4 weeks. At the close of the program, students completed an evaluation survey involving both closed- and open-ended questions.

Results
When describing the most effective parts of the program, participants highlighted 1) relationship-building opportunities (“Meeting patients face to face initially makes the actual calls feel more personal”), and 2) skill-building opportunities (“Applying motivational interviewing”, “being able to record sessions and notes with the [online medical record]”). When asked about areas for improvement, participants noted the need for 1) better support and feedback (“there needs to be more standardization and follow-up with the coaches”), and 2) better training (the training was “too brief” and would benefit from “[having] incoming coaches observe a call [between an experienced health coach and a patient]). Finally, with regards to the future potential of the health coaching program, responses covered three themes: 1) the program can foster learning by doing 2) healthy changes can occur, but take time in chronic care patients, and 3) improved training for health coaches is crucial.

Lessons Learned
This early data provides rich information about the educational value of the health coaching program. Survey participants noted that the program taught them to help chronic care patients develop goals and action plans. Participants also believed the program could lead to long-term health benefits for patients, making it a win for both students and patients. Important areas for improvement included more training and support for health coaches. Future directions include gathering patient perspectives and feedback on the coaching program and how it can be improved.

References:
EFFECT OF A DERMATOLOGY CURRICULUM IN AN INTERNAL MEDICINE RESIDENCY PROGRAM

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Background: Medical school curricula in dermatology vary widely in quality and quantity. Half of schools surveyed require 10 or fewer hours of dermatology instruction. Eight percent of schools required no instruction in dermatology.

Objective: To study the effect of a dermatology curriculum on the knowledge, skills, and attitudes toward dermatology in an internal medicine residency program.

Methods: 158 medicine housestaff at BIDMC were invited to fill out a pre-intervention survey assessing our outcomes prior to our intervention. A curriculum map was devised to align dermatology topics with appropriate teaching venues. Dermatology lectures were delivered by combined medicine/dermatology residents as well as dermatology faculty. Attendance policy was no different from medicine didactic sessions. Housestaff were then invited to fill out a voluntary post-intervention survey. Surveys contained questions on self-reported attitudes and knowledge regarding dermatology and a 10-point objective knowledge assessment. Self-reported questions were answered on a five point Likert scale. Demographic information and potential confounding factors were included on the survey.

Results: 61 residents filled out the pre-intervention survey; 46 filled out the post-intervention survey. In adjusted analyses, the curriculum improved self-reported knowledge in dermatologic emergencies, skin infections, autoimmune diseases, and drug toxicities (p<0.05). The curriculum decreased self-reported interest in learning about dermatologic emergencies, skin infections, common rashes, and drug toxicities (p<0.05). Overall, there was no change in self-reported knowledge or interest in dermatology. There was a significant increase in comfort toward evaluating a skin lesion (p<0.05), but not a rash. The dermatology curriculum improved scores on a 10-point examination from a mean of 4.88 to 6.33 (p<0.05). In subgroup analysis, the improvement in objective scores for all respondents who are not current or future dermatology trainees was from 4.88 to 6.18 (p =0.001).

Conclusions: The curriculum variably improved self-reported knowledge and decreased self-reported interest in a variety of topics within dermatology. The curriculum improved scores on an objective knowledge assessment.
Effective Mentorship during Residency Training: Needs Assessment and Perspectives of Residents

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Background: Mentoring relationships are essential components of professional development in medicine. The many benefits to having mentors in academic medicine include: catalyst for career success and development, promotes career advancement, improves productivity with regards to publications and grants and improves self-efficacy in teaching. Residents have a lot to gain from having effective mentoring relationships during their residency training. The impact of mentor/mentee training programs on residents during training is unknown. In this study, we aim to gain a better understanding of residents’ experiences with mentorship during training, potential barriers to forming mentoring relationships and their perceptions of how mentors impacts their training and careers.

Materials and Methods: A cross-sectional mixed method online survey (administered with SurveyMonkey) was administered to 334 senior medical and surgical residents (PGY3 and above) at the Massachusetts General Hospital, Boston, MA. We had a response rate of 61.7% (N=204). Questions explored trainees’ knowledge and experiences with mentorship. The online survey took approximately five minutes to complete. Participants were recruited through their program directors and chief residents. Informed consent and authorization was implied by voluntary participation of residents and approval was granted by the Partners Healthcare Institutional Review Board. Data were collected between March and May 2015. Quantitative data was analyzed using SPSS version 17 and qualitative data was analyzed using content analysis.

Results: 52.5% of residents reported they self initiated their primary mentorship relationships as compared to 20.6% who were assigned mentors by their training program. 36.46% of female residents reported they have no structure to the frequency of meeting with their primary mentors as compared to 18.28% of male residents. The top three characteristics of an effective mentor qualitatively reported by residents include: approachable, available and supportive. 48.7% of residents reported yes to the question: Do you have needs for professional mentoring that are not being met? If so, describe. Some of the common themes from residents include difficulty in finding faculty with similar interests, not having enough research mentors, and finding mentors who can help them with work-life balance.

Conclusions: The relatively high response rate indicates the importance residents attach to issues of mentorship and should be a priority of residency program leadership. Most residents initiate their own primary mentorship relationship. Residency training programs can augment individual efforts with formal mentorship programs. Having a community of mentors is more effective than just one. Training programs should emphasize that one mentor is not sufficient. Most academic medical centers have established the value of mentor training programs for faculty. Residents are interested in receiving similar training because it will potentially optimize their mentorship experiences.
IMPACT OF NOVEL HOUSSESTAFF TEAM STRUCTURES FOR INPATIENT CARE DELIVERY

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Introduction:
The changing landscape of healthcare requires integrated team-based care delivery. The MGH Internal Medicine Residency Program employs a unique team-based model for inpatient care and graduate medical education. This model offers enriched educational experiences through greater collaboration and diversity of patients but may increase rounding times, reduce educational conference attendance, and limit physician familiarity with each patient. We evaluated the impact of five different team structures on rounding time, conference attendance, sense of team, and familiarity with patients.

Methods: Five regionalized team structures were implemented and studied during the last 10 weeks of the 2014-2015 academic year. All teams were led by a junior resident and supervised by 1-2 attending physicians. Four teams varied by patient census and number of interns: 24 patients with 5 interns (24-5), 20 patients with 5 interns (20-5), 18 patients with 4 interns (18-4), and 13 patients with 2 interns (13-2). Two hemi-teams, each with 12 patients and 2 interns (12-2), rounded separately but shared afternoon patient care responsibilities. Each team self-reported daily rounding times. Post-rotation surveys of attendings, trainees, and interdisciplinary staff were used to assess qualitative metrics.

Results: Teams recorded 192 rounding times (response proportion 69%). Mean rounding time was 4.3 hours (95% CI: 4.2–4.5 hours) across all teams. Team 24-5 rounded for 5.4 hours (95% CI: 5.1–5.7 hours) and was least likely to finish rounds in time to attend educational conference (37% of days). By comparison, teams 20-5, 18-4, 13-2, and the hemi-teams finished rounds in 4.8 hours (95% CI: 4.6–4.9 hours), 4.4 hours (95% CI: 4.1–4.6 hours), 3.2 hours (95% CI: 2.9–3.5 hours), and 3.8 hours (95% CI: 3.6–4.1 hours), respectively. Conference attendance was possible 81-83% of days on teams 20-5 and 18-4, and 98-100% of days on team 13-2 and the hemi-teams. Post-rotation surveys were completed by 78 residents and 29 attendings (response proportions 87% and 66%). Relative to prior experiences on larger teams, 91% of residents and 100% of attendings on team 13-2 reported increased team familiarity with patients; compared to 46% of residents and 33% of attendings on team 18-4. In contrast, a larger proportion of team members on hemi-teams reported decreased team familiarity with patients, including 46% of residents and 43% of attendings. Sense of team was lowest on the hemi-teams and highest on team 13-2. Regardless of team structure, 96% of residents and 100% of attendings believed their team delivered high quality patient care. In addition to residents and attendings, 45 interdisciplinary staff completed post-rotational surveys. Equivalent staff cared for patients on teams 18-4 and 13-2. When asked to identify their preferred team structure, 86% and 42% of staff preferred their combined experience with teams 18-4 and 13-2 over team 24-5 and team 20-5, respectively. Six percent of staff preferred hemi-teams over team 24-5.

Conclusions: We found a correlation between rounding time and patient census. When team census exceeded 20 patients, resident ability to attend educational conference dropped substantially. Not all models were equally rated by residents, attendings and interdisciplinary staff. Further work is ongoing to determine if team structures affected length of stay, 30-day readmissions, or patient experience.
Impact of the Resident-as-Teacher Video Series in Preparing Students to be Resident Teachers

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Purpose: To assess the efficacy of the Resident-as-Teacher Video Series in improving future trainees’ comfort and confidence in teaching.

Background: Residents spend at least 25% of their time teaching, but frequently report that they do not feel prepared for this role. Residency program directors, however, often cannot find time to prepare curricula. The Resident-as-Teacher Video Series is a multidisciplinary curriculum of short videos and training modules which demonstrates effective teaching techniques, designed for use in resident-as-teacher training. The efficacy of this curriculum in improving trainees’ comfort as teachers has not been evaluated previously.

Methods: Fourth-year Harvard Medical Students entering Obstetrics and Gynecology or Surgery residencies attended a four-week Boot Camp that included two 1.5 hour sessions in resident-as-teacher training. Four short videos were shown, followed by interactive training sessions on “Principles of Adult Learning,” “Clinical Teaching Skills,” “Providing Effective Feedback,” and “Teaching Procedural Skills.” Anonymous pre and post intervention surveys were obtained from students to assess changes in self-perceived teaching skills using a scale of 1 to 7. Median scores were compared using the Wilcoxon-Mann Whitney test.

Results: In academic years 2014 and 2015, 21 students participated. Participants demonstrated perceived improvements in: engaging learners of different levels (4 to 6, p=0.01); engaging the quiet learner’s participation (4 to 5, p=0.0005); comfort in giving feedback (5 to 6, p=0.07); and ability to balance the needs of patients with needs of learners (4 to 5, p=0.002).

Discussion: The Resident-as-Teacher Video Series is an effective tool for improving trainees’ confidence and comfort in teaching.
IMPROVING FEEDBACK IN GRADUATE MEDICAL EDUCATION

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Feedback has long been identified as an issue given inadequate attention in clinical medical education1,2. 57% of the approximately 90 residents recently surveyed in the Department of Internal Medicine Residency Program at the Massachusetts General Hospital (MGH) indicated that they receive feedback on the wards 50% or less of the time. Moreover, 62% of these residents indicated that less than 50% of the feedback they do receive is “useful” or “actionable.” These results are congruent with the literature regarding the lack of effective feedback in clinical education.

To address this issue, a group of interested residents and faculty have designed a yearlong initiative aiming at increasing the frequency and improving the quality of feedback residents give and receive on the inpatient units in the Internal Medicine Residency Program at the Massachusetts General Hospital (MGH). For this purpose, “high quality” feedback is defined as actionable feedback that addresses specific behaviors and increases a learner’s awareness of the skills she is performing well, as well as identifies and makes a plan to improve a learner’s performance in the areas in which her performance is not up to standard2. Our proposed intervention will occur in two phases. The first phase will be aimed at increasing the frequency of feedback occurring on the wards. As such, it will begin with one-hour noon conference teaching the basics of giving and receiving high-quality feedback. Over the following four months, residents on inpatient services will have an hour of time each week, previously a noon conference, dedicated to wraparound individual and group feedback. Residents will receive periodic reminders to conduct feedback sessions with their inpatient teams during this time. The second phase will aim to provide residents with concrete methods of giving high-quality feedback. It will be marked with another noon conference halfway through the academic year delving into the specifics of high quality feedback, and how to overcome barriers in giving and getting feedback in the medical education setting. Over the following three months, three videos demonstrating various styles and models of giving feedback will be presented to all residents. They will be encouraged to then practice and apply these methodologies in giving feedback to their peers and attendings. At the end of the academic year, there will be a noon conference to elicit overall assessment of the intervention. Progress will be assessed with a redistribution of the same survey from the beginning of the year to assess an improvement in the quality and frequency of feedback on the wards.

Periodic evaluation by the program administration and residents involved in the project will be critical to assess progress towards the initiative’s stated goals. We believe that the results of this intervention will be helpful to guide future efforts to promote increased high-quality feedback in graduate medical education programs.

IMPROVING FORMAL DIDACTICS FOR A NOVEL INTERNSHIP PROGRAM IN RURAL AUSTRALIA

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1. Background: In March 2015 I was hosted by the Rural Academic Center of the University of Melbourne through a Fulbright Senior Specialist Grant. I evaluated the Murray to the Mountains Internship Program (M2M). M2M was designed to be a gateway for general practitioners to serve the rural regions of the state of Victoria. At the end of 2014, M2M contracted with the University of Melbourne and its Rural Academic Center at Shepparton, to provide clinical management of the program. This is the first post-graduate training program in Australia with a university contracted for this role. We explored the programs teaching missions, goals and areas of potential improvement, focusing on formal didactics.

2. Methods: I visited regional and rural sites currently involved with the program, as well as sites being considered for expansion. I met with current interns, past graduates of the program, current supervisors of the program, and supervisors of past graduates. I attended a workshop and two clinical reviews. I developed an interactive seminar on current learning theory and we used the concepts of “desirable difficulty,” “spacing,” “interleaving” and “interval testing” to work with the managers of M2M to develop recommendations for improvements in the curriculum.

3. Results: Formal didactics should focus on topics that come up less frequently in the day-to-day life of an intern. Formal sessions should be reserved for skills that an active clinician must master, but that he or she might not encounter frequently enough with patients. Topics should also cover scenarios where a physician needs to be able to discern a clinical problem that needs more expert consultation. Didactics could be replaced entirely by online modules but the format serves other purposes. It builds a sense of mission, provides psychological support to interns, raises the profile of the M2M program and increases its value in the community. It also builds relationships critical to future functionality.

4. Conclusion: Decisions regarding what topics should be presented in the formal curriculum, and the order of presentation would be determined by focus groups that include a broad representation of all players. Topics and skills that are part of formal training should meet the following criteria: they are essential for a well-trained intern to know and they are not topics and skills developed during their day-to-day training. The concepts of interleaving, spacing and interval testing will be integrated into the formal curriculum. Online modules will support the curriculum.
INTRODUCING A CORRECTIONAL PSYCHIATRY ROTATION INTO A PSYCHIATRY RESIDENCY TRAINING PROGRAM

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Background: Since the 1970’s era of deinstitutionalization, when many State-run psychiatric hospitals closed, prisons and (particularly) jails have become the largest de facto providers of mental health care to the severely mentally ill. Despite correctional psychiatry being an essential part of community psychiatry (over 20% of persons in jail have severe mental illness), correctional psychiatry is not taught in most residencies, and there is a national shortage of correctional psychiatrists.

Method: Starting in October 2014, an MGH psychiatry resident began working at a large urban Boston-area jail, while the department worked with jail leadership to do a needs assessment of how a relationship between the two programs may be mutually beneficial. For the 2015-2016 academic year, a new, required, PGY-3 rotation in correctional psychiatry was introduced, with each third-year resident seeing patients at the jail, one day per week for eight or nine weeks. This rotation was started despite some potential difficulties, including a lack of formal relationship between the two institutions and a lack of on-site supervision by an experienced correctional psychiatry attending physician.

Result: The first pair of residents has now completed their rotation, which we are continuing to develop. Much more work is required to assess how the new rotation affects residents (such as increasing knowledge and skills, changing attitudes) and how it affects the jail (such as decreasing the average wait time for patients to see a psychiatrist). However, preliminary feedback from both groups suggests that the rotation is off to a good start, and that it may be providing benefit to the residents, the patients, and the jail staff.

Conclusion: Adding a correctional psychiatry rotation to an established psychiatry residency training program is feasible. While much more work is necessary to determine the long-term impact of such a rotation, this current venture demonstrates that it can be implemented despite some potential challenges; furthermore, early evidence suggests that such a relationship between a psychiatry training program and correctional facility may be beneficial to both institutions.
Is MTb Gram (+)?

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Among the many challenges facing medical students is a seemingly overwhelming excess of new scientific terminology to master. Worse yet, many of the terms date from centuries past, unmoored from current molecular understanding of the underlying biology. The attempt to carry names arising from classical medical theories -locked in by generations of use- over to modern pathophysiological models can be both awkward and confusing to new learners. A Rheumatologist, for example, treating headaches from Giant Cell Arteritis would be hard put to explain what this has to do with the flow of Rheum!

While working with the Partners eMicrobes Project, an online resource of Infectious Diseases cases with clinical images, disagreement arose regarding whether Mycobacteria should be included in the search results for Gram Positive organisms. After some discussion, it became clear that the answer is that it depends on what one means by Gram Positive! Is it what Gram observed and reported in the late nineteenth century? What a modern practitioner of his stain typically sees? What the actual biochemistry and ultrastructure -unknown to Gram- of the bacterial cell membranes are? What is the phylogenetic relationship of the organism relative to other canonical Gram Positives? Or even -practically speaking- where under standard MeSH terms an organism is “filed”?

Having managed the online question-and-answer forum for the HMS Microbiology course for several years, I recognized that “Is X Gram Positive or Gram Negative?” has been a recurrent question each year for “non-obvious” organisms: e. g. Rickettsia, Chlamydia, Treponema, Mycoplasma, Nocardia, and Mycobacteria. Given our experience with eMicrobes, it occurred to me that rather than trying to “fit” a nineteenth Century nomenclature based on chemical dyes into the molecular microbiology era, the question of what it means to be Gram Positive or Negative could be used as an “in” to help students develop a deeper understanding of patterns within the microbial world, most notably in the structure and origin of bacterial cell membranes (which otherwise may seem to students simply an unmanageable heap of unconnected facts).

Just as astronomers struggle deciding which solar system objects should be called Planets, taking the classical notion of star-like points of light “wandering” through the constellations and applying it to worlds now visited by spacecraft, so medical terminology must grapple with classical descriptions of illnesses and their causes in the face of rapidly progressing scientific understanding. For educators, this requires recalling how befuddling the terminology can seem when first learned, but also grasping the opportunity presented by this disorientation to help students learn in a broader context.
LEARNING PREFERENCES OF BIDMC ANESTHESIA RESIDENTS

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Introduction: As residents continue to refine how they learn after they graduate medical school, an understanding of learning preferences would be beneficial both to instructors as well as the trainees. The VARK questionnaire has been widely used in education and research in determining a learner’s preferred learning style. It identifies four types: visual, aural, read/write, and kinesthetic. The purpose of our study is to determine if anesthesia residents at Beth Israel Deaconess Medical Center (BIDMC) know their learning preference and to identify possible learning trends within our institution.

Methods: VARK questionnaires were administered to anesthesia residents at BIDMC. Additional data collected included patient demographics and perceived learning style preference. Questionnaires were distributed on paper and collected from residents during the same encounter. Perceived and actual preferred learning styles were compared using STATA Data Analysis and Statistical Software, and the exact McNemar’s test.

Results: Out of 73 eligible residents, 29 (40%) completed the survey. Forty-three percent of respondents perceived that they had a multimodal learning style, which was significantly higher than visual (11%, p = 0.04), aural (4%, p = 0.003), and read/write (7%, p = 0.01). Thirty-six percent believed they had a kinesthetic learning style, which was significantly higher than aural (p = 0.01) and read/write (p = 0.04). Based on the results from the VARK questionnaire, 48% of respondents actually had a multimodal learning style, which was higher than visual (14%, p = 0.03), aural (14%, p = 0.03), read/write (14%, p = 0.03), and kinesthetic (10%, p = 0.01). A lower percentage of respondents actually had a kinesthetic learning style than they perceived (p = 0.04). Overall, 79% of respondents correctly perceived at least one preferred learning style while 21% correctly perceived all their preferred learning styles.

Conclusion: The preferred learning modality for our subset of anesthesia residents was multimodal. Preferences for visual, aural, and read/write styles were similar to each other and slightly higher than kinesthetic. As a whole, this group had some idea of their learning preference, but was poor at predicting their exact learning style. This understanding can help the learner not only focus on individual study strengths, but also adapt study habits to make learning sessions more high-yield and valuable. Further research should be done to investigate potential multimodal teaching curriculums for anesthesia residents so that they all may become their own best learners.

References:
Shared Decision Making in Medication Prescriptions: Improving Communication Skills and Professionalism for Internal Medicine Residents

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Background: The purpose of this study was to develop and implement an educational workshop for physicians-in-training to enhance communication skills and promote shared decision making with their patients in all clinical interactions, with a specific focus on decision making and counseling about medications for four target chronic conditions (diabetes, depression, hypertension, and hyperlipidemia).

Methods: We used a mixed methods approach to understanding our residents’ perspectives on SDM, improving resident knowledge about SDM, and implementing the use of a novel paper decision aid for resident training in conducting SDM conversations. We ran focus groups with residents to elicit challenges to having these conversations and to get feedback on a print decision aid tool, called a Decision Worksheet. A workshop curriculum was then developed and offered to the MGH internal medicine residents in the ambulatory curriculum. A variety of educational approaches were used including a didactic presentation of information on risk communication, introduction of the Decision Worksheet to guide conversations about chronic conditions, and role-playing exercises focused on decision making for a chronic condition with and without the Decision Worksheet. Participants were provided written cases at the beginning of each session to complete in the first 15 minutes prior to the presentation. The pre-test exercise was later examined for presence of 6 steps of shared decision making. They were also given time at the end of each workshop to complete a 20-question evaluation form that assessed their ratings of the workshop. We also tracked the number of times that Decision Worksheets were downloaded from an internal website.

Results: One hundred and ninety residents were invited to attend the workshops over a 4-month period (November 2013-February 2014). One hundred and ten were male and 80 were female. One hundred and thirty residents actually attended the workshops. Forty nine were PGY-1 and 81 were PGY 2-4. The interns rated the workshop higher than the residents (81% very useful content & 62% excellent overall rating vs. 46% very useful & 41% excellent). 89 written cases were completed during the workshops that revealed how residents would approach a discussion with a patient coming in with symptoms of moderate depression. While virtually all respondents indicated they would discuss medication and counseling with patients, only 29% would discuss behavioral treatments. In the sample note, only 40% documented that they presented an option other than medication, 62% documented discussion of risks of medications, and 35% documented discussion of benefits of medication. Only 14% documented patient’s goal or preferences and 37% documented a joint decision. For the most part, the note simply documented prescription for an antidepressant medication. The new tool, the Decision Worksheet, was stored on a primary care-focused intranet accessible to all hospital clinicians. The 4 Decision Worksheets were downloaded 1500 times in the first 8 months following their introduction online.

Conclusion: The workshop introduced internal medicine residents to a communication strategy of conducting shared decision making in routine clinical decisions, with a specific focus on decision making for chronic condition management. The focus groups and the written case exercises provided evidence that residents need training to put shared decision making into practice. The skills for inviting patients to participate, describing risks and benefits, and supporting deliberation among options are not well developed. The Decision Worksheets also generated significant interest from our general medicine clinicians and have continued to be used regularly in the course of routine primary care.
NOVEL EXPERIENTIAL TWO-YEAR AMBULATORY CURRICULUM FOR RESIDENTS

**Presenter:** Cristina Baseggio Alexander MD, Alev Atalay MD, Rebecca Berman MD, Sonja Solomon MD, Barbara Gottlieb MD, MPH

**Brigham & Women’s Hospital, Internal Medicine**

**Problem:**
1) Categorical internal medicine residents care for medically complex patients in their continuity clinics, but feel insufficiently trained and competent to do so.
2) Compared to specialists, PCPs give disproportionately few ambulatory talks, resulting in inadequate exposure to the primary care perspective.
3) It is challenging to obtain timely, meaningful feedback from busy residents

**Objectives:** Develop a 2 year experiential, integrated resident curriculum in order to:
1. Enhance residents’ knowledge and improve patient care
2. Provide novel teaching opportunities for PCPs
3. Obtain timely feedback for program improvement

**Description of Intervention**
The previous ambulatory curriculum consisted of a weekly class-based learning day and a second weekly learning day that all classes attended together. The second learning day suffered from both topical gaps and redundancies because interns were pulled into the junior curriculum on those days. During AY 2014-15, we rolled out the first year of our novel two year Friday curriculum. Each Friday morning consists of a cohesive set of highly-practical primary care talks that include both didactic and experiential components. The full curriculum contains 20 2.5 hour sessions, 10 of which are delivered each year.

**Approach to assess performance/measure success:**
- Outputs: # sessions delivered, % redundant sessions, exposure to PCPs versus specialists

**Findings to date**
1) We compared two representative intern cohorts from AY13-14 and AY14-15.
   - # talks per block increased by 19% (8.3 to 9.8)
   - % talks given by PCPs increased by 14% (39% to 45%)
2) Because we added an ambulatory block for interns in AY14-15, absolute increase in number of talks was even greater
   - # talks increased by 48% and # talks given by PCP increased by 69%
3) Qualitative feedback from residents was positive and only one of eight cohorts reported hearing a talk twice. Feedback included:
   - “Keep it fun and interactive! Great review slides!”
   - “It was very practical and clinician focused which was perfect!”

**Key lessons learned:**
- Combining hands-on practice sessions and lectures was effective and well-received but required balance
- Combining specialist and primary care teaching enhanced the experience for residents and teachers alike
- Oversight by ambulatory team was needed to ensure practical outpatient focus
- Electronic feedback was optimized by using three brief open-ended questions

*Graduate Medical Education*
PARENT SATISFACTION AT A STUDENT-FACULTY COLLABORATIVE PEDIATRIC CLINIC

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Crimson Care Collaborative Revere Pediatrics¹
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Description:
The Crimson Care Collaborative at Revere (CCC Revere) is a student-faculty collaborative pediatrics clinic at the Massachusetts General Hospital-Revere HealthCare Center. Medical students interview patients and present the patient to a supervising attending, who reviews the relevant history and repeats the physical exam in the presence of the medical students. CCC Revere seeks to provide an educational opportunity in pediatric medicine to students while providing high-quality patient care. Here, we describe the implementation of a parent satisfaction survey and report preliminary results. Non-clinical staff ask the parents/guardians accompanying pediatric patients to complete an anonymous multiple-choice survey while waiting to be seen by the attending physician, and collect the surveys after the visit. In the past 11 months, 47 surveys have been completed. Given answer choices of “yes, definitely”, “yes, somewhat” and “no”, >97% respondents answered “yes, definitely” to each of: whether the medical team explained things in a way that was easy to understand, listened carefully to them, seemed to know the important information about the patient’s medical history, showed respect for what they had to say, and spent enough time with them. The median overall rating out of 10 was 9 for medical students and 10 for the attending. Areas for improvement were identified: 15% of patients reported a >15 minute wait time, 18% of patients reported feeling that the clinic visit was too long, and >60% of patients were unaware they would be seeing a medical student in addition to a supervising attending. Overall, when asked whether they would recommend the clinic to a friend, 73% of patients responded “yes, definitely”, and 27% responded “yes, somewhat”. Overall, parent satisfaction was high, emphasizing the feasibility of delivering high-quality patient care within a pediatric medicine teaching model. We identified needs to shorten wait time, enhance the efficiency of clinic visits, and increase transparency about student involvement.
PROGRAM DIRECTORS’ PERCEPTIONS OF RESIDENT EDUCATION IN WOMEN’S HEALTH

Authors: Rachel Casas, M.D., Laura Hallett, M.D., Catherine Rich, M.D., and Tracy Battaglia, M.D., M.P.H.; Evans Department of Medicine, Boston Medical Center and Boston University School of Medicine

Introduction: Although multiple professional societies emphasize women’s health in Internal Medicine resident curricula, implementation varies in programs nationally and residents have demonstrated deficiencies in women’s health knowledge. This study describes the current state of women’s health education in Internal Medicine residency programs and evaluates program directors' perceptions of educational needs.

Methods: 390 categorical and 42 primary care program directors of Internal Medicine residency programs accredited by the Accreditation Council for Graduate Medical Education (ACGME) were recruited to complete an electronic, cross-sectional survey in April, 2015. Participants were surveyed about existing women’s health topics in core curricula, desired resident proficiency, current training opportunities, and interest in expansion in women’s health education. Program opportunities included a continuity clinic, expert faculty, electives, dedicated funding, research, and/or concentration/track in women’s health.

Results: Preliminary results yield an overall response rate of 21% (N=87). Respondents were 51% female with 53% practicing medicine for more than 16 years. Forty-seven percent of programs were in a university or academic hospital and 34% had a primary care track. The most common existing women’s health topics in core curricula were gender specific cancer screening (97%), osteoporosis (91%), and sexually transmitted infection (86%), which were consistent with topics that program directors strongly agreed that residents should master. While 58 programs (67%) included at least 8 priority topics in their curriculum, 39 programs (45%) offered no other opportunities in women’s health education. A minority of program directors (23%) were very interested in expanding opportunities in women’s health, and cite lack of faculty expertise and resident interest as the main barriers.

Conclusions: Surveyed program directors agree that residents should be proficient in women’s health and include priority topics in core curricula. However, other resident training opportunities in women’s health are limited and a minority of program directors report strong interest in expanding these opportunities. Continued growth in this area may require shared expertise from programs experienced in implementing women’s health education and more professional development to increase faculty comfort in teaching women’s health topics.
RESIDENT KNOWLEDGE IN PEDIATRIC ENDOCRINOLOGY: EFFECTIVENESS OF CURRICULAR INTERVENTION

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The Boston Combined Pediatric Residency Program educates 45 residents per year for certification in general pediatrics. There are important links between general pediatrics and pediatric endocrinology, particularly with regard to topics such as growth and pubertal development and general pediatricians are important participants in the initial diagnosis of many endocrine disorders. A survey including a test of knowledge in pediatric endocrinology was administered to BCRP residents. The survey was voluntary and consisted of 21 questions on growth, pubertal development, thyroid function testing, diabetes mellitus, hypoglycemia, diabetes insipidus and adrenal insufficiency. Content was aimed at the level of a general pediatrician and validated by testing with practicing endocrinologists, endocrinology fellows, pediatric residents.

Demographic data about post-graduate year of training, prior experience with endocrinology and perceived level of knowledge of various topics was collected along with the pre-test. Thirty-nine residents completed the initial survey (30 complete and 9 incomplete) including 18 PGY1, 11 PGY2 and 10 PGY3 residents. The majority of residents rated their knowledge base as Fair or Good in all topics except for diabetes mellitus where the majority felt more comfortable, choosing Good or Very Good.

Results were analyzed by PGY year, but there was little variability with PGY 1 residents averaging 16.3 correct answers (77.6%), PGY 2 residents 16.67 correct (79.4%) and PGY3 residents 15.7 correct (74.7%). Results varied among the topics covered, but there was no topic where residents had a consistently positive knowledge base.

A two weeks series of lectures, small group discussions and other activities were presented to the BCRP residents following the initial survey. Attendance was voluntary, though encouraged. Four weeks after these activities, another survey and post-test was administered to determine the impact of this endocrine-specific curriculum. Despite repeated requests, only 12 residents completed the post-test and survey (11 complete and 1 incomplete). Six of those who completed the survey had gained more experience in diabetes mellitus management while rotating on the associated inpatient service and two had participated in an endocrinology elective between the two surveys. Residents reported sparse attendance at the lecture series, though two residents reported independent learning in endocrinology during the same period. Despite various educational opportunities, post-test results revealed improvement in 6 residents with an additional one or two questions correct, but lack of improvement in 5 residents, three of whom performed worse on the post-test.
SMART-R: FEASIBILITY AND EFFECTIVENESS OF A RESIDENT WELLNESS PROGRAM

Presenters:
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Background: Burnout begins early in physicians’ careers, often during graduate medical education and can have serious consequences that extend far beyond training. While recent mandates like work-hour regulations are intended to support resident health and reduce fatigue, they have had limited impact on physician wellbeing. The Stress Management and Resiliency Training Program for Residents (SMART-R) is a resident-led curriculum aimed at teaching coping skills and supporting resident wellness, implemented in 2014-2015 for Medicine and Psychiatry PGY1s at Massachusetts General Hospital.

Methods: Through a prospective cohort study design, we investigated the feasibility and impact of the SMART-R curriculum on residents’ emotional and physical wellbeing, stress, and overall resiliency through validated survey instruments. In addition, we collected continuous remote physiologic and health-behavior data using a commercial device, Basis.

Results: Of 68 potential medicine residents who qualified to participate in the SMART-R curriculum study, 59 (86.7%) consented to participate in the study, 56/59 (94.9%) completed the pre-survey and 28/59 (47.4%) completed the post-survey. Of 17 potential psychiatry residents, 16 (94.1%) consented to participate in the study, 15/16 (93.8%) completed the pre-survey and 13/16 (81.3%) completed the post survey. Residents reported positive feedback about the curriculum and a desire for more education about stress awareness and coping strategies.

Conclusions: Preliminary feedback, Basis data and survey completion rates illustrate good participation and enthusiasm for the SMART-R curriculum. Results show excellent completion rates throughout the study, with the exception of medicine post-surveys; possible reasons for this should be explored. Next steps have included implementation of a controlled study to evaluate the impact of SMART-R on burnout, as well as streamlining the SMART-R curriculum for easy adoption into diverse residency programs.
TDA: A conceptual MODEL FOR improving residents GRADUATED autonomy in the operating room (OR)

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Abstract
Currently, significant concern exists about the lack of progressive in-training autonomy for surgery residents and their preparedness for independent practice upon the completion of the residency training. Although some educational concepts aiming at improving residents’ autonomy have been advocated, their implementation faces several challenges including patient safety, acceptance of attending physicians, and the current surgical training context. There is now an essential need for an efficient and effective approach to guide attending surgeons to assess and to grant in-training autonomy to residents in the operating room (OR). Therefore, we propose a simple and practical model called “TDA” (Teach-Direct-Assist) to meet this need. This 3-stage conceptual model consists of “Teach residents when the attending knows the resident does not know”, “Direct residents when the attending is uncertain of the situation and resident’s ability”, and “Assist residents when the attending is confident in resident’s capability as well as his/her own”. The TDA model is supported by theories and multiple studies, including the instructional scaffolding theory, performance improvement model, a general model of teaching, and our previous publications about OR autonomy. Our aim is to introduce the TDA Model as a conceptual approach to help attending surgeons increase OR autonomy of surgery residents while maintaining patient safety. The TDA model could also be applied to undergraduate education and graduate education in other specialties beyond Surgery.
TEACHING PRINCIPLES OF PATIENT-CENTERED CARE DURING RADIOLOGY RESIDENCY

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**Purpose:** Patient-centered healthcare delivery has become increasingly established as a cornerstone of quality medical care, which has increased the need for effective teaching of these principles to trainees. This is particularly true in fields like radiology with traditionally low but now increasing levels of direct patient interaction. Effective instruction on patient-centered care is complicated by the difficulty of teaching these principles, which deal with complex human interactions, in a traditional lecture format. To address these difficulties, we developed a novel educational session in which actual patient letters are used to facilitate a case-based discussion of the principles of patient-centered care.

**Materials and Methods:** Prior to the educational session, actual patient letters that introduced the principles of patient-centered care were distributed to the residents for review. During the session, radiology-specific cases were discussed in the context of the patient-centered care principles introduced by the letters. A post-session survey evaluating the efficacy and usefulness of the session was administered.

**Results:** Ten of the 21 session attendees (48%) completed the post-session survey. Most (80%) respondents preferred this case-based, interactive session over a typical didactic session. A majority of the residents indicated that both the patient letters (70%) and the radiology-specific cases (60%) helped them think differently about how they might want to interact with patients during residency and in their career. They indicated that the session added to their understanding of professionalism (3.7 out of 5.0 (95% CI 2.8-4.6)). Residents also reported that this session increased their motivation to become more patient-centered (3.3 out of 4.0 (95% CI 2.9-3.7)) and to take a more active role in patient care (3.8 out of 4.0 (95% CI 3.5-4.1)).

**Conclusion:** Residents favorably viewed our patient letter-facilitated, case-based session on patient-centered care as a means to help them reflect on how they might improve their interactions with patients. Our results suggest that such sessions are an effective and motivating method of educating residents about the core principles of patient-centered care.
Textual Analysis of General Surgery Residency Personal Statements: Themes and Gender Differences

Presenters: Laura Ostapenko, MD\textsuperscript{1}; Cheryl Schonhardt-Bailey, PhD\textsuperscript{3}; Jessica L Walling, BA\textsuperscript{3} Douglas Smink MD, MPH\textsuperscript{1}; Nora Y Osman, MD\textsuperscript{4}

Purpose: Applicants to US general surgery residency training programs are required to submit standardized applications. Applicants use the personal statement to express their individual rationale for a career in surgery. Our research explores common themes and gender differences within the personal statements of general surgery applicants.

Methods: The ERAS personal statements of 578 applicants (containing 382405 words) from LCME-accredited medical schools to a single ACGME-accredited general surgery program were analyzed using two automated textual analysis programs to identify common themes and gender differences. Using a recursive algorithm, the programs identify common words and clusters, grouping them into thematic classes that are internally validated.

Results: Eight statistically significant themes were identified through independent review and defined as: “my story”, “the art of surgery”, “clinical vignettes”, “why I love surgery”, “residency program characteristics”, “working as a team”, “academics and research”, and “global health and policy”. While some themes were employed equally by men and women, gender-specific differences were identified. Notably, women were more likely than men to be represented within the theme of “working as a team”\( (p<0.01) \). Furthermore, men were more likely to be represented within the theme of “clinical vignettes.” \( (p<0.01) \)

Conclusions: Applying textual analysis to a national cohort, we identified common narrative themes in the personal statements of aspiring general surgeons, noting differences between the statements of men and women. Across their respective gender cohorts, women were more likely to discuss surgery as a team endeavor while men were more likely to focus on the details of their surgical experiences. These findings add to the growing literature on physician identity formation, gender normative behaviours and professional expectations. Further work is necessary to characterize these gender differences as well as understand their effects on professional identity formation and the durability of surgical careers.

References:

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THE EFFECTS OF IMPLEMENTATION INTENTIONS ON RESIDENT READING HABITS: A COMPARATIVE EFFECTIVENESS TRIAL

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Effective self-directed learning requires that residents make a commit to study and follow through on this intention. Simple intentions (e.g., “I intend to read more”), however, are poor predictors of behaviors. This may be especially true for resident physicians, who are often highly absorbed in ongoing clinical duties, emotionally fatigued or physically tired. Implementation intentions are a strategy from cognitive psychology that help strategically automate intended behaviors, and have a medium-to-strong effect on increasing goal attainment. Implementation intentions involve anticipation of future opportunities or obstacles and planning specific responses, in “if-then” plans (e.g., “If my children are tucked in for the night, I will read an article from this month’s journal.” Implementation intentions have been studied in many domains but never in medical education.

Over the six-month period from March 1, 2015 to August 31, 2015, we performed a comparative effectiveness trial of implementation intentions versus simple intentions for reading goals. Thirty-four anesthesia residents on their intensive care unit rotations were included over these six months. Intervention was assigned based on the rotation month (i.e., first month received simple intentions, second month implementation intentions, third month simple intentions, and so forth). Primary outcome was time spent reading. Covariate analysis will also take place to account for baseline reading habits, interest in critical care, and night versus day shift assignments. Secondary outcomes are satisfaction with learning and study habits. The study will finish at the end of this month, and data analysis will occur subsequently (and prior to the HMS Medical Education Day).
Transitions in Care Curriculum for Medical Residents

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Transitions in care represent high-risk periods for adverse events. The discharge process from the hospital is a particularly vulnerable time for patients. At teaching hospitals, residents are primarily responsible for coordinating the discharge process for patients. Most learn about transitional care through an apprenticeship model of working directly with patients and through supervising peers and attendings. Although practical experience is beneficial, a lack of standardization can lead to variable degrees of learning amongst the residents. ACGME milestones require residents to be able to transition patients effectively within and across health delivery settings. We developed a curriculum to address this need.

We implemented a Transitions in Care Curriculum in 2013 that was provided to all junior and senior medical residents. The new curriculum was centered on ECHO-Care Transitions (ECHO-CT), a weekly novel program using videoconferencing technology to connect hospital-based residents and hospitalists of recently discharged patients with the providers at local skilled nursing facilities who receive these patients. We delivered the resident curriculum in three blocks throughout the year, covering topics related to the principles of effective transitions, common adverse events, readmissions, and interventions. Residents participated in the ECHO-CT clinic, leading the patient care discussions with doctors, advance practice clinicians, nurses, and therapists at post-acute care facilities. Other curricular activities included a one-hour case-based discussion, root-cause analyses of readmissions, in-person interviews with patients who had been readmitted, and a one-hour debrief on key learning points. In 2014, the curriculum was broadened to include direct, hands-on experience for our senior residents at sites in which issues in transitions are commonly encountered: home visits, VNA visits, post-acute care site visits, and the post-discharge clinic at BIDMC.

The curriculum was evaluated by a pretest and a posttest, comprised of multiple-choice and scale-based questions assessing knowledge, attitudes, and behavior towards transitional care. Resident-only discharge summaries completed before and after the curriculum were reviewed using a validated discharge summary assessment tool. In the first year, there was a significant increase in self-reported behaviors. Residents specifically noted increases in direct communication with outside providers and post-acute care sites; checking for patient understanding; seeking feedback regarding their discharge processes; and comfort level with transitioning medically complex patients. Significant improvement was seen in the knowledge and discharge summary assessment the second year. Residents were also asked to submit narrative reflections at the end of the year, highlighting the three things they learned from the curriculum; three things they would teach others; and three things they would change in their own practice. Major themes from the reflections included the importance of medication reconciliation; value of educating patients and their caregivers; increased understanding of the differences in levels of post-acute care; and enhanced appreciation for the complexities of readmissions.
APPLICATIONS OF 3D PRINTING IN MEDICAL EDUCATION AND RESEARCH
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Abstract: 3D printing is an ideal tool for simulation, which has been demonstrated to lead to improvements in medical knowledge, and enhance confidence and performance during procedures. 3-dimensional physical models are superior to 2-dimensional images and 3-dimensional visualization methods for comprehension of complex geometries in human anatomy. They are also cost effective when compared to cadaveric materials, which are usually difficult to obtain. In addition to training and educational purposes, 3D printed models can be used for pre-surgical planning of actual surgical procedures thereby enhancing efficiency of the surgeon and minimizing unforeseen complications. Using 3D printing for surgical planning allows improved diagnosis and evaluation of the complexity of the procedure, enabling surgeons to select, optimize, and simulate patient specific treatment plans before entering the operating room. In this Technology Demonstration, we aim to demonstrate how 3D printing can be utilized in surgical planning, medical education, and research.

This Educational Technology presentation will present multiple anatomic 3D models to showcase the vast array of disease processes as well as provide a step by step instruction of how these models are created. We are focusing on specific applications of 3D printing namely Education of anatomy and disease processes as well as simulation. In particular, in Musculoskeletal Imaging, Bone and Soft Tissue biopsy techniques are done on a do one see one base, however using 3D printing, simulation models with different textures such as cystic, soft and hard consistency could be created which can then be used by trainees to first practice with armamentarium and lay out a specific plan of interventional process before the actual patient. Similarly, for spinal intervention, utilization of a variety of normal and abnormal 3D models would help guide the trainee in simulation injection training and avoid potential complications that may occur in actual procedures. We foresee using this technology more frequently in the STRATUS Center for Simulation in Medicine, Surgery and Radiology for undergraduate and post graduate education using the expertise and manpower currently housed in the BWH Radiology Department.
A NOVEL HIGH-FIDELITY BEATING HEART ED THORACOTOMY SIMULATOR

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INTRODUCTION:
Emergency Department Thoracotomy (EDT) is an infrequent, time-sensitive, potentially life-saving procedure. We sought to develop a high-fidelity non-cadaver/non-animal EDT simulator and accompanying assessment tool.

METHODS: Using the Kern curricular model, a group of expert trauma surgeons performed a needs assessment and identified EDT as a high-stakes, low-frequency procedure. An EDT training module was developed. A simulator with beating-heart technology was built in collaboration with a medical simulation company. The previously validated Objective Structured Assessment of Technical Skills (OSATS) was adapted to create the “EDT-OSATS.” Surgical interns and trauma surgeons tested the training module. Participants received preparatory materials and a pre-simulation quiz before performing EDT on the simulator. Two independent raters scored performance. Participants evaluated the simulator and their overall experiences with a survey. Trauma surgeon vs. intern performance was compared in unadjusted analyses.

RESULTS: Trauma surgeons (n=6) scored significantly higher than interns (n=8) on most components of the EDT-OSATS, including pericardiotomy (4.5 vs. 3.0, p<0.001), cardiac massage (4.3 vs. 2.3, p<0.001), clamping aorta (4.6 vs. 2.8, p<0.001), control of pulmonary hilum (4.9 vs. 2.9, p<0.001), time/motion (4.5 vs. 2.8, p<0.001), instrument handling (4.8 vs. 2.8, p<0.001), and global rating (4.5 vs. 2.2, p<0.001). Interns reported a significant increase in confidence pre- to post-simulation (1.4 vs. 3.1, p<0.001). 93% of participants found the simulator realistic.

CONCLUSION: Our novel EDT training module was used successfully to improve trainees’ confidence and differentiates between performance of experienced surgeons and trainees. These tools hold promise for teaching surgical trainees to perform this high-stakes, low-frequency emergency procedure.
Background: The movement toward competency-based assessment in medical education has led to the development of medical student milestones in emergency medicine (EM). Twenty-four competency-based milestones for fourth-year medical students completing their EM clerkships were recently published. The means by which students should be evaluated on these, however, remains unclear. The goal of this study was to determine the feasibility of using case-based simulation to assess a subset of these milestones.

Methods: Fourth-year medial students enrolled in a four-week EM clerkship at an academic, tertiary medical center participated in a case-based simulation scenario using the Laerdal SimMan®. The case involved a patient presenting with chest pain that evolved into cardiac arrest. All simulations were recorded for teaching and evaluation purposes. After undergoing a 30-minute group training session, five emergency physicians (EP) independently reviewed the simulation videos and rated each student on ten of the EM medical student milestones using a 1-5 Likert scale, with 1 being unsatisfactory and 5 being outstanding (Table 1). Median scores were calculated for each milestone. A likert score of 3, 4 or 5 was considered as meeting the milestone. A Cohen’s Kappa was calculated to examine inter-rater reliability.

Results: Twenty-seven fourth-year medical students completed the simulation scenario over a four-month period and were scored by 2 reviewers. The results are shown in Table 1. The overall Cohen’s kappa for meeting the milestone was 0.26.

Conclusion: Case-based simulation is a feasible method for assessing fourth-year medical students on ten of the emergency medicine milestones. There was fair inter-rater agreement. Further studies are needed to determine how performance on these milestones compares with other methods of evaluation including direct clinical observation and standardized tests.
CREATION OF A SIMULATION CURRICULUM FOR INTERNAL MEDICINE JUNIOR RESIDENTS

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Background
In 2011, the Internal Medicine residency program at Massachusetts General Hospital implemented a formal intern simulation curriculum with the goal of better preparing residents to manage common conditions encountered on the wards. In its current form, this mandatory simulation program is comprised of 10 fall and 6 spring cases (such as hypertensive emergency, GI bleed, and COPD exacerbation). Second and third-year residents serve as facilitators, supervised by faculty. This format allows the delivery of an extensive curriculum to over 70 interns, while maintaining a low facilitator-learner ratio. This program has been highly rated by both intern learners and resident facilitators; however, few simulation opportunities are available for upper level residents as learners. We therefore sought to create a dedicated simulation curriculum for Internal Medicine PGY-2 residents.

Curriculum Development
The Medicine Junior simulation curriculum was designed in two stages: the first set of cases in the fall of junior year includes scenarios that are commonly encountered in the Medical and Cardiac Intensive Care Units. These currently include Undifferentiated Shock (which reviews a wide differential diagnosis for shock), Ventricular Tachycardia Storm (focusing on antiarrhythmics and management of unstable tachycardia), Refractory Hypoxemia (designed to review ventilator and pharmacologic management of hypoxic intubated patients), and Tailored Therapy (a review of PA lines, inotropes, and management of cardiogenic shock). Cases were written by senior residents and developed in conjunction with a specialist in the field. In addition, case notes were created to standardize learning across groups. The cases employ advanced simulator techniques including use of defibrillators for transcutaneous pacing, cardioversion, and defibrillation, as well as arterial line and pulmonary arterial line tracings on the simulated monitor.

In the spring, the goal of Junior simulation is to prepare residents to lead the rapid response and code teams for the hospital. These cases focus on management of medical emergencies such as seizure, acute hypoxemia, and unstable arrhythmias, as well as ACLS for cardiac arrest. In contrast to the fall curriculum, in which learners are given an initial case history in advance, the spring cases allow residents to practice rapid diagnosis and management with limited data at the bedside of an acutely decompensating patient.

Pilot Implementation
Since the beginning of the 2015-2016 academic year, we have conducted a voluntary pilot of the curriculum by holding one simulation case weekly, with eight spots available for junior residents and four senior residents acting as facilitators on two simulation mannequins. Simulation lasts approximately 30 minutes, followed by 30 minutes for feedback and debriefing. To date, nearly all available spots have been filled for each offered session, suggesting considerable interest in this program on the part of junior residents. Initial informal feedback from the participants has been very positive. We hope to obtain formal feedback from junior residents and continue to expand this program in the future.
DEVELOPMENT OF A TEMPORAL BONE SIMULATOR FOR TRANSCANAL ENDOSCOPIC EAR SURGERY

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Objective: Minimally-invasive transcanal endoscopic ear surgery (TEES) is being used more frequently in patients with chronic ear disease to remove cholesteatoma and reconstruct the middle ear and tympanic membrane. TEES can reduce the need for a post-auricular incision and mastoidectomy compared to techniques that rely on the operating microscope. However, TEES is a challenging technique even for the most experienced otologist, requiring one-handed dissection using angled endoscopes and instruments. We have developed a high-fidelity temporal bone model incorporating key aspects of TEES and cholesteatoma removal to facilitate the acquisition of these skills in a safe environment.

Study Design: Simulator development

Methods: This prospective endoscopic ear surgery pilot study was performed with the participation of microscopic ear surgeons at the Massachusetts Eye and Ear Infirmary. Mastoidectomy and facial recess drilling were performed on fixed human cadaveric temporal bones to access the middle ear via posterior tympanotomy. Cholesteatoma was simulated using chicken skin which was fixed to the epitympanum, oval window niche, sinus tympani, and mastoid antrum using cyanoacrylate (“Super Glue”). Water-based paint was utilized to generate artificial blood. Small-bore tubing delivered artificial blood to the external auditory canal to simulate bleeding during the procedure. Each participant used a 3mm diameter, 0 and 30 degree endoscopes and angled instruments to elevate a transcanal tympanomeatal flap under bleeding conditions and resect simulated cholesteatoma.

Results: Six surgeons completed temporal bone dissection using TEES techniques. Post-surgical surveys demonstrated high overall satisfaction with the TEES simulator, and 100% of participants strongly agreed that simulator training would improve performance during live surgery.

Conclusions: Our human temporal bone model provides a high-fidelity environment to develop the advanced techniques of minimally-invasive TEES and cholesteatoma removal. Further studies are underway to quantify performance measurements using global assessment scales and procedure-specific checklists in surgeons who are learning TEES.
EXTREME SIMULATION: DEVELOPMENT OF A LOW COST LAPAROSCOPIC TAPP HERNIA SIMULATOR

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We developed a correlate to the FLS pattern cutting task to assess transfer of learning from the FLS task to a more clinically orientated surrogate. Our objective was to build a low-cost, robust hernia simulator, with the initial focus on the first step of a (TAPP) hernia repair, the creation of a peritoneal flap.

Our model uses a piece of heavy-duty plastic obtained from a large trashcan that is curved to mimic the size and shape of the human abdomen and pelvis. A frame is placed around the edges of the plastic to maintain the desired curvature and it is then secured to a wooden base on three sides. A hinge mechanism is placed to keep the fourth side mobile and to provide access to the inside of the simulator so that the materials can be easily manipulated in between trials.

Trocar sites are created in the plastic and a piece of material that is smooth on the top side and foam on the bottom side is attached along the outside of the plastic as the abdominal skin. Corresponding holes for the trocar sites are placed through the skin. We designed a rectangular silicone mold to serve as a model of a left-sided pelvis. The mold is glued into the inside of the plastic in the anatomical location of the left pelvis. Plastic tubing of different sizes, shapes and colors is implanted into the mold to mimic the following anatomical structures: the medial umbilical ligament, the inferior epigastric vessels, the spermatic vessels/round ligament, the internal inguinal ring, the femoral vein, Cooper’s ligament, and landmarks for indirect, direct, and femoral hernia defects.

Power Mesh, a stretchy fabric, often used to make bathing suits, is then treated with silicone and cut into pieces that match the size of the mold. This serves as the peritoneum and adheres well to the mold to allow for visualization of the landmarks just behind the peritoneum. The peritoneum is clipped in place for extra security. The user will incise the peritoneum starting at the medial umbilical ligament and simulate the TAPP incision used clinically based on the simulator landmarks. The user will need to be sure to place traction on the peritoneum with their dissector in order to cut only through the peritoneum and not into the abdominal wall or vessels.

Our next stage of development is to design the molds and materials for the remaining TAPP steps: identification and dissection of the hernia sac, placement of the mesh, and closure of the peritoneum. We will use our prototype to develop a right-sided model and merge the two together to create a comprehensive bilateral laparoscopic hernia simulator. This simulator will provide unique training opportunities for medical students and residents and cost less than $125 to build.
FOURTH—YEAR MEDICAL STUDENTS DO NOT PERFORM A FOCUSED PHYSICAL EXAM DURING A CASE—BASED SIMULATION SCENARIO

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Background: High-fidelity simulation is becoming an increasingly more popular means of teaching and evaluating medical students on clinical competencies. The validity of case—based simulations for various clinical performance measures is unclear.

Objective: We sought to determine the utility of using a cardiac case—based simulation scenario to assess physical exam skills of fourth—year medical students during an emergency medicine (EM) rotation.

Methods: Fourth—year medical students enrolled in a four—week EM clerkship at an academic medical center were prospectively evaluated on their performance in a case—based simulation scenario using the Laerdal SimMan®. The case involved a patient presenting with chest pain that evolves into cardiac arrest. All simulations were video recorded for teaching and evaluation purposes. All videos were reviewed by three EM physicians, each of whom underwent a 30—minute group training session on simulation evaluation. The reviewers recorded whether or not each student completed the following components of a physical exam: auscultation of the heart, auscultation of the lungs, pulse and extremity exam, and abdominal exam. Proportions and confidence intervals (CI) were calculated using GraphPad.

Results: Twenty—seven students participated in the case—based simulation. The percentage of students completing each of the four components of the focused physical exam was as follows: cardiac auscultation 33.3% (95% CI 18.5 -- 52.3), lung auscultation 29.6% (95% CI 15.7--48.7), pulse and extremity exam 55.6% (95% CI 37.3--72.4), abdominal exam 3.70% (95% CI 0--19.8). None of the students completed all four of the physical exam components.

Conclusion: The majority of the medical students neglected to perform a focused physical exam during a case—based simulation scenario. The utility of case—based simulation to assess global medical student competencies may be limited. Future studies are needed to determine why omission of the physical exam occurs and to investigate other ways in which simulation can be used to evaluate this competency.
LOW-COST WIRE-LOCALIZED LUMPECTOMY PHANTOM MODEL FOR BREAST SURGERY TRAINEES

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Introduction
Wire-localized lumpectomy (WLL) is the most commonly utilized localization method for non-palpable breast lesions and is a standard treatment option for occult breast carcinomas. The optimal surgical technique for WLL accomplishes complete excision of the target lesion while avoiding excessive resection of healthy breast tissue, which can be assisted by selection of the ideal incision site during pre-operative planning. A simulation model could be beneficial for surgical trainees wishing to learn and practice basic skills such as incision planning required to perform WLL, and we sought to develop an inexpensive and reproducible training phantom model for WLL.

Methods
We developed a simple phantom model using inexpensive supplies to assist surgical trainees learn and practice the basic skills of WLL. The model can be constructed in four steps and requires two different colors of play-dough, a small bowl, plastic wrap, a walnut, and a paperclip. First, the bowl is used as a breast mold and the plastic wrap and then one color play-dough is inserted into the mold. The plastic wrap is removed and the play dough now represents the breast-mold. Second, the other color of play-dough is used to construct the nipple/areolar complex, which is placed on top of the breast-mold. Third, the paperclip is straightened and inserted into the walnut to represent a wire-localized lesion. Finally, the walnut end of the paperclip-walnut construction is inserted into the breast.

Results
The phantom model was constructed for a total cost of less than $10 and was prepared in approximately 10 minutes. This cost reflects the estimated US dollar equivalent of the price of materials obtained from a local grocery and toy-store during initial model development in 2015.

Conclusion
The WLL phantom model is a time- and cost- effective model that can be prepared to help assist surgical trainees in learning proper incision selection and basic techniques related to WLL. Future studies are warranted to further validate this model as an effective teaching tool.
Background: Traditional instructionist pedagogy and apprenticeship model are no longer equipped to accommodate modern medical training. Learners are expected to synthesize a large body of information in the midst of duty hour restrictions and competing responsibilities. Furthermore, clinical competency assessment is now central focus of medical education to ensure physician readiness for the delivery of safe and optimal patient care. The validity, reliability and effectiveness of traditional teaching methods in preparing physicians for this task has been called into question. As a response to this paradigm, virtual patient simulation has emerged as a potential means to address these inefficiencies. Virtual patients have been effective in facilitating learner’s knowledge acquisition and development of clinical reasoning skills, while also being used for competency assessment in these domains. Multiple patient simulators have been developed and implemented, and there exists a great heterogeneity in the purpose, design, execution, and effectiveness of those systems. As technology continues to emerge, these platforms can more closely approximate the cognitive and metacognitive strategies needed for complex medical learning. Here we describe a novel patient simulator that incorporates natural language processing (computational modeling of human text and speech) and free text inquiries to provide a more immersive learning environment.

Methods: We have developed PBLCloud, a virtual patient simulator that utilizes innovative natural language processing and tagging systems to allow learners to submit free text inquiries and receive specific responses for more precise inquiries. Learners engage in all components of the patient encounter and adapt to branching storylines that reflect the realistic complexity and spontaneity of the clinical setting. The patient’s clinical trajectory reflects the natural evolution of the underlying disease process and responds appropriately to the learner’s interventions. The learner’s clinical reasoning is collected and processed in a detailed transaction list that chronicles the timing and sequence of the learner’s actions. An interactive progress note is used to track the learner’s synthesis of a diagnosis and justification for related action items. An evidence-based scoring system will be incorporated to assess the learner’s competency within each patient encounter. Based on these elements, the system will generate timely and individualized formative feedback.

Instructors will be able to create their own cases in a user friendly and intuitive interface that allows a great degree of freedom to customize case content and structure. Instructors are guided to identify specific learning objectives for each case in addition to developing interactive case content. Instructors will have access to a large and modifiable database of diagnostic and therapeutic interventions to include in their case, as well as the ability to incorporate multimedia content (ex. audio, video) and interspersed test questions to actively engage their learners.

Conclusion: Upon completion of the development phase and usability testing, PBLCloud will be released on the free digitally based knowledge-sharing platform, OPENPediatrics (currently used in 126 countries) for piloting and psychometric analysis. We anticipate that this innovative system, based on the fundamentals of natural language processing and coupled with robust analytical support, will provide a more immersive environment for learners as well as serve as both a cost-effective and scalable tool for the instruction and assessment of clinical reasoning.
PERCEIVED STRESS ON LABOR AND DELIVERY (L&D) DURING THE OBSTETRICS AND GYNECOLOGY (OB/GYN) CLERKSHIP FROM STUDENTS, RESIDENTS, AND FACULTY’S PERSPECTIVES

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Objectives

Little is known about the effects of stress on medical students’ learning on L&D which is characterized by a complex, dynamic and unpredictable teamwork environment. The purpose of this study was to explore the perceptions of stressful factors from students, residents, and faculty when training on L&D during OB/GYN clerkship.

Methods

Individual interviews were conducted with 3 consecutive cohorts of students at the end of their OB/GYN clerkships and a group of OB/GYN residents and faculty through convenience sampling in 2015. Participants were asked to identify the most stressful clinical setting during the clerkship and factors contributing to the stress in this environment. Thematic analysis and manual coding were applied to code and synthesize the data to identify the perceived stressful factors among students, residents, and faculty.

Results

L&D was the most stressful learning environment as reported by 14/19 students (73.7%). A total of 11 stressful factors from 4 categories were identified: 2 (terminology, interacting with residents) classified as Interpersonal Communication; 4 (pace, logistics, intrinsic sensitive nature of L&D, non-routine schedule) considered as Context; 3 (crisis, emergency, patient refusal of student involvement) fell into Clinical Scenario; 2 (student role and assignment, the amount of new knowledge and skills required) identified as Learning Tasks. Most residents and faculty (75%) reported that factors from Context would contribute to students’ stress on L&D, and all students (100%) agreed. The majority of residents and faculty believed factors from Learning Tasks were stressful for students; but only 26.3% of students shared the same perception.

Conclusions

Context factors contributing to stress were perceived by students, residents and faculty alike as contributing to stress and considered non-controllable, whereas OB/GYN residents and faculty differed in the perception of the effects of Learning Tasks on stress from students’ perception. Clerkship programs are encouraged to integrate preparation of Context into curriculum through educational interventions to optimize students’ stress level without increasing residents’ and faculty’s teaching pressure.
BLUEPRINT FOR AN UNDERGRADUATE PRIMARY CARE CURRICULUM

Presenters: Sara B. Fazio, MD, Department of Internal Medicine, BIDMC; Kristen Goodell MD, Harvard Medical School Center for Primary Care; Barbara Ogur MD, Department of Internal Medicine, Cambridge Health Alliance - on behalf of the CPC Curriculum Working Group: Sara Fazio MD, Monica Demasi MD, Erin Farren, Susan Frankl MD, Barbara Gottlieb MD MPH, Jessica Hoy MD, Amanda Johnson MD MBA, Jill Kasper MD, Patrick Lee MD, Claire McCarthy MD, Kathe Miller MD, Juliana Morris MD EdM, Frances O’Hare MD, Rachael Rosales, Leigh Simmons MD, Benjamin Smith, Katherine Treadway MD, Kristen Goodell MD, Barbara Ogur MD

Description:

In light of the increasing demand for primary care services and the changing scope of health care, it is important to more clearly consider how the principles of primary care medicine are taught in medical school. While the majority of schools have increased students’ exposure to primary care settings, there is currently no standardized primary care curriculum for undergraduate medical education. In the setting of curricular reform efforts underway at HMS, the Harvard Medical School Center for Primary Care convened a group of educators from the disciplines of primary care internal medicine and pediatrics, family medicine, and medicine-pediatrics, as well as a number of student representatives. The task of this group was to create a blueprint for a primary care curriculum that could be delivered to all students regardless of their eventual career choice. The team reviewed available literature on PubMed (2000 to present), curricular offerings published on the MedEd Portal, as well as currently available national undergraduate curricula. The group then highlighted core themes that emerged, and eventually created an outline of areas upon which a primary care curriculum should be based. What emerged was a unique template for a three to four-year curriculum that defines three main domains of primary care curricular content, incorporating ten major themes. The domains include concepts of care management, specific clinical content, and understanding the role of primary care within the broader health care system. Within each domain, the group has defined general competencies that all students should possess upon graduation from medical school.

In deciding what features to include in an undergraduate curriculum, the group chose clinical topics that constitute the most common and salient areas of primary care focus as well as foundational skills that all physicians should possess regardless of specialty in order to practice in the health system of the future. The proposed model would be integrated into a longitudinal primary care experience throughout medical school. This coordinated curriculum incorporates important core features of doctoring, which are often affirmed by all disciplines but owned by none. The unique aspects of the curriculum are inherently linked to embedding the learning in a highly functioning practice environment. We believe that primary care educators should be natural stewards of these curricular elements, ensuring that they complement and strengthen all aspects of an undergraduate medical education.
THE FOUNDATIONAL CONTINUITY CLINIC (FCC): CURRICULAR INNOVATION TO TEACH FIRST YEAR MEDICAL STUDENTS CLINICAL SKILLS IN PRIMARY CARE PRACTICES

Susan Frankl, MD1, Leigh Simmons, MD2, Nora Osman2, MD, Katherine Miller, MD4, Kristen Goodell, MD5, Barbara Ogur, MD2,5, Sara Fazio, MD2,5, Karen Wood, MD1, Sue Seward, MD1, Rebecca Cunningham, MD2, Katherine Johnston, MD3 and the Practice of Medicine FCC Design Subcommittee.

1Beth Israel Deaconess Medical Center, 2Brigham and Women’s Hospital, 3Massachusetts General Hospital, 4Cambridge Heath Alliance, 5HMS Center for Primary Care

Background: HMS is engaged in the most sweeping re-design of undergraduate medical education in nearly 3 decades. Pathways, the new Harvard Medical School (HMS) curriculum fosters active learning pedagogical approaches and transitions students into clinical clerkships after 14 months of education in foundational basic, social, population, and clinical sciences. The Practice of Medicine (POM) is the new longitudinal, weekly, clinical skills course that prepares first year students for the clinical clerkships that take place in the Principal Clinical Experience (PCE) during the second year of medical school. The Foundational Continuity Clinic (FCC) comprises a new and innovative curriculum in which first year POM students are placed in primary care practices.

Objectives: The Foundational Continuity Clinic (FCC) comprises a new and innovative curriculum in which first year POM students are placed in primary care practices. In the FCC, students learn foundational primary care medicine and basic clinical skills in the context of authentic patient relationships through longitudinal interactions with a core faculty of primary care physician preceptors and their office staff. Additionally, sessions were crafted to integrate closely with concurrent study of the basic sciences. The learning objectives fall within the categories of clinical data collection, clinical reasoning, development of a strong therapeutic alliance and systems thinking.

Curriculum Design: In order to engage busy primary care physicians to dedicate time to teach in their ambulatory practices, we established a highly inclusive and collaborative planning process. A design committee of 22 faculty, 3 students and 2 HMS administrators representing all major HMS clinical sites met over the course of 8 months to craft the curriculum. A statement of guiding principles was first established, followed by specific learning objectives. Critical to the process of ensuring that the program was sustainable, funding was secured to allow faculty preceptors to reduce their clinical volume by 30% during FCC teaching sessions without any negative financial impact. A detailed session guide was developed for each of the sixteen 4-hour sessions that includes defined learning objectives, pre-session preparation readings and resources, defined in-session student tasks and post-session assignments. Each session begins with a 15 minute planning huddle and ends with a 30 minute guided wrap-up and instructions for detailed student feedback. Examples of session topics include addressing health literacy, social determinants of health, behavioral health, the focused visit and preventive health services.

Next Steps: The FCC will launch in September 2015, and we are currently developing tools to evaluate outcomes in student clinical skills, professional development and their preparedness for the PCE. In addition, metrics to assess student, faculty and patient acceptance as well as the impact on primary care practices are being developed.
COMMITTED TO LEADERSHIP: A LANDSCAPE ANALYSIS OF LEADERSHIP TRAINING IN THE MEDICAL SCHOOL CURRICULUM

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Little is known about the availability of or desire for leadership training in the medical school curriculum, particularly for students who are interested in primary care fields. A landscape analysis of leadership training in the medical school curriculum was conducted via an online survey of medical students and a database search of medical school curricula and courses. To determine the current offerings in leadership training in U.S. medical school curricula, a search of the AAMC Curriculum Inventory was performed using the keywords “teamwork” and “leadership”.

To determine which leadership competencies to study in our survey, we compared the competencies assessed by the validated NHS Clinical Leadership Competency Framework Self-Assessment and subtracted those required of U.S. allopathic medical schools by the LCME. This resulted in five leadership competencies assessing teamwork, team leadership, and change leadership. An online Qualtrics survey was constructed using these five competencies as a framework to assess the sufficiency of curricular opportunities for leadership training, the desire to pursue these curricular opportunities, self-perception of leadership competencies and behaviors, and career interest in leadership and primary care. This survey was distributed nationwide to U.S. medical students via the snowball technique and via the email listserves and social media networks of national medical student organizations. An incentive to enter a lottery for one of four $100 Amazon gift cards was offered to students who completed the survey in order to mitigate selection bias.

The quantitative survey results were analyzed with Qualtrics software to determine mean and standard deviation of responses, and sub-groups were analyzed with manually applied filters, cross-tabulations and chi-square analyses. The database search data was analyzed qualitatively for key aspects of teamwork and change leadership, according to predetermined definitions and competencies.

Our survey results demonstrated that medical students who are interested in primary care careers are equally as interested in being leaders as the whole pool of respondents. Survey respondents are interested in learning about teamwork, managing teams, identifying the context for change, facilitating transformation, and encouraging improvement and innovation. With regards to leadership behaviors, survey respondents identified “volunteering to lead the team” and “identifying the drivers of change” as areas of relative weakness.

The database search demonstrated that many U.S. medical schools provide curricular opportunities for working within teams, but a minority provided opportunities to learn team management or change leadership.

Leadership training for medical students, including those interested in primary care, is desired but still lacking in U.S. medical school curricula.

Undergraduate Medical Education
TEACHING THE CLINICAL BREAST EXAM TO THIRD YEAR OBGYN CLERKSHIP STUDENTS EVALUATING EFFECTIVENESS OF A SYSTEMATIC APPROACH
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BACKGROUND: Association of Professors of Gynecology and Obstetrics medical student objectives state that the student should be able to demonstrate the performance of a clinical breast exam. However, our program lacked a systematic method to teach, observe and evaluate students in this task. Teaching was haphazard and varied from student to student. As a result, the majority of students had done no more than 2 or 3 breast exams and did not feel comfortable performing the exam.

OBJECTIVE: The objective was to evaluate whether instituting a more systematic approach to teaching the breast exam would result in increased knowledge of the elements and comfort performing the exam.

METHOD: From 5/7/2014 through 7/25/2015, all 156 HMS 3 students starting the obstetrics and gynecology (OBGYN) rotation were sent a link to an online survey assessing previous experience, knowledge and comfort in performing the clinical breast exam. This was followed by a group didactic session that included a simulated breast exam that incorporated residents as teachers. At the end of the OBGYN rotation, the student completed the same survey, with the addition of a question regarding the usefulness of the didactic/simulation session. McNemar’s test was used to test for differences between paired proportions.

RESULTS: Fifty-six of 156 students (36%) completed the pre-rotation survey, and 19 (12%) completed the post-rotation survey. Prior to the rotation, students had performed a median of 2.0 (interquartile range [IQR: 1.0–3.0) clinical breast exams, and this experience increased to 5.0 (IQR: 2.0–10.0) by the end of the rotation (P<0.001). Additionally, comfort performing exams increased significantly (P<0.001). The majority (78.5%) felt the simulation session was relevant to their third-year experience.

CONCLUSION: Instituting a standardized approach to teaching the breast exam increases the comfort and experience of third-year HMS students with performing clinical exams.
HMS Medical Education Student Interest Group (MEDSIG): Teaching Tomorrow’s Educators

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Background: Medical students are key stakeholders in curriculum reform. While recent publications highlight the need for student involvement in curriculum reform, best practices for integrating student perspectives into large-scale curricular change are not well described.

Approach: The HMS Medical Education Student Interest Group (MEDSIG) is a partnership between the Office of Student Affairs and the Academy at HMS. Formed in 2013, the group services to connect HMS/HSDM students to opportunities for near-peer teaching, medical education research, and career pathways in medical education. In 2014, the group was tasked with coordinating student input into the Pathways design process. Thirty-four students representing all years of the HMS/HSDM programs volunteered and were assigned to existing faculty/staff design teams. An additional two design teams, focused on the required scholarly project and student advising and assessment, launched in 2015 and integrated student members from inception. The faculty advisor for MEDSIG coordinates student involvement in conjunction with the Office of Curricular Affairs and supports students in understanding principles of medical education and curricular reform through regular postings to the group’s secure social media site. A formal evaluation of the process was completed in the spring of 2015, consisting of focus groups with faculty (n=6) and students (n=3). The Boston Children’s Hospital Office of Clinical Investigation deemed this project exempt from formal review.

Lessons Learned: Early challenges included 1) identifying a central process for coordinating student interest in curricular reform, 2) balancing student preferences with the need for diversity in team membership, 3) finding mutual times for faculty/student meetings, and 4) integrating students effectively into the culture of existing faculty working groups. Divergent views were expressed regarding the timing of student integration into design teams (early v. late), the usefulness of having a formal (v. informal) process for student participation in curricular reform, and the appropriate roles of students on design teams (creative partner v. confirmatory participant). A range of opinions were expressed by both faculty and students. All participants agreed that students provide an important value to the curricular design process. Students have the advantage of taking all of the HMS/HSDM courses and can provide a longitudinal view of the curriculum. They also see reform through the learner’s perspective.

Significance: Students are key stakeholders in curricular reform. Students interested in medical education careers in particular have an appetite for creative involvement early on in the curriculum reform process. A revised process is underway to create a flexible corps of Student Curriculum Consultants who can provide the learner’s perspective on new course development and evaluation.

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Undergraduate Medical Education
IMPLEMENTATION AND ASSESSMENT OF A NEAR-PEER TEACHING PROGRAM FOR PRECLINICAL MEDICAL STUDENTS

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BACKGROUND: Near-peer teaching (NPT) is increasingly recognized as an effective method for teaching and learning within medical education. NPT is thought to benefit learners through the social and cognitive congruence afforded by having teachers of similar age, knowledge, and experience. Student-as-teacher experiences also provide medical students with an opportunity to reinforce past learning and develop teaching and leadership skills early in their medical careers. Here we describe the second iteration of a near-peer teaching program developed for fourth-year students (MS4s) in the Harvard Medical School second-year Respiratory Pathophysiology course.

METHODS: Twelve MS4s were paired with faculty members to co-teach 1-2 small group case-based sessions for second-year students (MS2s). As part of the preparation, students attended a resident-led workshop reviewing skills and strategies for teaching effectively in a small group setting. Student-teachers also attended a mandatory orientation session and were encouraged to coordinate with faculty co-teachers in advance. Using resources from the formal MS2 course, student-teachers independently designed lesson plans for their session. Following each teaching session, both MS4s and MS2s completed multiple-choice surveys evaluating MS4’s teaching skills and the overall experience. MS4s also wrote reflection essays describing their experiences. Faculty co-teachers completed a 12-question feedback form for MS4s during the session.

RESULTS: We received 114 post-session MS2 surveys, 13 post-session MS4 surveys, and 13 post-session faculty evaluations. The majority of MS2s reported that MS4s enhanced their understanding of the material and considered the quality of MS4 teaching to be “good” or “outstanding”. Nearly all MS4s enjoyed their experiences and believed the program both improved their teaching skills and enhanced their interest in becoming medical educators. Time management was the most common challenge cited by both MS4s and faculty co-teachers.

CONCLUSION: These data demonstrate that NPT in medical education is valuable for both students and teachers. MS2s benefited from the social and cognitive congruence afforded by near-peer teachers, while MS4s used this experience to build and enhance their skills as educators. These results support the continued involvement of MS4s in this second-year course, as well as expanding into other courses at HMS in the future.
MEDICAL STUDENTS AS TEACHERS: A COMPARISON OF SECOND YEAR VERSUS FOURTH YEAR NEAR-PEER TEACHING SKILLS

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**Background:** There is emerging rationale for training medical students as educators based on the principle that medical students will become residents and attendings with teaching roles. Existing evidence supports a longitudinal teaching skills development curriculum; however, very little literature exists on the optimal components or structure of such a curriculum. We conducted a study to examine and compare the teaching skills of second and fourth year medical students engaged in a near-peer teaching program at Columbia University College of Physicians and Surgeons. We hypothesize that differences will exist between the two groups, allowing for identification of specific educator skills to focus on at different time points throughout a longitudinal teacher-training program.

**Methods:** Video footage of second year (n=10) and fourth year (n=10) student teachers was evaluated by a group of third year medical students (n=20) using a validated survey of teaching skills. Survey data was analyzed for differences between the two groups of teachers using a two-sample t-test as well as a Wilcoxon rank sum test and linear mixed models as sensitivity analyses.

**Results:** Seven of the fourteen survey criteria showed statistically significantly higher ratings for fourth year versus second year teachers: Better overall quality of lecture (diff 0.68, p = 0.04), communication of the lecture topic’s importance (diff 0.53, p = 0.03), enthusiasm for topic (diff 0.83, p < 0.01), clinical relevance of presentation (diff 0.75, p < 0.01), interaction with students (diff 1.6, p < 0.01, monitoring of/adapting to students’ understanding (diff 1.2, p < 0.01), and clearer voice/visual aids (diff 0.35, p = 0.04).

**Discussion:** Overall, students in the clinical portion of medical school are more successful teachers than preclinical students. The two groups of teachers were similar in their ability to understand and synthesize information into a lecture format and inability to provide clear goals at the outset and a conclusion at the end of a lecture. However, fourth year students were better rated in teaching skills related to presentation style and engagement of learners. This relative success may stem from the fourth years’ considerable communication experience on the wards in teaching their patients and presenting on rounds, and also that fourth years have acquired more confidence and fluidity with the information as compared to the second years. These findings have implications for development of a longitudinal teaching skills curriculum in medical school.
MEDICAL STUDENTS OFFERING MATERNAL SUPPORT (MOMS): LESSONS LEARNED FROM A PILOT STUDY

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**Problem Statement:** Limited opportunities exist for medical students to be involved in longitudinal patient care and to work with underserved populations. At the same time, infant mortality and low birth weights in the United States illustrate persistent racial and ethnic disparities. Other interventions have shown that at-risk pregnant women may benefit from additional support from resources such as community health workers and health coaches. Given their status as educated, renewable human resources, deploying medical students as community partners, similar to the international community health worker model, can serve to enhance the student experience while addressing these health disparities.

**Objectives:** Medical Students Offering Maternal Support (MOMS) was piloted at Harvard Medical School in the 2014-15 academic year. The program aims to fill a critical gap in medical school education by providing students with longitudinal one-on-one patient experience while also addressing unmet health and social needs of at-risk pregnant women. The program is intended to be a mutually beneficial innovative education model.

**Description:** In November 2014, four first-year students at Harvard Medical School were selected and paired with pregnant women at the Bowdoin Street Health Center (BSHC). Students were matched with patients identified by the BSHC OB/GYN team as individuals who could benefit from additional support. The program was designed for students to attend prenatal appointments, the delivery, and early pediatric visits over the course of eight months. Students also participated in eight monthly didactic sessions led by obstetricians, social workers, doulas, and senior students on topics related to pregnancy, patient support, and community resources.

**Methods and Findings to Date:** Following the pilot phase, individual interviews and focus groups were conducted with students to assess their experiences and solicit feedback. Student feedback indicated that the MOMS program added value to their educational experience and was logistically feasible with their schedules. Students cited a number of benefits to their participation in the MOMS program, including: having long-term patient experience; seeing pregnancy from the patient’s perspective and understanding the social components of her experience in addition to the medical; and, learning from didactic sessions that complemented what they were observing with their patient as well as learning in medical school courses. Challenges students encountered included losing communication with patients and not always having knowledge on appointment times, and patients’ lack of clarity on the role of the student.

**Discussion:** MOMS has the potential to fill important gaps in medical education and was valued as a meaningful educational experience by students. More research is needed on the impact on patients and the ability to positively affect patient health outcomes.
ATTITUDES, PERCEPTIONS, AND MOTIVATIONS OF PATIENTS WHO
VOLUNTEER TO TEACH DERMATOLOGY TO MEDICAL STUDENTS

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Introduction: During the dermatology Patient-Doctor II exercise at Harvard Medical School,
students rotate in faculty-led small groups through four stations staffed by a resident and a patient
volunteer with psoriasis, vitiligo, dermatoheliosis, or dysplastic nevi. Residents guide students in
interviewing and examining each patient and discussing each disease. During this time, each
patient is given time to discuss the impact of the condition on his or her quality of life. We
surveyed our patient volunteers to investigate their motivations and attitudes, and to identify areas
for improvement in our process.

Methods: 15 patient volunteers were included in this study. An anonymous survey was
administered directly before and after the patient-viewing session.

Results: Of the 15 volunteers, 14 had participated in this activity previously. The group
comprised 11 men and 4 women. When asked to rate how much their skin condition negatively
affected their lives (10 point scale: 10 = a lot, 1 = not at all), three patients rated a 9 or 10, five
between 4 and 6, and seven between 1 and 3. In the pre-session survey, all 14 of 15 patients that
answered the question agreed or strongly agreed that he or she was comfortable being examined
by 10-15 medical students at one time.

In the post-session survey, all 15 participants agreed or strongly agreed that they were “treated
with respect” by students, residents, and faculty. All 15 again felt comfortable being examined by
10-15 medical students. All 15 disagreed or strongly disagreed that any medical student, resident
or faculty made them feel upset, uncomfortable, or poorly treated. 14 of 15 felt the medical
students were either very interested or interested in learning about their disease. All 15 felt that
their own presence at the activity was important or very important to enhancing the learning for
medical students. All 15 felt that patient participation is important or very important in teaching
medical students about skin disease, and all 15 agreed or strongly agreed with the prospect of
volunteering again.

Discussion: This was the first formal survey of our patient volunteers that examined their
attitudes and perceptions about volunteering. Our patients found their experience to be uniformly
positive. They spoke to the comfort they have with the activity, as well as to the respect and
dignity given to them by medical students and faculty alike. Most of our volunteers took time out
of their work schedules in order to volunteer for our curriculum, and we have been fortunate to
find a dedicated and altruistic panel of patients that offer to return yearly when given the
opportunity. This study demonstrates a high level of satisfaction among patient volunteers with
their experience in our patient-viewing session. We plan to incorporate our patients’ comments
into the planning of next year’s session and to continue to gather their feedback.

Undergraduate Medical Education
Purpose: Development of a diverse workforce of biomedical researchers is recognized as important by the National Institutes of Health (NIH), yet we know relatively little about the reasons that attract medical students and physicians to research careers. Our study has the aim of addressing this knowledge gap.

Methods: As part of a larger, four-year, NIH-funded study, we sent surveys electronically to 547 HMS alumni who had graduated an average of 15 years ago (graduating cohorts of 1996, 1997, 1998 and 1999). The surveys contained questions about the current positions held by alumni and their involvement in research, as well as questions regarding their attitudes toward research, encouragement from friends, family and mentors, self-efficacy, self-image as researchers, debt at graduation, and experience of stereotype threat during the time they were medical students at HMS.

Results: The response rate was 65.4% (n=358). An ordinal logistic regression analysis showed Underrepresented-in-medicine (URiM) alumni dedicated a significantly lower percentage of their time to research than non-URiM alumni (OR=0.37, \( P=0.004 \)). Alumni with higher rates of medical school debt at the time of their medical school graduation were less likely to be engaged in research (OR=0.88, \( P=0.005 \)). Lack of mentor encouragement for research (compared to encouragement by mentors) during medical school was also associated with decreasing levels of current research involvement by alumni (OR=0.34, \( P<0.001 \)). Female alumni dedicated a significantly lower percentage of their time to research than male alumni (OR=0.33, \( P<0.001 \)). However, female alumni that authored several publications during medical school were significantly more involved in research than those who did not (OR=2.53, \( p=0.05 \)). Those who indicated that significant others supported their involvement in research were more likely to be associated with higher current levels of alumni research involvement (OR=3.26, \( P<0.001 \)).

Conclusions: Based on these findings, medical school curricular modifications and interventions to affect publication opportunities, medical school indebtedness, support for research involvement, and increased performance of research mentorship could all help promote future involvement in biomedical research careers.
THE EFFECT OF COACHING ON PRESENTATION AND TEACHING SKILLS AMONG FOURTH YEAR MEDICAL STUDENTS USING AN ASSESSMENT TOOL

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Background: Presentation and teaching skills are an important part of residency training and an integral part of being an academic physician, but focused training during medical school is often lacking to develop these skill sets.

Methods: The study was approved by the Institutional Review Board at Harvard Medical School. Fourth year medical students in the senior preceptorship course, a fourth year elective, who gave informed consent were enrolled in the study. The study took place in three phases. During the first phase, students were videotaped using iPhone technology teaching selected JAMA Rational Clinical Exam articles. During the second phase, students and coaches (V.T., H.S.) reviewed the videotaped presentations and independently scored the presentations using an assessment tool adapted from a validated scoring system (Peters, MJ, et al.; Am J Phar Educ. 2010; 74: 1-8). The assessment tool was developed to evaluate 15 specific areas of presentation skills within the realms of verbal delivery, non-verbal delivery, visual aids, organization and content. Each student met with the coaches for a thirty-minute session detailing areas for improvement as identified by the assessment tool. The individualized coaching sessions focused on concrete and practical strategies, guided by specific strengths and weaknesses, to become more skilled, confident and engaging in giving teaching presentations. The coaching suggestions were summarized in a word document and sent to each student. During the third phase, students were videotaped presenting a different JAMA Rational Clinical Exam article. They then reviewed their second video presentations and re-scored themselves using the same assessment tool.

Results: Eighteen students gave informed consent, fifteen students completed phase 1 and 2 of the study and fourteen students completed all three phases (N=14). Of the 15 specific behaviors assessed, students’ scores of their pre- and post-coaching presentations were noted to have significantly improved in 9 categories. The areas of largest gain were in presentation content (p=0.000), rate of speech (p=0.001), opening statement and objectives (p=0.004), composure (p=0.01), and enthusiasm/pitch (p=0.01). Of the 4 discrete interventions utilized in our study (viewing their own videos, evaluating themselves using a scoring rubric, attending a personalized coaching session, and reviewing coaching notes), the students found the individualized coaching session to be most impactful on their teaching skills.

Conclusions: Students found the personalized coaching session to be the most helpful in terms of improving their teaching skills. The areas of largest subjective improvement were presentation content, rate of speech, opening statement and objectives, composure and enthusiasm/pitch.
THE BENEFITS OF A NOVEL PROGRAM THAT SUPPORTS THE PROFESSIONAL DEVELOPMENT OF THE INVISIBLE PRE-GRADUATE TRAINEE – THE RESEARCH ASSISTANT.

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Research assistants (RAs) are hired at academic hospitals to staff projects that advance evidence-based medical practice. Although they do not represent the formal sense of being a trainee (e.g., medical students), many are pre-graduate with their current jobs serving as stepping-stones to graduate programs. Lack of professional development programs for RAs may cause them to feel isolated, invisible, and undervalued. Institutions that promote professional development among RAs may see short-term benefits through research productivity via job satisfaction and long-term benefits by positively impacting future graduate learners. Little is written in the medical literature on this topic. This poster describes the development and benefits of a novel, self-sustaining, low-cost, service-oriented, and professional development program that promotes the acquisition of desirable professional skill sets (e.g., administrative, teamwork, leadership, scholarship, and volunteerism) among our future healthcare professionals.

The Program for Research Assistant Development and Achievement (PRADA) is a 5 year-old program at Boston Children’s Hospital that was developed by an attending physician and RAs. PRADA is run by RAs volunteering on a 20-member executive committee that oversees multiple programs, including: 1- Career and Scholarly Talks which includes RAs presenting their research, 2- Patient Tutoring Program which provides RAs the opportunity to tutor patients who don’t meet criteria for school tutoring, 3- Pre-Med Track which includes events that support RAs during the application process, 4- Public Health, Community and Advocacy Group which provides RAs the skills and opportunities to advocate for healthcare legislation and to provide education to the community, including the homeless, and 5- Science Writing Mentor Program which pairs RAs with students who submit manuscripts to a journal that publishes research performed by high school students. These programs offer RAs the opportunity to contribute to communities that they care about utilizing their strengths and interests without interfering with their actual work responsibilities. PRADA is sustained by passionate RAs who work as a team and engage in endeavors that are meaningful to them.

Formal and informal evidence support the benefits of PRADA and conceptualizing RAs as pre-graduate trainees. A survey of over 200 RAs in 2011 and 2015 show that many RAs are pre-med with over 40% indicating that they plan to attend medical school in three years. Approximately 50% (n=34) of outgoing RAs in the late spring of 2015 stated their next step was attending medical school. PRADA continues to grow with over 500 members on its distribution list and approximately 50 alumni enrolled in medical schools across the country. In the 2011 survey, 75% (n=86) of respondents agreed that PRADA had made them feel more a part of a research community, 55% (n=66) enhanced their job satisfaction, 53% (n=63) helped regarding career guidance, 47% (n=56) connected them with research assistants in other fields, and 36% (n=32) agreed that PRADA made them a better research assistant. Overall, 86% of respondents (n=101) agreed with recommending PRADA to other research assistants.

Undergraduate Medical Education
The new curriculum at Harvard Medical School (HMS), Pathways, is an exciting and novel educational experience provided to students through the creation of newly designed courses that foster innovative pedagogical approaches to teach basic, population, social, and clinical sciences. In an effort to optimize learning in a developmentally appropriate way, the new curriculum will transition students into clinical clerkships earlier than in the past, providing them with new opportunities for learning advanced clinical and basic sciences in the later stages of the curriculum. Making active learning its main focus, the Pathways curriculum will transform students into life-long learners and train our future medical professionals in a compassionate, integrated and collaborative manner.

The Practice of Medicine (POM) is the new clinical course within the Pathways curriculum at HMS that delivers foundational clinical education to students during the first year of medical school. This yearlong clinical course was designed to be longitudinal and fully integrated with a concurrent sequence of basic sciences courses that aim to deliver multidisciplinary education. This course takes place one day per week throughout the first year of medical school and will prepare students for the clinical clerkships that take place in the Principal Clinical Experience (PCE) during the second year. Students entering HMS are randomly assigned to one of our affiliated hospitals (MGH, BWH, BIDMC and Cambridge Health Alliance) and receive their foundational clinical education in the POM at that site. In order to foster continuity in education and establish meaningful relationships and mentorship, students stay at the same hospital for their second year to complete the Principal Clinical Experience (PCE).

The POM is unique in offering students the opportunity to learn clinical medicine with a multifaceted approach to acquire 1) interview & communication skills, 2) physical exam, clinical reasoning and diagnostic skills, 3) ambulatory care and inter-professional education, and 4) professional development and reflection. Guided by expert faculty of core educators at each clinical site, students participate in morning and afternoon sessions once weekly by alternating between inpatient and outpatient settings. During their time in the hospital sites, students have a set of preceptors who help them navigate the curriculum and learn foundational communications and physical diagnosis skills. In addition, students are assigned to a primary care clinic at the affiliated clinical site where a preceptor guides them and helps them understand the fundamentals of clinical practice in the ambulatory setting and the roles, as well as the responsibilities of the various health professionals by active participation within these interprofessional teams. Among many others, they also have specialized sessions on Geriatrics, Pediatrics, and delivering care in a cultural context and to patients with limited English proficiency.

This multifaceted approach delivers well-integrated clinical education while allowing students to establish meaningful, lasting relationships and mentorship with clinical teaching faculty at their assigned clinical sites. This structure allows students and faculty to establish continuity in education with opportunity for accountable assessment, evaluation and mentorship/advising/coaching. Our ultimate goal is to provide students with a core clinical education that is fully integrated across the basic, social, population and clinical sciences that will serve as the broad foundation for all their future learning.
THE REVERSE H+P: A MODEL FOR EFFECTIVE DISCHARGE COUNSELING

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BACKGROUND: Much time is spent in medical school teaching students how to "say hello" to their patients. The admission history and physical has a standardized form that is broadly accepted across disciplines. In fact, much of the goal of the third year curriculum is for medical students to perfect their H+P. Less standardized, however, is how we say goodbye to our patients. Several discharge checklists have been published to combat this issue but none are easily accessible or memorable. In this presentation we introduce a novel system for organizing the pre-discharge encounter which we have named the “Reverse H+P” which incorporates the elements from validated predischarge checklists into a memorable format while also utilizing the teach-back method.

Chief complaint:

Description: Physician repeats back the patient's initial presenting symptoms and transitions to an open ended question.

Example: "Now Ms. Jones, if I recall, you originally came to the hospital because you were having chest pain, what is your understanding of what caused that?"

HPI:

Description: This will generally prompt the patient to recount some of the details of her hospitalization as well as any diagnoses or terms that were used during the hospitalization.

Example: "Well the other doctor told me that I have a blockage in my heart that was opened up."

The physician will then validate the patients experience and clarify any misunderstandings.

Past Medical History:

Description: Physician concretely defines (wherever possible) the main diagnosis. Any lay terminology that has been used (e.g. “fluid in the lungs”) is correlated with the medical terminology (e.g. Congestive Heart Failure)

Example: "That is exactly right; you had a blockage in your heart that caused what is commonly known as a 'Heart Attack'".

This format continues through the standard H+P order with relevant social/family history, medication reconciliation, and allergy reconciliation (if any are new from this hospitalization). Next is the physical exam reconciliation where any physical finding that was not present at admission is discussed as well as the expectations that the patient should have. It finishes with the assessment and plan which identifies a follow-up plan (appointments and lab checks) and a contingency plan (reviewing red flags and whom to call if there are problems). All of the verbal communication does not necessarily happen in one sitting and it is paralleled by written discharge instructions.

The reverse H+P has already been used to teach our interns about predischarge communication and the next step is incorporating it into the MS3/MS4 year curriculum.
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Askari
Aydogan
Butler
Burns
Budson
Brzezinski
Buitrón de la Vega
Blum
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Bohnen
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Brunswick
Berman
Bernson-Leung
Besche
Bilello
Bladja
Blum
Bohnen
Boland
Bookman
Boone
Borba
Bortinger
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Brockman
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### B
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Baiu
Baker
Baseggio
Battaglia
Beckmann
Bell
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Bernson-Leung
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Chen
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### D
Danziger
de Moya
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