First Annual
University of Pittsburgh School of Medicine
Med Ed Day

Friday, September 30, 2016
Scaife Hall, UPMC Conference Center
WELCOME to the First Annual Med Ed Day sponsored by the School of Medicine Academy of Master Educators, the School of Medicine Office of Faculty Affairs, the School of Medicine Office of the Vice Dean and the Office of Academic Career Development, Schools of the Health Sciences.

The University of Pittsburgh School of Medicine Academy of Master Educators (www.ame.pitt.edu) is comprised of senior faculty with expertise in medical education and is designed to:

- Recognize and reward excellence in education
- Advance education through innovation and professional development of faculty
- Support and promote educational scholarship

The Med Ed Day event is intended to provide a showcase for educational scholarship and educational innovation across the schools of the health sciences. We anticipate an afternoon of learning and networking opportunity for busy faculty, residents, fellows and students engaged in outstanding teaching and educational scholarship.

We highly value the work of our educator faculty in designing effective and innovative teaching and learning programs, engaging in educational scholarship and research, and teaching and inspiring the next generations of learners.

This event is free and open to all University of Pittsburgh Health Sciences faculty and students as well as University of Pittsburgh Medical Center Graduate Medical Education staff, residents and fellows.

WELCOME!
2016 Med Ed Day

Planning Committee
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University of Pittsburgh School of Medicine
Academy of Master Educators First Annual Med Ed Day
September 30, 2016 | Scaife Hall | University of Pittsburgh

12 to 1 p.m.
Scaife Hall
Lecture Room 5
Keynote Presentation:
Charting a Rational Course for the Future of Medical Education
Steven L. Kanter, MD

1 p.m.
11th Floor Scaife Hall
UPMC Conference Center
Registration Opens

1:30 to 2:30 p.m.
11th Floor Scaife Hall
UPMC Conference Center
First Poster Session

2:30 to 4:15 p.m.
MED Talks
The Ten Case Commandments
Robert M. Arnold, MD
Finding Feedback: Implementation of a Web-Based Evaluation Tool
Nicole Donnellan, MD
Embarking on an RxPedition: A Game of Drug Discovery
Lorin Grieve, PharmD
Mastery Learning for Robotic Surgery Simulation
Melissa Hogg, MD, MS
Can We Change the Way Doctors Think?
Using Video Games to Recalibrate Physician Heuristics
Deepika Mohan, MD, MPH
Learn By Doing—Simulation Education for Healthcare at Pitt and Around the World
Paul E. Phrampus, MD

4:15 to 4:30 p.m.
Break

4:30 to 5:30 p.m.
Educational Resource Fair

5:30 to 6:30 p.m.
Second Poster Session

5:30 to 7 p.m.
AME Networking Reception

7 p.m.
Conclusion of Program
Steven L. Kanter, MD will deliver today’s keynote presentation entitled “Charting a Rational Course for the Future of Medical Education.” Dr. Kanter served as Vice Dean of the University of Pittsburgh School of Medicine (UP SOM) until July 2014 when he became Dean of the School of Medicine at the University of Missouri-Kansas City. He draws from a diverse background of experience that includes clinical medicine, medical informatics, medical education, scholarly publishing, and medical school administration. He was a driving force in curricular renewal at UPSOM, has played a key role in reformulating guidelines for promotion of faculty, and has established a system of “promotion pathways” that provides an explicit framework for career development. From 2008 through 2012, Dr. Kanter served as editor-in-chief of Academic Medicine, the peer-reviewed journal of the Association of American Medical Colleges.
MED TALK SPEAKERS

Robert M. Arnold, MD is a professor in the Division of General Internal Medicine, Department of Medicine at the University of Pittsburgh and in the University of Pittsburgh Center for Bioethics and Health Law. In 2000, Dr. Arnold was named the first Leo H. Creip Chair of Patient Care. The chair emphasizes the importance of the doctor-patient relationship, particularly at the end of life. He is the director of the Institute for Doctor-Patient Communication and the medical director of the UPMC Palliative and Supportive Institute. He is clinically active in palliative care.

Dr. Arnold has published on end-of-life care, hospice and palliative care, doctor-patient communication and ethics education. His current research interests are focused on educational interventions to improve communication in life-limiting illnesses and better understanding how ethical precepts are operationalized in clinical practice. He is currently working with the UPMC Health System to develop system-wide, integrative palliative services throughout the health system. He is the past-president of the American Society of Bioethics and Humanities as well as the American Academy of Hospice and Palliative Medicine.

Nicole Donnellan, MD, an assistant professor of Obstetrics, Gynecology and Reproductive Sciences at Magee-Womens Hospital, is the education director for the Division of Gynecologic Specialties. Additionally, she is the director of surgical simulation and the co-course director of the MS2 Organ System Block Course in Reproductive Biology at the University of Pittsburgh.
Lorin Grieve, PharmD was awarded his PharmD from the University of Pittsburgh in 2014 with an additional area of concentration that focused on academic research. Following this, he completed a postgraduate fellowship for clinical simulation at the VA Hospital in Pittsburgh. During that time, he was contracted with the School of Pharmacy to lead the effort in redesigning the Drug Development 1 class from the standard didactic model to a more engaging game-like experience. He has since been brought on board to lead that class (now referred to as RxPedition) and to strengthen the collaboration between the School of Pharmacy and the School of Information Science and Technology. Dr. Grieve believes that his years of experience designing games for entertainment purposes will allow him to apply gaming techniques to the classroom; gamifying the experience and increasing student engagement and motivation. In addition to games, his interests include ancient pharmacy practice and a well-made cup of coffee.

Melissa Hogg, MD, MS is an assistant professor in the GI Surgical Oncology Division at the University of Pittsburgh. She specializes in abdominal cancers and has a specialty in minimally invasive foregut surgery doing robotic hepatobiliary surgery. Her work focuses on education and training for safe incorporation of the robotic platform at the level of residents, fellows, and attending surgeons. Her master's thesis was in robotic simulation training. Dr. Hogg's work aims to link how technical training and surgical education can improve patient outcomes using proficiency-based curriculums and surgical coaching. In addition, she develops programs in patient-centered outcomes research, comparative effective and cost analysis in minimally invasive cancer surgery.
Deepika Mohan, MD, MPH is an assistant professor of Critical Care Medicine and Surgery at the University of Pittsburgh. Dr. Mohan’s research interests include determinants of physician decision making. Specifically, she is interested in the influence of intuitive judgments (heuristics) on decision making, and the implications for quality improvement efforts.

Paul E. Phrampus, MD is the director of the Peter M. Winter Institute for Simulation, Education and Research (WISER) at the University of Pittsburgh. He is an associate professor in the Departments of Emergency Medicine of the University of Pittsburgh School of Medicine. He is a member of the Academy of Master Educators of the University SOM and course co-director, Senior Elective in Quality and Patient Safety (UPSOM).

Dr. Phrampus has been active in simulation-based education since 1997 at the University of Pittsburgh. He has developed numerous education programs involving simulation and faculty development courses for simulation that are used around the world, attempting to improve healthcare education and patient safety. He has overseen WISER’s development of innovative technological solutions for education and an expansion that now includes eight satellite sites.

He is the 2013 past president of the Society for Simulation in Healthcare and an editorial board member of the peer-reviewed indexed journal, Simulation in Healthcare. His lecturing, faculty development and program development work in simulation-based education have taken him to Australia, China, Chile, Hong Kong, Tibet, India, South Korea, Japan, Taiwan, Thailand, The Philippines, Singapore, Norway, Denmark, Mexico, Saudi Arabia and Germany. Dr. Phrampus is a seven-year veteran of the United States Navy.
## Resource Directory

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Clinical and Translational Science Institute (CTSI)
Forbes Tower Suite 7057
Services Request:
www.swarm.upmc.com
General Questions:
Dana Farrell, 412-383-1171

Health Sciences Library System
(HSLS) Falk Library
Rose Turner, Medical Education Specialist
412-383-5006 | rlft@pitt.edu
200 Scaife Hall
3550 Terrace Street
Pittsburgh, PA 15261
www.hslibguides.com/reference

Human Research Protections Office (HRPO)
412-383-1480 | askirb@pitt.edu
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Laboratory for Educational Technology
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Dan Thompson, Instructional Media Specialist
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Department of Surgery
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412-647-5806 | scottm@upmc.edu
NW607 MUH
3459 Fifth Ave
Pittsburgh, PA 15213
www.gensurgerylabs.pitt.edu/
educationtraining/writing-workshops
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Integrating student personal genomic testing into the core PharmD curriculum to achieve pharmacogenomics competencies

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Introduction: Genomic and precision medicine are difficult concepts to teach effectively and comprehensively within the limited time constraints of health sciences curricula. We developed a participatory education model (Test2Learn™) using optional student personal genomic testing (PGT) coupled with custom software to use real individual- and population-level genetic data in the classroom within a robust ethical framework. Our objective was to deploy Test2Learn in two core first and second year courses to teach pharmacogenomics (PGx) in the PharmD curriculum (Drug Development I and II).

Hypothesis: We hypothesized that PGT integration and active learning activities would lead to enhanced student engagement and improved student achievement of high-level learning outcomes.

Methods: PGx competencies were mapped to course objectives and curricular sequence. Expert ethics instruction, making PGT optional, and processes to maintain faculty blinding and equal learning opportunities mitigated potential risks. Exercises/data using PGT or anonymous data were then used in both courses. Feasibility, engagement, student attitudes, and learning outcomes were measured through participation metrics, objective assessments, and pre/post surveys.

Results: New competencies were aligned with course objectives. In pharmacy year (PY)-1, emphasis was the genetic basis of population variability, ethics, clinical trials, and regulatory guidance. In PY-2, interpretation/application of PGx data to pharmacotherapy cases and population-based PGx were emphasized. PGT participation was high in PY-1 [88%(n=104/114)] and PY 2 [82%(n=100/122)]. More PY-1 (14.3% pre, 37.5% post, p<0.01) and PY-2 (21.4% pre, 56.1% post, p<0.01) students agreed they were confident in their ability to interpret/understand PGT results. PY-2 students improved on a PGx knowledge quiz compared with previous years (84% vs. 75%, p = 0.042). Genotyped students agreed they were able to empathize with patients better as a result of PGT and were more pleased with their decision to participate.

Conclusions: Integration of Test2Learn™ into the PharmD curriculum engaged students, was feasible, and led to achievement of high-level PGx competencies.

Significance: PGT through Test2Learn™ provided an innovative framework to advance PGx education.

Research/Grant Support: University of Pittsburgh Provost’s Office Advisory Council on Instructional Excellence
Teaching Transfer Training with Simulators: The Role of Self-efficacy
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Self-efficacy is related to skill competence. Simulation of skills in realistic environments has been used to achieve skill competency, but research examining simulation and self-efficacy has had mixed results, as has the influence of environment upon self-efficacy. There is limited research examining the use of simulation and the teaching environment to influence self-efficacy related to learning to safely physically move patients.

**Hypotheses:**
1) There would be no difference in students’ self-efficacy ratings among three teaching methods with varying amounts of participation in simulation and peer observation of simulation; 2) Subjects’ self-efficacy ratings would be influenced by the environment, decreasing after their initial simulation experience and 3) increasing after their second/final simulation experience.

**Methods:** Using measurements designed for this study, occupational therapy students (N = 106) rated self-efficacy Knowledge, Skills and Safety after initial transfer training with peers in a traditional classroom laboratory. Students were then randomly assigned to one of three teaching method groups with different dosages of hands-on transfers practiced at a simulation center (3 participative, 2 participative/1 observation, 1 participative/2 observations). Finally, students returned to the simulation center to complete a hands-on transfer. Self-efficacy ratings were collected after each exposure.

Data Analysis: Separate two-way group by time repeated measures ANOVAs were conducted to compare ratings for each construct. Three separate group by time repeated measure ANOVAs were conducted to determine change over time.

**Results:** Participants in the group with 2 participative/1 observation exposures had significant changes in knowledge self-efficacy over time compared to other teaching method groups (F (2, 110) = 5.95, p = .004). There was a significant group by time interaction for Knowledge self-efficacy (F (4,206)=2.51, p = .043) and Skills self-efficacy (F (2,103) = 5.47, p < .001), with significant differences between the classroom environment and the simulated acute care environment, regardless of teaching method group.

**Conclusions:** Teaching method can influence self-efficacy. Students who completed two transfers and observed one reported the highest self-efficacy. Students who never observed simulated transfers did not differ significantly from the other groups. Time can influence self-efficacy. Over time, Knowledge and Skills self-efficacy was significantly improved.

**Significance:** Results suggest that a combination of participation and observation and task practice in a familiar environment can improve self-efficacy which may lead to skill competence. The use of simulation can be a feasible curricular tool for education of healthcare professionals.

**Grant Support:** University of Pittsburgh Innovations in Education (PI: Ketki Raina, PhD)
Gamification of Oral Diagnosis - A Technology Enhanced Learning Experience
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Needs and objectives - When learning how to determine differential diagnoses of oral diseases in the preclinical setting, students require as many opportunities as possible to practice as they develop their fledgling diagnostic skills. Descriptions of the lesions cannot replace students seeing pathology and its associated nuances. Students struggle with the application and transfer of their didactic knowledge. Historically, students performed 9.3% percentage points lower on the diagnosis of clinical images than didactic questions on examinations. The objective is to help students achieve competency in oral diagnosis when this skill is customarily taught in a lecture setting with a relatively large class size (80 students). Images are limited as some of these conditions are rare and students do not have ready access to patients while acquiring foundational knowledge. Expanding student opportunities to practice in a more engaging manner with an extended set of available images is at the center of this project.

Setting and participants – Dental students and dental hygiene students were provided with access to an online oral pathology atlas and a linked game to use as an adjunctive tool while enrolled in Oral & Maxillofacial Pathology.

Description – We developed a web application that consists of an oral pathology atlas and a multi-level game allowing learners to practice their diagnostic skills, compete against their peers, and gain feedback on their progress. Students can choose to focus on particular topics in the practice mode of the game. Leaderboard and Mozilla OpenBadges system provided the game’s competitive elements. Students wishing to review, can browse and search the atlas.

Evaluation – The project is ongoing with 1 year of experience with students using the Beta version. Student feedback has been positive. Gamification has improved the effectiveness of the course, as indicated by student evaluations.

Discussion / reflection / lessons learned – We achieved improved student engagement and performance. Gamification of the courses was viewed favorably by students. Projects of this nature require collaboration of multiple parties, this project involved both Dental School & School of Information Science faculty. Significant commitment, after the initial deployment, was needed to optimize the user interface and improve the user experience. The potential for gamification of other courses, using a similar platform, exists.

Online resource URL –http://studentprojects.sis.pitt.edu/projects/oralpath/auth.php?userID=1
Support – 2014 University of Pittsburgh ACIE Award
Representation of Women among Academic Grand Rounds Speakers
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Introduction: Grand Rounds (GR), a time-honored method of disseminating clinical and research knowledge to medical audiences, showcases speakers as successful academic role models. Exposure to successful female role models, such as GR speakers, may positively impact retention of women in academic medicine. Therefore, we sought to determine whether women’s representation as GR speakers reflects their representation in academic medical workforces.

Hypothesis: Academic GR speakers are less likely than trainees or faculty to be women.

Methods: We surveyed GR speaker series in clinical specialties containing $>$2\% of US academic physicians, per AAMC 2013-14 data. Specialties for which $\geq$15 institutions made January-December 2014 GR calendars available via websites/email were analyzed. For each GR session, we categorized speakers by trainee status, institutional affiliation, and gender. Department meetings, annual reports, ceremonies, and poster sessions were excluded. Female speaker percentages were compared to AAMC workforce gender demographics using one-sample t-tests. Intramural and extramural percentages were compared via paired t-test.

Results: Anesthesiology, Internal Medicine, Neurology, OB/GYN, Pathology, Pediatrics, Psychiatry, Radiology, and Surgery met inclusion criteria. Overall, GR presented by women ranged from 20.0\% (Radiology) to 60.3\% (OB/GYN) of sessions (median: 28.3\%). Trainee-delivered sessions generally displayed comparable female and male speaker representation. Among sessions delivered by faculty or other non-trainees, female representation ranged from 19.6\% to 53.3\% (median: 26.2\%). When compared to national academic medical workforces, these non-trainee female speaker percentages were uniformly statistically lower than the female composition of resident workforces, and lower than faculty workforces’ female compositions in all specialties except OB/GYN and Surgery. Extramural speakers were less likely than intramural speakers to be women (median 22.4\% vs. 29.0\%; $p=0.01$). When female speaker percentages were normalized to workforce demographics’ female percentages, median ratios were 0.56 for medical students, 0.61 for residents, and 0.79 for faculty.

Conclusions: Women’s representation among academic GR speakers falls below percentages of female medical students (46.7\%), residents (46\% overall), and often faculty (36\% overall).

Significance: Women’s visibility in prestigious academic venues such as GR may subconsciously influence women’s desires to pursue academic medicine. According to previous findings, the lower a field’s female visibility, the more likely women are to consider male stereotypes necessary for success. Thus, even inadvertently disproportionately showcasing male GR speakers may limit female trainees’ identification as future academic medical practitioners and stifle female faculty’s academic ambitions. With this knowledge, GR organizers may consider implementing transparent processes to highlight more female role models as GR speakers.
Continuity Clinic Ambulatory Case Conference: A curriculum in literature appraisal and high-value care
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Needs and Objectives: Teaching residents how to incorporate literature appraisal and high-value care concepts into ambulatory practice poses multiple challenges. To address these difficulties, the UPMC internal medicine residency program has established the Continuity Clinic Ambulatory Case Conference (CCACC) curriculum with these objectives:
1) To showcase salient clinical presentations from internal medicine residents’ continuity clinic experiences.
2) To critically appraise evidence supporting diagnostic and management decisions in the outpatient setting, with a focus on providing high-value care.

Setting and participants: The CCACC is held prior to the start of the resident continuity clinic for 30 minutes, 1-2 times per four-week block. Approximately six residents and one faculty facilitator participate in each conference.

Description: The CCACC curriculum consists of a written and a discussion component. The written component, prepared by the presenting resident, consists of a summarized case presentation, 1-3 learning objectives, a synopsis of the supporting literature, and a reference list. The discussion component consists of the resident presenting their case followed by a group-generated differential diagnosis list and decision about the next diagnostic or management steps. Following this, the presenting resident teaches his/her peers by providing a critical evaluation of the supporting evidence and by summarizing the final plan for the patient based on this information. The faculty facilitator is present to serve as a consultant, and assure timeliness.

Evaluation: The CCAC has allowed residents to highlight interesting diagnostic and management cases from their continuity clinic. Examples of topics discussed ranged from pre-exposure prophylaxis for HIV, to Zika virus, to evidence-based management of chronic lower back pain. The most common general categories of topics addressed were hematology/oncology (21%), cardiovascular (14%), infectious disease (12.5%) and gastroenterology (12.5%).

Discussion/Reflection/lessons learned: The CCACC allows internal medicine residents to build multiple skills included in the ACGME’s Practiced Based Learning and Improvement (PLBI) core competency, including practice formulating a clinical question, searching for evidence addressing this question, evaluating the evidence for validity, and disseminating the clinical bottom line from the evidence for others’ education. This curriculum has several key facets which allow residents to show their enthusiasm for ambulatory medicine, facilitate familiarity with finding scientific evidence, pay attention to high value care principles, and hone teaching and leadership skills through a resident-run session.
Developing Interprofessional Case Conferences and Assessing Interprofessional Attitudes

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Needs and objectives: Student and faculty leaders within Primary Care Progress @ Pitt (PCP@Pitt) developed a series of extracurricular case conferences to improve team building and team-based patient care among health professional students. The goal of this project was to evaluate participants’ baseline interprofessional attitudes and the efficacy of case conferences as a tool for Interprofessional Education (IPE).

Setting and participants: PCP@Pitt is an organization that aims to enhance IPE and collaboration at the University of Pittsburgh. The organization has existing relationships with students and faculty in the Schools of Dental Medicine, Health and Rehabilitation Sciences (Occupational Therapy, Physical Therapy, and Physician Assistant programs), Medicine, Nursing, and Pharmacy.

Description: PCP@Pitt hosted 4 case conferences between February 2015 and March 2016. During these dinner events, interprofessional student teams worked through patient cases with faculty facilitation. Afterwards, students were asked to complete standardized questions from the Interprofessional Education Perception Scale (IEPS) as well as an open-ended survey on positive and negative aspects of the case itself.

Evaluation: IEPS results showed that, when compared to students of other professions, medical students believe their field is more highly regarded than others (p=0.015) and believe their peers are less likely to view other health professions highly (p=0.002). Open-ended survey responses displayed broadly positive attitudes towards the events and offered particular criticisms of case design and execution.

Discussion: Interprofessional activities are well received by students and offer important opportunities to understand common attitudes and skill sets within the healthcare team. PCP@Pitt will modify future events to address feedback and will advocate for more robust IPE opportunities university-wide.

Support: This project would not have been possible without the support of faculty members Amy Crawford-Faucher, MD and Jason Hare MPAS, PA-C as well as the PCP@Pitt Core Group and Primary Care Progress National.
Educational Innovation: Partnership between Academic and Service Institutions To Implement Faculty Preceptor Model
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Objectives: Implement faculty preceptor model to provide nurse practitioner (NP) students with clinical experience working with adolescents in an inter-disciplinary environment.

Needs: Despite guidelines to assess adolescent vulnerabilities and risky behaviors, the literature points to hesitancy in pediatric primary care providers as a significant barrier to comprehensive adolescent health assessment. Developing clinical competencies will contribute to improved health outcomes for this population.

Setting and Participants: The curriculum for NP students at the University of Pittsburgh School of Nursing (SON) offers a didactic course on adolescent health, however there is a lack of specialized clinical sites where students can apply learned concepts.

Description: NP faculty coordinated an NP teaching session alongside medical residents as an inter-professional experience within the adolescent clinic. NP students were integrated into resident’s rotation at the clinic, detention center, and community outreach sites. NP students were required to take the adolescent health course and complete simulation experiences prior to clinical rotation. Students were precepted by NP faculty and other adolescent medicine providers and attended didactic sessions with residents. Students and adolescent medicine staff satisfaction with clinical experience and student and faculty evaluation of change in clinical competency (Core Competencies for Adolescent Sexual and Reproductive Health California Adolescent Health Collaborative, 2008) were measured.

Evaluation: Twenty-five NP students rotated through the adolescent clinical experience. Faculty and student evaluation of pre-and post-clinical competency changes demonstrated an improvement in individual competency scores as well as overall improvement in student performance. The greatest changes in performance according to both faculty and student evaluation were in the core competencies related to Pregnancy, STIs and HIV and Sexual-Reproductive Health. This inter-professional experience has inspired the design of 4 DNP scholarly projects in which adolescent research staff and NP students collaborate to improve patient outcomes in this population.

Discussion: The partnership has been sustained and a stand-alone course has been approved by SON curriculum committee pending minor changes and will be submitted to State Board of Nursing for final approval. An adolescent health care competency checklist has been developed based on sexual health, Inter-professional Education and Quality and Safety Education for Nursing competencies to guide this clinical experience.

Reflection: Utilizing a faculty preceptor model to precept students nurtures collaboration between academic and service institutions and provides students with a unique and valuable clinical experience. This collaboration can stimulate inter-professional scholarly activities to improve health outcomes for adolescents.

Funding: SON Distinguished Clinical Scholar Award
High Value Psychiatry: Description of a Pilot Curriculum to Teach Cost-Conscious Care to Medical Students
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Needs and objectives: The Association of American Medical Colleges promotes teaching medical students about cost-conscious care that emphasizes the delivery of high value healthcare that balances benefits, costs, and harms. Educational interventions administered to resident and attending physicians have been shown to improve awareness of these issues, although few studies have explored the use of educational interventions with medical students.

Setting and participants: Third and fourth year University of Pittsburgh medical students rotating through their core psychiatry clerkship.

Description: We developed a novel curriculum to teach medical students about core issues related to high value healthcare. The curriculum was delivered as an hour-long session taught during the psychiatry clerkship. It has been administered six times between February 2016 and July 2016. We utilized case-based discussions derived from medical students’ experiences on the psychiatry clerkship, as well as other core clerkships. We also introduced two practical tools that can be utilized by medical students to make better cost- and value-informed medical decisions.

Evaluation: Forty-four students completed post-session evaluations of the curriculum, which included both quantitative and qualitative assessments. The average rating for the quality of teaching was 3.95, where 4 was coded as ‘excellent’ and 1 was coded as ‘poor.’ The interactive nature of the session and open case-based discussion were frequently cited as the most effective aspects of the curriculum. Regarding feedback for future delivery of this curriculum, the majority of students (n = 37; 82%) wrote statements similar to “no improvements needed” or did not provide a response about recommended improvements. The remaining seven students offered constructive feedback primarily focused on the content of the lecture, such as requesting more information on the Affordable Care Act or to see examples of cost breakdown in an actual hospital bill.

Discussion / reflection / lessons learned: Incorporating cost-value teaching into a core clinical clerkship during medical school was well-received by medical students. Moreover, qualitative feedback from students about the session indicates that students consistently prefer an interactive, discussion-based format to learn this material. Given the initial support for and the strong potential scalability of this educational intervention, future studies are warranted to measure the impact of this curriculum on medical students’ self-assessment of knowledge and confidence in delivering cost-conscious, high-value care.
Combination of flipped classroom and virtual patient case to enhance active learning in the classroom
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Introduction: Flipped classrooms and virtual patients (VP) have been integrated in PittPharmacy curriculum to support diversity of pedagogies, promote active learning, and enhance overall learning experience. However, literature to support combination of these active learning strategies has not been published. Our study assessed the design, implementation, and evaluation of a novel approach that integrated VPs into a required therapeutics course already designed as a flipped classroom.

Hypothesis: We hypothesized that students completing an in-class VP case within a flipped classroom model would score significantly higher on exam questions designed to assess higher-level learning compared to historic control cohort because active learning affords practice of critical thinking and problem solving skills.

Methods: A branched-narrative VP case was incorporated into complications of liver diseases module of PHARM 5223: Gastroenterology and Nutrition. Pre- and post-tests were developed around the VP case to assess student learning of VP case content. Examination scores were compared to historic control group from previous year who were not administered VP case. Questions from pre-/post-tests and examination were compared across low-level (knowledge, comprehension) and high-level (application, analysis, synthesis) Bloom’s Taxonomy domains. Students administered VP also completed a quantitative survey to assess learning preferences.

Results: A total of 109 students completed combined learning strategy. Students’ median post-test score totals were higher compared to pre-test scores after completing VP case (33% vs. 50%, p=0.01). Median examination scores were higher compared to historical control (n=109) (70% vs. 80%, p=0.025). Students answered significantly more high-level learning questions correctly compared to students in historic control (66.67% vs. 83.33% p=0.003). Majority of students (67.5%) agreed VP helped them understand and apply topics covered in the course. Thirty-three percent of students preferred this strategy to usual in-class activities, while 37% indicated both approaches were equally effective.

Conclusions: VPs integrated within a flipped classroom model improved student learning of course content, and led to significantly higher scores on exam questions designed to assess higher-level learning.

Significance: Combination of pre-class video lectures and in-class VP case is novel instructional design that promotes higher-level learning and is well received by learners.

Support: We gratefully acknowledge support of Laboratory for Educational Technology at the University of Pittsburgh for continued use of their online VP platform (vpSim).
Needs and objectives: Physician-as-teacher courses have been found to improve perceived teaching skills and are becoming more common in emergency medicine training programs. Including medical students in resident training courses can improve the realism and provide value to the discussion.

Setting and participants: To improve the fidelity of a resident as teacher course by using medical student participants, and teaching procedures using a simulation lab.

Description: We used 3rd year medical student volunteers who were currently enrolled in their emergency medicine clerkship to help with our Resident-as-Teacher course. The medical students participated in faculty facilitated small groups. The medical students answered questions about their own experiences thus far, and participated fully in the groups. There were several small group discussions that addressed the following topics: Patient Selection and Introduction of the Student to the Patient, Evaluation and Feedback, and Presentations to the Attending. In addition, there were small group sessions in the simulation lab, during which the residents taught the medical students how to perform procedures after the residents participated in a didactic session on teaching procedures. The procedures covered were: Central Line Placement, Endotracheal Intubation, and Lumbar Puncture.

Evaluation: The resident evaluations of the course demonstrated that the use of medical students added value to the course. They also learned from the comments the medical students provided during the small groups. The medical students found the course helpful as well, and enjoyed having the opportunity to learn procedures in the simulation lab.

Discussion/reflection/lessons learned: The use of medical student participants improves the fidelity of a resident-as-teacher course. Using a simulation lab and having the residents teach procedures provides valuable and realistic teaching experience to the resident and procedural training to the medical students who are eager volunteers and provide meaningful input in this scenario.
Matching Medical Students’ Learning Preferences and Curriculum Delivery
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Introduction: Recent reforms in medical education emphasize active and small group learning. However, not all students welcome these educational formats.

Hypothesis: Students’ learning preferences can be determined prior to experiencing a medical curriculum via a concise survey.

Methods: Entering medical students completed anonymous surveys prior to beginning our curriculum. We asked about 23 instructional methods (such as lectures, workshops or small group sessions), about 10 aspects of those methods (such as asking instructors questions or learning material from fellow students) and demographic information. Answers were on 5 point Likert scales (1= least, 5= most preferred). Students were asked to rate: how responsible the faculty was for their learning and whether they preferred learning in small groups. Data were analyzed initially with t tests, and models were built with linear regressions.

Results: Our response rate was 63% (92/146 students). The highest evaluated methods were: practical self-experiences 4.2 (SD .8), explaining concepts to others 4.2 (.8), practical demonstrations 4.1, studying summary materials 4.1 (1.0), laboratories 3.8 (.9) and lectures 3.8 (1.1). Among responders, 54% felt the faculty was responsible for their learning, and 52% preferred small group learning. Students who felt the faculty was responsible for their learning: were more comfortable asking instructors about material, were uncomfortable teaching fellow students and valued lectures more highly (R²=.27). Those preferring small groups: were more comfortable receiving help from other students, preferred questions in small groups, preferred workshops and giving presentations (R²=.62). Demographic information was not predictive.

Discussion: The highest evaluated methods were active and self-directed, but some students highly value lectures and other passive activities.

Conclusions: With 2 simple questions, we were able to define populations of students who preferred very different forms of curriculum delivery.

Significance: As individualization of curricula becomes technologically more feasible, understanding learning preferences may help students make choices about instructional modalities.
Reducing Unconscious Bias in Medical Decision Making
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**Needs and objectives:** Our current understanding of decision making is that it is very complex and multifactorial; one theory is the dual processing theory which describes fast thinking (intuitive, automatic) and slow thinking (analytical, deliberate, and demanding); cognitive biases are extremely common during fast thinking. Unconscious bias (or the automatic preference for a social group) is a type of cognitive bias. While it occurs outside of our awareness and intentionality, its impact is clear to affected by it. In order to minimize the impact of unconscious bias on medical decision making a session was added to the Transition to Internship Course. The objectives were to: understand how cognition works and affects medical decision making, recognize instances of unconscious bias, and apply strategies to minimize the impact of unconscious bias in patient care.

**Setting and participants:** Late in the MS-4 year, students attend the required Transition to Internship Course. The overall goal of the course is to help prepare students for their personal and professional roles and responsibilities as new physicians. In 2016, the Unconscious Bias in Medicine Session was added. This module consisted of a 2-hour interactive session which was delivered three times, each time to 1/3 of the class.

**Description:** The session began by reviewing our current understanding of cognition, highlighting the dual processing theory, and about the types of cognitive bias, introducing them to the concept of unconscious bias. Students then participated in a self-reflective exercise during which their own automatic preferences were highlighted. They then discussed “A Silent Curriculum”; students were prompted to discuss if they had seen similar instances of implicit and explicit bias while on their clerkships. Each student then completed a paper version of the Implicit Association Test (IAT), after which the national data and limitations/critiques of the IAT were reviewed. The session concluded by reviewing the PRISM (Perspective taking, pRosocial behavior, Individualism, Stereotype replacement, and Mindfulness) strategies to reduce unconscious bias in the clinical setting.

**Evaluation:** Students were asked to complete a short evaluation form at the end of the session. The session was generally much appreciated; many commented that they would have loved a similar session earlier in medical school. The opportunity for improvement most often cited was the paper IAT, with many recommending future use of the online version. The strengths of the session included reading “A Silent Curriculum”, and the frank discussions that evolved through the sessions.

**Discussion / reflection / lessons learned** – The session will be included in the 2017 iteration of the course as students were hungry to discuss the material. The program is generalizable to residency programs. Discussion on the effects of unconscious bias on physicians of diverse backgrounds (by their patients, co-workers, and superiors) could be included.
Pharmacists perform many roles in the course of their practice, few more important than that of communicator. The new standards from the Accreditation Council for Pharmacy Education lists communication as a key element of "Approach to Practice and Care", one of the four educational outcomes required for a pharmacy education program to be accredited.[1] A review of the pharmacy education literature yields one study published in 2013 which evaluated the methods employed in teaching communication skills to students in pharmacy programs all across the world.[2] In this review, programs taught primarily written and in person communication skills, but only a single article was centered on telephonic communication. This gap is alarming considering the potential for patient harm resulting from telephonic communication errors. Educators need to incorporate telephonic communication into the curriculum. To address this issue, the University of Pittsburgh School of Pharmacy has developed a tool for implementing telephonic communication education into the classroom. The intent was to make a simple system for creating a variety of assignments that incorporate communicating over the phone with patients and other health care professionals. This method has been named the "VoiceOriented Interprofessional Communication Evaluation System", or VOICES. VOICES has been deployed across three different courses in multiple use cases:

- Simulating the transcription of prescriptions phoned into a telephone line, much like in a community pharmacy.
- Providing a working telephone line for mock patients and providers during and after standardized patient experiences.
- Pushing time sensitive research assignments to students while at practice sites.
- Supplementing a virtual patient case to collect student responses and facilitate assessment.

Student response to the use of VOICES has been generally positive and it is currently being considered for deployment into more areas of the curriculum. Future steps will involve a more comprehensive evaluation of the value that VOICES brings in enhancing our student's telephonic communication abilities.

References:
The Association of Job Strain and Medication Adherence: Is your job affecting your compliance with a prescribed medication regimen?

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Introduction: This study examines for the first time the relationship between occupational factors (e.g. job strain) and medication adherence.

Hypothesis: Job strain experienced by patients effects their medication adherence.

Methods: This is an analysis of secondary data collected from a randomized controlled trial (RCT) where individuals with a new or existing prescription for oral medications and a diagnosis of diabetes or hyperlipidemia were enrolled at one of 34 drugstores of a national pharmacy chain in Tennessee. Job strain was classified by Karasek’s demand-control model which divides job strain into four categories: active (high psychological demand, high decision latitude), high strain (high psychological demand, low decision latitude), low strain (low psychological demand, high decision latitude), and passive (low psychological demand, low decision latitude). A fifth category, non-contributing, was established for the combination of participants who were unemployed, disabled, and retired. Medication adherence was measured using the proportion of days covered (PDC) metric. Adherence, health care utilization, psychosocial assessment, chronic disease status, and occupational health history data were obtained from study participants. Generalized Linear Mixed Models (GLMM) were used to model PDC as a function of job class and job strain.

Results: The study found that individuals in most job strains are less adherent to their medication regimen than those in a low strain job category. However, statistically significant differences are observed for only RASA and statins medications, and when PDC is combined across all medication classes.

Conclusions: Low job strain occupations, characterized by low psychological demand and high autonomy seem to allow individuals the capability to modify their health behavior, and thus, remain more adherent to their medication regimen.

Significance: Examining occupational factors may prove beneficial in developing workplace interventions and education that improve medication adherence. Healthcare professionals who are working with patients with low medication adherence may want to look at patient work history and environment to strategize approaches to improve adherence.

Research/Grant Support: Merck and Co., Inc.
The Pennsylvania Project: An Analysis of Patient Characteristics and Healthcare Utilization Resulting in Improved Medication Adherence and Reduced Healthcare Costs for a Pharmacy-based Intervention

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Introduction: The Pennsylvania Project, completed in 2014, evaluated the effectiveness of pharmacist-led screening and brief intervention (SBI) methods on medication adherence and downstream healthcare costs. This secondary analysis examines the influence of a number of patient and pharmacy characteristics on the intervention effect.

Hypothesis: Patient and pharmacy characteristics influence the effectiveness of the SBI intervention on medication adherence and downstream healthcare costs.

Methods: Patient data was extracted for 29,042 patients who filled prescriptions at 107 intervention pharmacies and 30,454 patients at 111 control pharmacies. Pharmacists engage in brief interventions (BIs) with patients with low adherence. The following variables were analyzed to examine their influence on the intervention effect (improved medication adherence as measured using the proportion of days covered (PDC) metric): patient demographics (age, gender), insurance status (Medicare, Medicaid, commercial), patient diagnosis (diabetes, dyslipidemia, dementia, depression), number of diagnoses (one, two, three), pharmacy characteristics (drive-thru present, script volume, and location size: large fringe metro, medium metro, and micropolitan), and healthcare utilization (inpatient nights, outpatient visits). Patient medication adherence was analyzed based on the class of medication prescribed including oral diabetes medications, statins, and anti-hypertensives. Regression analyses were used to model these variables.

Results: Insurance status had a significant influence on PDC. Medicare patients had significant improvements in PDC for all three medication classes, diabetes (4.7%), statins (3.1%) and anti-hypertensives (3.0%). Medicaid had even larger significant improvements for diabetes (27.3%), statins (28.4%) and anti-hypertensives (19.6%). Having only one diagnosis improved PDC for diabetes (18.3%), statins (4.2%), and anti-hypertensive (6.9%) medication classes. For pharmacy characteristics, script volume and location influenced PDC. Pharmacies with larger script volumes and those located in micropolitan areas had significantly improved PDC effects.

Conclusions: This secondary analysis reveals that there are a number of other variables that need to be considered when examining intervention effects.

Significance: This information can be used to develop tailored interventions to improve medication adherence for individuals with a particular diagnosis, insurance status, or access to pharmacies in specific environments.

Research/Grant Support: Merck and Co., Inc.
Effectiveness of Voice Simulation on Improving Attitudes Toward and Self-Efficacy Related To Care Provision of Patients with Auditory Hallucinations among Nursing Students

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Background: Through implementation of the Affordable Care Act, more mental health consumers will have access to healthcare, requiring more healthcare providers skilled in caring for this population. However, long-standing biases among nurses have dissuaded mental health consumers from seeking treatment. Thus attitudes toward psychiatric patients need to improve in order for increased healthcare access to have a substantial effect.

Purpose and Theoretical Rationale: According to Bandura's Self-Efficacy Theory and the experiential learning theory, simulation could help prepare students for clinical practice by allowing students to apply class course material and provide safe, active learning. This study aimed to improve attitudes toward and self-efficacy related to caring for patients experiencing auditory hallucinations (AH) through the implementation of voice simulation.

Method: A single group study design was used with pre- and post-intervention tests. The Hearing Voices That Are Distressing curriculum served as the intervention. Nursing students (n=87) completed three separate tasks while listening to simulated voices via headphones. An adapted version of the Attitudes of Mental Illness Questionnaire (AMIQ) assessed attitude, and a visual analog scale (VAS) assessed self-efficacy. Self-reflective open-ended questions were asked to assess participants' awareness of AH and confidence in communicating with those experiencing AH and to assess how the simulation experience could be applied to clinical practice. Descriptive statistics and t-tests were used to analyze data collected at pre and post-test.

Results: Among the 87 participants, 74 (85.06%) were female, 71 (81.61%) were Caucasian, and the mean age was 21.66 years (range=19-52; SD=4.26). Statistical significance was found for all AMIQ items (p≤0.01), indicating that students' attitudes towards AH changed after the intervention. Self-efficacy was not changed significantly (p=0.12). Participants reported increased awareness of AH and acknowledged the need for more empathy, understanding, and patience in practice.

Conclusions: Simulation of voices provided with debriefing sessions could increase awareness of and change attitudes toward AH among nursing students. Future efforts should be made to implement simulations of perceptual disturbances in nursing curriculums.
Creating a Fellow-Driven Lecture Curriculum in the Coronary Intensive Care Unit

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**Needs and Objectives:** Although residents rotating the UPMC Presbyterian Coronary Intensive Care Unit (CICU) encounter patients with a common set of pathologies, residents have traditionally learned via rounds-based teaching and education by random opportunity. Because most residents rotate through the CICU for only 4 weeks throughout their training, week-to-week variability in patient pathology leads to variability in their depth and breadth of knowledge. We aimed to develop a fellow-driven, standardized curriculum for residents rotating in the CICU.

**Setting:** The CICU is a 10-bed, cardiac critical care unit in a large teaching hospital. Typical pathology includes: cardiogenic or other shock, myocardial infarction (MI), unstable arrhythmias, respiratory failure, and cardiac arrest. Internal medicine residents rotate through the unit in groups of 6: 3 interns (PGY-1) and 3 residents (PGY-2/3/4).

**Description:** Cardiology fellows were solicited to identify high-yield topics for practical bedside application. Fellows assigned themselves to present 20-30 minute slideshows or “chalk talks” for given topics. Topics included: unit orientation; hemodynamics; pulmonary artery catheters; acute MI; mechanical ventilation; post-percutaneous coronary intervention care; mechanical circulatory support; codes and emergencies; sepsis and pressors; supraventricular tachycardia; ventricular tachycardia; post-cardiac arrest care; end of life care; and pulmonary hypertension. 8 different fellows, 2 nursing clinicians, 1 organ donation nurse, and 1 faculty member presented. Attending cardiologists were asked to accommodate a later rounding start time; CICU nurses were asked to defer non-urgent issues to the end of teaching.

**Evaluation:** After 2 months of fully implemented curriculum, residents (N=12, 100% response rate) responded to an anonymous web-based evaluation consisting of free comments and Likert-scaled questions. 11/12 (92%) of respondents agreed or strongly agreed that a formal CICU curriculum was a good idea. 75% disagreed or strongly disagreed that information in the curriculum was presented elsewhere in the residency program. The average lecture rating was 3.7 out of 4. Based on first month feedback, lectures were shortened to 15-20 minutes and moved to 7AM to allow for night team participation.

**Discussion:** A fellow-driven inpatient curriculum focused on practical skills can be introduced into a busy clinical unit to the benefit of resident education. Additionally, the natural enthusiasm of trainees to teach other trainees can be leveraged to create a program with low demands on faculty. Barriers to continuation of the lecture series include continued buy-in from fellows to refine talks to respond to resident feedback and sustain the program.
Evaluation of a flipped classroom approach in a pharmacology-based anatomy and physiology curriculum

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Introduction: The flipped classroom (FC) approach is a teaching method meant to shift the education paradigm from an instructor-centered model to a learner-centered model. The objective of this study was to assess the value of a FC in basic science pharmacology coursework.

Hypothesis: Our hypothesis was that the FC approach in an anatomy and physiology course will enhance first-year pharmacy student learning and confidence in applying physiologic drug mechanisms.

Methods: Students learned course material in a traditional lecture-centric fashion for the first half of the course and transitioned to FC for the second half. The FC approach required students to watch online lectures and complete short quizzes to assess understanding. In class, students worked in groups to solve cases that focused on application of physiologic drug mechanisms. An IRB-approved survey that assessed perceptions and self-efficacy was given at each half of the semester. The survey used dichotomous, Likert scale (1=strongly agree, 5=strongly disagree), and open-ended responses. Paired ordinal data was analyzed using Wilcoxon signed rank test. Paired nominal data was analyzed using McNemar's test.

Results: 104 (91.2%) students completed both surveys. 65 (62.5%), 31 (29.8%), and 8 (7.7%) students identified themselves as visual, kinesthetic, and auditory learners, respectively. 51 (49%) students felt that the kinesthetic learning method dominated in the FC approach versus 1 (1%) in the traditional classroom (p<0.01). There was no difference in perceived student engagement between the traditional and FC approaches (mean Likert score: 2.12 (SD=1.01) vs. 2.34 (SD=1.094), p=0.18) and in perceived student confidence in applying specific drug mechanism on cellular physiology (mean Likert score: 1.80 (SD=0.805) vs. 1.96 (SD=0.835), p=0.11). 62 (59.6%) versus 75 (72.1%) students stated that teaching methods enhanced learning in the flipped and traditional classroom, respectively (p=0.05).

Conclusions: The flipped classroom approach resulted in similar student learning and confidence in the application of physiologic drug mechanism compared to traditional methods in basic science pharmacology coursework.

Significance: This is the first study to describe the impact of a flipped classroom approach on student learning and confidence in applying drug mechanism on physiologic processes. Exploring mixed FC and traditional teaching methods appears warranted.

Research/Grant Support: N/A
Is non-physician instruction inferior to attending physician instruction for central line training in the simulation lab?

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Introduction: As the demands for simulation services increase, educators will be increasingly challenged to provide high quality educational experiences while minimizing cost. This study evaluates the effectiveness of education by non-physician competent facilitators (NPCF) versus physicians for simulation-based education of central line placement (SBCLP).

Hypothesis: We hypothesized that NPCF outcomes for SBCLP would not differ from physician facilitator outcomes for SBCLP in the areas of performance, knowledge, satisfaction, and confidence.

Methods: Eighty-five novice learners were randomized to undergo SBCLP by attending faculty or NPCF. Each NPCF completed 8-10 hours of competency based training. All learners completed an online curriculum and pre-test. Following the SBCLP course, subjects placed a central line on a task trainer. The task was recorded using a two-camera configuration synchronized with the ultrasound output and combined into a single video. Recordings were de-identified and evaluated by three physician raters blinded to instructor. The hypothesis was tested with a 5% non-inferiority margin. Secondary outcomes included student knowledge, confidence, and satisfaction.

Results: Forty students underwent SBCLP by attending physicians and 45 underwent SBCLP by NPCF. There were no appreciable differences in baseline demographics, written pre-test scores, or self-reported confidence. A total of seven NPCF participated: three were new nurse graduates, three were experienced critical care nurses, and one was a simulation specialist. The Fleiss intra class correlation coefficient (ICC) demonstrated good agreement among physician raters. Non-inferiority testing of the performance of NPCF trained learners versus physician trained learners demonstrated no difference between the groups (P<0.01). There were also no differences noted between the groups on post-test knowledge scores, self-reported learner confidence, course satisfaction, or instructor satisfaction.

Conclusion: We describe the creation, deployment, and evaluation of an expert curriculum-competent facilitator model for achieving competency in central line placement as measured in the simulation environment. Further, we demonstrate that NPCF are able to achieve similar outcomes as compared to experienced faculty physicians.

Significance: Our results suggest that effective deployment of the model has several advantages including supporting the scalability of simulation based training by reducing system based costs and alleviating strain on attending faculty teaching schedules.
Ophthalmology Mini-Elective For Medical Students by Medical Students

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Needs and Objectives: Despite the frequency of ophthalmic presentations in healthcare settings, the time spent on ophthalmology education has continued to decline in recent years¹. To address this, we implemented an ophthalmology short course (“mini-elective”) in which upper-class medical students and residents created a curriculum for preclinical year medical students. The objectives of the mini-elective were (1) to improve knowledge of ophthalmic conditions, and (2) to provide hands-on instruction in ophthalmic examination techniques.

Setting and Participants: Upper-class medical students and ophthalmology residents implemented a mini-elective in ophthalmology for preclinical students at the University of Pittsburgh School of Medicine under the supervision of the residency program director. Enrollment was twenty students in 2015 and seven students in 2016.

Description: Students participated in four two-hour sessions and one day of shadowing an attending ophthalmologist in the operating room. Each session consisted of 30-45 minutes of interactive case-based lectures followed by small group ophthalmic examination practice. In the first session, students were introduced to the field of ophthalmology, ocular anatomy, and the ophthalmic history and physical exam. The subsequent sessions covered cataracts, glaucoma, diabetic retinopathy, retinal detachments, and eye emergencies. During the hands-on portion, students practiced the eye examination including slit lamp biomicroscopy, and direct and indirect ophthalmoscopy with resident guidance. In 2016, a surgical wet lab was also included.

Evaluation: Pre- and post-course surveys were distributed to all students. Overall, students gained confidence in their clinical knowledge and ability to use ophthalmic examination techniques, fulfilling course objectives. Additionally, interest in ophthalmology as a career path increased. Students were especially enthusiastic about the hands-on experiences with examination techniques.

Discussion: Given the positive response to the course and the limited exposure in ophthalmology beyond medical school curriculum, our mini-elective is a practical method to remedy this issue due to the technical nature of the field. Additionally, involving senior medical students in development and implementation of the curriculum allowed them to solidify knowledge of course content and grow as educators, a concept that is applicable to similar short courses for preclinical medical students. Therefore, our curriculum not only provides a model for ophthalmology education, but also demonstrates medical education concepts that can be applied in all specialties.

Fitting the bill: A qualitative analysis of group reflections on patients' hospital charges

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Introduction: In the face of unsustainable U.S. health care costs, residency programs have been mandated to develop curricula teaching residents about high-value [cost-conscious] care (HVC). We evaluated a Patient Bill Reflection Curriculum implemented on the inpatient General Internal Medicine (GIM) service.

Hypothesis: We aimed to understand residents’ perceptions of the Patient Bill Reflection Curriculum, including how they believed the curriculum affected their clinical practice and understanding of HVC concepts.

Methods: This curriculum was implemented for internal medicine residents rotating on inpatient GIM services at UPMC Montefiore, and involved guided team-based reflections on a patient’s hospital bill. The curriculum was evaluated with thematic analysis of resident interviews after participation in the exercise. Interviews were semi-structured and elicited residents’ perceptions of the content of their reflection, usefulness of the reflection, and whether the reflection altered their clinical practice. Interviews were coded using the editing method for qualitative analysis developed by Crabtree and Miller.

Results: We interviewed twenty out of 21 eligible residents (95%) who participated in the curriculum during November 2014. Interview themes fell into five domains, including: reflection content, change in knowledge, change in management, feedback, and recommendations. The content of residents’ reflections focused on surprise about the magnitude of charges and discussion of how to minimize these charges. Residents reported that their knowledge of hospital charges improved, and that their clinical management would change with plans to order fewer unnecessary tests and medications. Residents found the curriculum useful and enjoyable, and recommended that charges should be available at the time of clinical decision-making. There was less reflection on the appropriateness or evidence value of various interventions.

Conclusion: The Patient Bill Reflection Curriculum was a feasible and focused intervention aimed at teaching residents about HVC principles. Despite our intent, the reflection discussions seemed to focus on minimizing costs instead of balancing costs with quality, evidence-based medicine to achieve optimal patient outcomes, which is at the heart of HVC.

Significance: To our knowledge this is first qualitative evaluation of an audit and feedback HVC curriculum. Residents enjoyed the curriculum, but discussion content was not as focused on value as we hoped. As a result, the curriculum has been modified to increase discussion around evidence and value. These findings may be useful to other training programs in search of easily implementable HVC curricula.

Grant Support: Division of General Internal Medicine Data Center Grant (PI: Anna Donovan, MD, MS)
Needs and Objectives: The Commission on Dental Accreditation mandates that dental graduates be culturally competent, since cultural competence directly impacts patient care and a patient’s ability to achieve and maintain optimal oral health. One essential component of achieving cultural competence is acquiring good interpersonal communication skills. However, teaching dental students the skills and values necessary to optimize the patient-provider relationship has been challenging and current educational resources are limited. These skills and values are effectively taught to actors using well-developed techniques and exercises that build interpersonal relationships and empathy. While such theatre techniques and exercises have been pilot-tested in medicine to improve patient-provider interactions, there are no comparable initiatives in dentistry. Our objective is to develop educational videos demonstrating theatre techniques to be incorporated into our existing curriculum. The overall goal is to enhance interpersonal communication skills, empathy, and cultural competence amongst students of dentistry.

Setting and Participants: Faculty from the School of Dental Medicine and the Department of Theatre Arts are collaborating to develop educational videos along with a communication skills assessment tool and to integrate the educational videos into the existing predoctoral curriculum.

Description: The instructional videos will present theatrical exercises to help predoctoral dental students recognize verbal and nonverbal communication clues and enhance their present moment awareness. Students will then practice the skills prior to and during currently existing standardized patient (SP) exercises in the first and third years of the curriculum. Faculty facilitators will score the students’ interpersonal skills during their SP sessions.

Evaluation: We will monitor the effect of our innovation by introducing the exercises ahead of the corresponding SP session to only half of the Class of 2020. The communication skills of third year students already in the predoctoral program (Classes of 2018 and 2019) will also be measured and used as a baseline.

Discussion: Approximately 80 predoctoral dental students will be impacted per year, and the videos can also be used for faculty development. We anticipate presentations at national meetings, publications, and a submission to MedEdPORTAL.

Support: This project is supported by the Office of the Provost of the University of Pittsburgh through an Innovation in Education grant.
Evaluating the Impact of Sample Medication on Subsequent Patient Adherence
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²RTI International
³MedVantx, Inc.
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Introduction: Medication nonadherence is problematic throughout healthcare practice. Teaching providers to use an electronic cabinet to distribute sample medications and information on these medications to patients may improve patients’ likeliness to fill a first prescription and continually refill prescriptions.

Hypothesis: If patients are provided with a generic sample of medication by their primary care provider, they will be more likely to initially fill and refill the prescription.

Methods: The sample consisted of patients prescribed medications to treat diabetes, hypertension, and dyslipidemia drawn from the electronic health records of a large healthcare provider. The treatment group of patients each received a 30-day generic sample of medication compared to a control group of patients who did not receive a sample. The study outcome was Primary Medication Nonadherence (PMN), defined as whether a patient filled a prescription within 90, 180 or 365 days of prescribing. Secondary Medication Adherence (SMA), measured as Proportion of Days Covered (PDC) and Proportion of Days Covered ≥ 80% (PDC80), was also examined. Propensity score methods and multivariate regression models were used to examine the outcomes and group differences. Costs to the patient prior to and following the prescription were also analyzed. Key informant interviews were conducted with physicians and qualitative analyses performed.

Results: Patients who received a 30-day generic medication sample had a higher probability of filling a first prescription within 90 days (72.2% for treatment patients vs. 37.6% for controls), 180 days (79.1% vs. 43.3%, respectively), and 365 days (85.5% vs. 48.6%). The medication sample had a positive effect on PDC for 90 days, with treatment patients having 72.8% adherent days and 35.1% for controls. At 180 days, PDC adherence was 57.1% for treatment patients vs. 35.4% for controls, and 43.6% vs. 33.9%, respectively for the 365-day period. PDC80 was significantly better among the treatment patients at 90 days, (53.5% vs 31.2%, respectively), 180 days (38.4% vs. 29.1%), but not at 365 days (23.7% vs. 23.7%). Costs were reduced by $395 for the treatment group. Interviews with clinicians indicated a positive view of the program.

Conclusions: Providing a free sample medication improved the probability of patients filling their initial prescriptions and adhering to those medications. This program can impact healthcare costs, as evidenced by the lower costs for the treatment group.

Significance: Educating primary care physicians on new technologies and prescribing methods can help further disseminate these innovations and improve adherence.

Research/Grant Support: MedVantx, Inc.
Balint group participation enhances professional development and stress management among pediatric residents
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Needs and objectives: Pediatric residents can find some interactions with patients or their families challenging. One way to learn from these interactions is to participate in a Balint group, which is a small physician group that meets regularly to participate in a supportive facilitated case discussion. In contrast to traditional case discussions which focus on problem-solving, Balint groups focus on enhancing the physician’s ability to provide empathic, effective and fulfilling care. Our objective is to assess the impact of Balint group participation on pediatric resident professional development, including empathy, flexibility, and self-reflection.

Settings and participants: Traditionally, Balint groups are held longitudinally; however, adding a longitudinal experience can be difficult for residency programs. Accordingly, in July 2013, we implemented a weekly Balint experience for Children’s Hospital of Pittsburgh of UPMC (CHP) PL-2 residents during three 1 month-long ambulatory block rotations. With support of program leadership and local family medicine Balint leaders, and buy-in from the block rotation directors, the PL-2 Balint group has become an established part of the CHP curriculum.

Description: CHP residents participate in 12 1-hour Balint groups during their PL-2 year. Group size is typically 6-9 residents; two faculty members (one pediatric and one behavioral health) serve as group co-leaders. In each session, one resident presents a challenging case, and then the group explores individual thoughts, emotions and needs from the physician and patient perspectives.

Evaluation: We survey PL-2 residents annually using an anonymous self-administered tool assessing four domains: group environment, leader characteristics, skill development, and overall impact. Survey data (n=86) reveal that residents agree Balint group participation fosters skills in: self-reflection (94.2%), empathy (93.0%), increased awareness of one’s own limitations (86.1%), increased flexibility when responding to challenging patient relationships (86.0%), and increased ability to tolerate uncertainty (81.4%). Survey results also show that the positive impact of the Balint experience increases with cumulative participation throughout the PL-2 year. Compared to residents with 1-2 months’ experience at the time of the mid-year survey, residents with 3 months’ experience more often strongly agreed that Balint: “was relevant to my preparation to work with patients in a patient-centered manner” (14.9% vs. 42.1%, p=.01) and “helped me manage the stress of residency” (13.6% vs. 42.1%, p=.006).

Discussion / reflection / lessons learned: Block schedule-based Balint participation enhances perceived professional development and stress management among pediatric residents and serves as a model to integrate Balint groups into more residency programs locally and nationally.
Evaluation of the Oncology Nurse Practitioners Web Education Resource Course
ONc-PoWER: Oncology Nurse Practitioner Web Education Resource
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Background: The Oncology Nurse Practitioner Web Education Resource (ONc-PoWER) is an online course developed by Margaret Rosenzweig, PhD, FNP-BC,AAOCNP from the University of Pittsburgh School of Nursing and funded by the National Cancer Institute (1 R25 CA148050-01A1). The course is designed specifically for Nurse Practitioners (NPs) in their first year of oncology practice paired with an on-site mentor (physician, nurse practitioner or physician assistant). Based on the Oncology Nursing Society’s Competencies for Entry to Practice, the course consists of 5 interactive modules: 1) the new patient visit 2) presenting a patient with cancer 3) cancer visits across the continuum of care 4) palliative and hospice care and 5) self-care and professional development. The purpose of this study was to examine to what degree the learning objectives were met, the NPs and Mentors comments about content learned and areas for course improvement were evaluated.

Method: NPs and mentors completed the course over 4-6 months then completed a course evaluation. There are 6 items on the course evaluation with Likert scaled responses of 1) did not meet objective 2) somewhat met objective 3) met objective 4) more than met objective 5) exceeded objective expectation.

Results: Enrollment is ongoing. Thirty NPs new to practice and 22 oncology mentors have completed evaluations thus far. Responses overall are favorable.

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<th>Module 2 Presenting a patient with cancer</th>
<th>Module 3 Visits over the cancer care continuum</th>
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Conclusion: The ONc-PoWER web enhanced oncology orientation program was favorably evaluated by nurse practitioners new to cancer care and their mentors. Areas most often identified by the novice NPs as new content learned were using National Comprehensive Cancer Network (NCCN) guidelines for practice and "how to organize a new patient visit". Areas for improvement were identified as the need for more complex information overall, more specific information regarding malignancies and more in depth information regarding (chemotherapy/treatment) side effects and oncologic emergencies. This method of electronic orientation could standardize the exposure of essential basic cancer care competencies at entry to oncology NP practice.

Funding Source: NATIONAL CANCER EDUCATION GRANTS PROGRAM (1 R25 CA148050-01A1)
Teaching Medicine Through Music
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Needs and Objectives: Music has been shown to improve memory and has been employed as a learning tool in other situations. Musical mnemonics have applicability to medical and non-medical education to enhance memorization, highlight essential concepts and engage the learners. It has been shown that students retain information and score better on tests when presented with material in a musical format. In the second year of medical school, University of Pittsburgh medical students take the renal segment of “Body Fluid Homeostasis” which involves exposure to a large amount of renal pathology, an area unfamiliar to the students, with numerous terms and concepts which could be captured in musical lyrics. The goal of this project is to enhance medical student learning through music, particularly rock and metal, musical forms with which many students are familiar.

Setting and Participants: Currently, the renal segment of “Body Fluid Homeostasis” uses standard teaching approaches, such as lectures and a comprehensive syllabus. Renal pathology is covered in lecture format and in workshops comprising small student groups and instructors, typically a pathologist and a nephrologist. The second year medical students are not well grounded in histology or pathology which makes the material challenging for them. The material is largely visual with images projected on a screen and an accompanying syllabus for detailed explanation. In order to understand and memorize the information, other avenues for learning can be employed. An auditory method may complement the visual images and engage the students.

Description: Dr. Schoedel composed lyrics highlighting important concepts in renal pathology, based on the syllabus given to the University of Pittsburgh medical students and faculty. A digital recording is in progress to be used in the renal segment of the course. Sample topics include: Amyloidosis, Diabetes Mellitus and Systemic Lupus Erythematosus. These lyrics set to music have the potential of improving student learning in the area of renal pathology.

Discussion: So far the lyrics have been shared with students in the small group renal pathology session and the response has been positive with students eager for more. The creation of music has been a greater challenge; however, not insurmountable. This learning tool could be applied to other subject areas in medicine and in other academic environments. The music itself can be recycled to convey concepts in other educational areas.
Resident Coping Mechanisms: State or Trait?
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Introduction: Coping mechanisms are cognitive and behavioral efforts that people use to deal with stress. They can be loosely grouped into “adaptive” or “maladaptive” based on their usefulness in a given situation. Little is known regarding the general coping patterns of physicians. The objective of our study was to determine the coping mechanisms used by internal medicine residents.

Hypothesis: Use of coping mechanisms would change throughout residency and that there would be differences in coping mechanisms used by residents based on sex, race and international graduate status.

Methods: We performed a longitudinal analysis of coping mechanisms used by internal medicine residents at the University of Pittsburgh from 2010-2015. Coping was measured using the Brief Cope, which was administered annually. We compared results from the new intern assessment taken prior to starting residency to those at the end of PGY-1, PGY-2 and PGY-3 year. We calculated significant changes from the new intern assessment using a mixed effects ordered linear regression model. Models controlled for sex, race, and international graduate status.

Results: Out of 494 residents, 377 (76%) completed the survey. 188 were male (50%), 267 (70%) were white, and 346 (92%) were domestic medical school graduates. Of the 818 surveys, 236 new intern assessments, 195 PGY-1, 197 PGY-2 and 190 PGY-3 surveys were analyzed. Using the incoming intern assessment as a baseline, the frequency of use of acceptance (p<0.001), planning (p<0.001), positive reframing (p<0.001), use of emotional support (p=0.012), use of instrumental support (p=0.032), self blame (p=0.004) and humor (p=0.003) all significantly decreased during residency. Female residents used acceptance (p=0.02), active coping (p=0.031), positive reframing (p<0.001), use of emotional support (p<0.001), use of instrumental support (p<0.001), self-distraction (p=0.044) and venting (p<0.001) more than their male counterparts. Male residents used humor more frequently (p=0.032). Non-white residents used denial more frequently (p=0.011) and international medical graduates reported less frequent use of emotional support (p=0.045) and humor (p=0.004).

Conclusions: The use of adaptive coping mechanisms decreases during residency. Maladaptive coping mechanisms were not substantially affected. There are differences in coping based on sex, race and international graduate status.

Significance: During residency, trainees are using adaptive coping mechanisms less frequently. Educators should be aware of these changes as they provide guidance to residents or target solutions for wellness.

Research Grant Support: Division of General Internal Medicine Grant
A Needs Assessment and Innovative Patient Safety Curriculum for Pediatric Residents
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Objectives: Patient safety has been identified as an important topic for resident medical education, but few published curricula target pediatric residents. We aim to design a curriculum to improve pediatric residents' knowledge of patient safety principles, their comfort in applying these principles to future practice, their satisfaction with their safety education, and rates of resident event reporting.

Setting and Participants: Seventy-five senior level (PGY-2 and above) pediatric and multi-board residents rotating through the Children’s Hospital of Pittsburgh of UPMC.

Needs Assessment: A pre-curricular assessment was administered to all residents. It consisted of 20 multiple-choice questions assessing knowledge and nine questions assessing attitudes on a five-point Likert scale. The response rate was 60% (45/75) and showed that >93% of respondents agreed that patient safety was an important part of their current duties as residents, their education, and their future practice. Only 49% agreed that they felt prepared to apply principles of patient safety to their future practice and 13% agreed that they felt comfortable using a root cause analysis (RCA) to analyze an event. The percentage of correct answers on the baseline knowledge assessment was 62%.

Description: The curriculum was delivered in five one-hour long, monthly morning report sessions. Topics were selected from national health-care and safety organizations' curricula, focusing on topics most relevant to inpatient pediatrics and tested on certification exams. The multidisciplinary sessions covered system-based thinking, safety terminology, second victim phenomenon, RCA, and medication errors and included didactics and facilitated group discussion. The conclusion of each session reviewed a recent event report that prompted a system-level change to provide feedback on reporting to residents and illustrate event reporting's efficacy.

Evaluation: The pre-curricular assessment was re-administered upon completion of the curriculum and will be analyzed to look for statistically significant changes. Adverse event reporting by residents will be tracked to look for changes in reporting rates. Formative feedback from residents and faculty has been positive.

Discussion: Pediatric residents at our institution perceive patient safety as important, but do not feel prepared to utilize safety principles in their future practice and can improve their knowledge scores. The major barrier to implementing our curriculum was resident attendance. Finding another venue for delivery of the content or making attendance compulsory could be considered. While focused on pediatrics, this curriculum is easily generalizable to any specialty with minor modifications to cases and content focus.

Funding: The Division of General Internal Medicine
The effect of video review on resident and attending free-text evaluations of laparoscopic operative performance
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Introduction: Operative skills assessment is now a requirement for surgical residency training, and video review provides a valuable educational tool. Targeted feedback is crucial, but standardization remains challenging. Existing scores often lack free-text evaluation.

Hypothesis: We hypothesize that resident and faculty description of strengths and weaknesses of a resident’s laparoscopic surgical performance would differ, pre- and post-video review.

Methods: Three general surgery residents and a single attending surgeon performed 16 laparoscopic surgeries, which were video-recorded. Post-operatively, residents and the attending described strengths and weaknesses, before and after video review. Responses were coded by categories: instrument use, bimanual dexterity, efficiency/flow, tissue handling, autonomy, use of assistant/camera, safety/critical exposures, and anatomic knowledge. Performance was also rated quantitatively using the American Board of Surgery evaluations. Statistical analysis compared nonparametric related samples, resident vs. attending, before and after video review.

Results: Participants most frequently described instrument use (25.6% of all comments) and safety/critical exposures (17.8%). Residents identified weaknesses in efficiency/flow, while the attending noted weaknesses in instrument use. Safety was a strength noted by both groups. Post-video review, the attending commented on fewer performance categories (strength \( p=0.02 \), weakness \( p=0.05 \)), while residents trended toward more categories, especially areas of weakness \( p=0.07 \). Residents quantitatively rated performance more poorly post-review, while faculty ratings did not change.

Conclusions and Significance: Instrument use and safety are prominent in free-text self- and external assessment of resident operative performance. While video review allowed faculty to focus on fewer operative parameters, it prompted residents to note areas they otherwise might have overlooked. Quantitative evaluation supports this, especially in regard to residents’ tendency toward identifying weaknesses. In the setting of operative performance feedback, free-text responses are informative and worthwhile.
An Innovative, Hands-on, Learner-focused Approach to Teaching Acute Care Topics and Procedures to Internal Medicine Residents in the Emergency Department

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**Needs and Objectives:** The Emergency Department (ED) is the ideal environment for IM residents to be exposed to acute care topics and obtain procedural skills. To improve the quality of resident teaching in the Veterans Administration (VA) ED, we aimed to develop a learner-focused, needs-based innovative curriculum for IM residents rotating through the ED. Our objective was to bridge the knowledge gap and allow residents to acquire expertise in acute care topics not covered in other rotations.

**Settings and Participants:** This innovative curriculum development took place at the VA Hospital in Pittsburgh between June 2011-June 2012. Twenty ED attending physicians and 48 IM residents from the University of Pittsburgh participated in the development and implementation of the curriculum. The residents' ED rotation is structured as 2-4 weeks/year with 4-8 hours of didactic sessions/rotation.

**Description:** To develop a needs-based curriculum we initially identified the knowledge gaps in acute care topics and procedures for IM physicians. These were defined as acute care topics and procedures necessary for the practice of IM but not covered in other rotations. They were identified using a three-pronged approach: a) surveys of IM physicians from our ED, b) surveys of IM residents, and c) review of ACGME/ABMS/ABIM clinical competencies. Based on these surveys, we identified several areas that could be covered during the ED rotation, delineated the goals and objectives for our curriculum, and implemented the curriculum.

**Evaluation:** The following areas of knowledge deficiencies were identified: a) ophthalmologic pathologies, b) ENT pathologies, c) gynecologic pathologies, d) toxicology, e) procedures: splinting, management of abscesses, peripheral intravenous access, venous and arterial blood draws, and endocervical cultures. We developed a list of eight topic areas of teaching. To provide residents with articles on the deficient areas, we compiled and distributed 27 symptom-focused review articles during their ED orientation. The residents favored small group, interactive, hands-on, experiential learning, and the staff physicians and residents suggested that the curriculum be adapted to individual resident needs during a specific rotation. The residents’ Leikert scale rating of the didactic sessions was 4.8±0.3 (overall quality of the didactics), and 4.9±0.3 (relevance of topic, scale 1-5).

**Discussion/Reflection/Lessons Learned:** We found that small group, learner-focused, interactive didactics with hands-on experiential learning was well suited for the ED rotation. Through this curriculum we were able to maximize learning in the limited time available to teach in the ED. The curriculum was unanimously well-received by the residents.
**“Get Ready for Residency” - An Innovative Elective for Senior Medical Students**

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**Needs and objectives:** Conversations with senior medical students often reveal high levels of anxiety regarding the transition from medical school to residency stemming from a perceived lack of clinically-relevant knowledge and decision-making skills. We developed an elective course designed to fill this void and prepare students for success in residency.

**Setting and participants:** Participants are all senior medical students one month prior to graduation. All sessions take place at the Peter M. Winter Institute for Simulation, Education, and Research (WISER).

**Description:** Two teaching modalities were used: online cases and simulation scenarios. First, an asynchronous learning modality was utilized as students were asked to review a series of “outpatient cases” prior to the start of the course. The cases were then reviewed with small group instructors over the course of the elective. Second, students were presented with scenarios in three categories: 1) critically-ill patients using a high fidelity simulator requiring resuscitation, 2) “outpatient” scenarios using visual stimuli, and 3) phone-calls simulating pertinent phone calls from associated healthcare providers requiring intervention.

**Implementation of simulation:** Rotating in two-person teams, students completed three scenarios at a time, followed by debriefing from an instructor. Students were divided into groups of six to eight students. Each group met for eight two-hour sessions. Each instructor taught three identical sessions per day, retaining the same group of students throughout the course.

**Evaluation:** “Get Ready for Residency” has become one of the most popular electives at our institution. An overwhelming sentiment expressed in post-course evaluations has been a desire for more simulation sessions in the final weeks of medical school, speaking to the perceived value of the rotation. Nearly all students rate the course good or excellent.

**Discussion:** There is a strong desire amongst graduating medical students to have a general “refresher” course due to a real or perceived challenge of internship. A course filling this void using a combination simulation/lecture format is feasible and results in high participant satisfaction. Further study is needed to assess the effectiveness of this course in first year residents’ skills and confidence levels.
"Bystander Emergency Response" - A Clinical Elective for 1st-Year Medical Students

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**Needs and Objectives:** The traditional undergraduate education model begins with two years of basic science followed by two years of clinical education. The University of Pittsburgh School of Medicine created a "Mini-elective" program to broaden clinical exposure for 1st (MS1) and 2nd year medical students. These electives provide information and skills that ease the transition to a clinical education while providing exposure to possible career interests. We sought to develop a course offering exposure to Emergency Medicine while providing a skill set appropriate for the MS1. This course provides a structured approach to the injured/ill patient for the MS1 with limited clinical experience and explores scenario-specific techniques for patient stabilization and management.

**Setting and Participants:** The entire course takes place at the Peter M. Winter Institute for Simulation, Education, and Research (WISER). Participants are all MS1 students.

**Description:** Six two-hour sessions utilized a combination of didactic and simulation teaching. Each case simulation highlighted skills associated with basic life support (BLS) emergency response. The scenarios emphasized BLS maneuvers appropriate regardless of environment. High-fidelity mannequins were used for case simulations. Review of key points from each session took place using PowerPoint or a re-demonstration of skill. Session topics included "Approach to the Ill or Injured Patient," "Basic Life Support," "In-Flight Emergencies," "Introduction to Wilderness Medicine," and "Introduction to the Trauma Patient." Skills reviewed included evaluation of scene safety, donning of personal protective equipment, reviewing the "ABCs," obtaining a focused history, cardio-pulmonary resuscitation, bag-valve mask ventilation, chin lift/jaw thrust, cervical spine immobilization, hemorrhage control, needle thoracostomy, long bone immobilization, and mass casualty triage.

**Evaluation:** Pre and Post surveys were administered. 67% (N=12) of our students had no experience with direct clinical patient care prior to medical school. All students rated the course as Excellent with 100% of respondents (N =11) recommending this course to fellow students.

**Discussion:** The Bystander Emergency Response Mini-Elective created an opportunity for MS1 students to gain life-saving patient and procedural skills. Students expressed a high level of satisfaction with the course and an increased level of confidence in responding to medical emergencies.
PRIME: Inaugural Years & Impact
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Needs and objectives: Teaching is a vital skill for all residents. Yet, resident teaching curricula are highly variable. In 2014, we conducted a needs assessment on the teaching curriculum of the pediatric residency program of Children’s Hospital of Pittsburgh of UPMC (CHP). All responders (100%) agreed that learning to be an effective teacher was important; however, less than 30% agreed that the current teaching curriculum met their educational needs. We founded a group called Pediatric Residents Interested in Medical Education (PRIME) with the goals of enhancing CHP’s teaching curriculum and inspiring residents to participate in educational scholarship.

Setting and participants: In Fall 2014, residents applied for PRIME membership; Dr. Miller selected 17 inaugural members. This spring, four residents were chosen to serve as PRIME leaders. The group is committed to improving the medical education curriculum and has engaged in lectures and workshops to hone their own teaching skills. Arranging PRIME sessions to ensure members’ consistent attendance has proved challenging. This year, PRIME will have regular meetings every two months built into protected educational time; this will maximize the experience by bolstering attendance.

Description: PRIME members planned and executed a series of conferences to address the identified gap in medical education. Faculty and PRIME members led interactive sessions that were open to the entire residency program. These sessions included Adult Learning Theory, Medical Decision Making, Cognitive Bias, and Small Group Teaching. This year, PRIME will augment its impact by creating a rotating curriculum building upon the aforementioned sessions by adding journal club, curriculum design, and career development, among others.

Evaluation: Enrollment in PRIME increased by 76% from 17 to 30 residents following its first year. PRIME has increased awareness of medical educational scholarship for its members and the entire residency program alike. Of the 32 members of the graduating class of 2016, nine (28%) completed medical education related scholarly projects, compared to a total of eight projects the previous four years combined. Finally, following the creation of PRIME, residents’ responses to the question, “The Medical Educational Curriculum meets my educational needs” rose significantly from 27.9% to 53.8% (P<0.05).

Discussion/Reflection: PRIME has addressed a previously unmet educational need by greatly enriching the residency’s teaching curriculum and secondarily increasing participation in education-related scholarly work. PRIME’s application is not limited solely to pediatrics; any medium to large residency program could replicate the creation of this group and implement a similar curriculum.
Training Internal Medicine Residents to Act on Social Determinants of Health using the Social Determinants of Health Fast Facts
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Needs and objectives: Social determinants of health (SDH) impact the health of individuals but have not traditionally been the focus of physicians, who are trained predominantly to intervene on downstream health effects created by a suboptimal biopsychosocial environment. To increase awareness of SDH and their impact on health, knowledge of evidence for SDH-based interventions and to address the calling to train physicians to screen and intervene on SDH in clinical encounters, a curriculum was developed using a learning tool titled “Social Determinants of Health Fast Facts”.

Setting and participants: At the University of Pittsburgh Internal Medicine Residency Program, during the 4-week intern ambulatory block a brief curriculum on the SDH was implemented using the Fast Facts as a teaching tool.

Description: In the first week, a 1-hour small group session was facilitated to introduce the definition and framework of SDH and discuss clinical scenarios to determine ways to screen and intervene on SDH. Interns applied this knowledge in their clinical encounters throughout the ambulatory block and were assigned 12 SDH Fast Facts to complete independently. The SDH Fast Facts are brief, clinical vignettes about key SDH topics commonly encountered by clinicians, followed by a multiple-choice question on the SDH. The question is followed by a review of the correct answer, as well as 2-3 key evidence-based learning points. In the fourth week, a 30-minute small group discussion was held to reflect on their ability to identify and intervene on SDH impacting their patients and their application of the evidence learned from the SDH Fast Facts.

Evaluation: To evaluate the effectiveness of the brief curriculum in changing interns’ attitudes, knowledge, behavior about screening and comfort intervening on identified SDH a pre, post, and delayed post- survey was conducted. This was compared to a formal needs assessment of residents who did not receive the curriculum.

Discussion / reflection / lessons learned: The curriculum increased trainees’ awareness of the SDH, the impact on health and the physician’s role in addressing the SDH in a clinical context. It also taught an approach to screening for the SDH in clinical practice and increases knowledge of the evidence for SDH-based interventions. This is an effective training tool that scaffolds experiential learning by providing a framework for SDH that empowers trainees to take a proactive role in addressing SDH.

Online resource URL: SDH Fast Facts http://www.sgim.org/web-only
Support: Department of General Internal Medicine Fellows Award
“What did they say?” Teaching health literacy and communication skills to medical service nurses to improve the patient experience

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Needs and objectives: The Division of General Internal Medicine Patient Experiences Committee implements interventions aimed at improving the patient experience. Based on suboptimal inpatient satisfaction scores on the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAPHS) for the item, “My nurses explained things to me in a way that I could understand,” the committee identified nursing communication as one area for improvement. We hypothesized one reason for suboptimal communication was nurses’ lack of adequate training in communication skills, as well as difficulty with recognizing poor health literacy among inpatients. Our goal was to develop a curriculum to teach nurses how to deliver complex medical information to patients at the time of discharge to ensure patients truly understand their care.

Setting and participants: Participants included all medical service nurses (N~120) on the general medicine wards at UPMC Presbyterian, Montefiore, and Shadyside Hospitals.

Description/Evaluation: All participants were asked to attend a one-hour communication workshop during June 2016. Led by a nurse-educator, the workshop included a didactic presentation outlining clear communication techniques, small group discussions, and video demonstration of simulated discharge conversations. Evaluation of the curriculum is multifactorial: 1) Communication skills will be assessed by comparing 150 pre- and 150 post-workshop observations of discharge encounters between patients and nurses using a standardized checklist of communication skills; 2) Change in knowledge and attitudes will be assessed by comparing pre/post electronic survey responses; 3) Change in patient satisfaction will be assessed by comparing HCAPHS scores in the area of nurse communication in the 6 months before and after the workshop.

Discussion: Preliminary results show that the workshop improved the nurses’ knowledge of health literacy and their feeling of preparedness (21.7% pre vs. 59.5% post rated themselves “very confident”). Post curriculum observations will be completed in August 2016. Interim analysis shows an increase in the use of the “Teach-Back” method (4.3% pre vs. 25.6% post), and in asking “What questions do you have?” (5.7% pre vs. 31% post). Full data analysis, will be available for the meeting. This curriculum could be expanded to all nursing services interested in improving communication with patients, which will have system-wide impact on the patient experience.

Support: The Beckwith Foundation Frontline Innovation Project (PI Carla Spagnoletti MD, MS)
The virtual patient game: Transformative learning in physician assistant education
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Needs and objectives: Physician assistant students must demonstrate competence in patient assessment during summative testing and with actual (sometimes critically ill) patients. Opportunities for application of instruction are limited, so integrative didactic methods are essential. To address this need, a virtual standardized patient program was adopted and tested for usability and instructional benefits.

Setting and participants: The program was integrated into University of Pittsburgh Physician Assistant Studies courses entitled “History Taking and Physical Examination” I and II, which include direct instruction on patient assessment fundamentals. Course completion provides the basis for patient encounters and instruction by clinical preceptors during rotations. Enrollment at the time of the project was 36 to 38 students.

Description: The Shadow Health Digital Clinical Experience™ (DCE) provided online avatars with scripted findings for student interview, examination, documentation, and critical reflection. Instruction on each body system included lecture, skills practice sessions, and an avatar for independent patient assessment outside of class time. Course credit was awarded for demonstration of a minimum level of competence and critical self-reflection, with bonus points for top performers. Following instruction, students performed objective structured clinical examinations (OSCEs) on associated body systems. Opinions on student self-confidence and the DCE were also requested.

Evaluation: All students performed assessment skills competently and self-reflected critically on every assignment. They consistently achieved positive patient assessment scores on OSCE testing and during clinical rotations. Faculty perceived student self-confidence in their patient assessment skills. Students identified a positive overall contribution to their education, but some exercises received mixed results regarding an intentional, programmed specificity necessary to elicit avatar responses.

Discussion / reflection / lessons learned: Inclusion of this virtual standardized patient program into the curriculum was user-friendly and has demonstrated benefits to physician assistant students and faculty. Further data is needed regarding its impact during the rest of the clinical rotation year and on national certifying exam scores: these are expected to be positive in light of the available results. This project supports the role of virtual standardized patients in the pre-professional, professional, and on-the-job training of other health care providers.

Online resource URL – https://shadowhealth.com/index.html

Support – Funded by a 2015 Innovation in Education Award through the Advisory Council on Instructional Excellence of the University of Pittsburgh Office of the Provost
Objective: Accreditation standards mandate schools of pharmacy assure curricular quality through the development of assessments of clinical practice readiness. A blended simulation progress test was designed and integrated into the PharmD curricula at the University of Pittsburgh to provide curricular quality assurance of student readiness for clinical practice, while affording students independent, practical opportunities to develop and refine key ability outcomes of the profession.

Setting: A knowledge and skill assessment involving multiple simulation strategies was administered as a progress test throughout the curriculum. Trainees included first and third year pharmacy students (P1 and P3) and pharmacy practice residents (PGY1).

Description: Trainees had 30 minutes to rotate through five stations: electronic health record review (station 1), multiple choice questions (station 2), virtual patient (station 3), mannequin model/standardized colleague experience (station 4), and standardized patient encounter (station 5). Trainees reviewed the index patient in the health record, then began making clinical decisions in the virtual arena, as a mannequin model, and as a standardized patient. The assessment targeted 3 ability outcomes of the pharmacy profession including clinical decision making (proficiency), attitudes of ownership (professional covenant), and interprofessional communication.

Evaluation: 18 PGY1 residents, 108 P3 students, and 106 P1 students rotated through the assessment in two, eight-hour days. 16 pharmacy faculty, 10 school staff, 6 student upperclassmen, 5 standardized patients, 5 standardized colleagues, and 6 technical support staff were required. Knowledge assessments (stations 2 and 3) were collected through a virtual patient platform (vpSim). Evaluations of student performance in stations 4 and 5 were conducted using digital rubrics uploaded into the iForm application allowing faculty to grade in “real-time” and results to be immediately accessed. P3s scored significantly higher than P1s across all evaluations (P<0.05). P3s scored significantly lower than PGY1s in interprofessional communications and attitudes of ownership in a standardized colleague/mannequin model station, and in patient communication in a standardized patient station (P<0.01). Individual scores were shared with trainees to provide feedback as to their strengths and areas of improvement regarding patient care skill development.

Discussion: Learners demonstrated evolving skills as they progressed through the curriculum. Progress testing through simulation is an innovative strategy to institute curricular quality assurance and provide students meaningful feedback as to their progress towards key clinical outcomes of the profession.
Fellows’ Evaluation of an Active Teaching Conference Curriculum

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**Purpose:** There is growing interest in creating didactic sessions using active teaching strategies to fulfill the ACGME’s milestones for medical knowledge. However, there are few examples of how to convert from traditional, lecture-based didactics to active teaching sessions. We describe our experience in transitioning our pulmonary and critical care core curriculum from traditional lectures to an active teaching format.

**Methods:** We adapted the ACTIVE teaching format as described by Swatsky et al. to convert four of our standard core curriculum lectures into active teaching sessions through the following steps: 1) meeting with the lecturer to identify learning points, 2) converting existing presentations from information-based slide containing text to case-based slides containing multimedia content, 3) arranging the room to stimulate conversation, 4) engaging the learners in a case-based conversation emphasizing the learning points, 5) distributing a one-page handout of more detailed information for future, self-directed study. Before and after each conference, learners completed surveys rating their knowledge of the topic, ability to evaluate the type of patient discussed, and comfort in teaching others on a 0-10 Likert scale. We also asked learners to rate their satisfaction with the format. We report before and after ratings as means +/- standard deviation. We calculated p-values with paired t-tests at a significance of 0.05.

**Results:** Twenty-three pulmonary and critical care fellows participated across the four sessions. Compared with before the sessions, fellows after the sessions reported increased knowledge (mean 5.1 +/- 1.6 vs 8.0 +/- 1.5; p<0.001), increased ability to evaluate the type of patient discussed (mean 4.6 +/- 1.8 vs 7.9 +/- 1.5; p<0.001), and increased comfort in teaching the topic to others (mean 5.8 +/- 1.1 vs 7.8 +/- 1.2; p<0.001). Fellows highly rated their overall satisfaction with the interactive format (mean 8.0 out of 10 +/- 1.7) and reported being highly encouraged to participate and respond to others (mean 8.0 +/- 2.0). Fellows reported that the session facilitators were highly effective at directing and stimulating discussion (mean 8.1 +/- 1.9). Fellows also provided comments on how to improve future sessions.

**Conclusions:** We found pulmonary and critical care fellows reported increased knowledge, ability, and comfort after converting traditional core curriculum didactic lectures to an active teaching format. Our experience may serve as a model for other programs. These data will help us improve on this format and convert the remainder of our core conference series.
Needs and Objectives: The Residency Review Committee for Internal Medicine mandates that programs “must develop models and schedules for ambulatory training that minimize conflicting inpatient and outpatient responsibilities”. However, it is important to ensure continuity of care between resident and patient, especially between elective blocks. We aim to assess residents' impression and satisfaction of clinic redesign in continuity of patient care.

Settings and Participants: Pre- and post- study intervals, comparing the two consecutive academic years’ surveys were designed. Each survey included 21 online questions and was sent to residents via a secure online application in November of 2014-2015 and 2015-2016 academic years.

Description: Before intervention, residents had one half-day weekly clinic in rotations except Critical Care Medicine (CCM), and Night Medicine. We defined “Core Rotations” as Inpatient Medicine, CCM, and Night Medicine. Residents’ outpatient schedules were changed to one full clinic day (morning and afternoon sessions) during non-core rotations. A “Resident Panel” was instituted to provide focused care when the primary resident was not available. Finally, the allotted clinic appointment time for any type of patient visit was increased. Resident cohort responses were compared and analyzed using STATA 14.1 statistical software (Chi-squared analysis).

Evaluation: From 57 residents in our program, 33 from 2014-2015 and 46 from 2015-2016 academic year participated in this survey. Increased clinic appointment time resulted in increased resident satisfaction that approached statistical significance ($P = 0.07$). There was no significant difference in perception of patient ownership or continuity of care by provider ($P = 1$) and quality of care patients receive ($P = 0.44$). There was no significant ($P = 0.35$) differences between each year's cohort of monthly patient visits.

Discussion: Although a majority of Internal Medicine training programs adopted the “X+Y” block schedule, the key questions is how to keep the continuity of care for clinic patients with this plan. We redesigned our continuity clinic to an inpatient/outpatient model. These changes had the greatest impact in residents’ satisfaction without sacrificing continuity of care or number of visits per month. Our results were limited by small sample size. These results highlight the importance of considering residents’ preferences when allowing clinic operations to evolve.
A National Curriculum of Fundamental Skills for Plastic Surgery Residency: Report of The Inaugural ACAPS Boot Camp

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Introduction: The Inaugural American Council of Academic Plastic Surgeons (ACAPS) Plastic Surgery Boot Camp program was developed in response to ongoing changes in graduate medical education. The Boot Camp is a hands-on, practicum-based, three-day course to introduce core concepts in plastic surgery.

Hypothesis: A national plastic surgery Boot Camp introduces first-year plastic surgery residents to core concepts in plastic surgery and will increase comfort and confidence across these topics.

Methods: The course was held in Pittsburgh in July/August 2015. There were 43 attendees (35 Integrated / 8 Independent) representing 22 residency programs, across 15 states. Faculty consisted of 8 local personnel and 5 visiting. Lecture topics and practical sessions covered the full spectrum of plastic surgery. All trainees completed an online survey evaluation both during the course and at 6 months.

Results: Participant responses were overwhelmingly positive. A total of 72% of respondents rated the Boot Camp between 8-10 on a 1-10 scale where 1 is poor and 10 is excellent for the overall course rating; 79% of respondents agreed or strongly agreed with the statement that the simulation scenarios were realistic; and 75% of participants agreed or strongly agreed with the statement that they found simulation based training to be a valuable way to teach this material. Respondents reported an increase in comfort and confidence across topics after attending the Boot Camp at both 0 and 6 month time points. Instructors received positive evaluations across all topics.

Conclusions: This successful inaugural course serves as a benchmark for development of a logistical blueprint, business plan, and curriculum for a proposed expansion to regional centers, in order to potentially encompass all incoming residents in Plastic Surgery.

Significance: The ACAPS Boot Camp provides standardized and timely exposure to critical clinical content in plastic surgery; provides a level of practical experience regarding these topics and procedures; establishes a low/no-risk educational environment that fosters learning; and establishes a sense of camaraderie amongst participants, building relationships and engendering professional enculturation within our specialty.

Research / Grant Support - None
The application of three-dimensional virtual reality technology in the development and implementation of novel anesthesia-related training techniques

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Needs and Objectives: Simulation-based training has been a mainstay in medical education since its inception many years ago. Applications have been wide-ranging and have extended to include various clinical scenarios within the field of anesthesiology.¹ However, in recent years, there has been a significant expansion in the field of virtual reality (VR) technology. This new realm, beyond its entertainment purposes, has found training usage in various industries including aviation, aeronautics, and the military. The 1ˢᵗ attempt at creating an interactive VR simulation – where users had to address a simulated OR fire – was made in collaboration with the Entertainment Center of CMU and was presented at the annual ASA meeting in 2010.²

The new proposal is to create and evaluate the efficacy of a widely applicable VR training simulation for medical students and anesthesia residents.² To work with the CMU Entertainment Center to create more advanced VR training simulations.³ To apply for funding to support the project.

Setting/Description: Phase I of this study will consist of the conversion of video-recorded procedures into a highly detailed yet intuitive VR interface. Procedures to be recorded and converted will include OR orientation with anesthesia machine check as well as induction of general anesthesia with endotracheal intubation. Phase II will then include the generation and implementation of more difficult or unexpected events encountered by the anesthesiologist, including loss of airway, cardiac arrest, hemorrhagic shock, and anaphylactic shock. A Likert Scale-based assessment will be used to evaluate the users’ experience. This will in turn be compared to an identical scale used to assess their experience with previously available simulation technologies. It is anticipated that the VR-based simulation training will enhance readiness, improve technical skills, and promote familiarity with complex scenarios without endangering patient safety.

Reflection: We predict that in the near future this technology will replace previous simulation-based modalities throughout all medical fields.

Resources:
Managing Dental Emergencies through Nursing/Dental Collaborative Care
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Needs and objectives: Effective healthcare delivery requires coordinated interprofessional teamwork. Yet, students trained within individual professions are infrequently afforded formal opportunities to explore the knowledge, skills, and attitudes of other professions or to learn strategies for effective teamwork. This is of particular concern when patients present with oral health needs to non-dental providers. Patients with dental emergencies often seek care in non-dental settings such as hospital emergency departments or primary care settings. Providers in these settings traditionally receive limited training to assess and treat dental emergencies. A pilot program was developed pairing nursing and dental students in an outpatient dental emergency clinic providing an opportunity for students to assess coordinated oral and general health needs.

Setting and participants: Dental students and nursing students worked together for a two-week rotation in the outpatient dental emergency clinic within a major teaching university.

Description: Student pairs assessed and developed strategies for addressing the patients’ oral and general health care needs. Strategies included emergency dental care as well as education related to health promotion, medication compliance, and options for follow-up care.

Evaluation: Each week, students summarized their experiences with nursing and dental faculty. A pre/posttest survey on interprofessional teamwork and a reflective journal discussing the beneficial aspects of the team, difficulty working with another team member and application of knowledge to practice were collected and analyzed from each student.

Students “agreed” or “strongly agreed” that health care delivery will require shared learning and teamwork to improve patient care; and that developing interprofessional communication skills required more than “common sense.” Journal themes included recognizing the oral and extra-oral presentation of dental infections, requesting opportunities for dental students to shadow nurses, and learning how to communicate in “non-technical language”. Students also suggested that background describing interprofessional team care prior to the experience would be beneficial.

Lessons Learned: The collaborative care experience was seen as extremely beneficial by both faculty and students, who requested future expansion of the program. We are also developing a learning module for students describing interprofessional team care skills that future students will review prior to the rotation.
Teaching Writing to Healers: Restoring the Human to Healthcare
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Needs/Objectives: A growing body of research demonstrates that teaching reading and reflective writing to clinicians improves their ability to provide patient-centered care. Through narrative workshops, providers gain skills that can improve relationships with patients and enhance clinical care. Clinically-based narrative workshops have been shown to increase empathy among clinicians. The goal of the workshop series offered at the School of Dental Medicine was to provide participants an interactive opportunity to practice and reflect upon the basic tenets of Narrative Medicine. The objectives were to recognize how a written text can inform and enhance empathetic and humanistic thinking, and to develop an increased appreciation for the importance of humanistic thinking in healthcare.

Setting/Participants: The “One Book, One Salk” workshop series provided participants in the Schools of Dental Medicine and Pharmacy an opportunity to practice reflective writing and to engage in perspective taking exercises. The workshops were led by Master of Fine Arts students; all students, faculty, residents and staff from the two schools were invited to participate.

Description: The book discussion series engaged the Department of English, the Schools of Dental Medicine and Pharmacy, and the VA Hospital in an innovative collaboration. The selected book, Sarah Manguso's "The Two Kinds of Decay," is a lyrical account of a young woman's protracted and sometimes excruciating treatment for a mysterious autoimmune disease. The workshops drew on the Narrative Medicine concepts developed in the pioneering training program at Columbia University College of Physicians and Surgeons.

Evaluation: To evaluate the overall effectiveness of these workshops, anonymous surveys and teaching reflection journal entries written by facilitators were used. Questions asked about participants' perception about the role of literature in health care, the role of reflection in the provision of care, and insights gained in the sessions. Responses showed positive responses by the participants; qualitative data analysis revealed areas of learning.

Discussion: The book discussion series initiated a promising collaboration that launched the University of Pittsburgh into the growing field of Narrative Medicine. Due to the success of the workshop series, we will offer the event again and expect it to become a sustained and yearly event that fosters collaborations across different schools of the University within and outside of the health sciences campus.

Support: This project is supported by the Office of the Provost Year in the Humanities matching fund and by School of Dental Medicine Dean.
Using EPA-Based Self-Assessment to Guide Students’ Learning Agendas
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**Needs and objectives**: At the end of year 3, Assessment Week provides a concentrated series of objective examinations that provide students and curriculum leaders with detailed feedback about individual and group progress toward curricular goals. The Entrustable Professional Activity (EPA) approach to assessment has provided a new perspective on learner progress toward the overall curriculum objectives. This innovation aimed to provide students with a structured setting for self-assessment and educational goal setting.

**Setting and Participants**: Rising fourth-year medical students in the Assessment Week course.

**Description**: A new EPA-based self-assessment activity was added where students take stock of their learning and achievements, and commit to a plan for growth toward higher skills and entrustment. For each EPA, students were generally asked where and how much they have learned; where they need to improve; and what they will do toward achieving those improvements. The results have formed the basis for individual advising and support efforts, and informing curriculum leaders about strengths and gaps in the existing curriculum.

**Evaluation**: Contrary to conventional wisdom about the limited value of self-assessment, students have been notably insightful and candid about their strengths and improvement areas. The EPAs provided a clear, cogent and universally applicable framework that students and faculty can understand and operationalize.

**Discussion and Significance**: As the school moves to ever greater individualization of the curriculum, EPAs can contribute to a unified assessment matrix. In a manner that is superior to a simple survey, the act of self-assessment against an EPA matrix has illuminated areas where our students should have greater exposure and/or instruction (e.g., more experience with order and note writing, to counter the reductions that have occurred since implementation of electronic medical record systems.) Current questions include: How to optimally integrate the results of the self-assessment and learning plan into a comprehensive learning plan for the fourth year? How to connect this to faculty-based entrustment assessments and decisions? How to best expand this into a longitudinal, iterative assessment?
Metacognitive Measurement and Development in Medical Students: One year experience with “Knowing What You Know” (KWYK) Test
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Background: In order to assess and develop medical student ability to match appropriate confidence to their level of clinical knowledge, the authors developed an innovative method of multiple choice testing (“Know What You Know” or KWYK testing). Students matriculating through the University of Pittsburgh required Family Medicine Clerkship took a series of four practice tests in this KWYK format in preparation for their final NBME shelf exam. The purpose of this study was 1) to examine the variability of the KWYK test metrics across a population of medical students, 2) to explore whether students were able to improve their KWYK metrics over the course of four weeks, and 3) to compare student performance on KWYK metrics to student achievement on formal measures of Clerkship performance.

Hypothesis: That a system using standard multiple choice questions can quantify measures of both accuracy and confidence and demonstrate that learners have a broad range of confidence compared to their range of accuracy.

Methods: Standard statistical analysis was carried out for one academic year of de-identified data from KWYK tests, Shelf exams, OSCE scores and clinical evaluations.

Results: 1) Students’ accuracy levels show moderate variability, while their confidence levels show wide variability. 2) Students’ performance on KWYK metrics do not appear to improve over the course of the four-week Clerkship. 3) Students with high KWYK metrics appear to perform strongly on other measures of student achievement. Students with low KWYK metrics appear to perform weakly on other measures of student achievement.

Conclusions: KWYK testing is a novel way to measure and encourage the development of metacognitive skills in medical students.

Significance: KWYK testing is an approach that can leverage large banks of existing multiple choice questions and provide feedback to learners that goes beyond how accurately they answer questions. In addition to accuracy, learners are provided with feedback about the confidence and efficiency with which they apply their knowledge base.

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Measuring the Impact of Inter-Professional Education: Teamwork Enhances Team Leadership

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Background: Ever since the AAMC’s 2011 statement supporting the importance of education for inter-professional collaboration, there have been widespread efforts to design such learning experiences. Despite bolstering national interest, measuring the meaningful impact of these projects remains difficult.

Hypothesis: Medical students with educational experiences working in clinical multi-disciplinary teams will be more likely to include other health professionals in patient care plans when taking on team leadership responsibilities within the PCMH Exercises in the Family Medicine Clerkship.

Methods: We performed a case-control study of historical records of UPSOM student emails from the Patient Centered Medical Home (PCMH) Exercises. The intervention is experience of the Adult Inpatient Medical Clerkship (AIMC) Multi-Disciplinary Work Rounds. Student team emails were coded for weekly references to other team members.

Results: The coding manual was successful at establishing a reliable coding method. 20% of all emails were evaluated by a second coder, with intraclass correlation coefficient of 0.930 compared to the original rater. A third coder evaluated 50% of the second coder’s emails, with intraclass correlation coefficient of 0.954. On average, post-intervention groups were 44% more likely than pre-intervention groups to include inter-professional team members during their first week of the PCMH Exercises (p=0.027). In subsequent weeks, the post-intervention group advantage decreased to 12%, which was no longer statistically significant.

Conclusions: Coding and quantification of references to other health professions in the text of student-generated care plans within the PCMH Exercises is a feasible way to measure the impact of inter-professional training experiences prior to the FM Clerkship. We show that the Internal Medicine Multi-Disciplinary Work Rounds and PCMH exercises are both viable ways to educate students about inter-professional patient care.

Significance: This is the first demonstration of an objective approach to evaluate the uptake of education in inter-professional care based on observed student behavior in the setting of generating care plans. This is distinct from approaches that are based on subjective, student self-reported feedback about educational experiences.

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Piloting a targeted, spaced, mastery-learning global health point-of-care ultrasound curriculum for internal medicine residents
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Needs and objectives: The WHO estimates two-thirds of the world’s population have inadequate access to diagnostic imaging, exacerbating global health disparities. At sites where University of Pittsburgh (UPMC) internal medicine (IM) global health (GH) track residents rotate, imaging is frequently inaccessible at local facilities. Ultrasound machines are available but a training gap exists for local clinicians and rotating residents. By participating in a global health targeted, spaced, mastery-learning ultrasound curriculum, GH residents will achieve skills in point-of-care ultrasound and apply those techniques to impact medical decision-making.

Settings and participants: The 12 GH track residents within the IM residency program at UPMC.

Description: A needs assessment survey was distributed to the study participants to inform the development of the ultrasound curriculum. The curriculum entails individual ultrasound scanning and portfolio creation, live mentored ultrasound scanning sessions, and portfolio review and feedback. During monthly small group sessions, trainees will meet with faculty ultrasound instructors to practice skills at the bedside, receive formative feedback on portfolios, and participate in discussion on application of ultrasound image data to clinical scenarios. This process of continuous quality assessment will foster development of proficiency.

Evaluation: A total of 8/8 residents completed the needs assessment (RR=100%) (the four interns will be staggered by six months to permit clinical maturation). All respondents indicated desire for further ultrasound training to achieve competence, and 75% identified lack of confidence in skills as a barrier to ultrasound utilization. The mean self-rating for confidence with both image acquisition and interpretation was 3.13/5 (Likert-type scale 1-5 where 1= not confident and 5= extremely confident). Trainees reported diverse syndromes amenable to ultrasound diagnostics at GH sites, including heart failure, pleural effusions, soft tissue abscesses, and hepatobiliary pathologies. To evaluate the curriculum, baseline assessment of image acquisition and interpretation will be obtained prior to curriculum implementation and repeated at 6 and 12 months to evaluate knowledge and skills acquisition. Interval surveys will assess resident behaviors and attitudes, including utilization and perception of impact on clinical decision-making.

Discussion: There is growing enthusiasm for global health opportunities and increasing application of point-of-care ultrasound, thus development of this program has broad relevance. The GH track residents are a pilot group selected to examine feasibility of an ultrasound curriculum for trainees. Future plans to ensure sustainability include a teach-the-teacher curriculum for GH track residents who become proficient in ultrasound, and expansion of this curriculum to local clinicians at GH sites.
The Skills of an Effective Physician Leader: A Survey of Rising Chief Medical Residents as a Roadmap for Curricular Development
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Introduction: Leadership development programs improve leadership ability; however, there is a paucity of such discourse in the medical education literature. Physicians in training rarely receive formal leadership development. Chief medical residents (CMRs), chosen for perceived leadership capacity, are an ideal sample through which to identify current best practices and gaps in residency leadership training.

Hypothesis: We surveyed rising chief medical residents to identify both current best practices/gaps in residency leadership training and to inform development of leadership curricula at the residency level.

Methods: This is a two-phase cross-sectional descriptive study of CMRs attending the 2015 Association of Program Directors in Internal Medicine CMR conference. We developed a unique survey assessing sociodemographic characteristics, exposure to leadership training, and perceived comfort with a wide variety of leadership skills adapted from validated leadership development curricula. Of 169 rising CMRs surveyed as a convenience sample, 75 were re-surveyed at the end of the CMR year.

Results: This sample was diverse with respect to gender, medical education, and residency program. Seventy-two percent denied ever having received formal leadership training. If available, 97% would have participated. Of those reporting prior leadership training, two-thirds felt additional development was needed. The majority of leadership skills development was attributed to on-the-job-training. CMRs remained persistently uncomfortable with finding personal/professional balance, making unpopular decisions, and accepting the isolation of leadership. CMRs desired further training in providing feedback, managing conflict, motivating others to high performance, communication and time-management. Female respondents reported less comfort with “finding balance between personal and professional goals” (p=0.05) and being “at peace with the isolation that leadership may bring” (p=0.01) than male counterparts.

Conclusions: This nationally representative sample of CMRs reported both lack of exposure to leadership training and desire for additional leadership training, suggesting that graduating residents do not feel adequately prepared for leadership roles. Rising CMRs report comfort with many leadership skills likely encountered while leading ward teams (e.g. initiative, professionalism) and discomfort with advanced leadership skills involving inter- and intra-personal conflict. On-the-job training led to increased comfort with actionable leadership skills. Affective skills remained persistently uncomfortable.

Significance: The results of this study can be used to provide an important starting point for the development of future leadership training curricula for residents nationally.

Research/Grant Support: Funding for statistical support provided by the Division of General Internal Medicine, Department of Medicine; PI: Sarah Merriam, MD
Teaching Medical Students Anatomy for Regional Anesthesia Using Multi-Modal Instruction
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Introduction: Increasingly, anatomy instruction incorporates multiple training methodologies beyond classic dissection, including imaging and digital media. We proposed to test the effectiveness of using a multi-media approach to teach medical students anatomy of the neck and axilla relevant to brachial plexus nerve blockade during an elective course for first- and second-year medical students.

Hypothesis: Participation in this elective course would improve students’ knowledge of regional anatomy based on pre- and post-course test scores.

Methods: The course met once weekly for 90 minutes for four sessions. Students took a pre-course test, then rotated each week through one of three stations during each class: viewing cadaveric pro-section of neck and axillary structures, using ultrasound to identify simulated “nerves” in a phantom task trainer followed by needle guidance for simulated “nerve block,” and employing a 3-D computer program to locate key anatomic structures. During the fourth session, all students identified designated neck and axillary structures using ultrasound on live models and then completed a post-course test identical to the initial one. Our primary outcome was the degree of improvement between pre- and post-course test scores. Our secondary outcome was student evaluation of the course instruction methods, in particular the use of ultrasound imaging.

Results: Fourteen students participated in the course; all were first- or second-year medical students, with a M:F ratio of 1.8:1. For the primary outcome, post-course test scores increased from 6.21/12 (SD 1.85) to 9.14/12 (SD 1.99), p = 0.006, 95% CI -4.33 to -1.52 (2-tailed, paired t-test). For the secondary outcome, students generally supported the use of multi-media for learning anatomy in this course, and were especially positive about use of ultrasound.

Conclusion: This study confirms our hypothesis that using multi-media anatomy instruction does improve medical students’ ability to identify structures in the neck and axilla. It also supports our secondary outcome that students themselves feel that ultrasound is an effective tool for learning regional anatomy.

Significance: This study indicates that multi-media regional anatomy instruction, particularly ultrasound, is both welcomed and useful to pre-clinical medical students, making expanding the teaching of ultrasound techniques for other anatomic locations in the pre-clinical curriculum a possibility worth pursuing.

Research/Grant Support: None.
Patients’ Perceived Value of Student-Delivered Neuroscience Content in an Outpatient Psychiatry Clinic
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Introduction: Despite psychiatry’s ongoing paradigm shift towards uncovering the neural basis of its disorders and treatments, routine clinical practice for most patients is yet unchanged, leading many to question the utility of a neuroscience-based curriculum for psychiatry trainees. One proposed immediately implementable clinical scenario is to explain to patients the neural circuit basis of their disorder and treatment plan. However, most outpatient physician office visits do not offer sufficient time for discussing this topic in detail, and thus new formats for presenting this information are desired. We sought to determine whether patients found it helpful for a medical student to deliver content on the neuroscience basis of their disorders in a small group format, and moreover, whether patients could gain an appreciation for this material in such a setting.

Hypothesis: We hypothesized that patients would find the neuroscience delivery session helpful and that patients would be able to comprehend the content.

Methods: A medical student delivered a structured presentation based on an online module developed through the National Neuroscience Curriculum Initiative. This occurred in groups of 8-15 patients (total N=32) receiving treatment for co-occurring addiction and psychiatric disorders through the Intensive Outpatient Program at the Center for Psychiatry and Chemical Dependency Services of WPIC. At the conclusion of the program, patients completed a brief questionnaire assessing whether they were able to comprehend the content and if they found the session helpful.

Results: On Likert scales with a possible range of 1 - 5, patients rated their level of understanding of the material at 4.36 ± 0.79 and reported that they found it helpful at a level of 4.20 ± 0.74.

Conclusions: These data suggest that patients find benefit in receiving information on the neuroscience basis of their psychiatric disorders and treatment. Moreover, these results suggest that a medical student-led session is an appropriate format for this.

Significance: We found support, from a patient benefit standpoint, for medical student-delivered scientific information regarding the basis of patients’ disorders and treatment. These results provide clinical justification to explore further whether delivering patient education in a structured group setting could be a valuable learning tool for students.

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The UPMC Pathology Resident – Medical Student Liaison Program: Bridging the Divide
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Needs and Objectives: The Pathology Resident – Medical Student Liaison Program at the University of Pittsburgh School of Medicine (SOM) Department of Pathology was established in 2014 to address the concern that students receive limited exposure to pathology during medical school and have restricted interaction with our Department.

Setting and Participants: The program recruits two residents interested in education to collaborate with directors, faculty, residents, and medical students to: enhance student understanding of the role of pathology in patient care; provide information about pathology educational, research, and career opportunities; encourage communication and strengthen mentoring relationships; and promote recruitment of competitive candidates to careers in pathology and our program.

Description: The aims have been pursued through numerous activities: sending welcome emails to all rotating students; individual meetings to discuss careers, residency, and our program; providing printed information regarding residency and our program; conducting departmental tours; and organizing pathology demonstrations. The liaisons work with the Pathology Medical Student Interest Group by participating in student activity fairs, resident panels, and “career night” sessions with directors to promote pathology.

Evaluation: To assess student elective experiences and their perceptions of the liaison program, a confidential post-elective survey was created that is administered by the SOM. Students found the liaisons helpful for orientation to the Department and for answering questions regarding the residency, etc. The liaisons were given a 30 question survey to assess their attitudes towards their responsibilities and to determine the perceived impact of the program on student education and the Department. They generally believed the program achieves its aims and is useful to students. They particularly found it to increase understanding of the role of pathology in patient care, but are less certain whether it recruits competitive residency candidates. They agreed it was enjoyable, enhanced mentoring skills, and beneficial to their career. Individual meetings with students were considered the most useful. They enjoyed being involved in student education and career development and found it a great way to demonstrate what pathologists do.

Lessons Learned: The liaison program is presented as an innovative method of enhancing resident responsibility and student involvement in pathology educational, research, and career opportunities, as well as recruiting students to pathology residency. Our preliminary results suggest that students, residents, and faculty are receptive to the liaison program and that it is worth continuing. The introduction of liaison programs in other specialties may represent a viable method of involving residents in medical education and increasing student exposure to a particular field.
"Knowing What You Know" (KWYK) Test: How Accuracy and Confidence Changes With Complexity
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Background: As medical knowledge increases, physicians need to recognize when they are correct and when to seek assistance. The KWYK testing system attempts to understand this "Knowing What You Know" (KWYK) metacognition in trainees. Objective: Is there a difference between the four metacognitive metrics of medical students in their family medicine (FM) clerkship who completed 3 weeks of new KWYK questions, compared to past students who completed older stock questions on the same material.

Hypothesis: There is no significant difference between the metrics when the questions change but the subject matter remains unchanged.

Methods: The KWYK tests cover the material from 40 fmCASES and are implemented via Google Forms every week during the four-week FM Clerkship. 3 new tests were developed and all four tests are structured as follows: 30 questions per test, covering 10 fmCASES per week. The fourth test consists of originally written questions, so this remained unchanged as a control. Test responses are collected in a database that calculates the following 4 performance metrics, for each student: accuracy, capture accuracy, capture efficiency, and confidence. The participants are a total of 27 3rd and 4th year medical students in FM Clerkships in June or July. The mean and standard deviations (SD) were calculated for each metric per week. The Mann-WhitneyU test with p value of .05 compared metrics collected in June and July of 2016 to those collected in June and July of 2015.

Results: The differences in Accuracy and Capture Accuracy were statistically significant (P<.05), with lower mean values for the new questions in weeks 2 and 3. Capture efficiency was statistically different in week 3. Differences in all other metrics, including confidence, were not significant for all four weeks. No significant differences exist between the metrics for Week 4.

Conclusions: The differences in accuracy scores in week 2 and 3, with no changes in week 4, along with the lower mean accuracy scores for the new questions during weeks 2 and 3, suggests that the new questions in these two weeks have a higher level of difficulty. Confidence remained unchanged, despite changes in difficulty.

Significance: These findings help to understand how students’ accuracy and confidence in the material changes when faced with difficulty. This reflects the fluctuating levels of complex cases found in medical practice. How physicians choose to utilize KWYK metacognitive skills in these situations may affect patient outcomes.

Grant Support: National Institutes of Health
A Specialty Tailored, Asynchronous Elective in Quality and Patient Safety for Senior Medical Students
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Needs and Objectives: There is a need to integrate quality and patient safety (QPS) into medical education. Hypothetical experiences expose students to concepts of QPS early on, but preclinical medical students have limited ability to make experiential connections and therefore have difficulty in establishing learning relevance. Senior medical students, by contrast, draw from broad and varied clinical experiences and are usually highly motivated to learn about their future specialty. This combination creates a unique teachable moment for QPS. Senior medical students face hectic travel schedules during interview months and would benefit from an asynchronous elective.

Setting and Participants: An asynchronously delivered, senior elective in QPS. In the first year of the course, 52 students representing 15 different specialties participated during three 4-week blocks that covered the interview travel season November – January.

Description: The course was delivered through an institutional learning management. Students completed introductory modules about QPS through the Institute for Healthcare Improvement open school curriculum. Students then reviewed specialty-specific learning by reviewing and reflecting on structured video-interviews of local experts. Students performed their own root cause analysis of a clinical case with adverse outcome and created quality improvement plans based on challenging quality problems in their specialties. Students provided structured feedback to peers and received narrative feedback from course directors.

Evaluation: Online course evaluations assessed students’ impression of the course overall and relative value of individual components. 40 of 52 (77%) students completed a post course evaluation. Students rated the course highly overall, rated the self-scheduling nature of the course extremely highly. Students strongly disagreed that the lack of live lectures or scheduling meeting time impaired their learning. Narrative comments reflected that students appreciated asynchronous and that the material was perceived to be important and was not otherwise covered in the medical school curriculum.

Discussion / Reflection / Lessons learned: A senior elective with specialty specific components can be delivered asynchronously in a manner that provided content and knowledge that medical students perceived as important and not otherwise covered in their curriculum. Reviews of the QI and RCA projects by faculty members revealed significant introspection and insight into QPS was applied. The self-scheduling was extremely valuable as the elective was offered during residency interviewing months.

Support: Sweat Equity Alone
Pittsburgh Screening, Brief Intervention and Referral to Treatment: An Interprofessional Curriculum

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Needs and Objectives: In order to train the next generation of healthcare professionals on screening, brief intervention and referral to treatment (SBIRT) knowledge and skills, the Program Evaluation and Research Unit (PERU) developed an online training program titled Pittsburgh Screening, Brief Intervention and Referral to Treatment (PGH SBIRT).

Setting and Participants: The PGH SBIRT curriculum was implemented across physician assistant, nursing, physical therapy, occupational therapy, counseling psychology, medicine, pharmacy and social work programs within Chatham University, Morehouse School of Medicine, and University of the Sciences.

Description: This training program is the culmination of research and curriculum development beginning in 2008 when PERU developed the initial training program as part of the first cohort of medical resident training grantees funded by the Substance Abuse and Mental Health Services Administration. The online training curriculum is composed of 5 core modules on foundational SBIRT knowledge for approximately 4 hours of didactic learning. The online platform allows the institutions to also pick and arrange supplemental learning material to adapt the curriculum to the needs of their trainees, patient populations and settings. Students complete an additional 2 hours of face-to-face skill development in workshop or clinical settings. The curriculum is currently being updated with discipline specific and interprofessional content so that trainees understand how SBIRT applies to their roles and the roles of their colleagues as they matriculate into the workforce.

Evaluation: As the first year of the program draws to a close, it has been successfully implemented within all three institutions. Focus groups and key informant interviews with trainees and implementers reveal positive views of the implementation process and training. The team is currently working on revamping the online curriculum to be more engaging and reduce information overload per trainee feedback. Additional outcomes that will be evaluated include number of trainees, satisfaction survey scores, metrics on trainees’ learned SBIRT and substance use disorder (SUD) knowledge and skills, and additional process improvement measures.

Discussion: PGH SBIRT is a flexible, interprofessional curriculum that can be implemented in diverse settings to meet the needs of its trainees and their available resources. Previous variations of this training program have been successful in improving trainee knowledge, skills and attitudes regarding SUDs and SBIRT.

Online Resource: https://www.sbirt.pitt.edu/

Support: Substance Abuse and Mental Health Services Administration
The Pennsylvania Heroin Overdose Prevention Technical Assistance Center and OverdoseFreePA.org: Education for Overdose Prevention in Pennsylvania
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Needs and Objectives: Pennsylvania has the 14th highest overdose rate in the United States. In response to this epidemic, the Program Evaluation and Research Unit (PERU) created the OverdoseFreePA.org website and the PA Heroin Overdose Prevention Technical Assistance Center (TAC) to provide educational resources and trainings to healthcare professionals and county coalitions, so they can implement initiatives to reduce overdose among their patient populations and communities.

Setting and Participants: OverdoseFreePA.org is an open access website. The TAC trains and provides technical assistance to all Pennsylvania county coalitions on overdose prevention, intervention and treatment solutions.

Description: OverdoseFreePA.org is a freely accessible “town square” for information to educate law enforcement, healthcare professionals, school or worksite personnel, and family members. The website also hosts a state-of-the-science data extraction tool for accessing standardized, real-time, county-specific, overdose-related death data input by county medical examiners and coroners. The website’s interactive “Find Naloxone” page constantly updates listings of pharmacies that stock and distribute Naloxone.

The TAC manages OverdoseFreePA.org and is in the process of training new and established county coalitions on how to address the overdose situation in their communities. Specifically, the TAC trains coalitions to conduct thorough assessments to understand the specific characteristics of the overdose situation in their communities and develop strategic and sustainability plans to implement effective overdose prevention, intervention and treatment efforts.

Evaluation: OverdoseFreePA.org has become a leading resource for overdose information in PA. Its county specific overdose death database continues to expand with more county coroners and medical examiners contributing data. PERU and TAC staff continue to update this website with the most recent and relevant research. By the end of September 2016, the TAC will have hosted trainings with 15 county coalitions. These counties have completed overdose situation assessments and will begin to use this data to formulate their strategic plans. The TAC is beginning to gather training feedback and satisfaction data to ensure that it is continually meeting the needs of the coalitions and communities it serves.

Discussion: OverdoseFreePA.org has become a model platform for overdose information and resources with other states wanting to use this site as a model for their own overdose initiatives. The TAC will become a centralized, expert resource for the Commonwealth of Pennsylvania that can be used to inform policy and praxis.

Online Resource: http://www.overdosefreepa.org
Support: The Pennsylvania Commission on Crime and Delinquency
Impact of Video Coaching on Gynecologic Resident Laparoscopic Suturing: A Randomized Controlled Trial

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Introduction: Laparoscopic surgery affords patients superior outcomes to traditional open surgery. Despite this ubiquitous data, barriers to implementation stem from current resident training, including work hour restrictions and increased procedural oversight, thus necessitating greater emphasis on simulation curriculums. Coaching enhances performance by identifying, focusing on, and achieving specifics goals. Historically attributed to athletics, performance coaching has become a professional development tool in business, education and medicine. We sought to determine if the addition of video coaching to an OB/GYN resident laparoscopic simulation curriculum improves acquisition of suturing skills.

Hypothesis: We hypothesized that residents exposed to video coaching would demonstrate a quicker acquisition of laparoscopic suturing skills.

Methods: 20 OB/GYN residents undergoing a 4-week laparoscopic simulation curriculum were video recorded weekly performing a suturing task. Residents were randomized to standard curriculum or standard curriculum plus weekly coaching by an expert laparoscopic surgeon. Primary outcome measure was comparison of weekly GOALS+ (Global Operative Assessment of Laparoscopic Skills plus Vaginal Cuff Metrics) scores of the suturing task.

Results: Senior (PGY3/PGY4) residents started with significantly higher GOALS+ scores than junior (PGY1/PGY2) residents (p <.001), with no difference in baseline GOALS+ scores across groups (p = 0.406). All residents showed significant improvement in suturing over the 4-week period (p=0.005). There were significantly improved GOALS+ scores from week 1 to week 2 in the coaching group compared to the standard group (p<0.05). Subanalysis of junior versus senior learners demonstrated that this difference was attributed to the junior learners. Junior coached residents (M=28.06, SD=3.10) had significantly higher GOALS+ scores at week 2 compared to the control residents (M=20.75, SD=6.38, p<0.04) with smaller increases noted in the coached senior resident cohort (M=35.00, SD= 1.80) compared to the control senior residents (M=29.83, SD=4.48).

Conclusion: Video coaching during laparoscopic simulation training has the greatest impact early in junior learners’ laparoscopic suturing skill acquisition.

Significance: Coaching offers a high-yield, feasible tool to add to established laparoscopic simulation curricula, as it requires minimal time and resources but provides substantial benefit to the novice learner.

Research/Grant Support: None
Behavioral Health Morning Report for Pediatric Residents
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Needs and Objectives: Twenty percent of youth ages 13-18 years old live with a mental health condition. 50\% of all lifetime cases of mental illness begin by age 14 and 75\% by age 24. There is a shortage of child psychiatrists, making pediatricians often the first line of identification and treatment for children. Due to this need the American Academy of Pediatrics recommends pediatricians "preform appropriate learning practices" around behavioral health and "establish a collaborative relationship with support groups" such as child psychiatrists. To address this need the behavioral health morning report was created to both increase exposure to mental health clinical cases and also to connect trainees with child psychiatry faculty.

Settings and Participants: The participants were residents in categorical pediatrics, medicine-pediatrics, or Triple Board programs who were able to attend their typically scheduled morning report.

Description: Pediatric residents, supported by child psychiatry fellows, selected, presented, and facilitated the case. A total of five cases were done over a one year period. Following case presentation child psychiatry faculty provided brief didactic information on the topic covered. The topics included anxiety disorders, delirium, obsessive compulsive disorder, depression, and psychosis. An email was sent to residents with a summary of the case and resource information. A standardized electronic evaluation form was also sent asking about knowledge of the topic, behavioral health in general, and what they want to learn in the future.

Evaluation: Forty percent of the participants of the evaluation attended three or more sessions. Ninety-three percent of participants felt that the behavioral health morning reports taught them more about child psychiatry topics and increased their comfort with behavioral disorders in patients. Survey responders asked for more education session and other topics to focus on such as eating disorders, agitation and ADHD.

Discussion/Reflection/Lessons Learned: This educational intervention increased the exposure of pediatric trainees to behavioral health cases and to faculty with content expertise. Survey responders indicated that these sessions increased their familiarity with behavioral disorders and treatments. A next step would be to see how much this leads to comfort with treatment in clinic and knowledge of available resources. Given familiarity with cased-based morning report this model could be generalizable to other specialties educational programing.
Evidence-Based Medicine Curriculum Improves Pediatric Emergency Fellows’ Scores on In-Training Examinations
Tavarez MM1,2; Kenkre TS3; Zuckerbraun Z1,2
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2University of Pittsburgh, School of Medicine, Pittsburgh, PA
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Introduction: Available evidence is unclear regarding best methods to assess learning outcomes for Evidence-Based Medicine (EBM) curricula.

Hypothesis: We aimed to determine if our EBM curriculum had an effect on PEM fellows’ scores on the “Core Knowledge in Scholarly Activities” section of the ITE.

Methods: We obtained 49 de-identified, raw sub-scores of 22 pediatric emergency medicine (PEM) fellows over 6 academic years for the “Core Knowledge in Scholarly Activities” (SA) and “Emergencies Treated Medically” (EM) sections of the ITE. We utilized the EM scores as balance measure. We divided scores into 3 instruction periods: “baseline” for years before our current EBM curriculum, “transition” for years with use of a research lecture series with some overlapping EBM content, and “EBM” for years with our current EBM curriculum. Data were analyzed with descriptive methods and multivariate mixed effects linear models to control for fellow-related factors including fellows’ PGY and multiple scores per fellow.

Results: SA scores ranged from 30%-100% (mean score=60% ± 17%). EM scores ranged from 54%-100% (mean score=77% ± 11%). During the EBM period, fellows’ ITE scores on the SA section were significantly higher than during the baseline or transition periods (Table 1). In contrast, there was no significant effect on fellows’ ITE scores on the EM section from either the study periods or the postgraduate year (Table 1).

Conclusions: Our EBM curriculum was associated with significantly higher scores on the “Scholarly Activities” section of the ITE. This positive effect was independent of fellows’ maturation over time.

Significance: Educators could use PEM fellows’ scores on the Scholarly Activities section of the In-Training Examination to assess the impact of EBM curricula developed.

Support/Acknowledgements: The project described was supported by the National Institutes of Health through Grant Number UL1TR000005.

Table 1. Effect of EBM curriculum on SA & EM section scores

<table>
<thead>
<tr>
<th>Variable</th>
<th>Scholarly Activities Score Parameter Estimate</th>
<th>CI</th>
<th>p-value</th>
<th>Emergencies Treated Medically Score Parameter Estimate</th>
<th>CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline vs. EBM</td>
<td>-0.28</td>
<td>[-0.41, -0.01]</td>
<td>&lt;0.01</td>
<td>-0.08</td>
<td>[-0.17, 0.01]</td>
<td>0.10</td>
</tr>
<tr>
<td>Transition vs. EBM</td>
<td>-0.21</td>
<td>[-0.35, -0.08]</td>
<td>&lt;0.01</td>
<td>-0.01</td>
<td>[-0.10, 0.08]</td>
<td>0.80</td>
</tr>
<tr>
<td>Post-graduate year</td>
<td>0.06</td>
<td>[0.02, 0.11]</td>
<td>0.01</td>
<td>0.002</td>
<td>[-0.03, 0.04]</td>
<td>0.93</td>
</tr>
</tbody>
</table>
Sentiment mining of Letters of Recommendations (LOR) for residency applications. A preliminary work on automated categorization
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Introduction: There has been a recent increase of interest in the automation of opinion extraction from text. As educators, we also face the increasing number of applications for our programs and expect to continue this rise in the future. In the last academic year, our program received in excess of 700 applications. We present preliminary work on the possible use of automation in extracting sentiment from standardized medical school LORs for residency applicants.

Hypothesis: Our hypothesis is that automated text mining of LORs results in similar interpretation of the sentiment, when compared to interpretation by established educators.

Methods: We obtained IRB approval for our work, following de-identification of the LORs, we selected 10 positive and 10 negative LORs to be interpreted by 4 educators. All the educators developed an annotated lexicon of 5 positive and 5 negative sentiments as interpreted during their reading of the LORs. We then used the reliability of interpretation between educators using Kendall's W for Agreement between Ranks with the null hypothesis that there is no agreement among the educators.

Results: There was good agreement between educators in interpreting the LORs and extracted similar terms (words, phrases) to build the lexicon for the next step of the work. The Kendall was W = 0.8839 with a chiSq=31.8214, df=9, and p=0.0002. When we build the word cloud, phrases such as “magna cum laude”, “excelled”, “sincere” were repeated frequently.

Conclusion: We established the first step towards an automated interpretation of LORs by confirming the coherence among educators interpreting text. The next step is to use this lexicon towards sentiment mining of LORs. Standardized LORs from medical schools during the time of residency application is an important variable in the decision making for residency acceptance.

Significance: An automated approach in extracting sentiment from the LORs would be a great asset for the educators in making residency decisions, and may have further reaching implications as evaluations become more standardized overall.
Leaving the lecture behind: putting PubMed instruction into the hands of the students
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Needs and objectives: We required a more engaging way to introduce PubMed to medical students than a traditional lecture. Our goals were to enhance learning, allow for interaction and reflection and foster collaboration between librarians and students.

Setting and participants: Participants were 140 total first year medical students in their second semester. The setting comprised of four instructors in four spaces. Total time was 1.5 hours to introduce PubMed learning objectives with no required preparation from the student.

Description: To support a smaller group environment, students were scheduled to attend one of two identical sessions. Students were divided into four groups of 4-5 people. The librarian instructor briefly introduced PubMed and the planned activity to the students. Each group was assigned a different exercise focusing on a single aspect of PubMed. Groups worked through the exercises together while a librarian instructor roamed around the room facilitating discussions. Students taught their peers the assigned PubMed topic while the librarian interjected with additional explanation as needed.

Evaluation: Evaluation data was collected in 2016 by asking students to complete a short online survey. 71% agreed or strongly agreed that they preferred the guided group method (n=107). 73% agreed or strongly agreed that working in guided groups to develop targeted class presentations was effective (n=108).

Discussion: Instructors felt that students were generally more engaged and sessions had more energy than traditional PubMed sessions. Session effectiveness was dependent on student attitude and presentation quality was varied. Overall, this was a valuable modification to one shot-class in place of a traditional didactic lecture.

Online resource URL: Modules are stored online: https://pitt.box.com/s/ncho6hgizj0f2tyu8egll47zpwwwhqkz
Support: None.
Needs and Objectives: There are significant health disparities that affect LGBT populations including higher rates of psychiatric illness, but less preventative care and screenings. The Association of American Medical Colleges has called for advancement of curricula in this area. The goal of this project was to create a comprehensive LGBT curriculum for internal medicine (IM) residents that could be easily taught by faculty who have little prior training in this topic area. The objectives were to increase IM residents and faculty knowledge and attitudes in providing care to LGBT patients; and to change implicit bias of residents and faculty towards patients who identify as LGBT.

Setting and Participants: The study population is our IM residents and GIM faculty clinic preceptors who see patients at 3 ambulatory clinic sites. The curriculum was incorporated into an existing structure of 30-minute lectures prior to each half-day of clinic, with a case based, interactive discussion format.

Description: The curriculum was developed by a group of IM, Medicine-Pediatrics, and psychiatry residents, with a faculty mentor. It was based on the American College of Physicians Fenway guide to LGBT health, along with the AAMC curricular resource for medical educators. The four major topic areas addressed were a framework for understanding gender and sexuality; cultural competency with history taking and performing a sensitive physical; health promotion and disease prevention; and mental health and societal factors.

Evaluation: Pre- and post-surveys assessed knowledge and attitudes towards care of LGBT patients. We used a sexuality implicit association task (IAT) to compare implicit bias from the pre-curricular period to the post-curricular period. Prior to the curriculum, the average number of hours of education on LGBT health received by the residents was 1.4 hours, while faculty felt that they had taught for 2.1 hours. 74.6% of residents, and 92.8% of faculty felt that the curriculum served to increase their understanding of the challenges faced by patients who identify as LGBT when interacting with the healthcare system.

Discussion/Reflections/Lessons Learned: A curriculum that can be proven to change this preference, could have a big impact on medical education, as well as spur further research.

Support: UPMC Shadyside Hospital Thomas H. Nimick, Jr. Competitive Research Fund and Shadyside Hospital Foundation
Tailoring the HIV curriculum to meet needs of primary care trainees  
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\textsuperscript{1}Department of Family Medicine  
\textsuperscript{2}Department of Internal Medicine

\textbf{Needs and objectives:} Improved HIV and hepatitis C (HCV) therapy has led to longer patient survival and a need for clinical skills in HIV and HCV among internists. We aim to identify needs in HIV and HCV clinical competencies, adapt the HIV curriculum in our internal medicine training program to address these needs, and evaluate changes to the curriculum.

\textbf{Settings and participants:} The Pittsburgh AIDS Center for Treatment (PACT) provides care to 1500 HIV infected patients in Western Pennsylvania. PACT serves an important role in training UPMC Internal medicine residents who rotate for two to four weeks during residency. Twenty internal medicine residents and four clinical educators participated in the needs assessment. Twenty-three residents who rotated through PACT in 2015-2016 participated in our pre-course evaluation and 17 completed a post-course evaluation.

\textbf{Description:} For our needs assessment, participants rated their level of confidence in prevention, diagnosis, counseling, initial evaluation, initiation of treatment, maintenance of antiretroviral therapy, and evaluation of patients with HCV. Competencies were derived from prior courses in HIV care. Participants were most comfortable in prevention and diagnosis of HIV infection, and identified needs in management of antiretroviral therapy and HCV diagnosis and management.

We adapted the PACT curriculum to include: 1) A pre-rotation assessment for residents to determine their educational goals; 2) A pre-rotation email with key articles and study questions to an array of self-study materials, with emphasis on ARV management and HCV treatment; 3) Development of a post-rotation assessment where residents assessed their progress and identified future educational goals.

\textbf{Evaluation and Results:} We compared pre and post-course test results as well as a pre and post-course self rated perceived confidence. Participants reported increased confidence in all six evaluated items, with the greatest change (4.8 points difference) in confidence of initiation, managing side effects and monitoring ARV. All knowledge-based question increased scores except for identification of AIDS. The greatest change was in ARV initiation.

\textbf{Reflections:} Our adapted PACT curriculum markedly improved participants’ self-confidence and medical knowledge in HIV and HCV related topics, particularly in initiation and management of ARV. Residents reported differing preferences between guided study and self-directed use of resources. Based on our findings, the adapted curriculum including pre and post-assessments and supplemental study resources may be generalizable to general internists’ education in HIV and HCV care.
Development and deployment of an interprofessional transgender standardized patient case
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Needs and Objectives: Improving transgender healthcare has become a nationally recognized objective with the inclusion of LGBT health as a new topic area in Healthy People 2020. To respond to calls for an increased focus on transgender patient care in professional health programs, a patient case was developed to prepare students to conduct patient interviews in a socially appropriate manner, recognize medical complexities related to transgender healthcare, and identify the roles of each member of the interprofessional team in optimizing patient outcomes.

Description: A standardized patient teaching case was developed using medical education literature and an interview with a transgender volunteer. Materials included learning objectives, a detailed case scenario, selected pre-readings, guidance for the standardized patient, and pre- and post-event surveys. The patient case was deployed over 90 minutes with a group of eight student volunteers drawn from pharmacy, medicine, dental medicine, physical therapy, and nutrition. A volunteer standardized patient was trained using the comprehensive case manuscript. Students were sent pre-surveys, the patient’s lab values, the case instructions, and optional pre-readings a week prior. Students interviewed the patient as a group to allow for interprofessional interaction and learning. After the interview, students had 30 minutes to collaboratively construct one prioritized problem list.

Evaluation: Anonymous pre- and post-surveys were used to evaluate interprofessional collaboration and personal beliefs regarding transgender patient care. A majority of participants indicated improved confidence in problem solving and caring for transgender patients. All students reported learning more about interprofessional collaboration. The event was observed by an interprofessional group of faculty members and administrators, and the observed student discussion touched on all components identified in the learning objectives. Potential improvements include allotting more time prior to the patient interaction for group organization and preparation, and more time after the patient interview for students to develop a comprehensive treatment plan. While this case addressed stated objectives, one case alone cannot encompass the entire spectrum of issues that impact transgender patient health. Ideally, this case would be expanded upon to include multiple simulated follow-up patient interactions.

Conclusion: A standardized patient case was an effective teaching strategy to facilitate student achievement of learning objectives related to the health care needs of transgender patients, social complexities of transgender patient care, empathy, communication skills, and team-based collaboration.
“Is It Worth It?” A Collaborative Clinical Decision Making Exercise
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³University of Pittsburgh School of Nursing
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Needs and objectives: “Is It Worth It?” (IIWIT) uses an old-school debate to teach critical thinking using a team-based collaborative, shared decision-making framework to map out how evidence-based practice and a patient’s values intersect, particularly when the patient is elderly or medically complex.

Setting and participants: 200 health professions (169 3rd year medical, 10 nurse practitioner, 13 pharmacy, 8 speech pathology) students in a 1-week interprofessional geriatrics course.

Description: We created a team-based exercise where eight-learner teams were assigned to defend the pro or con position of seven specific interventions (e.g. TAVR in severe aortic stenosis, hemodialysis in a frail man, or aggressive antihypertensive treatment) using an eight-question rubric to guide critical thinking about whether to pursue the intervention in an older patient. The answers to the questions are informed by the evidence-based literature and by a richly described case with clues about the patient’s goals and priorities that could be interpreted to support either argument. Each team presented an eight-minute argument in a competitive debate with an option to rebut its opponent. At the conclusion of the debate, the audience voted on the most convincing argument about whether to proceed with the intervention.

Evaluation: Students were assigned to four pairs of teams of 7-8 students each created from three large groups of 60-65. One large group consisted of interprofessional (IP) teams; two large groups were like-professional (LP) teams. Seven cases were distributed among a total of twelve pairs of teams; five cases were presented in two groups. The IP group weakly or equally favored (49-55%) the osteoporosis treatment, anticoagulation in atrial fibrillation, and aggressive blood pressure control despite side effects whereas LP groups strongly favored (68-80%) all interventions. Both IP and LP groups were strongly against (88% and 77%) TAVR in a frail patient. Two LP groups favored dialysis (51-61%) in a patient with a poor one-year prognosis.

Discussion: This framework uses adult experiential learning theory to teach how to collaborate in an authentic critical thinking exercise that compels the consideration of individual patients’ values. Regardless of the position defended or how they voted, this exercise required students to consider the alternative viewpoint to not intervene by calculating time to benefit, number needed to treat, prognosis, and use patients’ informed preferences.

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