Medical Education Day

April 7, 2014

Program Guide

Dow Auditorium
and
Towsley Center Lobby

University of Michigan
Medical School

Medical Education Day
Schedule of Events
April 7, 2014

12:00 pm Opening Plenary
Dow Auditorium, Towsley Center
Introduction

Joseph C. Kolars, M.D.
Senior Associate Dean for Education and Global Initiatives
Josiah Macy Jr., Professor of Health Professions Education
Professor of Internal Medicine

Plenary Speaker
Th.J. (Olle) ten Cate, Ph.D.
Professor of Medical Education
Director of the Center for Research and Development of Education
University Medical Center Utrecht

"Entrusting Learners with Clinical Responsibilities - Integrating Training with Competency Based Education"

1:00 pm Local Response Panel Discussion
Plenary Panel

Rebecca M. Minter, M.D.
Associate Professor of Surgery
General Surgery, Division of GI Surgery

Robert Englander, M.D.
Senior Director, Competency-Based Learning and Assessment
Association of American Medical Colleges

2:00 pm Poster Session and Computer Demonstrations
Dow Lobby, Towsley Center

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Guest Faculty

Th.J. (Olle) ten Cate, Ph.D.
Professor of Medical Education
Director of the Center for Research and Development of Education
University Medical Center Utrecht

Dr. Olle ten Cate is an internationally recognized medical education scholar and is particularly well known for originating the concept of Entrustable Professional Activities or EPAs. Competencies and EPAs are front and center for many in undergraduate and graduate education, so the opportunity to hear and interact with Dr. ten Cate is noteworthy.

Olle ten Cate attended undergraduate medical education at the University of Amsterdam and worked as an educational advisor from 1980 at the same medical school. In 1986, he completed a PhD dissertation on peer teaching in medical education. Between 1980 and 1999 he was closely involved with all of U of A's major preclinical and clinical curriculum reforms, educational research, program evaluation and educational development. In 1999 he was appointed full professor of Medical Education at Utrecht University. From 1999 until 2005 he was program director of undergraduate medical education at University Medical Centre Utrecht. Since 2005 he leads the Center for Research and Development of Education at UMCU. His research interests include vertical integration in the undergraduate medical education, peer teaching and competency-based postgraduate medical education. From 2006 until 2012 he served as president of the Netherlands Association for Medical Education. In 2012 he was appointed adjunct professor of medicine at the University of California, San Francisco.

Association of American Medical Colleges Faculty

Robert Englander, M.D.
Senior Director, Competency-Based Learning and Assessment
Association of American Medical Colleges

Dr. Robert Englander is currently the Senior Director of Competency-Based Learning and Assessment at the Association for American Medical Colleges, a role he assumed in June of 2011. Prior to that, he was in Hartford, Connecticut where he was Senior Vice President for Quality and Patient Safety at the Connecticut Children's Medical Center and Professor of Pediatrics at the University of Connecticut School of Medicine.

He received his Medical degree from the Yale School of Medicine in 1987. He completed a residency program in Pediatrics at the Children's National Medical Center in Washington, DC, and a fellowship in Pediatric Critical Care Medicine at the Massachusetts General Hospital in Boston, Massachusetts. Following fellowship, he spent nine years at the University of Maryland School of Medicine as an Assistant Professor of Pediatrics in the Divisions of Critical Care Medicine and Education. During that time his roles included Associate Director of the Residency Training Program in

Pediatrics and Director of Undergraduate Medical Studies for the Department of Pediatrics. He also received a Master's in Public Health from the Johns Hopkins School of Hygiene and Public Health in 1999. In 2002, Dr. Englander relocated to Hartford, Connecticut to assume the roles of Medical Director of Inpatient Services, Director of the Division of Hospital Medicine, and Associate Director of the Pediatric Residency Training Program overseeing competency based education. From 2005-2011, he assumed the role of Senior Vice President for Quality and Patient Safety for the Children's Hospital, while remaining actively engaged in both clinical care and undergraduate and graduate medical education. Dr. Englander has been a member of the Association of Pediatric Program Directors for well over a decade, and served as a member of its Board of Directors from 2002-2005. He has served as a member of the Pediatrics Milestone Work group since its inception.

University of Michigan Faculty

Joseph C. Kolars, M.D.
Senior Associate Dean for Education and Global Initiatives
Josiah Macy, Jr., Professor of Health Professions Education
Professor of Internal Medicine

Joseph C. Kolars, M.D., became the first senior associate dean for education and global initiatives on June 1, 2009. He serves as the Medical School's lead for the oversight and expansion of our education mission and our global initiatives. In this role, he leads our efforts to adapt and enhance the full spectrum of medical training — from undergraduate to continuing education to biomedical research education — and to bring it together with global impact.

Dr. Kolars' career has been focused on physician education, and he has held a number of leadership roles in education programs for medical students, residents, and fellows, including program director of one of the largest internal medicine residencies in the U.S. His scholarship has largely emphasized educational outcomes, measurements of competency, faculty development, and effective learning venues. He has worked closely with the Accreditation Council on Graduate Medical Education on its Educational Innovations Project that was designed to reform graduate medical education.

He has extensive international experience, including numerous faculty development programs worldwide. In 2010, he was appointed inaugural co-director of the Joint Institute for Clinical and Translational Research between the University of Michigan Medical School and Peking University Health Science Center. This virtual institute consists of four thematic programs and three cores to facilitate joint research projects and training initiatives between the schools and their affiliated hospitals. He has given lectures or conducted classes in many parts of the globe, including China, Malaysia, Thailand, India, Peru, Germany, Pakistan, South Africa, Ghana, Uganda, Tanzania and Vietnam. For more than three years, he lived in Shanghai with his family to establish a new health care system that could also serve as a learning site for local physicians.

A gastroenterologist, Dr. Kolars returned to the University of Michigan from the Mayo Clinic, where he held several positions, including professor of medicine, residency program director in the Department of Internal Medicine, and consultant to the Division of Gastroenterology and Hepatology. From late-2007 to mid-2012, he divided his time between the Mayo Clinic and the Bill and Melinda Gates Foundation, where he works on education systems that will build human resource capacity to transform health. He is continuing his work on these initiatives on behalf of the Gates Foundation.

Dr. Kolars earned his medical degree in 1982 from the University of Minnesota Medical School. He completed his postgraduate training here at the U-M Medical School and then continued at the U-M, first as an instructor in the Department of Internal Medicine in 1989, then as an assistant professor in 1991, and as an associate professor with tenure in 1995. Dr. Kolars served as associate chair for graduate medical education and residency program director in the Department of Internal Medicine from 1993-96.

Rebecca M. Minter, M.D.
Associate Professor of Surgery

Rebecca M. Minter, M.D., is an Associate Professor of Surgery (Section of General Surgery, Division of GI Surgery) and Medical Education at the University of Michigan. Dr. Minter graduated magna cum laude from the University of Denver in 1992. She received her M.D. degree in 1996, from the University of Texas Southwestern Medical School and went on to general surgery residency training at the University of Florida College of Medicine. Dr. Minter completed a two year research fellowship in molecular biology and gene therapy for the treatment of acute inflammatory conditions in 2000, and completed her general surgery residency in June of 2003. She joined the faculty at the University of Michigan shortly thereafter in July of 2003.

Dr. Minter is a NIH funded investigator whose current research efforts are focused on the development of necessary infrastructure to support robust clinical research and biospecimen collection for the facilitation of translational research focused on the treatment of pancreatic disease. In concert with this effort, Dr. Minter and bioengineering colleagues have developed a computational modeling approach for the analysis of dynamic, complex biologic datasets. Additionally, Dr. Minter is actively involved in both undergraduate and graduate medical education at the departmental, institutional, and national levels. In line with these activities, Dr. Minter is engaged in research within the medical education domain which focuses on the development of robust metric-based curricula to be utilized in the assessment of surgical trainee performance.

Program Planning Faculty

Larry G. Gruppen, Ph.D.
Professor and Chair
Department of Medical Education

Dr. Larry Gruppen is Chair of the Department of Medical Education at the University of Michigan Medical School. His research interests center around the development of expertise, knowledge and performance assessment, self-regulated learning, evidence-based medicine and educational leadership development. He has held the offices of president of the Society of Directors of Research in Medical Education and chair of the Association of American Medical College's Central Group on Educational Affairs. He was also the founding Chair of the AAMC's Medical Education Research Certificate (MERC) program. He has over 100 peer-reviewed publications on a variety of topics in medical education and presents regularly at national and international professional meetings. He was the founding Director (1998) of the University of Michigan Medical School's Medical Education Scholars Program. More recently, he has led the planning and implementation of an innovative competency-base Master in Health Professions Education (MHPE) degree program at the Medical School.

American Medical Association
Accelerating Change in Medical Education initiative
(changemeded.org)

In keeping with its historic leadership in physician education, the AMA in 2013 launched an $11 million competitive grant initiative aimed at bringing innovative changes to medical education. Through this initiative, the AMA will work to:

- **DEVELOP** new methods for measuring and assessing key competencies for physicians at all training levels to create more flexible, individualized learning plans
- **PROMOTE** exemplary methods to achieve patient safety, performance improvement and patient-centered team care
- **IMPROVE** understanding of the health care system and health care financing in medical training
- **OPTIMIZE** the learning environment

The recipient medical schools are:

- Indiana University School of Medicine
- Mayo Medical School
- New York University School of Medicine
- Oregon Health & Science University School of Medicine
- Pennsylvania State University College of Medicine
- The Brody School of Medicine at East Carolina University
- The Warren Alpert Medical School of Brown University
- University of California, Davis School of Medicine

- University of California, San Francisco School of Medicine
- University of Michigan Medical School
- Vanderbilt University School of Medicine

Another critical component of this initiative is the establishment of a learning collaborative with the selected schools so that best practices can be developed, shared and implemented in medical schools across the country. Nearly 200 medical education professionals, including the learning collaborative, gathered in October 2013 to advance this cause.

By the end of this five-year initiative, undergraduate medical education improvements will have been tested, refined and adopted as mainstream options. The innovations will enable the next generation of physicians to maintain the tradition of professional and clinical excellence within our evolving health care system.

Program Objectives

Competencies and Entrustable Learning Activities (EPAs) are major issues for many in undergraduate and graduate education.

This plenary session will

- Define Entrustable Learning Activities (EPAs) that are relevant to his/her professional discipline
- Map EPAs to competencies for the discipline
- Identify appropriate assessment methods to measure progress towards competence
- Link the EPAs and competencies to clinical education and practice

CME Credit Designation

The University of Michigan Medical School is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians. The University of Michigan Medical School designates this educational activity for a maximum of 1.5 *AMA PRA Category 1 Credit(s*)™. Physicians should only claim credit commensurate with the extent of their participation in the activity.

Disclosure

The following planners/speakers have no financial relationships with companies whose products are addressed in their planning/presentations.

Th.J. (Olle) ten Cate, PhD.
Robert Englander, M.D.
Joseph C. Kolars, M.D.
Rebecca Minter, M.D.
Larry Gruppen, M.D.

Displays

Family Centered Experience Program's Interpretive Projects

Kumagai, A.K., Skye, E.P., Malani, P., and Wagenschutz, H.

The Family Centered Experience (FCE) program is a required course in the University of Michigan Medical School curriculum. Through FCE, first- and second-year students engage in understanding the personal side of medicine through longitudinal home visits with patients and their families. Midway through their first year, students create an interpretative project. Working in groups representing 2-3 different families, the students find common themes in the great variety of stories they've heard. From these stories, they design and create a project using any medium they wish that illustrates their understanding of the patient's experience of illness and medical care.

Objective: To work collaboratively using a variety of media to capture one aspect of the experience of illness learned in speaking with the FCE volunteers.

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A Mannequin Simulator for Neurosurgical Training in Ventriculostomy

Stephenson, F.; Liao, P.; Savastano, L. MD; Sagher, O. MD; Shih, A. PhD; Tai, B. PhD

Objective: Ventriculostomy is one of the most common neurosurgical procedures, often performed in emergency situations, and surgical residents must become proficient early in their training. The procedure is not inherently high-risk, but the number of ventriculostomies performed every year increases the risk profile of this surgery. Residents have very few options for practicing ventriculostomies; they can either practice on live patients, or use expensive virtual-reality simulators. Thus, to provide an additional training option, we propose a physical simulator fabricated via 3D printing and novel tissue phantoms, aimed at better visualization of the entire procedures and more realistic tactile properties

Methods: Based on the procedures to perform ventriculostomy, the simulator needs to consist of an anatomically accurate skull, a replaceable insert similar to cranial bone for drilling and scalp suturing, and a brain replica in the skull cavity for catheter placement and fluid draining. The model has a clear window in the midline of skull to allow observation for trainers. This simulator design was realized using 3D printing, an evolving technology in rapid prototyping, which can build customized complex geometry, including molds for phantom tissues.

Results: Realistic tactile properties are important in making a high-fidelity simulator. Results of material analysis are: the brain replica is made from high-acyl gellan gum, which has been confirmed by neurosurgeons to have a haptic response very similar to that of brain tissue. The insert is 3D printed with plaster powder and applied with high-strength epoxy on the top and bottom layers to simulate bi-cortical cranial bone. The fluid that pressurizes in the ventricle is provided by a 20 cm-high water reservoir. Finally, the skull frame is printed in ABS plastic for durability. A follow-up content validity survey is being conducted.

Conclusion: We have demonstrated the capability of 3D-printing to quickly design and manufacture a customized surgical simulator based on the clinical needs. Appropriate phantom materials for cranial bone, brain, scalp, and dura have been identified through this study. Quantitative data to evaluate the validity of this simulator are being retrieved from at least 10 residents and faculty in the Department of Neurosurgery.

Computer Demonstrations

A User-centered Approach to Redesigning the Anatomy Website

Engling, J, MA; Yao, A; Chapman, C, MA; Stein, T, MA

Objective: After over a decade as a learning resource for first-year medical students, the UMMS Medical Gross Anatomy website needed an update to its content structure and user interface to improve its ability to serve as a learning resource. To create a tool for the current technologically-savvy medical student, the MSIS Instructional Design and Technology Team (IDTT) was charged with redesigning the website by working closely with the Director of Medical Gross Anatomy and medical students.

Methods: IDTT conducted a series of contextual inquires with recent anatomy learners by interviewing rising second-year students. Students were asked to walk through how they, as a learner, used the website for each of the dissections. After interviewing five students, patterns emerged which highlighted parts of the site that were valuable and those parts that were lightly used. The major trends included:

- The dissection answer page, which contained the learning objectives, was the main resource for studying used by all students;
- The prelab modules were a favorite resource;
- Most students wanted a key image to go along with text in the dissection answer and lab manual;
- The lab manual should be written more procedurally; and
- The anatomy review videos were more useful than the dissection videos.

After reviewing this information with the Director of Medical Gross Anatomy, the IDTT staff incorporated noted patterns and suggestions from students into a series of wireframe sketches of the website displaying the content in various layouts. After iterations of revising sketches, presenting them to students and faculty, and redesigning based on input, IDTT was able to begin producing a site that met and addressed the needs of the students and faculty.

Results: Initial student response to the site has been positive, as noted on the M1 2013 mid-year Anatomy course evaluation. When asked to rate the value of the anatomy website on a 5-point Likert scale with 1 = strongly disagree and 5 = strongly agree, the mean score was 4.13 (N=128, SD=.85). Informal feedback has been equally positive. The content updates to the course material are a mixture of completely re-written material (e.g., the lab manual, some learning objectives and lists of structures), and the functionality improvements of other parts (e.g., practice questions and clinical cases).

Conclusion: Incorporating student feedback early in the design process provided a deeper understanding of their interactions with the online materials, as well as provided a strong foundation upon which to build the new site. The current site is mobile device friendly, visually clean, and structured closely to match the learning flow students use when learning the anatomy material. From a technical perspective, the site structure is more manageable and portable way. Future work on the site will involve content and site design modifications based on course needs and student feedback.

The MSIS Learning Program
Supporting Medical Education across UMHS

Hofer, E.; MSI

The goal of the Medical School Information Services (MSIS) Learning Program is to enable the right learning for the right people at the right time, leading to exemplary patient care, safety, research, and education. The MSIS Learning Program supports our faculty, staff, students, and trainees in virtually every step of the education lifecycle across the Medical School and greater Health System, including everything from undergraduate and graduate medical education to completing mandatories on through to professional and continuous development. We employ innovative design and development processes, engaging staff and faculty in developing and deploying services that support lifelong learning. We broaden the impact and reach of the Medical School by sharing our learning materials with the global community.

Our demonstration will highlight some of the many ways MSIS supports medical education and skills development for our faculty, staff, and students. Highlights include the Coursera platform for MOOCs (Massive Open Online Courses) for which the Medical School has released two and is readying four new courses, the new release of the award-winning SecondLook Histology mobile application, and a pre-release look at the new “The Eyes Have It” mobile application, an interactive teaching and assessment program on vision care.

MSIS extends the reach of the Medical School even further through their Open.Michigan initiative, which offers thousands of health education learning materials for free, public access worldwide. These learning materials, which include a vast collection from the Medical School and our global health partners, have millions of views and hundreds of comments online. Many of these resources have been shared offline with partner institutions with limited Internet connectivity. To gain an even better understanding of their reach, Open.Michigan started an analytics project in an effort to publicly and dynamically share their usage data in interesting ways. Additionally, some of the educational videos from microbiology, disaster preparedness, and family medicine have been translated into Spanish, Portuguese, French, and eight other languages. Over 140 translations have been completed thus far by a force of more than 50 volunteers from within and outside the University.

Poster Presentations

Improvement in Teamwork Skills using an In-situ Multidisciplinary Simulation-based Trauma Team Training (T^3) Curriculum

Bassin, BS, MD; Murray, JA, MD; Benner, CA, MD; Santen, SA, MD, PhD; Nypaver, M, MD

Background: Trauma resuscitations require the rapid formation of an ad hoc medical-surgical team that must perform efficiently but rarely interact outside of the trauma bay.

Objective: Assess effectiveness of the Trauma Team Training (T^3) simulation-based educational intervention teaching non-technical (teamwork) skills utilizing crisis resource management (CRM) principles in an *in* situ environment.

Methods: Instruction was based upon principles of CRM adapted from the AHRQ's TeamSTEPPS™ course. Fifty-four volunteers – EM and Trauma Surgery attendings and fellows, residents, nurses, and technicians – participated in 1 of 8 sessions over 4 months. Volunteers reviewed CRM educational materials prior to the simulations. Sessions were three-part: videotaped in situ simulation-based resuscitation, educational intervention including video review and debrief, followed by a second resuscitation with bedside debrief. Participants completed the TeamSTEPPS™ Teamwork Perception Questionnaire (T-TPQ). A blinded, trained rater utilizing video review and the TEAM™ assessment tool assessed objective improvement in teamwork post-intervention. Aggregate and subgroup scores were compared pre/post intervention with two-tailed paired sample *t*-tests (SPSS).

Results: Aggregate data showed significantly higher post intervention scores on T-TPQ and objective teamwork improvement utilizing the TEAM™ tool (all p values <0.05). The largest improvements (T-TPQ) were team structure (3.2, 95% CI 2.3-4.1) and mutual support (3.2, 95% CI 2.2-4.2); smallest was communication (1.5, 95% CI 0.4-2.6). Overall team performance rating improved (7.14 +/- 0.90 pre intervention vs. 8.20 +/- 0.84 post intervention on 1-10 scale, $p=0.034$). The majority of participants (87%) believed teamwork in trauma resuscitations would improve as a result of the educational intervention.

Conclusions: We demonstrated both improved perception and objective measurement of teamwork skills among a multidisciplinary trauma resuscitation team using the T^3 brief educational intervention focused on CRM principles and an in-situ simulation-based teaching platform. Post-intervention scores improved in all core elements.

The Redesigning Education to Accelerate Change in Healthcare (REACH) Initiative's Teachers of Quality Academy: The Foundation for Curricular Change in Medical/Health Profession Education

Baxley, E, MD; Lawson, L, MD, MAEd; Garrison H, MD, MPH; Higginson, J, MD; Lake, D, RN, PhD; Lazorick, S, MD, MPH; Walsh, D, MD; Crawford, Y, MPH.

Patient safety and quality concerns have been increasing in US healthcare systems. Academic health centers are in a unique position to optimize care delivery through education of future health professionals about patient safety (PS), quality improvement (QI), team-based care and population health (PH). A significant gap exists, however, between current medical educators and the knowledge and skills they need to train the next generation of health care professionals.

With support from the AMA's Accelerating Change in Medical Education initiative, the Brody School of Medicine is addressing these needs through creation of a Teachers of Quality Academy (TQA), a year-long program for health science faculty that provides training in PS/QI, interprofessionalism and PH as a precursor to larger curricular renewal. TQA faculty also receive advanced training in adult education principles, curriculum development, instructional strategies, and assessment methods. The aim of the TQA is to develop a cohort of master educators to create the necessary learning laboratory for medical students to acquire competencies in PS/QI, PH and team-based care.

Using AAMC's Teaching for Quality faculty competencies as a roadmap, we are implementing the TQA for a cohort of 38 diverse, interprofessional faculty who were nominated and provided protected time for program completion. Key elements of the TQA include:

1. Completion of IHI's Open School Certificate and utilization of IHI faculty resources
2. Six 2-day learning sessions with structured didactic and experiential training
3. Development of clinical improvement projects, with faculty and peer mentoring
4. Participation in TeamSTEPPS to promote communication/clinical care collaboration
5. Partnership with the university's College of Education to provide courses in educational leadership, curriculum development and assessment skills, leading to a Credential in Medical Education
6. Structured e-portfolio development to catalog professional development and support faculty promotion and tenure review
7. Institutional support of scholarship through initiation of PS/QI Clinical and Educational Symposia.

Baseline competencies have been assessed using validated surveys and knowledge tests, with matched controls for TQA faculty participants; these measures will be repeated post program to complete the evaluation. Transfer of knowledge and institutional impact is being assessed through tracking of applied clinical and educational projects, to be presented at the annual Scholarship in PS/QI Symposium. Qualitative interviews will be performed to assess overall impact of the program. A description of the program and lessons learned to date will be presented.

Establishing a Regional Glaucoma Physician Collaborative to Improve Quality of Care

Blachley T, MS; Weizer J, MD; Imami N, MD; Stein J, MD; Lee P, MD; Lichter P, MD; Moroi S, MD, PhD; John D, MD; Wentzloff J, MD

Objective: To establish a regional glaucoma physician collaborative to report physician adherence rates to new glaucoma patient visit guidelines according to the American Academy of Ophthalmology's Primary Open-angle Glaucoma (POAG) Preferred Practice Pattern (PPP).

Methods: We enrolled three glaucoma group practices in Michigan into the physician collaborative. A data manager from each group practice reviewed all consecutive initial visits for each POAG patient from July 2012-June 2013 to assess whether the visit included the recommended 13 major examination elements recommended by the POAG PPP (i.e. evaluation of visual function, ophthalmic history, visual acuity measurement, pupil exam, anterior segment exam, intraocular pressure (IOP) measurement, gonioscopy, optic nerve head (ONH) and/or retinal nerve fiber layer (RNFL) exam/analysis with documentation, fundus exam, central corneal thickness (CCT) measurement, visual field evaluation, target pressure determination, and treatment plan determination [observation, medical, laser, or surgical treatment]), and electronically submitted these data to a centralized database. The physician adherence rates for each of the 13 recommended examination elements for all groups were combined and averaged, and the overall averages for the collaborative were reported to each group. The results were discussed in a group conference call to strategize how adherence rates could be improved.

Results: Data from 274 new patient visits were submitted to the centralized database by the three group practices. Mean combined adherence rates were: visual function 91.2%, ocular history 99.6%, visual acuity 100%, pupil exam 99.6%, anterior segment exam 100%, IOP measurement 100%, gonioscopy 96.3%, ONH/RNFL exam 100%, fundus exam 100%, CCT measurement 93.4%, visual field evaluation 98.9%, target pressure determination 73.4%, and treatment plan 100%.

Conclusion: It is possible to establish a glaucoma physician collaborative to assess and improve quality of care. Adherence rates to POAG PPP guidelines were comparable to or higher than rates previously described.[1,2] Future directions include reassessing adherence rates after result feedback to see if adherence improves further.

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R01 Boot Camp Pilot: A mentored research academy to help new UMMS investigators write competitive NIH R01 grant proposals

Black, Christine K, MLS, Gruppen, Larry, PhD

Objective: The R01 Boot Camp is a multifaceted program designed to help faculty members, who have yet to receive a NIH R01 grant, through the proposal development process under the guidance of faculty members with strong track records of funding.

Purpose of the study: The purpose of the pilot program was to help mentees develop a competitive R01 grant application by building knowledge of the content and NIH review process, skills to write a persuasive and well defined study, confidence to reach out to colleagues for feedback, and opportunity to work with peers to discuss best practices and ways to overcome obstacles.

Methods: The pilot program (Jan. 2013 to Feb. 2014) included 40 investigators from 26 different UMMS departments (including basic, translational, and clinical research) working in collaborative, interdisciplinary teams to develop and submit a competitive application. Each of 7 small groups was headed by one or two coaches (mentors), who are successfully funded investigators; groups met monthly and maintained writing schedules/ peer reviews that varied by mentee experience and preparedness. Each mentee had access to an internal Subject Matter expert and an external review. Large group activities included workshops on proposal writing, innovation, biostatistics for both clinical and pre-clinical research proposals, a review of research resources on campus, and opening and closing meetings. Funding will be tracked over two to three years.

Results: Mentee survey (N = 31 of 40 (RR = 78%) 27 Jan 2014

Program feature	Ave. rating (1-low, 5-high)	S.D.
Coaches	4.8	0.6
Grant writing workshops	4.6	0.7
Chalk talks	4.5	0.8
Peer group meetings	4.5	0.8
Internal SME	4.4	1.0
Peer group feedback	4.3	0.8
External SME	4.2	1.0

Conclusion: Thus far five mentees have received fundable R01 scores and three more have received other (e.g., NSF) substantial grants (>$500K). By June 2014, 75% of mentees will have submitted R01 applications. Recommendations for improvement included extending mentoring for one more year and offering R01 Boot Camp to a new cohort of young faculty members.

Peer support of a radiology faculty “Writers’ Circle” increases confidence and productivity in generating scholarship

Brandon, C, MD; Jamadar, D, MBBS; Girish, G, MBBS;
Dong, Q, MD; Morag, Y, MD; Mullan, P, PhD

Objectives: Scholarly productivity, especially manuscript publication, is critical for career advancement in academic medicine. Obstacles faculty may have to overcome include lack of time because of competing clinical and administrative responsibilities and lack of confidence in writing skills. Initial rejection of manuscripts can be particularly demoralizing. Our approach was to develop a peer writing group among senior clinical radiology faculty informed by theory (self- determination theory) and research on medical faculty development and peer writing groups.

Methods: The “Writers’ Circle” goal was to promote members’ scholarly productivity and associated career satisfaction and provide reflection on the characteristics of successful academic writers. Each of the five clinical-track members has more than 20 publications and been faculty for more than five years. Two members were alumni of the University of Michigan’s Medical Education Scholars Program. Members decided to focus on previously rejected manuscripts set aside by the first author. After the group’s initial meeting, interactions were informal, face-to-face during clinical work, and on-line. After the first six months, an anonymous survey asked members about the status of papers and their evaluations of their experience in the writing group.

Results: Ten previously rejected papers – at least one from each member - were submitted to the Circle. In six months, four revised manuscripts had been accepted for publication, five were in active revision, and one was withdrawn. The number of accepted co-authorships increased by an average of 2.2 (range of 2-3).

All (100%) participants characterized the program as worth their time, and as increasing their: motivation to write, opportunities to support scholarly productivity of colleagues, and confidence to generate scholarship. Multiple questions about the process of manuscript revision demonstrated convergence of opinions but reflections on their own patterns of writing behaviors had divergence of attitudes.

Conclusion: In our department, there is a strong emphasis on the production of peer-reviewed publications. By forming a peer-support writing group to revise and submit previously rejected manuscripts for publication, all four accepted papers benefited from the members’ pooled expertise. The members also reflected on the characteristics of successful writers. Our peer support group increased scholarly productivity and provided a collegial alternative to perceptions of writing as a solitary activity.

Scholarly Projects at Leading US Medical Schools: Focused Review of Tracks, Pathways, and Concentrations

Burk-Rafel, J, MRes

Objective: To identify, compile, and thematically analyze scholarly project programs (i.e., tracks, pathways, concentrations) at leading US medical schools.

Methods: US medical schools ranked in the top 25 for research and/or primary care (as identified by the 2014 *US News & World Report* rankings) were selected for focused review. A web search was conducted using relevant search terms ("scholarly," "project," "concentration," "track," "pathway," "thesis," "selective," "elective" AND "{school name}"), as well as exploration of institutional websites for curricular offerings. A search of peer-reviewed literature identified additional programs. Finally, institutions without apparent scholarly project offerings were contacted by phone for confirmation. Scholarly project focus areas were recorded for each institution. Institutional characteristics were extracted from the *US News Best Graduate Schools* publication, the AAMC *Medical School Admissions Requirements*, and program websites.

Results: Our analysis included 43 medical schools – 22 public and 21 private – ranked in the top 25 for research and/or primary care. Some form of scholarly project or pathway was identified at the majority of these medical schools. Programs varied widely in their expectations (required vs. elective), duration (weeks vs. years), timing (first vs. fourth year), and focus areas. Focus areas spanned diverse topics such as clinical research, global health, and women's health. From over 200 distinct focus areas, ten overarching thematic areas were identified:

(1) Basic science research
(2) Clinical and translational research
(3) Care of the underserved: community, public, and global health
(4) Health policy, economics, services, advocacy, and leadership
(5) Health informatics, e-health, and data-driven medicine
(6) Medical education: scholarship of learning and teaching
(7) Patient safety and quality improvement
(8) Bioethics and medical humanities
(9) Integrative medicine
(10) Special topics (e.g., women's health, geriatrics)

Conclusions: This focused review examined 43 of the 141 accredited US medical schools and was arbitrarily restricted to "top 25" institutions, limiting transferability to all US medical schools. Nevertheless, the emergence of ten core themes across widely varying programs has implications for the design of new scholarly project offerings and expansion of existing programs. While the high penetrance of scholarly projects at leading medical schools is exciting, they are typically co-curricular, calling into question the adequacy of current undergraduate medical curricula in preparing students to attain competency in these core areas.

Institution-Level Analysis of USMLE Step 1 & 2 Performance

Burk-Rafel, J, MRes; Purkiss, J, PhD

Objective: To investigate the role of institution-level factors in United States Medical Licensing Exam (USMLE) Step 1 and Step 2 (Clinical Knowledge) performance at US medical schools.

Methods: Admissions, curricular, and self-reported USMLE data were extracted from a variety of sources, including the AAMC Medical School Admissions Requirements, AAMC Fact Sheets, US News & World Report Best Graduate Schools publications, and institution websites. Complete USMLE data was available for 98 US medical schools in 2012. Data analysis was performed using SPSS v21.

Results: For medical schools reporting USMLE scores, mean (SD) institutional values were: MCAT, 10.6 (0.8); undergraduate GPA, 3.7 (0.08); Step 1, 227 (6.0); and Step 2, 235 (5.4). Medical schools not reporting USMLE scores had significantly lower MCAT scores (9.2 (0.8), n = 13, $p < 0.001$). Institutional MCAT was significantly ($p < 0.01$) correlated with Step 1 (r = 0.8), Step 2 (r = 0.5), uGPA (r = 0.6), NIH funding (r = 0.7), residency director ratings of graduates (research: r = 0.8, primary care: r = 0.6), private medical schools (r = 0.5), and graduates entering primary care (r = -0.4).

In stepwise multiple regression, only MCAT and uGPA were significant predictors of institutional Step 1 scores (β_{MCAT} = 0.66, β_{GPA} = 0.19, adjusted R^2 = 0.62, $p < 0.001$), while MCAT was the only significant predictor of Step 2 scores (β_{MCAT} = 0.48, adjusted R^2 = 0.22, $p < 0.001$). Despite a significant correlation between institutional Step 1 and Step 2 scores (r = 0.5), Step 1 scores did not predict institutional Step 2 scores when controlling for institutional MCAT ($p = 0.09$). Most importantly, utilizing these predictive models for Step 1 and 2 performance, we identified a number of potentially under- and over-performing institutions for further analysis of historical trends and curricular offerings.

Conclusions: Prior studies examining individual students' performance on the USMLE indicate MCAT scores and uGPA predict Step 1 performance but only weakly predict Step 2 performance; this relationship was observed at the institutional level. This analysis is limited by the sporadic nature of the data and lack of historical USMLE scores. Non-response of primarily lower-performing schools may also have resulted in restriction of range effects, and our institution-level analysis does not permit inference at the level of individuals. Despite these limitations, this analysis is useful in visualizing the landscape of USMLE performance at the institution level while identifying potentially under- and over-performing institutions. Work is ongoing to expand our data set and retrospectively analyze historical USMLE performance using more advanced methods.

Competency-based Education for Medical Educators: Implications and Implementation

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Objective: The growing interest in advanced training in medical education provides an opportunity to implement competency-based education (CBE) without being tied to legacy programs and curricula. This project explores the implications and implementation of competency-based education in the context of an innovative Masters degree program in Health Professions Education.

Methods: Entrustable Professional Activities (EPAs) serve as both the vehicles for learning, as program participants pursue these activities as part of their regular educational work, and as the means for assessing competence in 12 domains. Learning takes place in the context of daily work rather than formal courses, and is individualized and adapted to the circumstances, goals, and opportunities of the learner. Mentors guide individual learners through the program and link them to Subject Matter Experts in specific domains and skills

Results: 12 key competencies for all Masters-level health professions educators were defined and linked to EPAs as a means for assembling evidence for competence. These competencies reflect a range of activities characteristic of health professions educators, such as leadership, curriculum development, and research, among others. Evidence for competence is provided by completion of relevant EPAs and review of this evidence by in independent Assessment Panel.

Conclusion: A competency-based educational framework carries with it significant implications. These can be very attractive to learners who value self-regulation and individualized learning, but it is clear that CBE is not for everyone. Staying true to the principles of competency-based education is difficult in the context of time-based curricula and faculty-learner expectations.

The ASH Clinical Research Training Institute (CRTI) Positively Impacts the Success of Early Career Hematologists in Patient-Oriented Clinical Research

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Objective: There is a recognized need to translate scientific discoveries to patient-oriented clinical research (POCR) in order to improve human health. To overcome obstacles that interfere with the recruitment and retention of physicians for POCR careers, in 2003 the American Society of Hematology (ASH) developed the Clinical Research Training Institute (CRTI), an enhanced and extensive mentored experience for early career POCR investigators. The hypothesis is that an enhanced mentoring experience will result in increased development of successful POCR investigators.
Methods: The ASH CRTI is limited to 20 trainees/year (senior fellows or junior faculty) with an equivalent number of faculty mentors. The year-long Institute includes a 1 week workshop with didactic sessions on a variety of POCR and career development topics, disease-specific small group sessions focusing on research protocol development with biostatistician participation, and one-on-one interactions with faculty and representatives with expertise in career-development awards from the U.S. National Institutes of Health. Trainees have additional interactions with their small groups and CRTI mentors throughout the year to promote career development and research collaborations. Communications between the trainees' CRTI and home institution mentors are a vital component of the program. Evaluation of the POCR career development successes of the first 7 CRTI classes (140 trainees) was performed by reviewing trainees' curricula vitae and their responses to an electronically distributed survey.
Results: Gender, racial and ethnic distributions were similar to that of U.S. Hematology/Oncology fellowship programs. The majority (66%) of trainees were senior fellows or graduates of adult hematology/oncology training programs, 31% of pediatric hematology/oncology programs and the remainder of other hematology-related programs. Eighty-six percent of trainees had self-described success establishing a POCR study and 85% considered themselves clinical investigators. Nearly half of trainees had positions that were primarily research focused. CRTI trainees received at least 144 external grant awards plus additional internal awards, and had published 1035 peer-reviewed manuscripts, 173 chapters and 115 review articles. Testimonials supported trainee's impression that CRTI had a significant impact on their career success. Enhancements introduced into the CRTI program include broadening participant eligibility to include up to 5 international trainees per class to enhance global research collaborations and further enhancements to the trainee-mentor interactions.
Conclusion: The outcomes of the ASH CRTI support the hypothesis that enhanced mentoring experiences contribute to the successful career development of physicians pursuing POCR careers.

Eye Opener: Resident Self-Perception Survey On Their Ability to Recognize Papilledema

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Objective: Fundoscopic exams in the pediatric emergency department (PED) are important for the evaluation of certain disease processes. In particular, evaluating for papilledema can be used as a screening tool for increased intracranial pressure, in lieu of a cat scan. However, residents often omit this portion of the physical exam in the PED for reasons that are not fully understood. Therefore, a needs assessment of residents was undertaken in order to identify barriers.

Methods: An online survey of post graduate medical trainees at the University of Michigan was conducted to assess knowledge of characteristic findings of papilledema, indications for a fundoscopic exam, as well as confidence in their diagnosis and comfort using the ophthalmoscope and panoptic. Residents in the departments of medicine, pediatrics, family medicine, and emergency medicine and fellows in pediatric emergency medicine were eligible for the survey. Data on specialty and year of training was also collected. The survey was administered and analyses were conducted using Qualtrics.

Results: Surveys were completed by 169 (49%) of the 347 eligible trainees. The majority of those surveyed correctly identified images of papilledema and normal fundus, however confidence in their decisions was low. Only 26% confidently identifying an image of a normal fundus and 37% confidently identified an image of papilledema. They accurately identified 2 out of 3 characteristics of papilledema (table 1). Comfort using an ophthalmoscope was lower than for a panoptic (38 vs. 45 on a 100 point scale, 100 indicating most comfortable). When asked if they would perform a fundoscopic exam to evaluate for papilledema in a hypothetical clinical scenario that necessitated it, 39% would try alone, 29% would try with their attending physician, 21% would consult ophthalmology and 11% would not try. 67% of trainees felt they needed more training and practice. 99% thought it could be achieved by an interactive didactic module.

Table 1.

#	Answer		Response	%
1	Spontaneous venous pulsations		35	20%
2	Disc margins		171	98%
3	Vessels entering and exiting the disc		105	60%
4	Decreased visual acuity		37	21%
5	Proptosis		6	3%
6	Conjunctival injection		3	2%

Conclusion: Post-graduate medical trainees in medicine, family medicine, pediatrics, and emergency medicine report low levels of confidence and comfort with the fundoscopic examination. Trainees indicate a desire for more training in this area therefore curricular development is needed to address these deficits.

An Intelligent Eye Simulator for Cataract Surgery

Chen, R. PhD, Emma William, Mian, S. MD, Shih, A. PhD

Objective: More than 3 million cataract surgeries are performed each year in the United States. A high complication rate of around 10% has been reported in multiple studies in those cases operated by residents. This study aims to develop a physical eye model that can simulate cataract surgery to hasten the learning curve of performing the procedure. Capsulorhexis, the procedure to open the anterior capsule of the lens is commonly recognized as the most difficult part of the cataract surgery to master, because the mechanical and structural integrity of the capsular bag have to be maintained. A failure in capsulorhexis often leads to the complications of vitreous loss and posterior capsular rupture. Therefore, features related to the operation of capsulorhexis are the specific focus of this simulator. The intelligent system needs to detect and reflect the two common complications, posterior capsular rupture and vitreous loss.

Methods: This simulator consists of almost all the anatomical features of an eye, including cornea, iris, anterior capsule, lens, posterior capsule, sclera, and vitreous humor. Each component has a representative geometry (thickness and diameter) for a normal human. The posterior side of the eye is modeled as a square box, so that no extra holder is needed to fix the simulator. The vitreous chamber is pressurized to a level of normal intraocular pressure and connected to a pressure transducer and a microprocessor. The pressure within the chamber is continuously monitored during operation. If the pressure drops significantly, which means the posterior capsule is ruptured, the microprocessor will detect the difference in pressure and provides audio warning.

Results: A prototype simulator was made and tested. Silicone materials with various mixture ratios were used to simulate different tissue components and tested. The cornea layer provides closer haptic feedback than the existing plastic eye models. The tearing strength of the silicone material is slightly stronger than human tissues. The intelligent system can successfully detect pressure drops due to the rupture of posterior capsule.

Conclusion: This simulator provides a new platform for training the surgical skills for cataract surgery. The materials can be further refined to offer a more realistic feeling for operation and the sensitivity of the pressure transducer can be improved to detect mild ruptures. The content validity and performance measures still need to be conducted.

Caring for the Homeless and Underserved: An Online, Systems-Based, Interprofessional Curriculum (caringwithcompassion.org)

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Objective: Many clinicians lack formal training regarding social determinants of health, public healthcare systems, or special interprofessional care needs of the medically underserved. Locally, University of Michigan internal medicine residents scored an average of 44% on a baseline needs assessment quiz in these content areas. Residents who rotated through underserved clinical venues with a traditional informal curriculum showed no significant improvement in knowledge. In response, we sought to develop a sharable online curriculum regarding public healthcare systems and bio-psychosocial care for the underserved.

Methods: Supported by a Graduate Medical Education Innovation grant from the University of Michigan Medical School, the curriculum design team identified two relevant curricular domains supporting care of at-risk populations. Each domain was divided into knowledge content modules: *Domain 1. Public Healthcare Systems* includes epidemiology of the homeless and medically uninsured, public health insurance systems, and public healthcare delivery systems; *Domain 2. Bio-Psychosocial Model of Care* includes biomedical needs of the homeless, social determinants of health, the bio-psychosocial model of health, and interprofessional team care. Each content module was presented in a case-based format and housed in a professionally designed web site: Caring with Compassion (caringwithcompassion.org). The website also includes an individualized learner dashboard, extension resources, a case presentation pocket guide, and a milestone-based assessment tool. The core knowledge curriculum is supplemented with a case-based online game integrating core content into an enjoyable, low-risk learning experience.

Results: Over 300 medical and nursing learners across the United States have registered for the curriculum. It is now a core resource for University of Michigan Medical School and School of Nursing courses regarding care of underserved populations. Qualitative feedback has been highly positive, with faculty and learners stating that the curriculum addresses significant gaps in the traditional curriculum. Preliminary outcome data demonstrate highly significant improvement in multiple choice examination scores following exposure to the modules and game for all assessed content areas [n, pre-test, post-test, T test p value]: epidemiology of populations in need (42, 49%, 81%, $p<0.0001$); health care delivery systems knowledge (19, 53%, 67%, $p<0.002$); homelessness and disease (20, 59%, 82%, $p<0.0001$); public health insurance (30, 52%, 80%, $p<0.0001$); team care (14, 45%, 64%, $p<0.001$); social determinants (29, 51%, 56%, $p=0.022$).

Conclusion: This freely shared online curriculum addresses identified national and local gaps in socioeconomic and sociobehavioral knowledge for clinical learners. Modular online curricular components are well received by faculty and by learners, and are associated with highly significant improvements in content knowledge scores.

Integrating Public, Dynamic Metrics Into an Open Educational Resources Platform

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Background: Open.Michigan was launched in April 2008 as an umbrella open education initiative at the University of Michigan (U-M). Open.Michigan has two primary goals: to sustain a thriving culture of sharing knowledge at U-M, and to provide comprehensive public access to all of U-M's scholarly output. The Open.Michigan website (http://open.umich.edu/) serves as the primary portal to Open Educational Resources (OER) – learning materials that are publicly available, free to access, and licensed to allow others to copy, adapt, and share to suit their contexts.

Objective: Over the past several years, we have seen an increase in the number of requests from authors and departmental administrators for customized usage reports for their learning materials in Open.Michigan. In 2013, we began to develop a framework for sharing that usage data in more useful, accessible, and timely ways for our audience.

Methods: We conducted semi-structured interviews aimed to identify what metrics and indicators were of particular interest to our audience and why. We interviewed nine individuals: two librarians, two faculty members, three multimedia specialists, and two communication specialists. The interviews included a card-sorting exercise with 15 cards to determine our priorities for subsequent features. The tree-node structure of our content management systems allows us to easily isolate and aggregate metrics for individual courses or resources – locally hosted and external links external links to OER hosted on a number of external websites (e.g. YouTube, SlideShare, Amara.org). Combined with application programmable interfaces (APIs), the tree-node structure can be used to gather metrics from these external sites into a central database.

Results: An analysis of the user interview notes revealed two primary motivations for sharing and accessing dynamic usage metrics for OER: to strengthen relationships with authors and to justify the effort and expense of OER practices. Our stratified technical design allows the dynamic sharing of metrics down to the level of individual resources. By integrating the metrics from content hosted on external sites, Open.Michigan is able to provide a more comprehensive snapshot of the metrics for the OER associated with a particular course or resource.

Conclusions: Authors who were interviewed consider views, downloads, and comments where their OER are published as validation, evidence that there is some likelihood their effort provides real value to others. The technical architecture an organization uses to host and reference OER is tied closely to the organization's ability to share detailed usage data for its OER for different levels. Many interviewees noted future possibilities given an available supply of usage metrics, which allowed us to do something. Many of these future possibilities hinged on extracting interesting patterns from data over time.

Computer-Simulated Arthroscopic Knee Surgery: Effects of Distraction

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Objective: Knee arthroscopy is a fundamental skill for orthopaedic surgery resident education, yet it requires high levels of psychomotor coordination and three-dimensional perception. Learning these skills in the operating room increases operative time, potentially increases operative complications, and places the resident in an environment with numerous distractions. The purpose of this prospective cohort study was to use a knee arthroscopy simulator to investigate the effects of distraction on resident surgical performance.

Methods: Fourteen “junior” and eleven “senior” orthopaedic surgery residents were enrolled but were not informed that the purpose of the study was to evaluate the effects of distraction on surgical performance. Using a knee arthroscopy simulator, they each performed a diagnostic knee arthroscopy according to a checklist of structures to identify and tasks to complete. Participants were evaluated on arthroscopy time, number of chondral injuries, instances of looking down at their hands, and completion of checklist items. At a minimum of two weeks after their initial diagnostic arthroscopy, residents repeated this task under similar conditions but while simultaneously answering distracting questions posed by the evaluators.

Results: Under distracting conditions, residents had a significantly greater number of missed checklist items ($p<0.02$) and a statistically non-significant increase in chondral injuries ($p<0.16$), increase in instances of looking down ($p<0.35$), and decrease in arthroscopy time ($p<0.15$) as compared to non-distracted conditions. Without distraction, senior residents completed the simulation in less time ($p<0.001$), with fewer chondral injuries ($p<0.005$), and with fewer instances of looking down ($p<0.012$) as compared to junior residents. While distracted, senior residents continued to perform the simulation more quickly ($p<0.003$), but with no significant difference regarding chondral injuries ($p<0.06$) or instances of looking down ($p<0.08$) as compared to junior residents. While distracted, there was a statistically non-significant increased likelihood that senior residents would incompletely evaluate the lateral recess ($p<0.08$) and meniscus ($p<0.08$), and that junior residents would incompletely evaluate the lateral recess ($p<0.04$), ACL ($p<0.08$), and popliteus ($p<0.08$). Most residents became visibly frustrated when asked distracting questions, though they answered most questions correctly (85–92%).

Conclusions: While senior residents expectedly demonstrated greater arthroscopic proficiency when compared with junior residents, residents at all levels appear susceptible to the detrimental effects of distraction when performing arthroscopic simulation. While it is impossible to anticipate or eliminate all intraoperative distraction, the results of this study suggest that addressing even straightforward questions intraoperatively may have an effect on surgeon performance.

Transforming Medical Education through the Science of Health Care Delivery

Mayo Medical School, in partnership with Mayo Clinic Health System, Mayo's Transformative Centers, Quality Academy, and School of Health Science, and collaborators, Arizona State University and Dartmouth College, propose an ambitious program to design, implement and disseminate a new education model to prepare the next generation of physicians to practice within patient-centered, community-oriented, science-driven, collaborative care teams delivering high-value care. The model will be grounded on three objectives: 1) We will develop a challenging experiential program in the science of health care delivery (SCHD) where students will learn how inter-professional health care teams, patients and their families and communities, public health resources and professionals, and health care delivery systems impact patient care, outcomes, and cost. This model will advance a new level of integration between health care and educational systems and communities of inter-professional learners. The program will also include opportunity for a master's degree in SHCD. 2) Our new model will include flexible student progression within SHCD based on milestone achievement—among the first medical school in the nation to do so. Given MMS's unique flexible schedule and small faculty:student ratio, we can pilot and validate this milestone-based approach within SHCD and once successful extend it to the remainder of our curriculum, building a model that other medical schools may readily adapt. 3) To help ensure students thrive and are personally well-equipped to handle challenges of a career in medicine, we will develop programming and tools to optimally prepare students to care for themselves and for each other. MMS brings a decade of research in this field and stands ready to design portable interventions and support models that will provide students a holistic framework to succeed. Each objective will result in tangible contributions that will be shared with the broader consortium. Our well- integrated, comprehensive program will accelerate change in medical education, preparing future physicians to meet the rapidly shifting healthcare arena and achieve the triple aim of better care, healthier people/communities, and more affordable care.

Development and Implementation of a Continuity Clinical Experience

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Objective: The Continuity Clinical Experience (CCX) is a required longitudinal course launched in the fall of 2012 by the Vanderbilt University School of Medicine (VUSM). CCX is a four-year curriculum that integrates students into clinical teams to learn about the larger care-delivery system and contribute to patient care. The goals of CCX are to: (1) Integrate students into clinical teams to care for individual pts while learning about the larger care-delivery system (2) Integrate the pt care experience with medical knowledge, (3) Integrate systems knowledge with clinical care, (4) Cultivate respectful professionals who effectively interface with interprofessional teams.

Methods: In 2012 we created CCX, a longitudinal required course for all medical students. CCX curricular goals are accomplished in the context of clinical work teams and consistent facilitated small group sessions. Students spend one half-day a week in the same clinical setting working with a dedicated preceptor. Seminar groups, with a designated small group facilitator, meet monthly to teach system-analysis skills. Our vision is to create a longitudinal experience allowing students to observe and influence the impact of systems science on patient outcomes through early and active clinical work. The course enables learners to assume meaningful roles in clinical teams that evolve over time. First year curriculum involves learning about inter-professional teams, patient-centered care, medication reconciliation, health coaching, quality improvement and patient safety. Second year curriculum helps students understand and optimize transitions of care. In the third and fourth years, students will progress through self-directed modules, requiring the synthesis and demonstration of skills learned in previous years focused on interprofessional practice development, advanced communications, and a mentored quality improvement project.

Results: We recruited 155 faculty preceptors for the entering 2012 & 2013 classes. The department representation among our preceptors is broad, including primary care, surgery, and specialists. Students & faculty rate the course highly. 92% of faculty preceptors are satisfied or very satisfied with CCX and 86% of faculty preceptors would recommend participation in CCX. Students in year one saw an average of 55 pts with their faculty preceptors for a class-wide total of more than 5,000 pts. Following each clinical session, students complete a log of pts seen, allowing them to build a patient panel for continuity of learning and care. Students reflect on an area of core competency & define individual learning goals within that competency for the coming weeks. The domains of SBP and PBLI are emphasized in small group sessions through discussion comparing & contrasting the clinical systems. Students are assigned monthly in-clinic tasks which require them to demonstrate proficiency in “systems skills” such as: fishbone diagramming, flow-charting, problem identification, and team-based problem solving. We know from evaluations that 1st year students are now contributing to clinical teams regularly with skills from the course; including med rec, health coaching, telephone follow up, and patient navigation.

Conclusion: We currently have two classes, and by 2015 will have all students enrolled in CCX. Our approach can be scaled to other institutions. Preceptors include Vanderbilt and community faculty. Preceptors are provided with ongoing faculty development, as well as weekly communications. The degree of preceptor engagement, rather than any specific field of practice, has determined the most successful sites. In addition to engaging with clinical teams much earlier in their professional development, CCX will enable a workforce that has systems-level analytical approaches to problem solving: necessary for transformation of the larger healthcare system

Addressing Primary Care Workforce Shortages at the University of California, Davis: A 6-year UME/GME Pathway

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The purpose of this five-year project is to establish a University of California Davis School of Medicine (UCDSOM) model six-year undergraduate and graduate medical education (UME/GME) track that addresses critical workforce shortages, starting with adult primary care. The program will be designed and implemented in partnership with Kaiser Permanente of Northern California, the largest healthcare provider in California and a national leader in population health.

The goals of the Accelerated Competency-based Education in Primary Care, ACE-PC, program are to: (1) develop a transformative UME model that prepares students for contemporary 21st century medical practice; (2) solidify UCDSOM's reputation for developing diverse, highly skilled physicians ready to meet the needs of underserved communities and populations; and (3) develop broad and collaborative strategies to address workforce gaps in the medical field, including but not limited to primary care physicians.

The program features the following innovative elements: (1) immersion of students in Kaiser's integrated health systems and primary care medical home model; (2) Utilization of Enstrustable Professional Activities to assess competence; (3) Emphasis on development of Systems-Based Practice and Practice-Based Learning and Improvement; (4) Robust faculty development and collaboration among Kaiser and UCDSOM faculty to foster seamless integration of clinical practice and education; (5) dedicated Kaiser clinician mentor-coaches; and (6) Emphasis on addressing needs in medicine, including medically underserved populations, workforce diversity, and workforce gaps.

Each ACE-PC student will be offered a conditional acceptance to a UC Davis or Northern California Kaiser residency program. The initial focus on primary care internal medicine and family medicine will immediately address the primary care workforce need and set the stage for to expand primary care residency positions in California.

Impact of a dedicated research rotation in Ophthalmology

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Objective: To determine what impact implementation of a dedicated research rotation had on resident attitudes regarding their research experience, scholarly activity during residency and career choice after residency.

Methods: In 2009, the Kellogg Eye Center ophthalmology residency program introduced a formal research rotation. We conducted a post-residency survey regarding their research experience during residency. We divided the residents into two groups: those graduating before (2006-2009 – Control group) and after (2010-2013 – Research group) implementation of a dedicated research rotation and compared the responses between the two groups. We measured scholarly activity of the two groups by tallying publications and presentations from residency. Fellowship training and career choices after residency were also compared between the two groups.

Results: 77% of residents in the research group report that they had adequate time to conduct research during residency compared to 14% of residents in the control group. 68% of residents in the research group were satisfied with their research experience compared to 21% of residents in the control group. Residents in the research group averaged 1.71 publications and 1.96 presentations compared to 1.24 publications and 1.4 presentations in the control group (p=0.78 and 0.07 respectively). Residents in the research group were more likely to pursue fellowship training, 89% versus 72% (p=0.24), and hold an academic position, 63% versus 44% (p=0.26).

Conclusion: A dedicated research rotation removed the barrier of lack of protected time to conduct research during residency. Residents who had a dedicated research time during residency were satisfied with their research experience. A dedicated research rotation resulted in a modest increase in scholarly activity during residency. Residents who had a dedicated research rotation were more likely to pursue fellowship training and a career in academic ophthalmology.

Rating Scale for Attitudes and Confidence in the Integration of Psychiatry in Medicine

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Objective: There is growing consensus regarding the importance of integrating training in behavioral health and psychiatry with other fields of medicine, given broad applicability, inter-relatedness, and clinical relevance. We sought to develop a scale to measure students' attitudes and confidence related to such integration.

Methods: Through discussion with content experts across disciplines and pilot testing of items, we developed a scale: Attitudes and Confidence in Integration of Psychiatry in Medicine (ACIP). This scale was administered to third and fourth year medical students at the University of Iowa (N=84) and the University of Michigan (N=104) to evaluate for correlates, variability, internal consistency, and factor structure. Multivariate models including site, gender, age (3 levels), and clinical training (3 levels) assessed variables associated with ACIP scores.

Results: A total of 188 medical students participated in the survey with 55% of respondents being female. Students varied in the amount of clinical training they have had: less than 6 months (4%), 6-12 months (40%), 13-18 months (21%), and more than 18 months (35%). The scale showed considerable variability across respondents with a normal distribution of scores, an absence of floor or ceiling effects, and a high internal consistency (Cronbach's alpha=0.87) across items. Individual survey items loaded on the two factors of interest corresponding to distinct subscales: attitudes and confidence. In multivariate models, female students scored higher on the ACIP, which was driven entirely by higher scores on the attitudes subscale. Those with more than 18 months of clinical training also scored higher on the ACIP, which was driven entirely by higher scores on the confidence subscale.

Conclusion: Attitudes and confidence in the integration of psychiatry in medicine can be reliably measured. The ACIP may be useful for determining the outcome of educational efforts toward integrated care and is sensitive to gender differences and apparent training effects.

The Primary Care-Population Medicine Program at the Warren Alpert Medical School of Brown University

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The goal of this five-year project at the Warren Alpert Medical School of Brown University (AMS) is to accelerate change in medical education through the development of a Primary Care-Population Medicine (PC-PM) program. This dual-degree program is intended to prepare medical students for leadership roles in areas ranging from clinical service to research, education, and health policy. In developing the PC-PM program, we will implement curriculum innovations such as active learning, interprofessional education, a Longitudinal Integrated Clerkship (LIC), and the creation of a Master of Science Degree Program in Population Medicine.

As part of the Master of Science in Population Medicine, students will take an integrated nine-course sequence on topics including biostatistics, epidemiology, health care policy, health systems, quality improvement, leadership and interprofessional education; students will also undertake scholarship in an area relevant to Population Medicine and complete a thesis. In the LIC, students will spend one-half day per week with physician mentors in Family Medicine, Internal Medicine, Obstetrics and Gynecology, Pediatrics, Psychiatry/Neurology and Surgery. In addition, students will follow a patient panel of their own beginning in first year of medical school and continuing through the LIC.

Students will be expected to complete this curriculum in 4 or 5 years. Several residency slots in Brown Primary Care Residencies will be reserved for graduates of this program. A robust evaluation strategy will be employed including assessment of student attitudes, skills and knowledge in the area of Population Medicine. At the conclusion of the Primary Care-Population Medicine program, AMS graduates will: (1) Practice evidence-based medicine in a primary care or generalist field; (2) Impact and improve the provision of health care, medical education, research and advocacy at the local, regional, national and international levels; and (3) Integrate Population Medicine into their practice as physician-leaders in the community.

Assessing Residents' Competency at Baseline: Does the Medical School Matter?

Gollehon, N, MD; Stansfield, RB, PhD; Lypson, M, MD, MHPE

Objectives: The educational hand-off between medical school and residency training is a perilous transition for learners. There is very little data detailing which medical schools are embracing curricula that best prepare trainees for internship. Using a general linear model we attempt to determine the contribution that medical school training has on performance on a standardized OSCE exam administered during resident orientation.

Methods: The University of Michigan Health System has been administering the Postgraduate Orientation Assessment (POA) since 2002. This OSCE focuses on skills essential for interns in the first months of residency. Since its implementation, 1,797 new residents from over 130 medical schools have completed the assessment.

Station performance was grouped into four domains; assessment, communication, data gathering, and teamwork. Station scores were normalized within year to correct for fluctuations in difficulty and discernment.

For each domain sub-score, we estimated the percentage of variance explained by schools students attended. We conducted a general linear model of each domain sub-score, entering only medical school as a random factor to obtain these estimates. Some percentage of this score variance can be seen as tendency of students from any particular school to receive low or high scores relative to their peers. We use restricted estimation by maximum likelihood to estimate the impact being from a particular school appears to have on each score and the amount of variance the schools appear to explain in the overall sample.

Pairwise correlation of domain sub-scores and USMLE Step 1 and 2 scores were determined to confirm validity of the POA for measuring clinical skill.

Results: Medical school predicts 4.93% of the variance of assessment scores, 1.67% of the variance of data gathering scores, 2.37% of the variance of communication scores and 0.8% of the variance of teamwork scores and 4.19% of the variance in overall score. The POA domain sub-scores showed statistically significant correlation with USMLE Step 1 and 2 scores, providing validity for the POA as an assessment tool.

Conclusions: The medical school from which one graduates does matter. Statistically significant variance in performance on a standardized, validated OSCE can be attributed to the medical school attended. These results suggest that differences in educational methods and other unique characteristics of individual medical schools can impact competency and readiness for internship.

ASSESSING BASELINE COMPETENCY: ARE PEDIATRIC RESIDENTS UNIQUE?

Gollehon, N, MD; Stansfield, RB, PhD; Lypson, M, MD, MHPE

Objectives: In 2013, over 2,600 newly graduated doctors matched into pediatric residency positions (10% of all slots filled). With the implementation of the Pediatric Milestones, focus continues to shift towards a competency based assessment of new trainees. However, little data exists on the baseline competency of pediatric residents or how they compare with trainees in other specialties. We attempt to quantify the measurable contribution that medical school training has on variance of performance on a standardized OSCE exam administered during resident orientation, and compare the performance of pediatric residents to the performance of all residents.

Methods: The University of Michigan has been administering the Postgraduate Orientation Assessment (POA) since 2002. Since its implementation, 1,797 residents, including 193 pediatrics interns, have completed this OSCE.

Performance was grouped into four domains; assessment, communication, data gathering and teamwork. Station scores were normalized within year to correct for fluctuations in difficulty and discernment.

For each domain sub-score, we estimated the percentage of variance explained by schools residents attended. We use restricted estimation by maximum likelihood to estimate the impact being from a particular school appears to have on each score, and the amount of variance the schools appear to explain in the overall sample. We conducted a general linear model of each domain sub-score, entering only medical school as a random factor to obtain these estimates. Pairwise correlation of domain sub-scores and USMLE Step 1 and 2 scores were determined to confirm validity of the POA for measuring clinical skill.

Results: The percent of variance predicted by medical school for each domain is shown in the table below.

Domain	Pediatrics (%)	All (%)
Assessment	3.3	4.9
Data Gathering	13.6	1.7
Communication	16.9	2.4
Teamwork	0	0.8

Conclusion: The medical school from which pediatric residents graduate has more impact on variance in some domains and less in others compared with all residents assessed. Medical schools, by some effect, seem to impact pediatrics residents' communication and data gathering skills to a greater extent than all residents as a group. Given these findings, pediatric program directors should be acutely aware that trainees enter residency with differing levels of competency, and the medical school students attended ultimately may matter.

Creating a Virtual Healthcare System within Indiana University School of Medicine's Transformative Curriculum

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Indiana University School of Medicine (IUSM) has embarked on a revision designed to integrate foundational and clinical sciences throughout the four year curriculum. The curriculum at IUSM is delivered at nine geographically distributed campuses to over 1200 medical students. The AMA Accelerating Change in Medical Education grant has provided funds to create a novel virtual health system (vHS) curriculum that will initially be embedded within a longitudinal Foundations of Clinical Practice course in the new curriculum. This course focuses on the doctor/patient relationship, social and behavioral science aspects of health, disease and care delivery, clinical skills, clinical reasoning, and interprofessional team-based care.

The vHS curriculum uses a teaching EMR (tEMR) as a teaching and learning resource. The tEMR is being constructed from de-identified medical records of patients who receive care in health care delivery systems across the state. To ground learning in systems- and population-based care, the population of patients in the tEMR mirrors the population of Indiana (demographics, insurance coverage, community characteristics and access to healthcare). [i],[ii],[iii] We will create patient panels for each student and for each learning group that includes patients from rural, suburban and urban populations and from regions with varying access to care as defined by physician density.

Educational activities within the VHS curriculum are being designed to help students learn about care delivery for individual patients as well as for populations of patients. Evaluation of the curriculum will include measures of students' emerging competence in systems-based care through assessment of their ability to navigate the tEMR, recognize the roles and responsibilities of the health care team through interactions in caring for patients within the vHS, detect learning needs relative to systems-based practice, identify social and system factors that contribute to undesirable outcomes, track determinants of health over time, test hypotheses relative to population-based health and study adherence to preventative care guidelines within their virtual group practice.

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[i] Source Kaiser Family Foundation: State Health Facts (kff.org/statedata)
[ii] Source: www.stats.indiana.edu accessed 12-3-13
[iii] Source: National Women's Health Center Healthcare Report Card http://hrc.nwlc.org/status-indicators/people-medically-underserved-areas accessed 12-4-2013

Designing the Documentation of Part IV MOC Projects to Teach QI

Harrison, RV, PhD; Greenberg, GM, MD, MA, MHSA; Pihalja, CA, BA

Objective: Use required participation in quality improvement (QI) projects for Maintenance of Certification (MOC) as an opportunity to help UM physicians learn and apply structured, systematic processes to improve the quality and safety of patient care. The American Board of Medical Specialties has approved the University of Michigan Health System to designate Part IV MOC credit for qualifying UMHS QI projects and award credit to UMHS physicians who participate as required. (Fifteen Boards currently participate.) Developing materials to explain requirements for QI projects, participation, and required documentation provided an opportunity to teach and reinforce basic QI principles taught at UMHS through the Michigan Quality System.

Methods: A sequence of developmental and pilot efforts occurred.

Understand requirements. The requirements of the ABMS Part IV MOC Program were outlined, including those for projects, for individual participation, and for documentation.

UMHS framework. The ABMS requirements were discussed with leaders of the Michigan Quality System to identify language and materials that expressed the requirements in terms commonly taught and used at UMHS.

Developing documentation forms. Forms were developed that obtained the required information using basic QI concepts and language routinely used at UMHS.

Developing teaching materials. For physicians not already familiar with QI concepts and vocabulary, instructional materials were developed to introduce this information and apply it to the preliminary planning of systematic QI activities.

Making the information available. A website was developed that explains the requirements and provides planning materials, forms, and completed examples. Additionally, dozens of presentations have been made and consultation is available.

Piloting and improvement. The information, materials, and communications go through recurring cycles of improvement based on experience and feedback from users. Improvements continue to be made in content and in processes.

Results: Outcomes have occurred at several levels.

Projects and participants. Through 2013, 27 projects have been documented for Part IV MOC credit for 257 physicians.

Improved QI planning. Most project leaders report that the materials helped improve the design and conduct of their QI activities.

Longer term capabilities. Physicians now leading their second and third projects for Part IV credit are much better able to design, conduct, and document these QI projects.

Conclusion: The documentation of QI projects for Part IV MOC requirements provides an effective opportunity to teach QI principles to physicians and for physicians to apply these principles directly to QI projects they are leading and in which they participate.

How do we effectively measure the milestones?

Hauff SR, MD; Hopson LR, MD; Stansfield RB, PhD; Perry MA, MD; Gruppen LD, PhD; Santen SA, MD, PhD

Background As Emergency Medicine (EM) moves to evaluation and reporting of milestones, care must be taken to understand validity issues with assessment tools. The EM milestone evaluation form is a global evaluation with progressive milestones representing levels of expertise. Each level is behaviorally anchored to encourage a more precise behavioral assessment, however the concern is that faculty are continuing to make gestalt global assessments rather than employing the behavior anchors.

Objectives The purpose of this study was to compare assessments completed by faculty using the standard form with milestones in order and a form where the milestones were randomized, forcing faculty to use the behavior anchors for assessment.

Methods Nine of the milestones were evaluated. For the randomized form, a random number generator was used to create the order in which the level 1-4 skills were listed. Each faculty completed both forms for each resident. Correlation between the forms was calculated using Intraclass Correlation Coefficients.

Results 20 residents were evaluated by 34 faculty. Inter-rater reliability for the standard evaluation was near-perfect (0.96-0.99) indicating that faculty were assigning a global gestalt rating and not making expert assessment judgments. Inter-rater reliability for the randomized form was poor (-0.05-0.68). Rating variance between the ordered and randomized was the same for each milestone evaluated.

Conclusions Given these results, it is likely that by tethering these discrete skills to a developmental continuum, performance information is actually lost. This suggests that our current evaluation tool is not being utilized correctly, and is probably not measuring the discrete behaviors we are interested in. Treating the milestones as a continuum may actually be taking away information, as faculty are not thoughtfully rating residents and instead place them at the point where they “should” be based on post-graduate year.

Correlation Between The National Board Of Medical Examiners Advanced Clinical Exam In Emergency Medicine And The National 4th Year CDEM Online Exams

House J, MD; Hiller K, MD; Heitz C, MD; Beeson M, MD; Wald D, DO; Poznanski S, DO; Miller E, MD

Background: End of rotation examinations are often used to assess students at the end of clerkships. In 2013, the National Board of Medical Examiners (NBME) initiated an Emergency Medicine (EM) Advanced Clinical Examination (ACE). Since 2011, Clerkship Directors in Emergency Medicine (CDEM) has provided an online, internally validated end of rotation exam for students completing a 4th year rotation (National EM M4). This exam consists of 2 forms (V1, V2). While the NBME provides statistics on internal validity for the ACE exam, there is no comparison with the EM M4 exam. Clerkship directors who use these exams are unable to compare students' performances on one exam versus the other.

Objectives: To evaluate the correlation between 4th year medical students' performance on the NBME EM ACE exam and the EM M4 exam (V1 and V2) in order to better inform clerkship directors who use these exams for summative assessment.

Methods: From May 2013 to February 2014 the NBME exam and either V1 or V2 of the EM M4 exam were administered back-to-back to students completing a fourth year EM rotation at four U.S. medical schools. Random effects linear regression with institution as the cluster variable was performed for both EM M4 versions.
Results: 269 students from five institutions took both the NBME and EM M4 exams (244 V1 and 25 V2). The mean percent correct for the NBME exam was 74.8 (SD-8.83), 83.1 (SD-6.27) for the EM M4 V1 exam and 78.4 (SD-7.55) for EM M4 V2 exam. Pearson's correlation coefficient for the EM M4 V1/NBME was 0.51 (0.44 scaled) and for the EM M4 V2/NBME was 0.59 (0.41 scaled). The coefficient of determination for EM M4 V1/NBME was 0.74 and for EM M4 V2/NBME was 0.70 (0.97 and 0.49 for scaled scores). The R2 values were 0.26 and 0.34 (0.20 and 0.17, scaled), respectively. There was significant cluster effect by institution.

Conclusion: There was moderate positive correlation of student scores on the NBME EM ACE exam and both versions of the National EM M4 exam.

Development and Implementation of an Education Value Unit System (eVU) for Faculty Incentives

House J, MD; Carney M, MD; Nypaver M, MD; Hopson L, MD; Santen S, MD, PhD

Objectives: As part of an incentive plan for academic EM faculty, a taskforce representing education, research, and clinical missions was convened to develop a method of incentivizing productivity in all domains. A primary focus was educational metrics.

Method: Domains of educational contributions were defined based on the medical school's Funding Allocation Model. Each category was assigned a value based on time committed. Expected threshold for individual achievement was aligned with departmental goals and models created to test achievement of different benchmarks. Targets included increased completion of resident evaluations and attendance at resident conferences. The final eVU model is show in Table 1. After review of several thresholds, consideration of priorities, and individual faculty impact, an annual benchmark of 30-hours of eVUs was set.

Results: In the 2012-2013 academic year, faculty eVUs ranged from 0 to 301.5 with a mean of 122.9 (std 194.5). Forty-five of fifty (90%) faculty members were met the 30-hour threshold based on current activities. Comparing faculty attendance at residency conference, from July 1 to October 31, pre- and post- eVU model implementation, faculty attendance increased from a mean of 5.3 hours in 2012 (pre) to 12.3 in 2013 (post) (t-test, p=0.0002). Evaluation completion increased from 121(52.4%) to 150(62%) (t-test p=<0.01) comparing 6-months pre- to 6-months post-implementation.

Conclusion: We propose an eVU model, which could be implemented and adjusted for differing departmental priorities, at other academic departments. Post-implementation has seen increase in didactic attendance and evaluation completion.

Table 1: Education Value Unit per educational activity

Departmental Activities- Baseline	**Expected Minimums**
Leading a new educational sessions (10 hrs credit : 1 hr presented) Or Preparing & leading an Active Learning sessions: (5 hrs credit : 1 hr presented) Or Assist with active learning sessions, small groups, skills labs, mentoring resident session, focused mentoring (2 hrs credit : 1 hr presented) Or Student teaching sessions (1 hr credit : 1 hr presented) Or Other Teaching activities EMIG, Clinical Skills Assessments (CSA) (1 hr:1 hr)	10 hrs/ yr
Didactic conference attendance* (1:1) optimal 3hrs/ month= 36	10 hrs
Completion of evaluations of residents & fellows (1 hour per month)	10 m/yr = 10 hrs
Recruitment interviews for residency or fellowship programs (1 hour : 1 hour)	
Additional Activities- resident mentoring, educational activities outside department, educational committees (maximum 10 hrs)	
Total (minimum expected)	Total=30

Adherence To Labeling Guidelines Of Inhalant Allergen Immunotherapy Practice Parameter 2011 At The University Of Michigan Health Service

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OBJECTIVE: Assess adherence to labeling guidelines of Allergen Immunotherapy (AIT) Practice Parameter 2011 at University of Michigan Health Service (UMHS)

METHODS: AIT extracts of 324 patients receiving their care at UMHS were reviewed. Data collected looked at patient identifiers (PI), concentrations in volume/volume (v/v) format, color coding, vial content of different allergens, expiration date and instructions about AIT dosing and systemic reaction treatment. Data was analyzed using simple bivariate logistic regression.

RESULTS: Of 238 non-University formulated labels, 69% had 2 or more PI, 62% had a v/v concentration, 41% had color coding, 71% had the content listed and 100% had a recorded expiration date. Only 21% had all 5 recommended components. Labels with 2 or more PI were more likely to have a v/v concentration with its corresponding color coding (OR 3.84, $p<0.001$, CI 1.9-7.7). Labels specifying the extract's content were more likely to be color coded or to have a v/v concentration listed (OR 6.3, $p<0.001$, CI 3.4-1138). For all AIT extracts, complete labels were significantly more likely to have clear buildup schedule (OR 9.6, $p<0.001$, CI=4.2-23.2), clear dosing adjustment after a missed dose (OR 8.2, $p<0.001$, CI 3.4-19.8) or after a reaction (OR 13.7, $p<0.001$, CI 7.8-2.1) and clear systemic reaction treatment instructions (OR 9.7, $p<0.001$, CI 7.8-24.1).

CONCLUSION: Standardizing AIT labeling is needed to improve communication between healthcare providers. Recording 2 or more PI, color coding or a v/v concentration increased the likelihood of having a complete label as recommended by AIT Practice Parameters. Also, complete labels were more likely to have clear instructions for AIT dosing and reactions treatment.

Are we teaching the majority of students correctly? Marked differences between primary care physicians and surgeons in clinical importance of skills/topics taught during the 3rd year general surgery clerkship

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Introduction: Medical students are exposed to many skills and topics during their third year general surgery clerkship. The learning objectives are valuable for future surgeons, but their relative importance to non-surgically-based fields is unclear. We hypothesize that future primary care physicians would benefit from an emphasis on different learning objectives than future surgeons would during the 3rd year general surgery clerkship.

Methods: We surveyed 2319 resident physicians and junior faculty (up to Associate professor) at a single academic medical center. Physicians specified their primary specialty and level of exposure (4 point Likert scale) to a number of skills and topics during their third year medical school surgery clerkship and indicated the relative level of importance of those skills and topics to their current practice. We then compared the responses between primary care physicians (family medicine, internal medicine, internal medicine subspecialties) and surgeons (general surgery and surgery subspecialties).

Results: 18.9% (440 of 2319) of contacted physicians completed the survey. Regarding their current practice, three topics were reported to have a greater importance to primary care physicians than surgeons (acute and chronic abdominal pain: p=.0036, gastrointestinal (GI) bleeding: p=.0001, and jaundice: p=.0001). The remaining 11 topics were considered to be of greater importance to surgeons with the greatest differences observed relative to trauma/shock/burn (p=.0001), post-operative fevers (p<.0001), inserting/removing foley catheter (p<.0001), subcuticular or other simple stitch (p<.0001), and perioperative care (p<.0001). Compared to primary care physicians, surgeons reported a greater level of exposure to all topics and skills during their clerkship. The greatest differences in exposure were observed in response to wound management (p=.0001), fluid/electrolyte abnormalities (p=<.001), trauma/shock/burn (p=.0062), TIA/carotid stenosis (p=.0078), and claudication/cold pulseless leg (p=.0135).

Conclusion: Primary care physicians felt that abdominal pain, GI bleeding, and jaundice were of more importance to their current practice than did surgeons. Surgeons noted a higher exposure in all skills and topics during their clerkships. There are marked differences in the perceived level of exposure and level of current importance of surgical topics based on specialty. This could help clerkship directors modify their learning objectives to address the majority of future non-surgeons.

Reported Mistreatment During the Surgery Clerkship Varies by Student Career Choice

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Introduction: Mistreatment has been increasingly recognized as a pervasive problem among clerkships, and of particular concern on surgical clerkships. The definition of mistreatment has been vague, and often left up to the discretion of the student. We hypothesize that future surgeons would perceive less mistreatment than non-surgeons during their 3rd year surgical clerkship.

Methods: We surveyed 2319 resident physicians and junior faculty (up to associate professor) at a single academic medical center. Physicians were asked to specify their primary specialty, their medical school, and the year of graduation. They were also asked to indicate whether or not they had experienced any form of mistreatment during their 3rd year general surgery clerkship and to describe the situation. Mistreatment reporting was then correlated to specialty and year of medical school graduation.

Results: 18.9% (440 of 2319) of contacted physicians completed the survey. Reported mistreatment ranged from 9-56% depending on the physician specialty. The lowest mistreatment rates were reported by physicians in general surgery (3 of 31; 9%), neurology (1 of 7; 14%), or surgical subspecialties (8 of 35; 19%). The highest mistreatment rates were reported by physicians in psychiatry (9 of 16; 56%), internal medicine (31 of 69; 45%), pathology (5 of 13; 38%), and emergency medicine (5 of 14; 36%). The combined mistreatment rate of all non-surgeons totaled to 30.4% (108 of 355) and was significantly higher than the surgeon-specific reported rate (11 of 77, 14.3%; $p<.0046$). When assessed by graduation year in 5-year intervals from 1990 to 2013, the percent of physicians who reported episodes of mistreatment decreased from 50% to 24.3% (1990-1994 vs. 2010-2013; $p=.0198$). Types of mistreatment ranged from sexual harassment and cultural insensitivity to verbal abuse.

Conclusion: Student mistreatment during the 3rd year general surgery clerkship continues to be an issue throughout the country, but appears to be improving over the past two decades. The lower mistreatment reporting by surgeons may reflect bias due to career choice, but also may indicate differences in culture that may or may not reflect true mistreatment.

Using In-House Materials to Decrease Fundamentals of Laparoscopic Surgery Training Program Costs

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Introduction:
Since becoming a training requirement for General Surgery Board in 2010 [1], the metrics from the FLS manual test have become the standard to which surgeons rate their laparoscopic skills. Implementation cost of the FLS manual test continues to be a consideration [2]. The FLS program currently requires specific products to be purchased from commercial sources, with few alternatives. Although FLS materials are required for the assessment program, we propose "in-house" materials could be used to lower training costs. To evaluate cost differences, we compared production costs for "in-house" and purchased products for four tasks of the FLS manual test.

Method:
Materials for the pattern cut and knot-tying tasks were purchased from an online retailer [3]. Cost was calculated using purchase price and production time ($23.00/hr). Surgitie™ ligating loop were purchased at cost and retied for added use. The extra- and intracorporeal knot-tie pieces were produced "in-house" and description is included.

Results:
With a cost of $20.89 each, retying the ligating loop took approximately 1:17 minutes and doubled use, dropping the price to $10.90 per use, saving $9.99 each. Fifty pattern cut gauze pieces were produced in under 20 minutes, with a total material cost of $1.40. Not including the $66.00 for a pattern stamp, the estimated cost per pattern cut gauze was $0.18, saving $0.53 each, when compared to purchased product. Fifty knot-tie task pieces were produced in under 50 minutes, with a total cost of $5.17 for materials. Accounting for 8% loss (quality control), the estimated cost was $0.48 per piece, at a savings of $0.31 each.

Conclusions:
We identify methods that can be used to decrease FLS training program costs. Utilizing the described techniques, an average program consisting of 15 residents [2] will save $428.90 annually.

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911 Response: Ad-hoc Creation and Preliminary Evaluation of A Novel Needle Cricothyrotomy Simulator

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Introduction:

Clinical scenarios such as upper airway obstruction from foreign body or airway malformations, maxillofacial fractures, bloody airway or airway infections, make it challenging to provide a conventional definitive airway. Therefore having a rescue airway is essential to emergency airway management. Since these clinical presentations are rare occurrences, having simulated situations with a realistic airway model is critical. Currently, there are no commercially available simulators that adequately replicate needle cricothyrotomy and manage jet ventilation. While easy, low-cost modification to an existing simulator provided an opportunity to teach critical skills required to safely perform a needle cricothyrotomy, preliminary evaluation of validity evidence is required before next implementation.

Method:

Presented with an immediate need during a Pediatric Emergency Medicine Fellows' course, our team modified a "retired" adult airway head (Laerdal® Airway Management Trainer, Laerdal Medical) to better replicate needle cricothyrotomy and manage jet ventilation. Modifications are described in detail.

Evaluation: Following the session, fifteen participants were requested to complete a self-report, six-domain, 18-item instrument consisting of 4-point rating scales via the web (Qualtrics). An additional 4-point item was used to identify participants' global opinion of the simulator. Comments were reviewed and content validity was evaluated by examining the rating frequencies.

Results:
Results are pending and will be completed by presentation date.

Conclusions:
Discussion and conclusion are pending, and will be completed by presentation day.

Are Emergency Medicine (EM) Residents Comfortable Caring for Lesbian, Gay, Bisexual and Transgender (LGBT) Patients? What Do We Know?

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Background: The Institute of Medicine, Department of Health and Human Services, and Joint Commission recently cited the need for physician education on lesbian, gay, bisexual and transgender (LGBT) health. Deficiencies in care have been documented and serve as barriers for LGBT patients. There are few studies examining resident attitudes toward LGBT patients and none in Emergency Medicine (EM). We sought to examine resident attitudes and comfort level when caring for LGBT patients as part of a needs assessment for LGBT health curriculum development by the Academy for Diversity and Inclusion in Emergency Medicine.

Objective: To perform a pilot study at 3 academic hospitals to evaluate EM resident attitudes, comfort and behavior in caring for LGBT patients.

Methods: A 24-item, anonymous, descriptive survey asked residents about their usual practice and comfort level when taking a history and conducting a physical exam on LGBT patients, and if discriminatory statements by colleagues were observed. Program and personal demographics were included**.**

Results: There were 115 responses to the survey with a response rate of 75%. Less than half of residents (47%) felt comfortable addressing the needs of LGBT patients. When taking a sexual history or evaluating a patient with an abdominal or genitourinary complaint, only 36.5% and 18.3%, respectively, routinely took an appropriate history. When evaluating transgender patients 25.2 % of residents found it challenging to discuss sexual behavior and 27% found it challenging to perform a genitourinary exam. Residents reported inappropriate or discriminatory statements by other residents (57.4%) and faculty (47%). Neither race nor gender impacted the results of the survey.

Conclusion: The majority EM residents are not comfortable addressing the needs of LGBT patients. EM residents do not routinely take an appropriate history on LGBT patients and some find it challenging and uncomfortable to care for transgender patients. Discriminatory statements by both residents and faculty are commonly observed in the clinical environment. This further supports a need for LGBT health curriculum development and implementation in EM residency.

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Creative Art, Narrative, and Encounters with 'Otherness' in the Professional Development of the Empathic Self

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An essential component of empathy is perspective-taking. The use of narratives and the affective bond between the storyteller and listener that the act of telling creates facilitates attempts to see the world through the eyes of the Other. How can one assess this perspective-taking and the development of empathy?

The Family Centered Experience (FCE) program at the University of Michigan Medical School has incorporated visual and performance art created by medical students with two goals: to stimulate exploration of the experience of illness and to document students' understanding of the patient's perspective.[1]

The basis of the FCE is longitudinal conversations that first- and second-year medical students have with patient-volunteers about experiences with illness and medical care. After each visit, students return to small groups to discuss feelings, impressions, and insights arising from the stories that they have heard.[2] Midway through the first year, the students are tasked with creating a project that expresses their understanding of their volunteers' narratives. Students work in groups of 2 or 3 and use any medium they wish to document their understanding of what they have learned.

Student artwork has taken the form of songs, sculpture, painting, poetry, videos, children's picture books, and dance. Themes have included the experience of loss and struggle, courage and hope, the importance of support, and the meaning of survival. Works are presented at an annual reception for volunteers, students, and faculty.

Each act in this creative process—from the students' conversations with the volunteers, to the audience's interactions with artists and art—is one of interpretation (Gadamer) and represents an opportunity to understand the tacit lessons learned from stories. In this context, the works represent the visual expression of the affective, experiential, and existential aspects of the patient's perspective and provide an object of the students' reflective, often transformative, vision.

References

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Examples of student interpretive projects may be accessed through the University of Michigan Medical School's Family Centered Experience Website:
http://www.med.umich.edu/lrc/fce/index.html

Facilitating Facilitation: Introducing incoming first year medical students to active learning

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Objective: Medical school, especially the pre-clinical years, involves primarily memorizing and understanding information, while medicine involves synthesizing and applying information in a team-based setting. The Liaison Committee for Medical Education (LCME) includes the need for active learning in its Educational standards, pushing medical schools to move learning from “remember” and “identify” towards more complex areas such as “apply” and “analyze.” One method is to design active learning small groups and to share responsibility with students for facilitation.

Active learning pilots sessions were tried in the first year curriculum in 2012-2013 to varying degrees of success. Less successful pilots suffered from lack of clear expectations for students and goals for the sessions. A student committee worked in consultation with curriculum administrators to design a session to expose learners to the concept of active learning, effective facilitation techniques and skills, and set expectations for curricular experiences throughout medical school.

Methods: We created a 90-120 minute session that was run as a required workshop for all incoming first-year students (M1s) during orientation before coursework started. Each small group consisted of 15 incoming M1s and 1 near-peer facilitator. A group of second year medical students (M2s) were trained to serve as these near-peer facilitators. M1s were asked to read selected chapters of *Complications* by Atul Gawande and complete prework before attending the session. The session itself consisted of three discussions: (1) A model discussion facilitated by the trained facilitator; (2) A group discussion on Active Learning that deconstructs the first discussion in order to identify active learning and appropriate facilitation techniques; and (3) A discussion on a second theme facilitated by a group of learner volunteers using what they have just learned. After the session, supplemental resources were distributed to M1s, including descriptions of active learning strategies and skills that could be used.

Results: This session was intended to train M1 learners to facilitate. Following the session, some M1s (n=17) had volunteered to facilitate a small group session in a medical decision making course: 88% of students agreed or strongly agreed that they had enough preparation on facilitation skills to effectively facilitate. Faculty comments consistently praised the facilitators for successfully engaging their peers and guiding discussion. The session itself received positive feedback from learners, with specific praise for the book chosen, group facilitators, and opportunity to preview small group expectations and experiences for the year. M1s completed an evaluation of the program (n=131), with 64% reporting the orientation session to be quite or extremely valuable.

Conclusion: The student-led orientation workshop succeeded in transmitting expectations for active learning throughout the medical curriculum, and introducing students to effective facilitation skills. This session will be included as a student-led part of M1 orientation in subsequent years. Session development areas include robust near-peer facilitator development, adapting to current curricular features, and including many examples of facilitation techniques in the session. As the UMMS curriculum evolves, expectation setting of this nature will be an integral part of student preparation for medical school success.

Defining and Implementing Milestones in Undergraduate Medical Education

Lomis, K MD; Ahmed, T PhD; Cutrer, W MD; Fleming, A MD, Fleming, G MD; Spickard, A MD; Miller, B MD

Objectives

As part of a major curricular revision, we designed an assessment system that would align student incentives with our intended outcomes. Competency-based assessment allows each learner to focus on performance criteria and to identify and address personal strengths and weaknesses. Summative decisions are criterion-referenced and informed by multiple objective measures. To generate reliable data points to support such judgments, we set out to create aligned descriptors of student performance that are detailed enough to inform future learning yet can be applied across multiple courses and settings.

Methods

From our established competencies, we identified an initial subset for which to write milestone anchors. Selection was based upon: faculty impression of relative import, review of existing assessments, areas in which students historically struggle, and those amenable to assessment beginning in the first year. Writing teams assigned to each domain were provided reference materials and guidelines. To support a developmental approach, teams were instructed to create lower-level anchors that describe acceptable novice performance, rather than simply describing the absence of higher-order behaviors. Drafts were reviewed by all stakeholders and a master set of competency milestone anchors (37) was approved.

Results

The standardized milestone behavioral anchors are being used across courses and settings (classroom and clinical) and applied to students in all four years. No user group can change descriptor language; however customized forms include only those anchors most pertinent to a given setting. A robust IT platform supports the collection and display of feedback, sorting evidence by competency domain. With faculty coaches, first year students have reviewed performance evidence, completed self-assessment in each domain and generated personalized learning plans. Domain performance data is considered in promotion committee proceedings. Preliminary review of milestone data shows a mixture of levels within a given learner and within a class of learners. Additionally, some of the anchor language appears in student-generated learning goals.

Discussion

To support informed self-assessment and competency-based personalized learning plans, it is essential to populate learning portfolios with meaningful data. It is feasible to create standardized milestone anchors to be applied across settings. Preliminary findings indicate that the language of the milestone anchors is meaningful to students and faculty members. Future quantitative and qualitative analysis will determine whether the milestone anchors are valid and reliable, and will explore how the milestone anchors are used by students and portfolio coaches to direct future learning.

Lessons Learned About Coordinating Academic Partnerships From an International Network for Health Education

Luo, A, PhD; Omollo, K, MSI, MPI;

Background: In 2008, five African institutions and University of Michigan entered into a partnership to establish the African Health Open Educational Resources Network ("the Network"), with the shared objective of advancing health education in Africa by creating and promoting free, adaptable, and openly licensed teaching materials by African academics to share knowledge, address curriculum gaps, and support health education communities. Founding members include the South African Institute for Distance Education (Saide), Kwame Nkrumah University of Science and Technology, University of Ghana, University of Cape Town, University of the Western Cape, and University of Michigan (U-M). A founding principle of the Network was that collaborative regional networks are an essential component to foster multi-directional knowledge transfer.

Objective: We aimed to identify and refine communication and management practices to define and ensure timely completion of mutually beneficial project objectives in complex multi-organizational projects in order to develop sustainable sociotechnical infrastructure for future collaborative projects.

Methods: We employed semi-structured interviews, document analysis, and participant observation to examine the management and communication processes that led to the success of the Network.

Results: The Network developed a Central Coordination Team (CCT) led by Saide and U-M, each with complementary expertise and experience, to jointly facilitate project activities within and between the African universities. The CCT embedded opportunities for dialogue, feedback, and relationship-building throughout the project lifecycle via ongoing activities for professional development and project assessment. The Network conducted multi-pronged systemic evaluations, including an annual impact assessment by an external evaluator, a socio-technical study of collaboration, institutional case studies, and periodic monitoring of web analytics. These evaluations and assessments enabled the CCT and participating institutions to understand the Network's short-term and long-term educational and learning impact at different phases, as well as identify the progress and challenges faced by the Network so that the challenges could be addressed in a timely manner.

Conclusions: As a result of this flexible approach to project management, the African participants reported that they felt they were considered equal partners and there were rarely concerns about cultural imperialism. The founding members now have in place processes, personnel, and, in some cases, official institutional policies to continue to support the creation, usage, distribution, and research related to health open educational resources.

VETERAN-CENTERED CARE ACROSS THE CONTINUUM OF MEDICAL EDUCATION

Lypson, M, MD, MHPE; Ross P, PhD

Objective

Improving health care for veterans has become a matter of national attention, yet little work has been done focusing on veteran-centered care. To address this need we developed several projects to expose medical trainees to the unique needs of service members and enhance their understanding of unique aspects of veteran culture. These projects are designed to address this need at our institution and fulfill our commitment to the Joining Forces Initiative.

Methods

We developed several activities across the continuum of medical education focusing on improving the health care of military veterans. First, we developed a faculty development workshop for practicing clinicians using an award-winning documentary *Where Soldiers Come From*© focusing on the invisible wounds of war, primarily Traumatic Brain Injury (TBI) and Post-Traumatic Stress Disorder (PTSD). Secondly, we developed two standardized patient cases at the graduate medical education level providing training in the area of mental health in a safe learning environment. This exercise can provide program directors with data on interpersonal communication skills and the respective specialty milestones. Finally, we have begun to design an interactive eLearning exercise using photo-elicitation and reflective writing methodology to heighten medical students' awareness, and stimulate critical thinking about the complexities of caring for veterans.

Results

The workshop has been delivered to nearly 40 primary care providers (physicians and nurse practitioners) in Veterans Administration Health Care settings to date. The evaluation results indicated: 78% of participants indicated that the activity changed their knowledge/attitudes/skills, 59% stated they had a better understanding of how to develop a care plan for veterans, 72% of participants stated they gained a better understanding of how to prepare for issues around the returning veterans. Even within the VA system, 89% indicated that the scenes from the documentary helped them to reflect on my own attitudes toward veterans.

Conclusion

We have developed a veteran-centered medical education program. Future plans to build on this work include dissemination of the practical use and facilitation of the exercises in various settings in UMMS and other locals. We have been awarded a University of Michigan Graduate Medical Education (GME) Innovation grant and are seeking additional funding from the GEA National Grant and Gold Foundation to support these activities.

Accountable Medical Student Education at the University of Michigan: Improving Learning and Health

Mangrulkar, R, MD; Santen, S, MD, PhD; Tsai, A, MBA; House, J, MD; Lukela, M, MD; McKean, E, MD, MBA; Monrad, S, MD; Skye, E, MD

The purpose of this five-year project is to transform medical student education at the University of Michigan Medical School (UMMS) to be more responsive to the needs of a rapidly changing healthcare landscape. To do this, we will (1) change the structure, content, and context of the UMMS curriculum, and (2) implement a robust project evaluation process to measure the impact of the curriculum on student, institutional, and health-system outcomes.

Components of our proposal will include a 2-year foundational “Trunk” with integrated scientific and clinical experiences, leading to flexible, professional development “Branches” where students will achieve competency through integrated activities in leadership, inter-professional education, and “Paths of Excellence”, while developing change management experience in healthcare scholarly concentrations. Finally, all students will have a clinical and educational learning community (the “M-Home) that provides longitudinal relationships with core faculty, as well as direct connections to advanced clinical settings, families, and communities that will allow linkages between improved learning and patient outcomes.

Students will be expected to complete the curriculum in 3-5 years. Individualized Learning Plans and an electronic portfolio will be central to complete the development of each student so as to facilitate the achievement of specific milestones. A capstone project will also be required. As a result of this new program, we expect that the UMMS graduates will: (1) have a deep, integrated biomedical foundation, with the ability to access relevant information when needed, (2) acquire professional identity by growth in self-awareness and the ability to reflect as they cross milestones and develop competency, (3) be able to lead change that will improve health and healthcare, and (4) have the required core clinical skills to diagnose, treat, communicate, and with patient and family input, implement care plans successfully.

Multi-Faceted Approach to Mistreatment and Improving the Learning Environment

Mangrulkar R, MD; Weir, S, MA; Kolars, J, MD; Gay, T, MD;
Purkiss, J, PhD; Santen, S, MD, PhD

Background and Objectives

For the past decades, medical student mistreatment has been a growing concern. As a result, the AAMC added items related to student mistreatment to its Graduation Questionnaire (GQ) in 1990 with recent major revisions. Further, the Liaison Committee on Medical Education (LCME) monitors the learning environment. This proposal describes a multi-faceted Innovation, implemented over the past 2 years, designed to address mistreatment and improve the learning environment for medical students.

Methods

The school used multiple approaches: (1) Development and dissemination of rigorous mistreatment / learning environment statements and policies. (2) Creation of an anonymous mistreatment reporting website with reports going directly to the highest position overseeing all educational activities (Senior Associate Dean for Education). (3) Development, dissemination, and discussion of mistreatment scenarios to encourage conversations among students, residents, and faculty. (4) Portrayal of mistreatment scenarios by teams of actors, to trigger small group discussion by medical students as they enter the clinical years. (5) Administration of components of the GQ- mistreatment questions directly to third-year medical students during their clerkships to help identify problematic sites. (6) Addition of “respect” questions on faculty and resident teaching evaluations, with systematic review of all student comments.

Outcomes

(1) 96.7% of students reported on GQ awareness of policy in 2012 (improved from 52.9% in 2012, 73.4% in 2011). (2) 11 students reported using website and these issues were addressed. (3 &4) Dialogue between cohorts of students, faculty and staff resulted in good evaluations of these sessions. (5&6) Identification of pockets of learning environment issues, which were fed back to clerkship directors and department chairs. These resulted in collaborative interventions including implementation of mistreatment retreats and specific discussions with identified faculty. As a result of this multi faceted approach, the GQ results on mistreatment and the learning environment have improved in some areas.

Discussion

A multi-faceted program to decrease mistreatment and improve the learning environment is key to addressing this complicated problem. While the interventions have improved dialogue between the departments, the Dean’s office, and the students, continued challenges remain to address the underling culture in order to improve the learning environment. While we believe that this approach has had some effect, we know that this type of initiative requires constant monitoring and attention, and direct collaboration with the Health System. We believe that our interventions can serve as a roadmap for medical schools are addressing this critical set of issues.

Implementation of Simulation in the Teaching of Local Anesthesia

Marti K, DMD, MD, PhD, FEBOMFS; Krishnan G, DDS, MS; Fitzgerald M, DDS, MS, Ramaswamy V, PhD

Objective: To determine how a pre-clinical local anesthetic simulation exercise could improve dental students' perception of learning, confidence, preparedness and stress.

Methods: A simulation exercise (on manikin mounted dental models) was used in conjunction with a clinical experience to teach 2nd year DDS students (n=102) on local anesthesia during their comprehensive care course. Students watched instructional videos to prepare for the exercise. Students were randomly divided into two groups. Group A (n=43) received a local anesthesia simulation after their clinical exercise. Group B (n=59) received the same simulation before their clinical experience. Students voluntarily completed an anonymous post-course survey self-assessing their knowledge, experience and confidence concerning their assignments. The questionnaire addressed four competencies (1) Assembling of instruments, (2) Recognition of anatomical landmarks, (3) Maxillary local anesthesia and (4) Mandibular local anesthesia.

Results: An ANOVA was conducted with main effects of groups on 3 dependent variables: knowledge; experience; confidence. Group A had higher mean ratings than Group B for all 3 dependent variables of knowledge, experience, & confidence (non-significant statistically). When comparing competencies separately (assemble, landmarks, maxillary & mandibular anesthesia), there were statistically significant differences ($p<.05$) for the maxillary competencies. Higher ratings were found for all other competencies for Group A. When students were separated into groups according to their Stress Level Group L-low stress and Group H-high stress, Group L was associated with higher ratings for all 4 competencies (all non- significant statistically). For the question: "How prepared do you feel" students were separated into two groups. Group LP-less prepared and Group MP-more prepared .Group MP had higher competency ratings (significant statistically for these competencies: landmarks, maxillary & mandibular). Standard t-test and the Levene's Test was used ($p<0.05$).

Conclusions: It seems in this study that the 2nd year dental students may "prefer" the simulation after the actual clinical experience as reflected by higher ratings of their maxillary anesthesia competencies. This may be consistent with a theory of adult learning, the Kolb's four-stage learning cycle including: 1) Concrete experience 2) Reflective observation 3) Abstract conceptualization and 4) Active experimentation. We can actually associate the use of simulation to an active experimentation procedure in the Learning Process.

A Qualitative Assessment of a Patient-Centered Curriculum about Persons with Disabilities

Miller, S, MD

Objective: To determine the impact of a patient-centered curriculum about persons with disabilities on students' understanding of living with a disability.

Methods: The curriculum is centered on a DVD in which persons with disabilities tell their stories in their own words. When possible they also provided visual images to accompany their narratives. Another component of the curriculum is discussing definitions of some key concepts, such as disability, advocacy, health disparities and social determinants of health. These core elements create an interactive curriculum that encourages active learning among the students. Approximately two weeks after the module was taught, on a written test the students were asked "As a result of participating in the class sessions entitled 'Aspects of Life with a Disability', how has your ***understanding, awareness or perception*** of individuals with disabilities changed?" Students were offered up to 5 points of extra credit for providing an answer.

Results: Eighty-five students participated. A qualitative analysis using a semi-grounded approach was used. The most common themes identified are as follows. Becoming familiar with the daily life of individuals with disabilities, "Personally, I am increasingly aware of the inaccessibility of many public facilities to those with certain physical impairments. It had never dawned on me before how even a building with one small curb out front can be so inhibitory for some people." Changing notions of normalcy, in which persons with disabilities consider themselves normal, "My awareness of those with disabilities has changed in that they want to be seen as a normal person, and not someone who is incapable and disabled." Seeing discrimination against individuals with disabilities as issues that impacted them, "I also was never fully aware of the numerous physical and social barriers they are constantly faced with and the isolation they must feel on a daily basis." Recognition that disability is not only an issue of the physical body, "The personal narratives helped me to realize the many difficulties people with disabilities face on a daily basis. Not only are these difficulties related to physical hardships, but also emotional and social well-being. The perceptions that others have and the way people interact with individuals with disabilities has a large impact on their overall well-being. Without a doubt, I am more aware of how to support and be an advocate for individuals with disabilities!"

Conclusions: The curriculum with its authentic representation of persons with disabilities inspires self-reflection. The students gain insight in to some of the realities of having a disability. The results suggest they start to blend knowledge about impairments, activity limitations, and participation restrictions that can be associated with having a physical disability, with an appreciation of the personal impact these issues can have on individuals, their families, and those who provide their care, also known as informed empathy. Persons with disabilities are effective educators and should be included in the curriculum of health care professionals more often.

Academic and Clinical Integration: Novel Residency Curriculum Translating Evidence Into Action

Moll J MD[1]; White M MD MPH[2]; Stettner E MD[2]; Heron SL MD MPH[2]; Shayne P MD[2]

Objective: Emergency medicine (EM) residents graduate to an environment with increasing emphasis on evidence based quality metrics and outcomes. Teaching evidence based medicine (EBM) by journal club has not been shown effective, and EM programs surveyed in 2010 averaged only 5 hours of EBM instruction. The need to be able to obtain and evaluate new evidence and translate it into effective, efficient, and measureable care led us to a novel EBM and knowledge translation (KT) curriculum. Few curricula exist that longitudinally combine evidence-based medicine with actual knowledge translation into a clinical environment with context.

Methods: The longitudinal curriculum in a three-year EM residency has four modules that consist of introduction, small groups that formulate a clinical question and recommendations, implementation, and finally review of outcomes.

Results: The curriculum has been well received and is in its third year. All residents surveyed found the curriculum valuable. For the initial cohort of residents to complete the curriculum, evidence based sources were the first query in 61% compared to 50% pre-curriculum. All residents self reported practice change as a result of the curriculum.

Conclusion: The curriculum directly addresses several core competencies, and effects knowledge and behavior patterns that are challenging to teach. Experience demonstrates a high level of resident acceptance and participation in evidence based learning and actual knowledge translation.

1-University of Michigan School of Medicine; 2-Emory University School of Medicine

Now that We Know: Using Retrospective Pre Post- Evaluation to Promote Reflection on Competence Informed by Instruction, Observed Performance, and Feedback

Patricia Mullan PhD; Jennifer Stojan MD; Jocelyn Schiller MD; J.T. Fitzgerald PhD

Objective: Traditional pre-instruction self-assessment can be vulnerable to learners' limited understanding of "not knowing what they don't know." Medical educators caution that, exacerbated by the relative infrequency of feedback based on direct observation of medical students, this can reduce the potential power of reflective self-assessment to "guess my grade" research. In contrast, retrospective pre- post- assessment asks learners who have completed instruction to reflect back on their entering level of competence prior to and after their participation in instruction, so it is informed by learners' exposure to education about both expected levels of competent performance and feedback about their performance. The objective of this study is to promote informed student reflection by comparing medical students' traditional and retrospective pre-post self-assessments of their competence in conducting patient care handoffs.

Methods: In 2012, 19 medical students participated in a one-month elective curriculum designed to teach them to perform transfer of care for patients to another health care professional ("patient handoffs.") Students completed traditional pre-instruction assessments of their competence; following instruction and feedback based on direct observation of their performance, students completed an assessment of what they then considered their pre-instruction competence had been and what level the instruction and feedback now provided them. Repeated measures analysis of variance was used to compare self-assessment before and after instruction and feedback based on their performance, with $p<.01$ set as the level for statistical significance. Effect sizes (Cohen's d, correcting for within-subjects design) were calculated to determine the magnitude of the change between post instruction self-assessment ratings, compared to both traditional pre- and retrospective pre-self assessment ratings. Effect sizes are recommended reporting practices, as they facilitate direct comparisons of the magnitude of the impact achieved with different educational approaches.

Results: Although all comparisons of post-education assessments were significantly higher than students' pre-instruction levels, the effect sizes reflecting retrospective pre-instruction self-assessments, compared to traditional pre-instruction self-assessments, were higher for students' ratings of their ability to communicate all the information that is needed in a handoff ($d=1.9$ vs. $d=1.08$), communicate needed information efficiently ($d=2.2$ vs. $d=1.6$), take care of acute issues overnight based on the handoff I receive ($d=.29$ vs. $d=.17$), and overall handoff performance ($d=2.81$, $d=.29$).

Conclusions: This study's incorporation of both traditional and retrospective pre- post evaluation of medical students offers support for the ability of well designed instruction to improve medical students' self-assessed competency in important care competencies, with more dramatic gains associated with the incorporation of reflection involved in retrospective pre- post assessment strategies.

Crowdsourcing Video Translations for a Global Network for Health Education

Omollo, K, MSI, MPP;

Background: Through its Open.Michigan initiative (http://open.umich.edu/) the University of Michigan (U-M) has thousands of learning materials that are used around the world. Up until December 2012, the vast majority of the resources were available only in English. However, with several million views between the Open.Michigan website and the Open.Michigan YouTube Channel, these learning materials had already attracted an audience in countries where English is not the native language.

Objective: In January 2013, Open.Michigan launched a campaign to make some of our health training materials more accessible to non-English speakers. We decided to target 31 videos from our collection: 12 clinical microbiology videos co-authored by instructors in Ghana and Michigan and 19 disaster management videos co-authored by seven schools of public health in East Africa. We invited translations of the English subtitles into all languages but prioritized four: Spanish, French, Portuguese, and Kiswahili.

Methods: The project launch was timed with an on-campus weekend-long volunteer translation event hosted by the university Language Resource Center. Open.Michigan also recruited volunteers through other on-campus and external organizations, including various health departments on campus, alumni networks, visiting and resident international students and academics, language networks, and social networks. We used YouTube.com and Amara.org to manage the translation workflow.

Results: To date, 139 captions have been completed covering 12 languages, including languages that are traditionally underrepresented in education (e.g. Luganda). Of those 139 translations, 43 had a translator and a reviewer for quality. Though 31 videos were targeted, 51 have translations into at least one language besides English. Of the over fifty volunteers, half were from outside U-M. Amara.org proved to be easier for managing signup of volunteers and versioning of translations. Amara offers integration into YouTube, where volunteers may signup or view the final product on YouTube, but editing and synchronization is done through Amara. Now all Open.Michigan YouTube videos have a corresponding translation link in Amara.

Conclusions: If properly coordinated, crowdsourcing can be an effective method to adapt and translate learning materials, including ones with highly technical vocabulary. Technology can be used to streamline the translation process, but it ultimately it is the community of volunteers who are the essential component to producing a high-quality final product. Community building activities such as in-person translation sessions and public recognition (e.g. press releases, blog posts) as well as personal thank yous were important for motivating volunteers. By adopting these coordination methods, the volunteers proudly offered some of their time for translation. The result is a wide dissemination of materials across language boundaries.

Medical Student Milestones in Emergency Medicine

Peterson, W, BA; Sozener, C, MD; House, J, MD; Khandelwal, S, MD; Manthey, D, MD; Santen, S, MD PhD.

Background
Medical education is a continuum from medical school through residency to unsupervised clinical practice. There has been a movement towards competency-based medical education prompted by the Accreditation Council for Graduate Medical Education (ACGME), using milestones to assess competence. While implementation of milestones for residents sets specific standards for transition to internship, there exists a need for the development of competency-based instruments to assess medical students as students progress toward internship.

Objective
Our objective was to develop competency based milestones for medical students completing their Emergency Medicine clerkship.

Methods
We performed a literature review and assembled a list of potential milestones. We then assembled a Delphi expert panel 23 faculty whose roles were program directors (4), clerkship directors (16), assistant deans (5) and a medical student from 19 different institutions to investigate consensus on these milestones through two rounds of a modified Delphi protocol.

Results
Of the initial 39 milestones, 12 were removed at the end of round 1 due to low agreement on importance of the milestone or because of redundancy with other milestones. An additional 12 were revised to improve clarity or eliminate redundancy, and 1 was added based on participant suggestions. Of the 28 milestones moving to round 2, consensus with a high level of agreement was achieved for 24 of the milestones. These were mapped to the ACGME EM residency milestone competency domains, as well as the AAMC's Core Entrustable Professional Activities for Entering Residency (CEPAER) to improve content validity.

Conclusion
Our study found consensus support by experts for a list of 24 milestones relevant to the assessment of fourth year medical student performance by the completion of their EM clerkship. The findings are useful for development of a valid method for assessing medical student performance as the student approaches residency.

Enhancing the Catalytic Educational Effect of Summative Assessments: Use of Skill-Domain Scoring and Feedback for an M4 Objective Structured Clinical Examination

Purkiss, J, PhD; Bernat, C, MA, MSW; Santen, S, MD, PhD; Stansfield, B, Phd; Stalburg, C, MD, MA; Hernandez, M E, MD, MS

OBJECTIVE

Summative OSCEs often inadequately produce "catalytic educational effects", whereby "assessment provides results and feedback in a fashion that creates, enhances, and supports education [and drives] future learning forward" (Norcini et.al. 2011). This project describes our recent utilization of skill-domain scoring/feedback intended to enhance catalytic educational effects of our M4 OSCE.

METHODS

We provide OSCE scoring/feedback at the individual-station level, and the overall-exam level. Beginning with the 2012-13 M4 cohort (n=171), we calculated new skill domain scores to provide additional scoring/feedback*: Data-Gathering*, tabulated from History/Physical Examination checklists across seven stations; *Communication*, from six station checklists; and *Clinical-Reasoning*, from five post-encounter notes and assessments, an oral case presentation, and written evidence-based medicine and critical values exams.

RESULTS

Across domains, Mean(SD) were similar. Data-Gathering: 83%(5%); Communication: 82%(8%); Clinical-Reasoning: 83%(5%). All inter-domain correlations were significant ($p<0.01$). *Communication* yielded weak inter-domain correlations with Clinical-Reasoning ($r=0.25$) and Data-Gathering ($r=0.22$); Data-Gathering and Clinical-Reasoning were moderately correlated ($r=0.45$); OSCE-Overall had the strongest correlation with *Clinical-Reasoning* ($r=0.87$). Students ≥2SD below average on *Communication* scored variously on the OSCE-Overall: some poorly, others well. In contrast, students with low *Clinical-Reasoning* scores fell in the bottom quartile on OSCE-Overall.

CONCLUSIONS

Adding domain-specific scoring to our OSCE identified needs for communication and clinical-reasoning curricular enhancements. It also improved remediation for students with domain-related performance patterns. Some who did well on the OSCE overall learned *Communication* improvements were still warranted; patterns for students with poor *Clinical-Reasoning* scores revealed some needed data-gathering improvements, while others could data-gather but needed to improve synthesis. Domain-specific scoring/feedback expanded catalytic educational effects of our OSCE, by identifying areas for curricular enhancement, and improving feedback and remediation for students.

Aggregated Numeric Exam Scores From A Pass/Fail Preclinical Curriculum Are Strongly Associated With Performance On United States Medical Licensing Exam Step 1

PURKISS, J, PHD; MANGRULKAR, R, MD; YANG, J, MS; SANTEN, S, MD, PHD

OBJECTIVE
Undergraduate medical education programs often disavow “teaching to the test”, endeavoring instead to train the best possible physicians. Pursuing this, many schools have implemented pass/fail preclinical curricula. Nevertheless, given the influence USMLE performance has on trainee options and outcomes, most programs seek to prepare learners for success on these exams. Our objective is to describe and analyze processes we developed to verify the association between examination scores from our pass/fail preclinical curriculum and performance on USMLE Step1.

METHOD
For three cohorts of students (graduating classes of 2012-2014, n=557) we calculated weighted cumulative averages from course exam data we use to generate pass/fail course outcomes. We weighted by course credit-hour to reflect relative contributions of exam material in our curriculum. We calculated Pearson’s R to examine correlations between these averages and Step1, and tabulated means and SDs to describe score distributions. We also examined risk of Step1 failure associated with specific cumulative average cut-points. The analysis was done with existing data for program evaluation and is therefore IRB exempt.

RESULTS
The M1 Cumulative Average (M1CA) was 89.3(SD=4.4). The M2 Cumulative Average (M2CA) was 89.5(SD=4.0) and USMLE Step 1 mean was 233.3(SD=19.2). We found strong correlations: for M1CA and Step 1: $r=0.639$, $p<0.001$; for M2CA and Step 1: $r=0.698$, $p<0.001$. Furthermore, students with M1CA≥85 had a Step1 failure rate of 0.6%, while the failure rate was 12.5 times higher (7.5%) for those with M1CA<85. Similarly, those with M2CA≥85 had a Step 1 failure rate of 0.2% but the failure rate was 59 times higher (11.8%) for those with M2CA<85.

CONCLUSION
Even in the context of a pass/fail preclinical curriculum, we found strong correlations between aggregated exam scores and USMLE Step 1. We now tabulate M1CA and M2CA for students, explain the correlation with Step 1, clarify that association is probabilistic not deterministic, and provide information and resources for those seeking to improve performance.

Academic Coaching in Medical Education

Reis,T,EdS; Dalaly,M,MPH

BACKGROUND:
Academic Coaching is a new concept to medical education. In an effort to create a holistic model of support, academic coaching pairs individual students with trained faculty coaches for the purpose of problem solving around a specific identified academic concern. The program was piloted with the beginning of the 2012 – 2013 academic year within the UMMS Office of Student Services.

OBJECTIVE:
The purpose of the Academic Coaching program was to provide a faculty coach to individual students for one-to-one academic and professional support.

METHODS:
Thirteen physicians were recruited to serve as academic coaches. Eight students from both the M1 and M2 class asked to participate. Academic Coaches met with their students a minimum of twice per semester.

RESULTS:
In an evaluation given to participating students, students reported a positive increase in their academic performance, life balance, and overall well-being.

CONCLUSION:
Though new to medical education, results from both students and faculty indicate the Academic Coaching model as a viable and positive addition to medical student education. Implementation of this model can inform current educational practice and serve as a foundation for building a more robust program.

A Portable Local Area Network Empowers Sharing of Medical Education Materials in Settings with Restricted Internet & Electricity

Riddle, B, BS; Omollo, K, MSI, MPI; Murphy, M, PhD

Background: Medical Schools in sub-Saharan Africa commonly struggle with limited availability, high subscription costs, and unpredictable transmission rates of Internet and electricity. Many institutions also lack sufficient staffing to maintain and support networking or other technology services on campus. These barriers make it difficult for students and instructors to access, create, and integrate digital learning materials into their education and research activities.

Objective: To explore, deploy and evaluate models for sharing digital learning materials at institutions with no or limited bandwidth, no or limited electricity, and limited on-site support for technology.

Methods: We experimented with two models for a portable, easily customizable wireless area network that can broadcast digital learning materials regardless of whether Internet, electricity, or local networking expertise is available. The two devices selected for wireless access points are TP-Link MR3020 and a Raspberry Pi model B. Both devices are small in size (approximately 7 cm x 7 cm x 3 cm), cost under US$50, and can be configured to create a 802.11N wireless access point that broadcasts the contents of a connected USB storage device.

Results: A sum of 20 devices are currently deployed in Ethiopia, Kenya, and Liberia. Both the TP-Link and Raspberry Pi are easy to set up and configure in less than an hour. Individuals within range can then browse the files on the USB drive from any wifi-enabled device (e.g. phone, laptop) with a web browser. Since the files are stored on USB flash drives, if anyone wishes to modify the file collection, they simply detach it from the access point and attach to another computer with a monitor and file browser. Both devices offer an optional backup Internet connection by Ethernet if available.

Conclusion: Both devices may be used as a low-cost, low-maintenance methods to share digital content locally in the absence of an Internet connection and of electricity. The Raspberry Pi offers more customization options than the TP-Link, such as setting up a full operating system and other services (e.g. search, analytics).

Returning surgical research fellows: What are their needs during their transition into clinical duties?

Rooney, D; Gauger, P

BACKGROUND
Many general surgery residency programs offer their residents the opportunity to engage in academic development (research). During research years, residents are excused from clinical responsibilities. It seems that residents returning to clinical duties may have unique needs related to re-entry to a clinically intensive environment. We propose that information from a needs assessment survey could guide curricular changes that better support residents' transition into clinical duties.

METHODS
In 2012 and 2013 General Surgery residents who are, or have recently been, engaged in, research (n = 29), and faculty (n = 16) completed web-based surveys. The surveys measured residents' ability at performing twenty tasks/procedures and concern towards thirteen aspects relevant to management of residency/life. Items were rated on four-point scales. Residents' moonlighting experience was also captured. ANOVA Rasch model was used for analyses.

RESULTS
On average, residents-reported abilities at performing tasks (M=3.3) and procedures (2.9) were lower than faculty-reported resident abilities (3.7 and 3.4, respectively), p<.01. Significant differences were found for seven tasks and procedures (p<.05). Residents' concern toward Life aspects was higher [M=3.4, (3.0="fairly concerned")] than concern perceived by faculty (M=4.4 (4.0="little concern")], with differences found for all aspects but one (p<.05). Rating differences across resident research year and moonlighting experience were identified and are reviewed in greater detail.

CONCLUSIONS
Preliminary findings indicate that residents who are returning to clinical duties following academic development may have unique needs that some faculty may not be aware of. Findings may help guide the development of a scalable curriculum that supports residents as they transition back to clinical duties.

Table 1. Resident and faculty ratings for survey items

Item	Descriptor	Resident Mean (S.D) (*n*=29)	Faculty Mean (S.D) (*n*=16)	P-value
Tasks				
2	Perform an open, stapled bowel anastomosis	3.69 (.47)	3.00 (.85)	.003
8	Laparoscopic extracorporeal knot-tying	2.43 (.69)	3.20 (.45)	.023
Procedures				
9	Open inguinal hernia repair	3.14 (.44)	3.67 (.50)	.004
12	Open vascular anastamosis	2.48 (.51)	1.71 (1.16)	.001
15	Laparoscopic inguinal hernia repair	2.34 (.48)	3.00 (.71)	.013
17	Laparoscopic Nissen fundoplication	2.12 (.33)	2.67 (.52)	.002
18	Laparoscopic Gastric Bypass	2.00 (.00)	2.25 (.50)	.011
Other Aspects				
21	Fund of knowledge	3.03 (.63)	4.06 (.90)	.001
22	Interaction with patients	3.83 (.47)	4.47 (.72)	.001
23	Technical proficiency	2.93 (.70)	3.65 (1.11)	.010
24	Team leadership	3.38 (.68)	4.18 (.88)	.001
25	Clinical decision-making	3.00 (.71)	4.12 (.93)	.001
26	Duty hours	3.72 (.53)	4.64 (.50)	.001
27	Inter-professional relationships	3.90 (.31)	4.41 (.87)	.006
28	Personal relationships outside of work	3.24 (.69)	4.71 (.61)	.001
29	Judgment/evaluation of my performance by attendings	3.10 (.74)	4.00 (1.23)	.001
30	Adequate sleep	3.48 (.74)	4.71 (.47)	.001
31	Maintaining professionalism	3.93 (.26)	4.56 (.81)	.001
32	Personal health	3.31 (.54)	4.60 (.91)	.001
33	Quality of Life	2.96 (.74)	4.46 (.78)	.001

A Video-based Method for Assessing Proctors' Scoring of the Fundamentals of Laparoscopic Surgery Manual Skills Exam

DM Rooney[1], I Brissman‡, P Gauger†.
Department of Medical Education, University of Michigan[*], Department of Surgery, University of Michigan†, SAGES Fundamentals of Laparoscopic Surgery Program

BACKGROUND: In efforts to maintain standards required to evaluate the high stakes assessment, SAGES Fundamentals of Laparoscopic Surgery (FLS) requires all new proctors to complete the Train the Proctor workshop. As the pool of FLS proctors expands, new methods to streamline training and quality assurance programs are being considered. In previous work we proposed asynchronous web-based performances might be used in such a program. Continuing this work in this study, we assessed the accuracy of proctors' ratings from asynchronous web-based performances by comparing sensitivity and specificity of ratings from proctors having varied experience levels.

METHODS: A sample of 43 (26%) FLS proctors (recently trained novice *n*=9, intermediate *n*=27, expert *n*=7) viewed two videotaped, laparoscopic-view, FLS performances via the web. The first performance (*Error*) contained one predetermined critical performance error in each of the five tasks (five total errors), while the second performance (*No Error*) contained no critical errors. For both performances, participants noted the time to complete each of the five tasks, and any critical errors they observed (dichotomously scored). Participants also completed a demographic section that captured years of experience as a proctor. ANOVA with Tukey post-hoc analysis was used to compare new trainee, intermediate, and expert proctors' recorded task times for the two performances. Sensitivity and specificity values were independently calculated using the ratings from the *Error* and *No Error* performances and then compared using Wilcoxon signed-rank test.

RESULTS: There were no differences in recorded times across proctor groups for any task (*p* values ranged between 0.56 and 0.86). Rating sensitivity was 75% (Intermediate) and 83% (Novice and Expert), with no significant differences across experience levels, *p*=0.79. Following removal of the peg transfer task which had particularly low sensitivity, sensitivity for remaining four tasks increased [85%, 91%]. Specificity was 84% (Intermediate) and 100% (Novice and Expert), *p*=0.03. Comments from intermediate proctors that indicated their focus on non-critical performance issues, such as "endoloop not on black line" and "air-knot," were consistent with decreased specificity.

CONCLUSION(S): Favorable results of this pilot study suggest web-based FLS performances may be used for assessing FLS proctors' rating quality with adequate sensitivity and specificity. This is particularly true for novice and expert proctors, whose ratings were found to be comparable. Decreased rating specificity from intermediate proctors (proctors who have between one and 10 years' experience, and report between five and 20 FLS test in the past year) indicate these proctors would benefit from training on current FLS proctoring standards.

Open Researcher and Contributor ID (ORCID) at the University of Michigan

Rosenzweig, Merle, AMLS; Schnitzer, Anna E., AMLS

This poster illustrates the implementation of ORCID.

ORCID is an open, non-profit, community-based effort to create and maintain a registry of unique research identifiers and a transparent method of linking research activities and outputs to these identifiers. ORCID provides a standard unique author identifier that distinguishes a researcher and also aims at preventing authorship confusion by solving the name ambiguity problem in research and scholarly communications. The University of Michigan MLibrary signed a Member License Agreement with ORCID. The Agreement allows us to, among other things, create ORCID records, deposit to existing ORCID records, and use various APIs and the data those APIs can access to perform tasks associated with ORCID records. The Library has set up an ORCID Taskforce to move forward on the ORCID implementation.

Methods:
Members of the ORCID Task Force met on a regular basis to discuss how implementation would be accomplished. Right now ORCID is, in effect, a new, open source project. Regardless, the Task Force felt that the library should facilitate and encourage the use of ORCID. Doing so would position our library and the University of Michigan as an early adopter and would provide us with opportunities to shape it in ways that will more directly benefit our institution and other institutions considering implementing ORCID. The decision was to initiate the creation of ORCID records to a select group of researchers and faculty to determine any issues that may arise as we move forward on the wholesale assignment of the ORCID.

Results:
We are moving forward in collaboration with ITS, MSIS, MCIT, ORSP, and other units to continue the implementation of ORCID across the University of Michigan.

Conclusion:
The University of Michigan is in the forefront of the collaboration with publishers and other entities in promoting ORCID as a means of assuring that individual researchers and authors receive full credit for their scientific output.

Integrating Ethics Education in the Clinical Years

Saunders, N, MD; Fuhrel-Forbis, A, PhD; Smith, L, MD; Hammoud, M, MD

Objective: Ethics education often occurs using case scenarios in the preclinical years of a medical school curriculum. The purpose of our study is to evaluate the integration of teaching medical ethics in a clinical context. We specifically report on an innovative way to discuss medical ethics through clinical scenarios encountered by students during the obstetrics and gynecology clerkship.

Methods: Medical students rotate through obstetrics and gynecology for 6 weeks during the third year. At orientation students are instructed to take note of ethical dilemmas they might encounter during the rotation. They are asked to choose one specific dilemma and write a one page reflective essay on their experience. The essays are then summarized by an ethicist under appropriate categories. During the last week of the rotation, the students meet with a faculty expert in ethics and a clinician to review and discuss the essays. Students then complete a satisfaction/evaluation survey on the assignment itself as well as on the ethics discussion.

Results: A total of 149 students (out of 165 total third year students who wrote essays) participated in the ethical discussion sessions in the 2012-2013 academic year. Overall students' essays fell under several categories. These included professionalism, informed consent, autonomy, beneficence/non-maleficence, resource allocation, patient preferences, conscientious objection, communication, cultural competency, confidentiality, privacy, and medical errors. Topics covered did not vary significantly from the beginning of the year to the end of the year, although there tended to be more student-centered essays earlier in the year. Overall students were very satisfied with the ethics discussions during their clerkships. The majority of students found the information covered during the discussions to be relevant to their education (81%) and the majority (75%) recommended continuing the ethics session in the future. The writing assignment was the least liked by students with just over half of the students agreeing that the writing assignment enhanced their sensitivity to ethical issues. Comments also reflected students' appreciation of having the opportunity to discuss ethical dilemmas in a clinical context; "Very useful in thinking through and discussing ethical issues we may see on any rotation and in the future", "I think this session would be a great idea to all clerkships to keep us aware of ethical issues and to not become desensitized to them." Many students also commented that they felt this was an excellent venue to discuss topics that are not a common part of the medical school discourse.

Conclusions: Obstetrics and Gynecology is a unique and rich environment in which to integrate an ethics curriculum for medical students. Reflective essays provide students with the opportunity to process personal experiences that challenge or trouble them, and the follow-up discussion allows students to discuss these issues with each other and with a trained ethicist and clinician. Since third year students are just beginning to form their professional identities, this is a key time to include a curriculum to identify and work through common ethical issues physicians encounter in everyday practice. The ethics education initiative is an attempt to ensure that future graduates not only *perceive* having received training in ethics, but have received ethics training threaded throughout the curriculum and delivered through meaningful educational experiences.

Systematic Direct Observation of Clinical Skills in the Clinical Year

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Gelb, D, MD, PhD; Grum, C, MD; Heidelbaugh, J, House, J, MD; Weir, S, MS;
Santen, S, MD, PhD.

Objectives: Direct observation of clinical skills is vital to medical student development. As a result, the LCME mandates that a "medical education program must include ongoing assessment activities that ensure that medical students have acquired and can demonstrate on direct observation the core clinical skills, behaviors, and attitudes that have been specified in the program's educational objectives." Direct observation of students by faculty is often sporadic, undocumented, and unstandardized. The purpose the Systematic Direct Observation of Clinical Skills in the Clinical Year was to create intentional, standardized, systematic feedback on clinical skills across all required clinical clerkships. Based upon common clinical conditions medical students are expected to address, the standard problem-focused history and physical exam was divided such that each clerkship was responsible for direct observation of a specific aspect of the history and physical as well as an advanced communication skill such as information sharing.

Methods: For the purpose of direct observation, the clerkships developed and adopted an assessment checklist for a problem-focused history, organ-specific physical examination, and an advanced communication skill. The checklists were vetted and revised based upon clerkship leadership and faculty input. The program was initiated in spring of 2012, and there have been quality improvements to the process since its inception. In each clerkship, each student must have a faculty member observe the required history, physical exam, and advanced communication skill. The faculty physician provides formative feedback on the skills, then at the end of each clerkship, students turn in their documentation of direct observation. The program was initiated 2/3 into the 2011-2012 academic year and outcome data for the implementation year was compared with academic year 2012-2013, after full implementation.

Results: Before the implementation of systematic direct observation, 71% of students reported direct observation of history examination and 82% direct observation of physical examination (average across all required clerkships). After implementation, 92% reported direct observation of history and 96% for physical examination.

Conclusion: Implementation of a systematic program for direct observation of clinical skills can effectively increase direct observation of clinical skills. Furthermore, at the end of the clinical year, we can ensure that the major patient problems and the key portions of the physical examination have been observed and formative feedback provided by faculty.

Correlating Students' Educational Background, Study Habits and Resource Usage with Learning Success in Medical Histology

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The work described in this manuscript was supported by a University of Michigan Center for Research on Learning and Teaching (CRLT) Investigating Student Learning Grant, 2011-12.

Objectives: Histology or microanatomy is a traditional core basic science component of most medical and dental education programs and presents a didactic challenge for many students as few students have taken a histology course in college and are unfamiliar in analyzing and interpreting microscope images. Identifying students that are likely to struggle with histology would allow for early intervention in order to support and encourage their learning success. This project set out to find common characteristics among students, who either did well or were academically challenged by histology.

Methods: To identify student characteristics that correlate with learning success in histology, three first year medical school classes at the University of Michigan (>440 students) were surveyed about their educational background, attitudes towards learning histology, and their use of histology learning strategies and resources. These characteristics were correlated with the students' final cumulative quiz and examination results in the M1 histology component.

Results: Students who reported previous experience with histology or pathology and/or hold science or biomedical science college degrees usually do well in histology. Learning success in histology is also positively associated with students' perception that histology is important for their professional career. Other positive indicators are in-person participation in teacher-guided learning experiences, specifically lectures and laboratory sessions. In contrast, students who relied on watching histology lectures by video rather than going to lectures in person performed significantly worse.

Conclusions: These characteristics and learning strategies of students doing well in this very visual and challenging study subject will be of help for identifying students early, who might be at risk of failing a histology course or component. Furthermore, the results this analysis will help in advising these students to develop a successful study strategy and to use the available learning resources in a more effective way.

Successful Implementation of Neonatal Lumbar Puncture Curriculum

Shafer, S., DO; Rooney, D., PhD; Chapman, R., MD; House, J, MD

Objective: Following a performance audit of lumbar punctures (LPs) at an academic Level 4 Neonatal Intensive Care Unit (NICU) several areas of concern were identified. To address deficiencies associated with proper technique and procedural skills, we developed and implemented a novel, simulation-based educational curriculum. The purpose of this study was to evaluate learning effects of this intervention.

Methods: A total of 85 residents were assessed while rotating through the NICU from January to December 2013. In a pre-post design, we captured a variety of measures used to evaluate the impact of curriculum. Knowledge was assessed using a multiple-choice quiz, while self-rated surveys were used to capture learner self-efficacy. A validated OSATS-type instrument was utilized to assess LP procedural skill (Iyer, 2012) during live observation in a simulated setting. Pre-post comparison of quiz scores was performed using paired-student t-test, while differences in performance ratings were analyzed using a many-facet Rasch model.

Results: Results indicate that this intervention resulted in an improvement among learners on procedural knowledge. The mean quiz score improved from 7.6/11 to 9.9/11, $t(84) = 14.49$, $p < .0001$.

When reviewing pre- and post-intervention OSATS LP scores, there were significant improvements in all eight performance evaluation domains (Table 1).

Table 1: Mean pre- and post-intervention OSATS scores.

OSATS Item	Pre- Score *(S.D)*	Post- Score *(S.D)*	Sig. (2-tailed)
Preparation	2.34 (.50)	2.68 (.47)	**.001**
Positioning	2.12 (.50)	2.92 (.28)	**.001**
Analgesia	1.76 (.80)	2.64 (.55)	**.001**
Needle Insertion	2.78 (.52)	2.94 (.24)	**.001**
CSF return	2.82 (.52)	2.97 (.24)	**.001**
Lab Management	2.86 (.52)	2.99 (.11)	**.001**
Sterile Field	1.85 (.81)	2.73 (.61)	**.001**
Overall (Global)	1.27 (.52)	2.27 (.76)	**.001**

For procedural skill in a simulated setting, there was significant improvement between the pre- ($M = 1.27$) and post-intervention ($M = 2.27$) overall OSATS scores, $X^2(1, N = 170) = 73.25$, $p = .001$. The items that showed the largest improvement were Sterile field management ($\Delta = 0.91$, $p < .001$) and Overall ($\Delta = 1.0$, $p < .001$). Following intervention, the highest mean scores were associated with CSF return (post-score = 2.97 (*SD*), $N = 85$) and Laboratory management (post-score = 2.99 (*SD)*, $N = 85$). Prior to intervention, 65 learners (76.5%) achieved an Overall score of 1 (needs further instruction) while77 learners (90.5%) achieved a score of 2 or 3 (technically competent or clearly technically superior) following the intervention. Evaluation of rater differences indicated no overall rating differences, with the exception of the preparation component, with rater 2 being more severe $t(25) = -3.3$, $p<.01$. Although the difference was significant ($p < .01$), practical impact is relatively small.

Conclusion: This educational intervention seemed to positively impact learner's knowledge, self-efficacy and LP performance in a simulated setting. While intervention effects seem favorable in simulation environment, further analysis of the curriculum's impact on clinical care is required.

Translation of Neonatal Lumbar Puncture Training to Clinical Care

Shafer, S., DO; Rooney, D., PhD; Chapman, R., MD; House, J, MD

Objective: Following the implementation of a novel, comprehensive neonatal lumbar puncture (LP) curriculum, we evaluated the impact on residents' and interns' performance during their neonatal intensive care unit (NICU) rotations. The purpose of this study was to evaluate the intervention's impact on learners' LP performance on live patients.

Methods: A total of 85 residents completed the educational intervention from January to December 2013. During this time, 16 live LPs were assessed during this study period. In a pre-post design, we compared performance measures captured prior to intervention in simulation setting (pre) to those captured in the clinical setting on a live patient (live). A validated OSATS-type instrument scored on a 3-point rating scale was utilized to assess procedural skill (Iyer, 2012). Differences in performance ratings were assessed using paired student t-test and many-facet Rasch model.

Results: Results indicate that this educational intervention has a positive impact on a learner's ability to perform a LP on a live patient. When reviewing pre- and live-OSATS scores, there was significant improvement in seven of the eight performance criteria (Table 1).

Table 1: Mean pre- and live-OSATS scores.

OSATS Item	**Pre- Score** (N=85) *(S.D.)*	**Live- Score** (N=16) *(S.D.)*	**Sig. (2-tailed)**
Preparation	2.34 (.50)	2.94 (.25)	.0001
Positioning	2.12 (.50)	2.75 (.45)	.0001
Analgesia	1.76 (.80)	2.63 (.62)	.0001
Needle Insertion	2.78 (.52)	3.00 (.00)	.191
CSF Return	2.82 (.52)	2.19 (.98)	.001
Lab Management	2.86 (.52)	2.63 (.72)	.003
Sterile Field	1.85 (.81)	2.56 (.73)	.003
Overall (Global)	1.27 (.52)	1.94 (.86)	.001

There was significant improvement between the pre- (M = 1.27) and post-intervention (M = 1.94) and overall OSATS score, $X^2(1, N = 101) = 16.76$, p = .001. The largest performance improvement was associated with development of an analgesia plan (Δ = 0.87, p =.0001). More importantly, learners showed significant improvement at maintaining the sterile field (Δ = 0.71, p = .003), the single most important step to ensuring patient safety during this procedure.

Conclusion: This simulation-based curriculum seems to improve learners' performance at LP in the NICU setting. There was significant improvement in seven of eight categories, including the most critical to patient safety, maintenance of the sterile field. Results of this study suggest learners are not only improving in the simulated setting, but are translating it to patient care. We anticipate this curriculum will lead to decreased complications and improved outcomes for some of the smallest, most vulnerable patients.

Using technology to enhance observational learning and student participation in small group teaching

Sisson, T, MD; Chapman, C, MA; Morgan, H, MD; Purkiss, J, PhD; Santen, S, MD, PhD; Weir, S, MA; Wozniak, L, BS; Christensen, P, MD

Objective: Case-based learning is an accepted approach to medical education, but it is not clear what is the optimal teaching approach in a multimedia environment. We sought to determine whether case-based teaching using the Learning Activity Management System (LAMS) in small group teaching would improve learning and retention of new material compared to standard teaching methods.

Methods: The existing small group curriculum for the M2 respiratory course was adapted for the technology-based teaching tool LAMS. Each student was assigned to two small group (12-13 students) sessions (2 hours each) of case-based teaching. Cases were distributed in advance and students were asked to review the cases prior to each session. Seven experienced faculty instructors were each assigned two groups (14 total groups). Faculty received a one-hour training session on used of the LAMS tool prior to the sessions. Each small group had a single faculty instructor who taught one session using LAMS and one session using standard methods. Outcome measures included a quiz of five multiple choice content questions plus 'rate the experience' questions given at the end of each session (early retention) and ten content questions covering small group material during the final exam (late retention). Students were asked to evaluate the small groups as part of the course evaluation. Faculty instructors were also asked to 'rate the experience'.

Results: At the end of the course students agreed that the small group teaching 'made an important contribution to my learning' (4.47 ± 0.63; 0-5 scale, 5 = strongly agree) which compared favorably to the previous year with standard teaching methods only (2012 4.26 ± 0.83; p=0.01 t-test for difference in means). Comments from students included…'LAMS was amazing, I usually feel like the dumbest kid in the class…the learning experience was much more enjoyable'. Faculty reported being adequately prepared for LAMS teaching and more engagement comparing LAMS vs. standard teaching. There was no difference in measures of early retention of material between the teaching methods for either the first or second small group session or late retention of material taught in the first session. However, there was a statistically significant difference for late retention of material taught in the second small group using LAMS compared to standard teaching (3.79 ± 0.52 vs 3.60 ± 0.64; p=0.36 t-test).

Conclusion: The addition of LAMS to small group teaching enhanced participation and was well favorably reviewed by both faculty and students. Teaching with the LAMS pedagogy also shows limited benefit to long-term retention of material. Limitations of this approach included slowing down the discussion in small group. Additional studies are needed to refine use of LAMS during small group teaching to determine if it is a preferred teaching method for all faculty facilitators.

The importance of medical student gender and class in perceptions of physician professional behaviors.

Smith, M, BA; Hammoud, M, MD; Sheetz, K, MS; Makki, N; Morgan, H, MD

Objectives: Determine whether third and fourth year medical students hold physicians accountable to different standards of medical professionalism based on the gender of the physician. Determine whether there is a difference in perceptions of physician professionalism based on gender and medical school class of the student.

Methods: Third year and fourth year medical students were given 16 professionalism vignettes and asked to rate whether the physician behavior was a breach of medical professionalism, using a 100 mm visual analogue scale (0=Not a Problem, 100=Severe Problem). In half of the surveys, the surname of the physician was a male name, and in the other half of the surveys, the surname of the physician was a female name. The vignettes were otherwise identical. Differences in student perceptions were calculated by comparing mean survey response scores between groups using unpaired t-tests. A logistical regression and standard beta analysis was performed to determine the strength and impact of the variables student gender, physician gender, and student class in each of the 16 vignettes. An ANOVA analysis comparing M3 males, M3 females, M4 males, and M4 females was completed for each vignette to identify differences in student subgroup responses.

Results: 289 medical students completed the survey. 150 M3 students (53% male, 47% female) completed the survey with a 97% response rate. 139 M4 students (49% male, 51%female) completed the survey with a 67% response rate. Approximately equal numbers of male and female students completed each version of the survey. There was no overall difference in how third and fourth year students rated the professional behaviors of male and female physicians ($p = 0.31$). There was also no difference in how only the M3s and only the M4s rated the behaviors of male and female physicians. Logistical regression and standard beta analysis of each vignette identified physician gender as the strongest variable in only 2 out of the 16 vignettes. In 12 out of 16 vignettes, there was a significant difference ($p<0.05$) between at least two student groups when categorized by gender and class (M3 male, M3 female, M4 male, M4 female). In 9 out of those 12 vignettes, M4 females rated the behaviors as the least professional. In 7 out of the 12 vignettes, M3 males rated the behavior as the most professional.

Conclusions: Student gender and student class (M3 vs. M4) appear to have the strongest influence on students' perceptions of physicians professionalism. Furthermore, M4 female students appear to have the highest expectations for professionalism and M3 males appear to have the lowest expectations. Future work will investigate the foundation of student's biases and practices to improve assessment measures to avoid the effect the biases may have on physicians' evaluations.

Seize the Cube: Novel Medical School Funding Opportunities made possible through Library Partnership

Song, J, MSI; Brandenburg, MD, MS, MSI; MacEachern, M, MLIS

Objective: To grow funding resources though interdisciplinary partnerships with the Taubman Health Sciences Library.

Methods: In 2012, the University of Michigan piloted the MCubed program which funded innovative interdisciplinary research on campus through the effort of student workers. Project proposals had to enlist the support of three faculty members with at least two different departmental affiliations. Successful proposals were then funded ($60,000.00) by a random process.

Results: Three Taubman Health Sciences librarians participated in this funding program with Medical School faculty and had two proposals successfully selected. The librarians used multiple methods to identify and participate in the project proposals including aggressively marketing the opportunity to potential faculty collaborators and identifying existing proposals that could benefit from librarian participation. The librarians have been involved in varying stages of project implementation and are assessing their value and impact through qualitative evaluation surveys.

Conclusion: It is expected that the librarians' participation in these projects will be considered positive and valuable.

Utility of a Novel, Competency-Based Emergency Medicine "Dean's Letter"

Sozener, C, MD; Hopson, L, MD; House, J, MD; Dooley-Hash, S, MD; Hauff, S, MD; Lypson, M, MD; Santen, S, MD PhD

Background: EM Milestones are meant to guide training from the end of medical school through residency. It is unclear how well prepared new medical school graduates are to meet Level 1 milestones. It has not yet been resolved whether the responsibility for ensuring that graduating students have met these entry level milestones lies with undergraduate medical education. The current dean's letter or MSPE does not adequately confirm achievement of the entry-level milestones.

Objectives: This study attempts to determine the utility and value of a milestone-based competency assessment provided to program directors (PDs) of their incoming EM residents. This is provided in the form of a second MSPE at graduation. Our hypothesis is that this assessment would be beneficial to PDs to customize training at the start of internship.

Methods: An ad hoc EM Medical Student Competency Committee comprised of clerkship and residency leadership and medical school assistant deans was formed. Multiple assessments and performance data were utilized from the 4th year EM clerkship, the multi-station summative clinical exam, and assessments from an EM procedures elective to assess competency of level 1 milestones of graduating students from University of Michigan (UM) entering EM programs. Nearly all milestones could be assessed. Resultant data were utilized in 2 phases. In Phase 1, individual assessments of students were sent (with permission) to the PD of their matched program. In Phase 2, a representative assessment of a graduating UM medical student entering EM was sent to all US PDs. Surveys were sent in each phase to assess utility.

Results: Total surveys completed to date in Phase 1 is 3 (50%) and Phase 2 is 62 (56%). In Phase 1, 33% of PDs were dissatisfied with the utility of the current MSPE in judging achievement of level 1 milestones, while 57% of those in Phase 2 were dissatisfied. 100% of Phase 1 PDs and 80% in Phase 2 said they do not use the MSPE to customize training for incoming interns. 66% in Phase 1 and 85% in Phase 2 felt the proposed Milestones Assessment Letter would provide new information over the MSPE. 100% of Phase 1 PDs and 91% in Phase 2 felt the proposed assessment would be useful for all incoming EM interns.

Conclusions: Graduating med students entering EM can be assessed on nearly all level 1 milestones using existing data which can be easily formulated into a Milestones Assessment Letter and sent to the PD of the program where the student will train. Surveyed PDs overwhelmingly felt the proposed assessment would provide new information over the MSPE and would be useful to assist with customizing training for incoming residents. Remaining surveys are being actively collected and similar results to the representative sample are expected.

The Leadership Inventory for Medical Education (LIME): A Novel Assessment of Medical Students' Leadership Skills

Stansfield, R. Brent, Ph.D., Mangrulkar, Rajesh, M.D.Purkiss, Joel, Ph.D., McKean, Erin, M.D., Skye, Eric, M.D., Gay, Steve, M.D., Santen, Sally, M.D.

Objective: Medicine is becoming increasingly collaborative, so leadership skills must becoming a key component of medical education. The University of Michigan is beginning a curriculum revision in which student leadership skills are a main focus. We sought to develop and validate a novel scale for assessing student leadership in accordance with the learning objectives of the new curriculum.

Methods: A 12-item scale was developed from the 4-competency model of leadership outlined for the curriculum revision. Each item was worded so as to be rated on a 4-point frequency scale. The scale was administered to orienting M1s along with other psychosocial measures: the Patient-Physician Orientation Scale, the Ways of Coping Scale, the Tolerance for Ambiguity Scale, and Medical Student Well-Being Instrument, and the Connor-Davidson Resillience Scale.

Results: The overall scale was unidimensional with a Cronbach's alpha of .71. A maximum-likelihood factor analysis largely matched the *a priori* 4-factor model of the scale justifying the calculation of subscores for Analysis, Culture, Policy, and Communication aspects of leadership in medicine. High LIME scores correlated with positive Ways of Coping, Tolerance of Ambiguity, Patient Orientation, and Resilience.

Conclusion: In this initial sample, the LIME shows reliability and criterion validity. It is brief and simple. The frequency scale is concrete which makes the LIME useful for longitudinal assessment of students' leadership development. We expect LIME scores to reflect the impact of the curriculum changes on students' leadership skills.

Why Do You Exercise? A Mixed Methods Survey of Exercise Motivations

Stansfield, R. Brent, Ph.D., Segar, Michelle, Ph.D., MPH, Falk, Emily, Ph.D., Ripley, Lauren, B.A., Preston, Stephanie, Ph.D.

Objective: The health benefits of regular exercise are very well known and ubiquitously publicized, but most people find it difficult to maintain an exercise regimen. Understanding what successfully motivates people to exercise is crucial for addressing increasingly global public health crises of obesity, heart disease and Type 2 diabetes. Our previous work has suggested the existence of 6 orthogonal exercise motivations with males and females differing on which motivations they rate highly. While females' motivations correlate with their self-reported exercise, none of the motivations correlate with males' exercise. This work sought to refine the 6-motivation model and test for the existence of other motivations that might predict males' exercise behavior.

Methods: We surveyed a broad sample (N = 95) of US residents using Amazon's Mechanical Turk (MTurk) using the existing 98-item survey and 42 additional items to test 6 novel and potentially distinct motivations. We gathered additional information asking participants to suggest their own motivations and de-motivations for exercise, and gathered participants' self report of frequency, type, and difficulty of their exercise regimens. Confirmatory Factor Analysis (CFA) was used to test the original 6-motivation model and to generate motivation subscores. Maximum-likelihood factor analysis (ML-FA) was used to relate potential new motivations to the existing ones. Correlation of these factor scores and subscores with exercise tested which of them predicted exercise among males or females.

Results: The original 6-factor structure was confirmed and refined using CFA. The existing Other-Directed Recovery motivation (e.g. "my doctor wants me to") correlated with the existing Appearance motivation (e.g. "to look better") mainly because items about weight loss applied to both. The novel factors correlated fairly strongly with existing factors suggesting that they are not distinct motivation types. Some novel motivations—Addiction to Exercise (e.g. "I feel gross when I don't"), Incremental Improvement (e.g. "To make gradual progress on a goal"), and Helping Others (e.g. "for solidarity") correlated with Other-Directed Recovery, suggesting that that motivation might have more to do with extrinsic motivation broadly than with compliance with doctors' orders and family wishes. The novel factor Morality (e.g. "Because that's what good people do") predicted exercise for both males and females making it the only identified motivation to predict males' exercise behavior, though it correlates with the existing motivation, Competition (e.g. "to win").

Conclusion: Many public health crises can be addressed by helping people exercise more, but exercise is not motivated entirely by health concerns. Instead, there is a broad spectrum of motivations that resonate differently with different individuals. These results confirm and refine our 6-Motivation Model which reduces this spectrum into a manageable set of types of motivations. Further work will improve the model, which can then be applied to help promote regular exercise for more people.

Impact of a bacterial biofilm graduate elective on interdisciplinary learning

Stewart, E.J. MSE; Younger, J.G. MD, MS; Solomon, M.J. PhD

Objective: Through investigating student learning in a graduate course co-taught by a faculty member from the Department of Emergency Medicine and a faculty member from the Department of Chemical Engineering, we seek to answer the following questions: a) does a single graduate elective impact interdisciplinary learning; b) do graduate students increase their usage of skills and language from disciplines outside of their own during a single semester graduate elective; c) does a graduate elective that is designed to by interdisciplinary change student self-perception of interdisciplinary learning outcomes.

Methods: We studied the impact of a bacterial biofilm elective course on student interdisciplinary learning. Several steps were taken to encourage interdisciplinary learning such as including two course instructors with different backgrounds (emergency medicine and chemical engineering), recruitment of students from three different graduate programs (microbiology and immunology, chemical engineering, and environmental engineering), and having guest speakers from infectious disease, environmental engineering, and air force research laboratories. We assessed interdisciplinary learning though three surveys containing questions about self-perceived interdisciplinary learning outcomes. We also coded open-response questions from homework assignments throughout the semester to assess increases in fluency across disciplinary boundaries.

Results: Students made increases in interdisciplinary learning through completion of a graduate elective course on bacterial biofilms that was designed and offered according to an interdisciplinary approach. As assessed through three surveys at different time points in the course, students increased their self-perceived ability to recognize disciplinary perspectives and teamwork skills; however, students did not perceive changes in their interdisciplinary skills and reflective behavior over the course of the semester. Coded homework responses revealed that students increased fluency across disciplinary boundaries. In the first segment of the course 73% of students gave responses that were grounded in their discipline, while in the later half of the course only 36% of students remained grounded in their discipline in their homework response.

Conclusions: We have shown that increases in interdisciplinary learning occur in a graduate elective intentionally designed to promote interdisciplinarity, specifically in areas of recognizing disciplinary perspectives and teamwork skills. Additionally, fluency across disciplinary boundaries increased during a single semester, as revealed through coded homework responses. This study serves as a pilot study for advancing the understanding of interdisciplinary learning in the graduate classroom, specifically in classrooms that incorporate clinical perspectives into graduate education.

Long-Term Impact of Narrative-based Learning on Physician Attitudes Regarding Patient-Centered Care

Jennifer N. Stojan MD; Eleanor Sun MD; Arno K. Kumagai MD

Objective: The Family Centered Experience (FCE), a course in the University of Michigan Medical School started in 2003 that is required of all students during their first two years, is designed to enhance students' understanding of the human side of medicine and the impact of illness on a patient and family. Pairs of medical students are matched with a patient-volunteer and his or her family for a series of home visits over two years. Each home visit is centered on a specific theme, such as the impact of illness on self and family, the relationship between doctors and patients, stigma and illness, and breaking bad news. After each visit, students return to the medical school where they discuss their impressions and insights in a small group setting. The goal of this program is to foster humanistic qualities and teach the value of patient-centered care in the preclinical years so that as medical students advance in their training and become physicians, they are able to maintain their focus on empathic care. Previous studies have investigated the impact of the program on medical students and faculty instructors; however, the long-term effects of the FCE have not been investigated. The purpose of this study was to examine the long-term impact of the FCE curriculum on former students.

Methods: In-depth, face-to-face, interviews were conducted with former students of the FCE who have since graduated from the University of Michigan Medical School. Interviews consisted of open-ended questions that explored what former students remembered from the course and examined whether or not the FCE influenced the way they thought about and currently practice medicine. Comments were audio-taped, transcribed, and thematic analysis was performed using Grounded Theory methodology.

Results: Twenty former students were interviewed. Most respondents were either in their residency or fellowship. The average number of years since medical school graduation ranged from two to eight. Respondents reported that the FCE made them more aware of the patient's perspective and experiences with chronic disease and that they have drawn on the lessons that they learned from their volunteer families after becoming physicians. They also reported that the FCE impacted their patient care, especially when it came to making them cognizant of the importance of communication, empathy and compassion. Former students felt that the FCE was an important part of their preclinical years and reinforced to them why they had wanted to become physicians. They also felt that the FCE helped them understand the humanistic side of medicine.

Conclusion: The Family Centered Experience has had a long-lasting impact on former students of the program, influencing the way they viewed the effect of chronic disease on a patient and their family while also influencing their views of medicine and the quality of care that they provide to their patients.

Handover knowledge test scores similar amongst faculty, postgraduate trainees and students

Jennifer N. Stojan MD; Patricia Mullan PhD; Monica Lypson MD; James T. Fitzgerald PhD; Amy Hepper MD; Jocelyn Schiller MD

Objective: Effective patient handovers are vital to patient safety, but studies indicate trainee deficits in handover knowledge and skills. The teaching, role-modeling and supervision of handovers, if done, are often by inpatient faculty. This study examines resident and medical student handover knowledge.

Methods: An expert panel and key stakeholders developed a nine-question handover knowledge test (HKT) with previously published questions. Questions addressed relevance, important characteristics, consequences, and international mandates of handovers. In 2012-2013, we administered the HKT to inpatient faculty, incoming post-graduate trainees; while fourth-year medical students on pediatric sub-internships completed the HKT before and after a handover curriculum. Analysis of variance compared performance across student, resident, and faculty levels. Paired t-tests compared student knowledge test performance before and after training.

Results: 37 out of 37 students, 173 out of 173 post-graduate trainees and 24 out of 25 hospitalists completed the HKT. Mean percent correct on the HKT was 60.9% for faculty, 55.0% for trainees, 55.7% for students before and 70.6% after the curriculum. Faculty did not perform significantly better than students or trainees. Students performed better after the curriculum (mean difference 14.9, t-Ratio 6.28, DF 36, $p<0.0001$.). Post curriculum, students outperformed the faculty (mean difference 9.6, t-Ratio 2.49, DF 59, $p=0.0078$).

Conclusion: Faculty did not score better on a handover knowledge test than students and interns. Student knowledge at the end of a handover curriculum improved and exceeded faculty knowledge scores. Our study provides empirical support for faculty training in patient handover.

Curriculum Emphasizing Feedback Improves Medical Students' Comfort and Perception Surrounding Feedback

Jennifer N. Stojan MD; Jocelyn Schiller MD; James T. Fitzgerald PhD; Monica Lypson MD; Patricia Mullan PhD

Objective:
Giving feedback is an essential educational tool. However, formal instruction on how to provide it is lacking, leaving students unprepared to offer appropriate, effective feedback. This study evaluates students' comfort level with and perceived usefulness of feedback during a handover curriculum.

Methods:
34 fourth-year medical students participated in a handover curriculum that also provided instruction on delivering peers feedback on performance. Faculty provided students feedback on 3 handovers. Peers receiving these handovers rated the students' performance and provided written and verbal feedback on the handovers' sufficiency and usefulness the following morning. Paired t-tests compared ratings of student comfort with feedback and perceived usefulness of feedback between the rotation start and end.

Results:
At the rotation start, students' mean ratings of their comfort level with giving and receiving feedback were 3.09 and 4.09 respectively, based on a 1-5 Likert scale with higher values indicating more favorable ratings. By rotation end, students rated their comfort level giving and receiving feedback as 4.29 and 4.62, showing an improvement in their comfort level ($p<0.0001$). At the rotation start, students rated the helpfulness of feedback from peers and faculty as 4.35 and 4.53. By rotation end, students rated feedback from peers and faculty as 4.59 and 4.74, showing an increased perception of the helpfulness ($p=0.04$).

Conclusion:
A curriculum with an emphasis on feedback increases student comfort giving and receiving feedback and increases recognition of the helpfulness of receiving feedback from faculty and peers. Integrating feedback instruction within the context of a specific care responsibility is feasible and effective.

Multi-Metric Analysis of the Utility of Asynchronous Learning versus Conventional Learning for Medical Student FAST Exam Training

Theyyunni, N MD; Betcher, J MD; Barton, D MD; Wourman, H; House, J MD

Objective: Ultrasound (US) is an indispensable skill for Emergency Physicians (EP). Use of bedside US requires the ability to acquire and interpret images correctly. There is a dearth of research on the comparative effectiveness of differing instructional approaches. Specifically little research has addressed the quality of image acquisition. We compared the utility of an asynchronous module (AM) with a lecture based approach for the instruction of medical students (MS) in the Focused Assessment with Sonography for Trauma (FAST) exam. We assessed three metrics: cognitive understanding (post-test) as well as the quality (B-QUIET score) and accuracy (Blue Phantom gold standard) of the images they acquired. We hypothesized there would be no significant difference between the two instructional approaches.

Methods: Volunteer MS were prospectively enrolled. A pretest was obtained. The MS were randomized to a classroom lecture or AM. All MS received small group hands-on instruction and were tested using a FAST exam training model (Blue Phantom), positive for free fluid in the left and right upper quadrants. The MS completed a posttest. MS interpreted the images they acquired. The quality of these images was assessed using the B-QUIET instrument, and by an US trained EP. MS judged their comfort with the exam on a visual analog scale before and after the training.

Results: Twenty-six MS were enrolled, 15 in the AM group and 11 in the conventional group. Groups were compared using the Mann-Whitney-U test. The pretest and posttest scores and MS' confidence, and percentage of MS correctly interpreting their own images were not significantly different. The mean B-QUIET scores were slightly lower in the online group, 17.4 and 18.9 in the in class group (p=0.04).

Conclusion: Asynchronous learning was as effective as conventional lecture in evaluation metrics that looked at both cognitive skills and image interpretation. Quality of image acquisition as measured using B-quiet scores showed a slight statistically significant decrease in the AM. It is unclear what the clinical relevance of this is given the lack of difference in accuracy of interpretation. The primary limitation of this study is the small sample size. Future research will extend this model to residents and trained EPs. The metrics used here may be extended to resident education and fit easily with the recently created milestones.

Table 1: Asynchronous Learning vs. Conventional Learning

	Asynchronous Learning	Conventional Learning	p value
Mean Pretest Score	12.66	14.33	0.24
Pretest Confidence	4	2	0.38
Mean Posttest Score	17.5	17.7	0.8
Posttest Confidence	52	53	0.95
RUQ Interpretation	66%	72%	0.753
LUQ Interpretation	53%	72%	0.335
Cardiac Interpretation	90%	100%	0.403
Bladder Interpretation	100%	100%	n/a
B-QUIET Total Score	17.4	18.9	0.04

Medical Student Ethics Essays as Faculty Development Tools

Theyyunni, N; House, J; Barnosky, A; Santen, S

Objectives: Ethical conduct is important in Emergency Medicine (EM), but there is little literature focused on continuing education in ethics for practicing Emergency Physicians (EP). Medical students (MS) often learn ethics through the hidden curriculum by role modeling more senior physicians. Formal education on practical ethics for MS and those teaching them in the ED is needed.

In our study MS essays about ethics were used as a faculty development tool. This served to improve attending physicians' ability to mentor MS on ethical situations as well as to provide good and bad examples of behavior for faculty.

Methods: During an EM clerkship, MS wrote essays on ethical dilemmas faced during their EM rotation. A team of EPs and ethicists analyzed the essays. Essays representing good and bad examples of physician actions, or teachable ethical points for MS were selected. These essays were presented at a faculty meeting and discussed. Feedback from this session will be used to make changes to the rotation, and change physician behavior going forward.

Results: In the faculty feedback session, eight essays were presented to faculty and discussed. An example of ethical conduct was an EP calming an agitated patient, allowing him to be cared for. An example of negative behavior was a student communicating a patient's declining condition to a resident and being ignored, leading to a bad outcome. Discussion focused on the objectives for each case to encourage faculty awareness when these situations occur. Changes were also made to the medical student rotation to address concerns brought up in the discussion. Faculty wanted the student ethics essays brought to them regularly.

Conclusion: MS ethics essays provide valuable information for both faculty development and medical student education. Feedback provided to faculty and changes made to the rotation should help combat the effects of the hidden curriculum.

Table 1: Examples of Discussion Cases

Case	Objectives (Discussion Points)
Variable treatment of chronic alcoholics	Discuss with MS reasons for the range of practice with these patients
Treatment of chronic pain patients: Unfairly withholding pain medication, or contributing to addiction	Discuss with MS medical student variability in treatment
EP takes time to explain to patient with aortic dissection why surgery will not be offered	Model good communication with family and end of life care

The Eyes Have It App for iPhone

Trobe, JD, MD; Burkhart, L; Kirchmeier, L

The Eyes Have It (TEHI) app is designed to teach medical and optometric students, and to assist physicians, optometrists, ophthalmic technicians, nurses and other health care providers in managing eye care problems.

The text is written by respected University of Michigan ophthalmologist Jonathan D. Trobe, M.D. Hyperlinks to supplemental images, narrated animations, and videos illustrate the clinical and teaching points. Images, animations, and videos were generated at the University of Michigan.

With 134 eye conditions, 410 images, more than 40 narrated animations and patient videos, 6 screening examination videos and an eye anatomy review section, this pocket resource can be your go-to source for eye information!

The web product by the same name, on which this app is based, has become the favored worldwide resource in this field.

Highlights:

- **Learn** about an eye condition through concise bulleted text that addresses *What is it? How does it appear? What else looks like it? What to do?* and *What will happen*?
- **View** supplemental images with highlighting arrows, narrated animations, and videos
- **Develop** a differential diagnosis using the links to candidate conditions
- **Find out** what happens if you correctly or incorrectly diagnose or manage a condition
- **Discover** the structures of the eye and visual pathway through pop-up cross sectional drawings and ophthalmoscopic images
- **Watch** videos to learn how to conduct the common screening eye exams and interpret what you find
- **Search** title and text to find a feature of interest to you
- **'Favorite'** a condition to get back to it easily

See: http://www.kellogg.umich.edu/theeyeshaveit/app.html

Supported by: Department of Ophthalmology and Visual Sciences, University of Michigan Medical School

Stimulating Change in Required Clerkships: Supporting Improvements in Grade Timing, Direct Observation Reports, and Mid-Clerkship Feedback

Weir, S, MA; Mangrulkar, R, MD; Belmonte, D, MD; Englesbe, M, MD; Gelb, D, MD, PhD; Grum, C, MD; Hammoud, M, MD; Heidelbaugh, J, MD; House, J, Schiller, J, MD; MD; Kolars, J, MD

Objective: During the LCME self-study period, specific attention was paid to core required clerkship measures of timeliness of grades, rates of student report of being directly observed during history-taking and physical examination, and providing mid-clerkship feedback. It was recognized that clerkship directors, staff and faculty spent considerable efforts on these initiatives, yet more work was needed to meet and exceed external benchmarks for these metrics. It was also recognized that departmental chairs were, at times, unaware of specific initiatives and current data on these metrics. We sought to provide data and incentives, in order to strengthen the connection between chairs and clerkship administration on these initiatives.

Methods: We implemented a 2-pronged approach to improve these metrics, focused on transparent (and regular) data dissemination to key stakeholders, and incentives to departmental leadership for improved performance:

1) The clerkship director group (Component 3-4) during monthly meetings discussed their struggles with these initiatives, sharing best practices, initiatives and normalizing the group's outcomes. The Component 3-4 and Curriculum Policy Committees reviewed specific quarterly reports on these measures for monitoring and interventions.
2) The Dean and Senior Associate Dean for Education reviewed these data and their relation to LCME compliance at group Departmental Chair meetings. The data included trajectories on grade timing, direct observation, and mid-clerkship feedback metrics. In addition, specific benchmarks were included as targets for the department chairs' executive incentive compensation packages. The Dean and chairs received reports on these metrics twice annually. Discussions on these benchmarks were reviewed individually between the Dean and each chair.

Results: Averages are provided across all required clerkships.

Grade Timing: Average time for required clerkships to deliver final grades to students moved from 57 days in 2009-2010, to 24 days in 2012-2013.

Direct Observation: Student report of faculty direct observation of history-taking increased from 71% in 2011-2012 to 92% in 2012-2013; report of direct observation of physical examination increased from 82% in 2011-2012 to 96% in 2012-2013.

Mid-Clerkship Feedback Receipt and Provision: Student report of receipt of mid-clerkship feedback increased from 89% in 2009-2010 to 94% in 2012-2013; clerkships demonstrated 100% compliance with provision of mid-clerkship feedback in 2012-2013.

Conclusion: Engaging leadership, clerkship administration, faculty and staff in awareness and responsibility for key clerkship compliance metrics was critical in achieving compliance with standards, and to stimulate the culture change needed for these improvements to be sustained.

Clinical Application Exercises in M1 Year Curriculum: Increasing Student Engagement and Preparation

Weir, S., MA, D'Alecy, L, DMD, PhD, Larkin, L, PhD, Mangrulkar, R, MD; Williams, J. MD, PhD., Mortensen, R, MD, PhD

Objective: Using recommendations from the UMMS 2013 Active Learning Task force, a series of eight (one diagnostic reasoning, seven organ system physiology) small group case discussions were revised for the 2013-2014 M1 academic year. This revision built upon the M1 Orientation introduction to small group active learning, to feature consistent expectations for students, required pairs of student volunteer facilitators for each group, and pre-class preparation for all students.

Methods: Faculty revised existing case discussions to become conducive to student facilitation. Students were responsible to facilitate some or all of the case, depending on the session. Cases were put into a standard format to facilitate standardized conveyance of expectations. Materials developed/revised for each case:

1) Email introducing faculty to the 'revised' methodology and expectations
2) Student case discussion handout, with consistent learning objectives for each session, required preparation, and deliverable 'pre-work' before the session
3) Faculty moderator and student facilitator guides, with key discussion points
4) Facilitation guide for student facilitation techniques and expectations
5) One-hour faculty pre-session to ensure consistent content knowledge and review methodology and classroom technique
6) One-hour session with case faculty for student facilitators to seek help on content or facilitation methodology
7) Narrative assessment form for faculty to complete on student facilitator performance

Results: Student curriculum evaluation of the course was similar as in past years, when a traditional small group faculty facilitated format was used. Student narrative evaluation comments indicated that discussion was robust. Faculty moderator respondents indicated that the students were more engaged (50%) than students in past years, and felt that preparation was better (61%). Faculty moderators thought skill at integrating relevant knowledge was about the same as in past years (68%). No faculty respondents responded that any of these three domains were worse than in past years. Ninety percent of student facilitators agreed or strongly agreed with the statement that they had enough preparation to effectively facilitate the small group, and 97% agreed that all students actively participated in small group.

Conclusion: While student satisfaction, as measured on curriculum evaluations, did not see a meaningful increase with the pedagogical change, the changes did increase student preparation and engagement for the session, as reported by faculty moderators.

Future Directions:

For the future, faculty leaders will consider increasing student responsibility for case facilitation, consider online learning platforms or team-based learning to facilitate engagement with 'pre-work' material, and increasing importance of session by assigning meaningful course credit to the session. Additional concerns are the need for more robust/consistent preparation for faculty moderators, increased faculty workload, and increasing the time allotted for the session.

Educating for change: Medical students develop organizational leadership skills through student group-led community-based field projects

Williams BC, MD, MPH; Fisseha S, MD, JD; Williams JC, MD; Mullan PB, PhD

Objectives: A central goal of our newly created Global Health and Disparities (GHD) co-curriculum is to prepare medical students to be agents of sustainable change to reduce domestic and global health disparities. We developed and implemented an experiential leadership curriculum for learners to: a) assess their skills and practices related to organizational leadership effectiveness, b) develop a personal learning plan for becoming a more effective leader and c) build, critique, and refine a collaborative project with community-based organizations (CBOs) to address health disparities using frameworks and processes of demonstrated effectiveness in team and organizational development.

Methods: The 34 second year medical students in the GHD co-curriculum at the University of Michigan during 2013-14 self-organized into teams of 3-4, and contacted one of 9 pre-selected CBOs to design and implement a new project or program over 7 months. Projects were to be of immediate value to the CBO and/or its constituents, and co-designed by the students and CBO. CBOs included community health centers, a rural psychiatry outreach program, free clinics, school-based clinics, and the UM Community Outreach Program.

To complement the field projects, four two-hour seminars were held at the medical school that included discussions with organizational leaders in health disparities, student-led case studies, and field team discussions and presentations applying established conceptual frameworks in organizational leadership.

Results: Student teams will present a 'deliverable' to the CBOs in late March. Program evaluation will include: a) Pre- and post-intervention surveys of students' self-rated leadership skills using the validated *Empowerment Leadership Questionnaire*, b) CBO leadership online surveys and phone interviews measuring program processes and outcomes, effects on the CBOs, and ratings of individual and groups of students, c) Review of students' interim written assignments for inclusion of key concepts, and d) Evaluation of students' final project reports, including completion rates, inclusion of key concepts in project descriptions, reflections that identify practical applications of lessons learned, including sustainability for future GHD student cohorts.

Conclusions: Our project established the feasibility, acceptability to students and community-based organizations, and impact of our curriculum using real world experience to develop organizational leadership competency. Guiding principles are that leadership is learned effectively by *doing* with structured reflection and feedback rather than learning without an authentic context, and that building genuine collaborations across differing cultures and organizations is essential.

Developing a Robust Faculty Advising System through Paths of Excellence: Lessons and Opportunities

Williams BC, MD, MPH; Williams J, MD; Fisseha S, MD; Mullan PB, PhD

Objective: A key component of the current curriculum redesign at the University of Michigan Medical School is the development of a sustainable, effective system of faculty advisors for each student. Effective faculty advising systems require resources in faculty recruitment and development, and motivated faculty who can allocate time to advise. Since its introduction as a co-curriculum in 2011, the Global Health and Disparities Path of Excellence has served to develop, implement, and evaluate models of advising that will be effective, sustainable, and able to be scaled to serve all students.

Methods: During Year 1 of operation (2011-2012), 7 faculty were funded at 10% to define the functions of GHD Advisors, advise 4-6 GHD students each, and document their interactions using a Web-based Portfolio. Goals were to facilitate students': a) self-regulated career development related to health disparities, and b) scholarly field project. During Year 2 (2012-2013), with a priority to move toward sustainability, a system of 3 funded and 5 volunteer advisors was achieved. Goals and methods of advising remained unchanged. Throughout Years 1 and 2, periodic meetings and semiannual retreats were held to share best practices, familiarize faculty with methods and objectives of the program, and build advising skills. These 8 faculty are now completing Year 3 (2013-2014). In the fall of 2013 faculty were asked to rate the influence of being a GHD Advisor on: a) job satisfaction, b) career development, and c) work-life balance, with follow up discussion at a retreat.

Results: Among the 8 GHD Advisors, faculty rated the job satisfaction related to being a GHD Advisor highly, and uniformly enjoyed interacting with students. Among a minority of faculty, leveraging GHD advising for career advancement was very important. Favored methods to achieve this included messaging from the school to Chairs and Division heads on the importance of advising, enhancing skills and disseminating associated scholarly products (e.g., curricular modules), and co-authoring publications with their advisees. Among more senior faculty, GHD advising was not viewed as an important part of career development, but as a 'luxury' that could be added into their workload. Faculty uniformly rated GHD advising as worsening their work-life balance, with trade-offs between time with children and GHD activities most commonly cited. Students consistently describe the one-on-one advising as among the most valuable features of the co-curriculum program.

Conclusion: Faculty willing to volunteer as student advisors are motivated mainly by the rewards of interacting with students; a minority also hope for recognition to promote career advancement for this work. To address work-life imbalance resulting from a volunteer or unfunded model, the GHD Path: a) has expanded its cadre of advisors to 13 to decrease the number of advisees per faculty, b) is working to promote recognition of faculty as advisors by Departments, and c) is assisting the medical school in implementing similarly structured advising systems in new Paths of Excellence.

International health research collaborations: Contextual and operational lessons from a pilot project in Quito, Ecuador

Winters, LJ, BA; Llanes, M, MD

Objectives

The establishment of sustainable collaborations between academic institutions and community organizations for the benefit of underserved international populations is a burgeoning field in academic medicine. To begin to rectify the current gap in operational knowledge about such projects, this paper describes lessons learned from a pilot project for diabetes education that was initiated in January 2013 and conducted by medical students and faculty from the University of Michigan Medical School in collaboration with the Pontificia Universidad Catolica del Ecuador (PUCE) in Quito, Ecuador during June and July, 2013.

Methods

Qualitative methods including field notes and personal interviews were used throughout the project to collect the U.S. and Ecuadorian researchers' perspectives on project difficulties, challenges and successes. Upon return to the U.S., additional interviews with international researchers based at the University of Michigan were conducted to complement team member observations. Data was analyzed using a deductive approach to identify ten "lessons learned."

Results

A few important considerations for operationalizing and maintaining international health research partnerships are outlined. Ten "lessons learned" are described, including: 1) begin with a small, manageable project; 2) research experience is advantageous; 3) do not "reinvent the wheel"; 4) consider the project's sustainability; 5) ponder the patient/participant perspective; 6) budget extra time; 7) arrive on-site early; 8) establish expectations and responsibilities face-to-face; 9) be flexible- but not too flexible; 10) know the culture. Potential challenges are also highlighted.

Conclusions

Project results identify a potential framework for international health research collaborations that have previously not been well described. This framework may be used to establish and maintain more academically rigorous and professionally satisfying international health research partnerships. No two collaborations will thrive in the same set of circumstances, so it is important that future researchers use the contextual and operational information provided in this paper as a simplistic foundation on which to tailor their own international health-based projects.

Patient Safety Training in Pediatric Emergency Medicine: A National Survey of Program Directors

Wolff, M, MD; Macias, C, MD, MPH; Garcia, E, MD; Stankovic, C, MD

Objective: The American College of Graduate Medical Education requires training in patient safety and medical errors but does not provide specification for content or methods. Pediatric emergency medicine fellowship directors were surveyed to characterize training of pediatric emergency medicine fellows in patient safety (PS).

Methods: From June 2013 to August 2013, pediatric emergency medicine fellowship directors were surveyed.

Results: Of the 71 eligible survey respondents, 57 (80.3%) completed surveys. 24.6% of programs reported having a formal curriculum with a median of 6 hours dedicated to the curriculum. One program evaluated the efficacy of the curriculum. Nearly 91% of respondents without a formal program identified lack of local faculty expertise or interest as the primary barrier to implementing a patient safety curriculum. 93.6% of programs without a formal curriculum included at least one component of patient safety training in their fellowship training. The majority of respondents would implement a standardized PS curriculum for pediatric emergency medicine if one was available.

Conclusions: Despite the importance of patient safety training and requirements to train pediatric emergency medicine fellows in patient safety and medical errors, there is a lack of formal curriculum and local faculty expertise. The majority of programs have introduced components of patient safety training and desire a standardized curriculum.

Vaccine Education for Residents: Getting to Yes!

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Background: Despite the well-established benefits of childhood vaccinations, increasing parental concern regarding safety of vaccines has contributed to under vaccination. A critical factor for shaping parents' attitudes to vaccines is their interaction with health professionals (HP). However, HP often feel unprepared to have these discussions.

Objective: To determine the effectiveness of a curriculum utilizing the C-A-S-E (corroborate, about ourselves, science, explain) framework endorsed by the CDC to improve pediatric residents' comfort, knowledge, and communication regarding vaccines when counseling vaccine-hesitant parents.

Methods: Twenty-six pediatric interns participated in a longitudinal curriculum over three months that consisted of didactic sessions, role play using the C-A-S-E framework, and a panel discussion. Development of the curriculum was informed by a local needs assessment and focused on knowledge and communication skills. Baseline performance was assessed using a standardized patient interaction with a vaccine hesitant patient. All interviews were videotaped and scored by two faculty independently using a performance checklist that measured the house officer's ability to initiate a conversation about vaccines, elicit and listen to parental concerns, discuss vaccine recommendations and vaccine side effects, and develop a plan for additional discussions. Each item was scored on a 5-point Likert scale. House Officers also self-reported their comfort with these conversations. The standardized patient encounter was then repeated at the end of the curriculum.

Results: 76% of all residents reported having had an interaction with a vaccine hesitant parent with 80% of these residents stating they did not have the necessary knowledge to have this discussion. 12% of residents stated they were very comfortable with having these discussions while 77% reported being very uncomfortable or uncomfortable with these discussions. Scores for baseline standardized patient encounters are shown in Table 1. At this time the curriculum is completed and residents are completing the follow-up standardized patient encounters.

Conclusions: Residents feel uncomfortable about their ability to discuss vaccines with hesitant parents. We expect that these educational interventions have improved resident skills in speaking with families about vaccinations. Given the critical role health professionals' play in helping parents make this important decision, enhancing resident education to improve their comfort level may also improve vaccination rates among the growing population of vaccine hesitant families.

Table 1: Scores for Baseline Standardized Patient Encounters

	Mean	Standard Deviation
Resident initiates conversation about vaccines	3.88	0.65
Resident appears comfortable with the conversation	4.00	0.75
Resident actively listens and elicits concerns	3.63	0.89
Resident demonstrates knowledge about vaccines and side effects	2.71	0.88
Resident is able to explain the importance of vaccines	3.47	0.92
Resident develops a follow-up plan	3.24	0.97
Residents counsels about risk of not vaccinating	2.43	0.78

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