Facilitating the direct observation of student performance with mobile technology

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Needs and objectives: Direct observation of a medical trainees’ performance in authentic clinical settings remains challenging. The rationale for direct observation is to ascertain and document the acquisition of the clinical skills needed to care for patients. One of the few feasible ways to efficiently distribute criterion-based assessment tools in clinical settings is with technology; including internet enabled mobile devices such as smartphones. The objectives of this study were to assess the feasibility and acceptability of a clinical assessment tool called the CEX app, and to measure its inter-rater reliability and validity.

Setting and participants: Between July 2010 and October 2012, 367 third year medical students at Michigan State University’s College of Human Medicine completed 5 to 10 formative CEXs during their internal medicine clerkship. Observers (attendings and residents) used the CEX app to guide and document their observations, record their time observing and giving feedback to the students, and their overall satisfaction. Inter-rater reliability and validity were assessed with 17 observers who viewed 6 videotaped student-patient encounters, and by measuring the correlation between student CEX scores and their scores on subsequent standardized-patient OSCE exams.

Description: We developed a web-based content management system which enables users with average computing skills to author customizable assessment tools for delivery to any internet enabled device. These customized tools function like "Apps", but they work on most internet enabled mobile devices. We developed, implemented and assessed a specific clinical assessment tool (i.e. the CEX app) and measured its utility in displaying problem-specific checklists corresponding to training problems created by the Clerkship Directors in Internal Medicine (CDIM), and evaluated its utility in the assessment of students in authentic clinical settings.

Evaluation: 3567 CEXs were completed by 506 different observers (125 attendings and 381 residents). The average number of completed CEXs per student was 9.8 (+/- 1.8), and the average number of CEXs completed per rater was 6.9 (+/- 15.9 SD). Of the 18 CDIM training problems, students were assessed on 8 problems > 5% of the time (abdominal pain, altered mental status, chest pain, CHF, COPD, dyspnea, diabetes and headache). Of the 3567 CEXs, 27.6% assessed communication skills, 21.1% history taking and 48.8% physical exam skills. On average students performed 82.5% of the items correctly. Faculty reported that 45.2% of the CEXs took them < 10 minutes, and for 69% of the CEXs, feedback lasted < 10 minutes. Faculty reported a high satisfaction (91.7%) with the CEX. Inter-rater reliability was measured at 0.69 among the observers viewing the videotapes, and their ratings discriminated between competent and non-competent performances. Student CEX grades, however, did not correlate with their end of third year OSCE scores.

Discussion / reflection / lessons learned: The implementation of this CEX app, which displays on most contemporary mobile devices, was found to be feasible and its use reliably captured students’ clinical performance data with a high rate of user satisfaction. Our embedded checklists had adequate inter-rater reliability and concurrent validity. The grades measured on this app, however, were not predictive of subsequent student performance.

Online resource URL (optional): The CEX app can be accessed with any internet connection (including desktop computers) at: www.justintimemedicine.com/mobile; log in with the username cexapp@msu.edu and the password test
GOTMeDS? Designing and Piloting an Interactive Module for Trainees on Reducing Drug Costs

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Needs and objectives: Patients are facing a rise in the out-of-pocket cost of drugs. Multiple studies show physicians are unaware of how much prescription drugs cost to patients. Patients and physicians agree that more discussion of patients’ out-of-pocket drug costs is necessary. While patients have expressed a desire to have their physicians educate them on the cost and quality of their treatment options, physicians are unlikely to do so. One reason is because of the lack of standard education on drug cost reduction strategies exists in medical training. Our aim was to create an interactive educational module that makes strategies and resources for lowering patients’ prescription drug costs readily accessible and easily applicable for medical trainees.

Setting and participants: The module was piloted with the Pritzker School of Medicine Quality and Safety Track (QST), consisting of four medical students and two attendings. Feedback on potential improvements to the module was elicited from the stakeholders and pilot participants and was subsequently incorporated into the module.

Description: Based on expert opinion from a pharmacoepidemiologist and pharmacist, literature review, and input from trainees, an educational module was designed, comprised of a PowerPoint presentation, Pocket Reference Cards, and a Video Vignette. The participants completed pre- and post-tests to evaluate their preparedness and confidence regarding drug cost reduction strategies and counseling. Participants ranked each item 1-5 (Strongly Disagree-Strongly Agree). Paired t-tests comparing mean response on Pre- and Post-Test were performed for each item, as well as Wilcoxon signed-rank tests.

Evaluation: The resulting curriculum used the mnemonic “GOTMeDS?” which encompassed the strategies trainees should use to reduce patient out of pocket costs: (G) Generics; (O) Ordering in bulk; (T) Therapeutic alternatives; (Me) Medication review; (D)iscount programs; (S) Splitting pills. The interactive module includes a case that highlights the costs for a patient on multiple medications (ASA, statin, beta blocker, ARB, Plavix, and non-generic antidepressant) and asks trainees to use the GOTMeDS strategy along with online resources (LowestMed App & Consumer Reports Best Buy Drugs) to potentially save the patient over 50% of the cost. Paired t-tests revealed a significant increase in mean score for the following three Pre-/Post-test items: (1) “I know where to look to find the most cost-effective drugs in a particular drug class,” (2.00 vs. 3.50, p<0.01) (2) “I know where to look online for medication cost-savings resources,” (2.33 vs. 3.83, p<0.01) and (3) “I know which mobile applications are useful for medication cost-savings resources” (2.17 vs. 3.83, p<0.05). The module was piloted with all 88 first year medical students. 100% reported confidence in screening patients for difficulty to pay for medications after the session. 100% found it useful & 98% helpful for free clinics they work in. Comments were very positive: “These [are] skills easily implemented to make a very significant impact. A.k.a. SUPER high yield!”

Discussion / reflection / lessons learned: An interactive educational module may improve medical trainee knowledge and confidence regarding ability to communicate with about drug costs. Future work will test the module on a larger scale and assess changes in practice using a standardized patient exercise to evaluate trainees behaviors in practice.

Online resource URL (optional): http://www.costsofcare.org/education/teaching-value-project
Teaching Electronic Patient-Doctor Communication Using A Patient Web Portal

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Needs and objectives: Patients frequently use secure web portals to access their medical record and communicate with their doctors. Few institutions, however, train residents on best practices for electronic communication or provide opportunities for electronic communication with patients. We aimed to create an electronic communication curriculum for residents using PatientSite, a web-based patient portal, and to explore resident attitudes toward online communication over an academic year.

Setting and participants: This intervention was created and implemented at Beth Israel Deaconess Medical Center, Boston, MA. Residents who practiced at the hospital based primary care site (n=125/159) were enrolled in the PatientSite portal. All medical residents were eligible to participate in the didactic components. Patients must enroll in the portal through an eligible provider, and can then access their medical information, order med refills, and send messages to their clinician.

Description: We designed the curriculum based upon a review of the literature of patient portal experiences and best practices. All residents participated in a lecture and a small group discussion; those at the hospital based primary care site also had experiential learning through PatientSite. The major domains covered were: Patients, The Patient Experience, The Provider Experience, and Systems-Based Practice. The lecture covered an overview of portal functionality and usage, while the small group discussion focused more on developing skills to respond to patient concerns and use the communication tool effectively. Equity in access and health literacy were addressed in both sessions. The practice did not make any attempt to notify patients that they were eligible to enroll in the portal and individual residents varied in promoting the site to their patients. Faculty preceptors were automatically copied on all messages sent to residents as a redundancy feature.

Evaluation: Residents were surveyed at the beginning and end of the intervention regarding perceived benefits and burdens of using a web portal for patient communication. In the pre-intervention survey, the majority of residents felt that the portal would increase work for providers but would benefit patients. The survey also revealed that 53% of residents had already used email to communicate with their patients. Almost 75% of surveyed residents were concerned about medical liability. Post-intervention surveys demonstrated statistically significant changes in areas of provider workflow (Agree +20% p=0.04), patient care delivered (Agree +38% p<0.01) and patient empowerment (Agree +18% p=0.02) among those residents who used the portal.

Usage statistics were recorded from the patient portal. Residents enrolled 424 patients, 26% of whom emailed their resident at least once.

Six residents (14.6%) reported that they had missed or delayed responding to a patient’s message, and four (9.8%) reported that they had received an inappropriately urgent message.

Discussion / reflection / lessons learned: Implementing a patient web portal and secure messaging in a residency clinic is feasible, and may improve the work and educational experience of trainees, better preparing them for real-world practice. Residents remained concerned about medical liability from inappropriately urgent messages, and about 1/10 residents reported receiving such a message. Clinic supervision policies appear warranted. Our next step will be testing an assessment tool for faculty to use when reviewing resident-patient exchanges to facilitate feedback.
Writing for Change: Training Residents in Advocacy through Public Medical Communication

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Needs and objectives: Medical narratives are used in advocacy to educate, change opinions and influence policy. From letters to the editor or opinion columns in newspapers to essays in medical or policy journals, physician's stories inspire change and give a voice to society’s most vulnerable. Although law and business schools teach persuasive communication, medicine has used narrative principally for self-reflection and humanism. The new field of Public Medical Communication broadens communications skills in medicine to include persuasive writing and engagement with the public and policymakers about health and health care. We developed, implemented and assessed a brief curriculum to train residents in advocacy-based Public Medical Communication.

Setting and participants: Nineteen internal medicine (n=15) and pediatrics (n=4) residents at the University of California, San Francisco, participating in advocacy educational tracks at San Francisco General Hospital.

Description: Five faculty with narrative, policy, advocacy, and underserved medicine expertise collaborated to develop a 3-part workshop. Each 2-hour-long session included: close reading of newspaper, medical journal and health policy journal articles; discussion of narrative craft and how to select target audience, publication venues and advocacy levels; development of opening paragraphs or ledes (session 1) and writing workshop style works-in-progress sessions of the residents’ draft articles (sessions 2-3). Faculty reviewed additional drafts as needed. Participants scored session quality, relevance and usefulness on a 0-5 scale and provided qualitative feedback. Faculty tracked resident publications.

Evaluation: All 19 residents completed evaluations. Most had little writing experience. Combined session ratings for quality, relevance and usefulness were 4.95, 4.925 and 4.975, respectively, on a 5-point Likert scale. All residents drafted articles based on their clinical experience and tied to an advocacy issue. With additional revisions and faculty help, six residents published seven articles in the New York Times (2), Health Affairs Narrative Matters (2), Huffington Post (2) and Annals of Internal Medicine. Qualitative feedback included: “Thank you for pushing us – I thought that the writing was incredible painful and so valuable,” “Glad we were encouraged to read aloud, great experience,” and “I enjoyed the pre-reading and discussion of how to actually write a piece/lede.”

Discussion / reflection / lessons learned: Narrative writing is a relevant and useful advocacy tool for generalist residents. Despite initial discomfort with both writing and reading works-in-progress aloud, this advocacy-focused Public Medical Communication workshop was enthusiastically received by the learners. All trainees were able to develop the basics of publishable pieces within the framework of a few structured seminars, and a quarter completed articles accepted for publication in national media, medical and health policy journals. Although publication was possible from just a six hour curriculum, it required additional faculty time after the workshop. This is an innovative method to address core ACGME competencies and help residents translate their clinical experiences into meaningful public service and discourse.
Novel Integration of Systems-based Practice into Internal Medicine Residency Programs: The Interactive Cost-Awareness Resident Exercise (I-CARE)

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Needs and objectives: The Accreditation Council for Graduate Medical Education (ACGME) and American Board of Internal Medicine (ABIM) have identified cost-awareness as an important component to residency training. However, cost-awareness is generally not emphasized in traditional residency curricula. Novel methods are needed to provide cost-awareness in a time efficient manner.

Setting and participants: Internal Medicine interns, residents, Faculty and Yale School of Medicine third year students at three Yale-affiliated teaching hospitals in Connecticut.

Description: The Interactive Cost-Awareness Report (I-CARE) follows a traditional, Morning Report style teaching session run by a Chief Resident, where the diagnostic workup of a patient is discussed in a one hour didactic session. I-CARE takes place over a 4 day period every fourth week. One hour each day is provided for each level of training: medical students, interns and sub-interns, residents, and lastly, attending physicians. Those planned to participate in a later session are prohibited observing the trainee sessions, however all trainees are present to observe the attending physician session. Following the initial case presentation, trainees can inquire of the Chief Resident for further information in an effort to make a diagnosis. Additional history and/or physical exam maneuvers not included in the initial presentation (such as travel history, dermatographism, straight leg raise) have no associated cost and are free to the group of trainees should they be specifically requested. Laboratory tests, diagnostic imaging, and diagnostic procedures can also be requested, and the actual patient charge from our institution for that item is recorded by the Chief Resident in real time. These charges are blinded to the participants at the time of the exercise. The actual charges for each group’s diagnostic workup are recorded and shared in a friendly competition across training levels and training sites.

Evaluation: Anonymous, voluntary survey of all participants and comparison of expenditures by training level.

Discussion / reflection / lessons learned: Interns, residents and attending physicians were asked to complete the survey. 37 surveys were returned (39% response rate). Response was overwhelmingly positive, with 31 respondents (84%) identifying the SBP case as ‘an overall improvement’ to Morning Report. Using a 10 point Likert Scale, survey respondents rated the educational quality of the I-CARE case 8.57 and the educational quality of the prior morning report format 6.81 (p<0.001). Narrative responses from survey respondents were also positive. (Figure 1) Sampling of the first five cases revealed 100% accuracy of diagnosis by the attending physician group, 60% accuracy by residents and interns and 50% accuracy by medical students. Furthermore, dichotomous t-test was performed (Excel 2010, Redmond, WA) to determine difference in expenditures. The attending physician group spent less on average than non-attending participants ($1027.45 vs $4264.00, p=0.02). This difference persisted with medical students excluded from the analysis ($1027.45 vs $3962.80, p =0.03). The I-CARE provides for immediate inclusion of cost-awareness and enhances Systems-based Practice education in an Internal Medicine Residency Program with minimal additional resources by using a pre-existing educational conference. The I-CARE is easy and quick to implement, and the preliminary results show a popular cost-awareness educational experience.