Purpose: Multiple barriers to regular, ongoing practice of evidence-based medicine ("EBM") have been previously identified for both practicing health care practitioners (Zwolsman, te Pas, Hooft, Waard, & van Dijk, 2012), as well as health professions students (Ilic & Forbes, 2010). Some of these barriers include lack of access to and understanding of available evidence resources, and lack of interactivity of content taught (Khan & Coomarasamy, 2006). In order to clarify the various pathways of applying evidence to practice in the health professions, the authors created an interactive infographic (the "Biomedical Evidence landscape Map" or "the Map") to illustrate the various types and applications of the biomedical evidence and support teaching efforts around EBM.

Approach/Methods: The Map was created by a team comprising medical librarians, a graphic design expert, and a practicing clinician advisor. The first version was launched in September 2016 (http://lane.stanford.edu/graphics/maps/beemap.pdf), along with an accompanying online feedback survey (http://lane.stanford.edu/beemap.html).

Results/Outcomes: EBM instructors at the Stanford University School of Medicine ("SOM"), who were also on the Map creation team, began incorporating the Map into teaching sessions in October 2016. Between the launch of the Map in September 2016 through the end of November 2016, it has been accessed online 502 times. Feedback from the online survey is being collected on an ongoing basis, and 83 responses have been collected as of November 30, 2016. Thus far, respondents have indicated interest in using the Map primarily for instruction (38%), curriculum development (26%), or self-study (26%) (n=39). Respondents generally find the Map easy to understand (50%) (n=28). Respondents also confirmed that the Map increases their understanding of the biomedical evidence landscape (48%) (n=23) and how information is used in the biomedical sciences (40%) (n=20).

Within a month of launch and to date, one other institution has requested to adapt the Map for local use. To address this request, a pared down version of the Map was created for customizable adaptation by other institutions by request on CC BY-NC-SA licensing terms. Similarly, we have created another version of the Map featuring open access resources for other SOM EBM instruction to audiences outside of our institution (e.g., CME, international digital education projects).

Discussion: Due to the varied information needs (e.g., patient education, clinical decision-making, knowledge building, and knowledge creation) of health professions students and providers and known barriers to incorporating evidence into practice (Straus, Tetroe, & Graham, 2011), knowing where to go to find reliable, authoritative information in an efficient manner can facilitate effective real-time information seeking behavior. Building the Map as a way to support instructional efforts (both during teaching sessions and as an ongoing 24/7-accessible online resource) has thus far been useful to the instructors of EBM at our institution and, according to preliminary feedback findings, also to users of the Map and instructors at other institutions. Ongoing development and systematic evaluation of the impact of the Map's utility for learning and instruction is being conducted and expectantly also will be expanded to include analysis at multiple institutions.

Significance: This infographic was created in order to support classroom EBM teaching and provide an online, interactive resource to supplement instruction and support students and healthcare practitioners in navigating the biomedical evidence landscape. To date, usage and feedback has been encouraging and it is hoped that, with ongoing supportive instruction, evaluation studies, and continued development, the Map will measurably improve knowledge, skills, attitudes and behavior around EBM.


**Level of Audience:** Mid-career  
**Focus of Presentation:** Continuum  
**PRESENTER:** Nicole Capdarest-Arest  
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ABSTRACT BODY:

Purpose: As we are currently facing an aging population and a decline in the number of geriatricians, medical students will need the skills and interest to provide care for the elderly. Preclinical medical students currently have minimal exposure to geriatric patients. Our aim was to assess the impact of an innovative immersive virtual reality (VR) experience as a supplement to the traditional methods of delivering pre-clerkship course content pertaining to geriatric medicine.

Approach/Methods: A group of second-year medical students (M2s) was selected to pilot a seven-minute virtual reality (VR) geriatric immersion prior to the start of the geriatrics coursework. Students individually used an immersive Oculus Rift headset with Leap Motion VR technology to embody Alfred, a 74-year old African-American man with age-related macular degeneration (AMD) and high-frequency hearing loss. The student has control over Alfred’s gross head and hand motions. The Alfred Lab starts by the learner embodying Alfred at his birthday party and experiencing challenges interacting with family due to the visual and hearing impairments. The learner, as Alfred, is seen at a doctor’s visit, and has difficulty completing a cognitive test due to the AMD. The pilot group was asked to complete a pre- and post- VR experience survey, and invited to volunteer for a focus group to discuss their experience in more detail.

Results/Outcomes: Forty-one of 197 M2 students piloted The Alfred Lab, of whom 40 completed a pre- and post- VR experience survey, and 14 students participated in a focus group. Prior to the VR experience, 20% (n=8) of students in the pilot group expressed interest in pursuing a geriatric specialty, and half (52.5%, n = 21) felt they could appreciate the perspective of an elderly patient. After completion of the VR experience, 32.5% (n=13) of students expressed interest in pursuing a geriatric specialty, 90% (n=36) felt they could appreciate the perspective of an elderly patient.

During the focus groups, students shared that using VR in medical education led to a more engaged, memorable, and effective learning experience. Learners found that embodying a geriatric patient through VR was “humbling, frustrating,” provided a better understanding of perspective than traditional lecture, and compelled more empathy and compassion. Students reflected that it is “tragically easy to be dismissive of the elderly,” and that they could now appreciate better the impact of physical impairments on an examination during a doctor’s appointment.

Discussion: In this pilot group, embodying a geriatric patient through immersive VR increased the students’ appreciation for the perspective of an elderly patient and increased interest in pursuing the field of geriatrics. These findings suggest that immersive VR may be an acceptable and effective way to increase empathy with geriatric patients. Learners shared more appreciation of considerations for providing care to the elderly in a clinical setting. The ability to deliver immersive VR experiences via handheld devices is rapidly increasing, improving feasibility for large class sizes.

Significance: It is increasingly important for medical schools to emphasize geriatrics care as part of a patient-centered curriculum. Our results suggest that immersive virtual reality is a valuable tool to improve exposure to and empathy with geriatric patients and other vulnerable populations.


Level of Audience: Early-career

Focus of Presentation: UME

PRESENTER: Ananya Gangopadhyaya

AUTHORS/INSTITUTIONS: A. Gangopadhyaya, A. Khan, N. Rajagopal, L. Hirshfield, R. Ramahi, D. Lorens, S. Dauner, R. Yudkowsky, University of Illinois at Chicago- College of Medicine, Chicago, Illinois, UNITED STATES|C. Shaw, E. Washington, Embodied Labs, Chicago, Illinois, UNITED STATES|
**Purpose:** Clinical supervisors are often reticent when asked to frame their observations in assessment terms rather than formative, developmental terms. LCME standard 9.5 (LCME, 2016) requires that medical students receive frequent, documented narrative feedback. Challenges to meeting this standard in clerkships include limited opportunities for students to be observed and difficulties capturing feedback in the moment. We sought a user-friendly method to: engage students in requesting feedback on their clinical skills; provide supervisors with an efficient way to give multiple instances of useful, motivating feedback to students; require students to actively construct a plan to make use of the feedback received.

**Approach/Methods:** We designed a mobile Web app that supports self-regulated learning, which is a cycle of preparation, engagement in an activity, and subsequent identification of appropriate next steps or learning plans (Artino and Jones, 2013). The app uses a student’s mobile phone to capture voice-to-text dictation of purely narrative, future-focused feedback. The goal is to increase the quality and number of documented direct observations during core clerkships. Supervisors’ narrative comments feed into a relational database that also captures students’ structured reflections about their experiences and their learning plans for the future. Clerkship directors can set requirements for the minimum number of direct observations, the types of clinical activities to be observed, and the sources of feedback. Supervisors were asked to describe the activity they observed, to identify what the student should focus on for next time, to note something in the observed activity that was “on track”, and to add comments that could help the student be specific in developing plans for next steps.

**Results/Outcomes:** In feasibility and acceptability piloting, narrative-only feedback (with no rating scales) was appealing to clerkship directors and students (example: “It adds a component of good and honest feedback when it’s not for a grade”). The voice-to-text dictation feature resolved the task and time burden of typing comments into text boxes. The mobile Web app created the expectation that students initiate a proactive request for direct observation and specific feedback. The follow-up questions required students to reflect on their experience and actively construct a plan to make use of the feedback received.

**Discussion:** This app facilitates the collection of unrated but specific direct observations as they take place “on the fly”. Use of the app results in supervisors modeling key functions of the RIME framework (Pangaro, 1999); accurate reporting and interpretation are both skills that students are expected to practice during clerkships.

**Significance:** Many direct observation tools are assessment instruments that assign behavioral anchors to a rating scale and require supervisors to learn and apply conceptual frameworks. The cognitive load of repeatedly re-orienting to these tools can be profound, particularly as the number of competing frameworks and tools proliferates. Developmental, narrative feedback is inherent to the mentor-apprentice relationship and is an effective way for supervisors to provide many separate instances of direct observation feedback.


**Level of Audience:** Mid-career

**Focus of Presentation:** UME

**AUTHORS/INSTITUTIONS:** S. Yingling, Department of Medical Education, University of Illinois College of Medicine, Chicago, Illinois, UNITED STATES|B. Williams, J. Bateman, Medical Cell and Structural Biology, University of Illinois
Purpose: Clinical rotations in the third and fourth years of medical school mark a shift in learning methodology from structured didactics to bedside apprenticeship. In this setting, feedback, which is traditionally verbal and not formally recorded, plays a critical role in student development. Little is known about the quantity and quality of feedback provided. This study uses a novel, web-based Minute Feedback System to evaluate feedback given to students during their core surgical clerkship.

Approach/Methods: A previously created Minute Feedback System was used to collect feedback given to medical students during their surgery clerkship from May 2015-April 2016. Using qualitative content analysis, feedback comments were categorized as: Encouraging, Corrective, Specific, and Non-specific. Effective feedback was a combination of specific and either corrective or encouraging feedback; Ineffective feedback contained only non-specific comments and Mediocre feedback contained elements of both Effective and Ineffective comments. Feedback responses were compared between resident's training level and faculty. Significant differences between groups were determined using Chi Square analysis with a p value <0.05 considered significant.

Results/Outcomes: During the study period there were 3191 unique feedback requests. The overall response rate was 62% (2029 unique feedback responses): faculty 66%, senior residents (PGY 3-7) 59%, and junior residents (PGY 1-2) 60%. “Non-specific” feedback comprised 60% of faculty, 72% of senior residents’, and 68% of junior residents’ comments (p > 0.02). “Specific” feedback was given by 16% of faculty, 8% of senior residents, and 17% of junior residents (p < 0.05 between faculty and all residents). “Effective” feedback was provided by faculty only 16% of the time, by senior residents 8% of the time, and by junior residents 17% of the time (p < 0.05 between faculty and senior residents). “Mediocre” feedback comprised 13% of faculty comments, 9% of senior resident comments and 7% of junior resident comments (p <0.05 between all groups). “Ineffective” feedback comprised 67% of all feedback: 60% of faculty feedback, 72% of senior resident feedback, and 68% of junior resident feedback (p < 0.05 between all groups).

Discussion: Using a novel, web-based feedback system we found the majority of resident and faculty feedback to medical students during their core surgery clerkship using an electronic, email-based application was non-specific and encouraging and therefore of limited effectiveness. This represents an opportunity for resident/faculty development and education regarding optimal feedback techniques.

Significance: Ineffective feedback still outranks Effective feedback 3:1 and we thus conclude that most evaluators systematically provide vague or non-specific feedback. The Minute Feedback System provides an excellent source of illustrative and identifiable feedback data that can be used in system and faculty development to improve the learning environment in medical education.
