Title: Does the Opportunity to Reflect and Revisit during a Clinical Skills Exam Improve Students’ Clinical Reasoning?

Submission Type: Research Highlights in Medical Education

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Purpose: Though reflection is valued in clinical medicine, little empirical evidence exists to support its impact on performance.1,2 Clinical skills exams (CSEs) are opportune for exploring reflection outcomes.3 Typically, in CSEs students visit each standardized patient (SP) once. However, students’ thinking may deepen if, after reflecting while writing their patient note (PN), they revisit their patients to further explore differentials. The purpose of this study was to examine the effect of a virtual revisit on students’ diagnostic reasoning processes and on assessment psychometrics.

Approach/Methods: In spring 2017, students conducted a virtual revisit during an end-of-third-year CSE that included five SP cases depicting clinical presentations common in 3rd-year clerkships. Students conducted their virtual revisits in their last three CSE stations. Students had 15 minutes for a focused history, physical and counseling; 10 minutes to write a USMLE-style PN; and 5 minutes to complete the virtual revisit: “If you had 5 minutes to revisit the patient, list up to 3 additional history questions or physical examination maneuvers that would help clarify your differential diagnosis. Explain how this information would help you.” Trained faculty used the UIC PN4 rubric to score the patient notes; they also used a special rubric to rate the diagnostic relevance and rationale of revisit items.

Results/Outcomes: The mean PN score for 179 students was 61% (SD 8). In 81% (373/463) of revisit opportunities, students requested one or more additional history or physical exam items (mean= 2.01, SD.59). Of the 756 items requested across cases, 148 (20%) were key to the diagnosis of the case, 454 (60%) were relevant but not key, and 154 (20%) were irrelevant. 714 rationales were provided, 68% correct, 23% partially correct. Of the 756 requested items, 159 (21%) would have resulted in changes in the PN rubric score: 69 (9%) in documentation; 45 (6%) in justification; 27 (4%) in plan. PN scores increased for 97 students (26%) and decreased for 17 (5%). There was no correlation between revisit scores and history or physical exam checklist or patient note scores. Including revisit scores increased the variance associated with Person-Case interaction and decreased the reliability (Generalizability) of the CSE scores.

Discussion: Reflection while writing the PN resulted in students identifying additional relevant and key H&P items, promoting diagnostic reasoning. In this study the patient note was the reflection trigger; training students in explicit reflection methods (e.g., de-biasing schemes; fuzzy cognitive mapping)5 may further improve clinical reasoning and warrants future study. Decreased reliability when including revisit scores also needs further exploration: it may reflect thoroughness based on rote memorization6 rather than thoughtful recognition of items that discriminate among diagnoses. Future research includes conducting a live revisit study in which students actually revisit their SP, and exploring the impact of reflect-revisit on diagnostic accuracy.
Significance: When “flaws in clinical reasoning are present in most diagnostic errors,” more effective approaches to teaching clinical reasoning are needed. This study provides preliminary evidence that the opportunity to reflect-revisit may promote students’ diagnostic thinking during clinical encounters.
Title: Teaching Diagnostic Error: A Qualitative Analysis of Student Reactions to Simulated Cases

Submission Type: Research Highlights in Medical Education

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Purpose: Diagnostic error constitutes approximately 18% of medical error overall (1). While medical educators have begun to “unpack” the cognitive processes of clinical reasoning, the optimal educational strategies to reduce diagnostic errors are uncertain (2-4). The purpose of this study is to use the DX: Diagnostic Excellence modules, a suite of 6 unfolding virtual cases that describe diagnostic errors, as a method for teaching diagnostic error. Students have the opportunity to work through each case, and reflect on the causes and impact of diagnostic error.

Approach/Methods: The DX: Diagnostic Excellence modules were implemented with second and third year medical students at two institutions as part of a patient safety and a longitudinal problem-based learning course, respectively. Students completed free text responses to several prompts. All students were asked about their general perceptions to the cases upon completion, and the lessons learned. The third-year students were also asked whether the cases brought to mind any clinical experiences that they had encountered. Responses were obtained from 188 second-year and 91 third-year students, and were analyzed using qualitative content analysis for themes and relevance.

Results/Outcomes: Responses across institutions and level of learner were strikingly similar. Overall, students found the cases relevant and encouraged their inclusion in the curriculum. When asked about lessons learned, students frequently identified that they learned how cognitive biases can impact clinical decision-making and lead to error. Students also identified the contribution that systems factors have on decision-making and diagnostic errors. Students resonated with the negative emotional impact that diagnostic errors have on clinicians and how errors may lead to over-testing and other maladaptive practices. When asked whether the cases brought to mind experiences from their own training, most third year students were able to identify a similar situation from a clinical encounter, or sometimes from their personal lives, where a diagnostic error or near-miss occurred. A smaller number of students reflected on their own vulnerabilities to errors, and expressed the importance of avoiding similar errors in the future. The most common vulnerabilities revolved around the concept of “jumping to conclusions” or “not considering all possible diagnoses”. Students related these vulnerabilities to cognitive biases such as anchoring or availability, or to knowledge deficits such as not being familiar with the full range of differential diagnosis. Students reported that greater awareness of these vulnerabilities would help avoid diagnostic errors in the future.

Discussion: The Diagnostic Excellence modules elicited rich and thoughtful responses. Students found the modules relevant and similar to experiences they have had in their still-nascent careers. Even at an early stage of clinical training, the students were able to relate these cases to their own experience, implying that the study of diagnostic errors is appropriate at this stage of clinical training.
**Significance:** Given the prevalence and gravity of diagnostic error, educators should consider curricular approaches to teaching diagnostic error. These virtual cases seem to be an effective strategy for introducing this important topic, and lead to changes in knowledge and attitudes that students perceive as useful to their present and future practice.
Purpose: The representation of a clinical problem appears to shift dynamically across the process of a clinical encounter, yet little is understood about how particular clinical contexts shape clinical reasoning moment-by-moment. The purpose of this study is to examine the emergent characteristics of clinical reasoning using think-aloud reflections following participation in live or video-based simulation encounters.

Approach/Methods: In this mixed-methods comparison, internal medicine and family medicine physicians were quasi-randomly assigned to one of two conditions: a video (watching two 15-minute clinical encounters; 6 participants) or live simulation scenarios (participating in two encounters with standardized patients; 8 participants). All participants received one diabetes mellitus and one stable angina scenario. After watching or participating, all participants completed an open-ended questionnaire that asked them to reflect on differential and leading diagnoses, desire for additional information, and changes to practice (e.g., “Is there anything you would do differently when figuring out the leading diagnosis?”). Participants were then instructed to “think out loud” while rewatching the video recorded simulation or watching their own live simulation. Think-alouds were coded for instances of reconsideration: moments when practitioners questioned their own choices or thought processes, or that of the physician in the video.

Results/Outcomes: Participants included 14 physicians ranging in age from 27 to 54 years and having 1 to 25 years in practice. Those in the live scenario condition reconsidered thought processes and choices more often (m = 7.75, SD = 6.6) than those in the video condition (m = 4.67, SD = 4.7), but the differences were not statistically significant (Mann Whitney U = 15, p = .28). Qualitative analysis of think-alouds in both conditions revealed three themes: diagnostic reconsideration (noting what one “should” or “would” do differently in terms of patient interview or physical exam to come to the correct diagnosis, e.g., “In retrospect, I would have asked her or investigated a little bit further about the goiter [to rule out thyroid issues in diabetes mellitus case];” “practice improvement” reconsiderations (cases where participants were confident they had the diagnostic information they needed but noted what they would do differently based on broader standards of practice, e.g., a full systems review, despite confidence in the diabetes mellitus diagnosis); and prior case reflections (using the first case to frame the clinical reasoning process for the second case, e.g., “[in comparison to] the last patient I would be more concerned with [this patient's] compliance.”)

Discussion: As participants cycle back through their prior reasoning processes and reflect on them, it seems new diagnostic avenues and practice improvements emerge. These opportunities for reflection appear to be richer and slightly more frequent for live scenario than for video participants.
Significance: Think-aloud reflections on video encounters offer important insights into physicians’ shifting choices throughout the diagnostic process, as well as the reasoning behind these shifts. Moreover, live simulation followed by video think aloud appears to offer more opportunities for reconsidering diagnostic procedures.
Title: The Pragmatists Guide to the Galaxy: Using PDSA and Cognitive Interviewing to Implement a New Outcomes Framework

Submission Type: Research Highlights in Medical Education

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Purpose: In conjunction with the trend towards outcomes-based medical education (OBME), in 2013 Emory University School of Medicine (EUSOM) adopted a locally-defined set of outcomes titled, “Student Physician Activities” (SPAs). The SPAs stemmed from a pragmatic desire to operationalize OBME while eluding the thorny theoretical issues of using EPAs for medical student education [1, 2]. The SPAs were implemented using a continuous quality improvement (CQI) approach of Plan-Do-Study-Act (PDSA) [3]. In 2016, a CQI research project was undertaken to evaluate the educational impact of the 28 SPAs and to recommend revisions. This report describes CQI research on using the SPAs as the outcome framework for the EUSOM MD program.

Approach/Methods: After implementing the SPAs, EUSOM leaders moved to the “study” and “act” phases of the PDSA cycle. To study the SPAs themselves, the qualitative method of “cognitive interviewing” [4] was chosen. Although typically used for other purposes, the cognitive interviewing harmonized with the CQI research objectives [5]. In order to align each educational event and assessment with its intended SPA, course and clerkship directors were invited to meet individually with two researchers. At the meeting, cognitive interviewing was used to discuss how the required course/clerkship events were calculated to guide students towards the designated SPAs for that course/clerkship. The researchers led in-depth dialogues regarding how the directors operationalized the SPAs into the course/clerkship activities. By responding to questions about the conceptual relationship of activities and outcomes, directors revealed their understandings and misunderstandings of the SPAs. Their responses and counter-questions comprised the data used for CQI.

Results/Outcomes: During the cognitive interviews, the researchers recognized that a few SPAs regularly spawned confusion or provoked misapplications. In isolated cases, this was attributed to unfamiliarity of the course/clerkship director to OBME. But, the cognitive interviews revealed several instances in which the SPA wording had led to uncertainty. During the cognitive interviews, an oral rephrasing of the SPA’s intent led to recognition of the SPAs intent. These dialogues led the researchers to conclude that the scope and constructs of the SPAs were appropriate; however, the language used to express the SPAs needed revision. Thus, revisions were drafted, discussed, and approved by the Curriculum Committee in 2017. This completed the first PDSA cycle for the SPAs.

Discussion: This effort was driven by a desire to move the EUSOM program towards OBME while appreciating factors of institutional context. Cognitive interviewing provided the qualitative data that was needed to complete the PDSA cycle for enacting of the SPAs. The PDSA cycle for implementation of the SPAs was a practical approach to ensuring that the locally-developed was appropriate and effective.
Significance: CQI for educational innovations is vital, particularly for locally-developed initiatives, but it is often difficult to conduct. The SPAs are the cornerstone of all aspects of the EUSOM MD program; employing CQI methods ensured that the SPAs could accomplish their intended purpose. Utilizing the cognitive interviewing method for analysis and revision of the SPAs was a practical and effective means to conduct CQI research.