Implementation of a Multi-segment, Mixed Synchronous-Asynchronous Patient Safety and Quality Improvement Subcurriculum for First Year Medical Students to Improve Clinical Preparedness

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INTRODUCTION

- Patient safety (PS) and quality improvement (QI) are vital concepts in any healthcare environment, and some recent studies have indicated the need to better implement training in these areas into the undergraduate medical curriculum (Jackson 2018, Jain 2020)
- At the Wayne State University School of Medicine (WSUSOM), there have been unique opportunities to incorporate PS and QI training alongside other elements of the curriculum, notably gross anatomy dissections
- Here, a three-part mixed synchronous-asynchronous subcurriculum is under implementation for a first-year cohort at WSUSOM that taught students about (1) core concepts of PS and two important PS activities, clinical timeouts and handoffs and (2) core concepts of QI and several of the most important QI tools

METHODS

- Three segments were delivered chronologically:
- **First segment:** the basics of PS and several methods used to improve PS in healthcare, including clinical timeouts and handoffs, were introduced in a lecture given during the first gross anatomy dissection session to all first-year students
- Thereafter, students completed simulated timeout and handoff exercises during every dissection session, approximately 30 total in the academic year, to gain experience and build confidence with these procedures
- **Second segment:** Students were assigned an online module "QI 102: How to Improve with the Model for Improvement" from the Institute for Healthcare Improvement Open School website to be completed asynchronously
- **Third segment:** All first-year students completed a case-based learning (CBL) activity, facilitated by clinicians experienced in QI, that guided them through the creation of a QI project for primary care issue using several defined QI tools, including Model for Improvement; PDSA cycle; aim statement; process, outcome, and balancing measures; and others.
- Pre- and post- Likert surveys were administered electronically. Pre-survey (n=260/280) questions assessed understanding of PS and QI concepts, and ability to perform PS activities such as timeout and handoff and was delivered prior to the first segment. Post-survey (n=152/280) questions also assessed using QI tools in addition to previous questions and was delivered after the third segment.
- "Strongly agree" and "agree" responses were interpreted as concordance. Proportions of concordance between pre- and post-survey for questions related to general concepts and PS activities were compared via z-test with $\alpha=0.05$. Proportions of concordance with QI tool questions were analyzed with descriptive statistics.

RESULTS

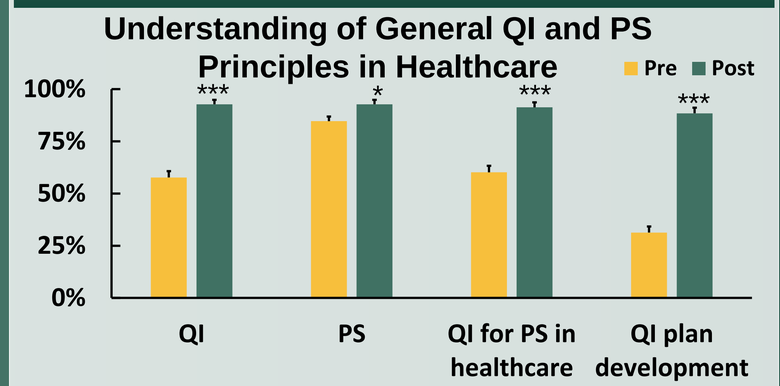

Fig. 1. QI, defining quality improvement; PS, defining patient safety; QI for PS in healthcare, understanding application of quality improvement for patient safety in healthcare; QI plan development, confidence in developing a quality improvement plan to address a patient safety issue. * represents p<0.05, *** represents p<0.001. Error bars represent standard error of the proportion.

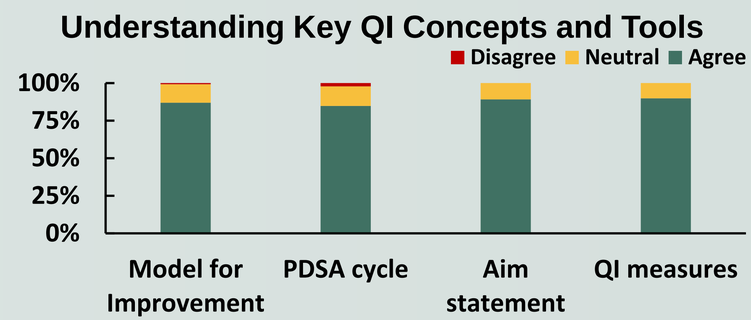

Fig. 2. Student understanding of use of various Qi tools after completion of the subcurriculum. QI measures include outcome, process, and balancing measures.

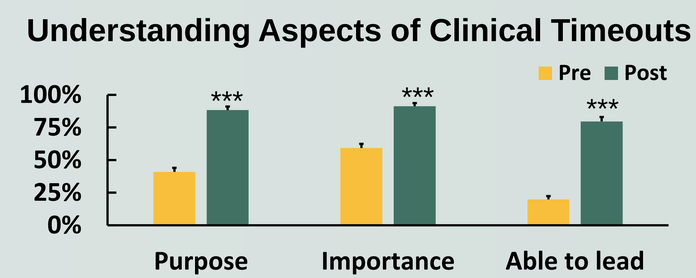

Fig. 3. Student understanding of the purpose, importance, and perceived ability to lead timeouts after the subcurriculum. *** represents p<0.001.

RESULTS

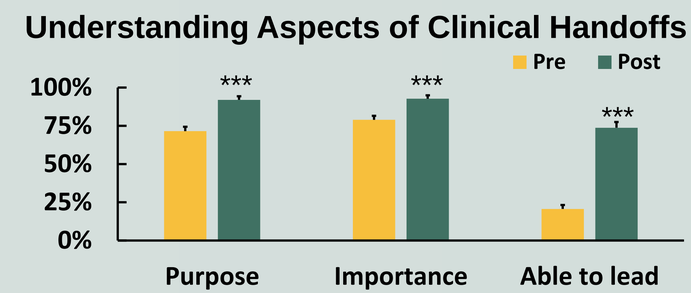

Fig. 4. Student understanding of the purpose, importance, and perceived ability to lead handoffs after the subcurriculum. *** represents p<0.001.

- In the post-survey compared to pre-, students reported a significant increase in understanding of basic QI and PS principles and the basics of using QI to improve PS in healthcare (Fig. 1)
- Critically, students' perceived ability to develop a QI plan to address a PS issue significantly increased (Fig. 1), and a high proportion feel comfortable with some of the most important tools in doing such (Fig. 2)
- Students also reported significantly increased understanding of clinical timeouts and handoffs as well as perceived ability to lead them in the future in the post-survey compared to pre- (Fig. 3, 4)

CONCLUSIONS

- The subcurriculum implemented has been effective in achieving its goals of improving the first-year cohort's understanding of general PS and QI principles, the important PS tools of timeout and handoff, and key QI tools
- The combination of asynchronous module and CBL were effective in helping help students understand the QI process
- Most importantly, students were able to develop a toolbox of QI tools to draw from when developing QI projects in the future with some experience in implementing them
- Future direction: longitudinal study of PS and QI techniques in clerkship years and beyond