Designing and Implementing Teamwork Training for Students in the Emergency Medicine Clerkship Rotation

Category of submission (select as many as apply):

Resident/Fellow Project

IOM Domains that this project addresses (select as many as apply)

Safety
Effective

Please share how you defined your project. Consider addressing the questions below. (Max 500 Words)
What was the identified Quality Gap? - What was the improvement target? - What was the timeline of the project? - Who were the stakeholders? - What was the stakeholders' input? - What was the method for collecting stakeholder input? - What was the potential for significant impact to the institution? - What was the potential for significant impact to society?

The 1999 landmark Institute of Medicine report "To Err is Human" identified miscommunication as a significant contributor to preventable medical errors in patient care. To combat that, the AAMC came out with its "Entrustable Professional Activities" (EPAs) for entering residency, which are skills they expect medical students to learn before entering residency. Two of these EPAs require that students entering residency are competent in performing patient handovers (EPA 8) and can collaborate in an interprofessional team (EPA 9). The Accreditation Council for Graduate Medical Education's CLER Pathways to Excellence also emphasized the importance of teaching and assessing the competence of student handovers and teamwork during their clinical experiences. UT Southwestern as an institution identified a lack of emphasis on interprofessional communication, teamwork, and patient handover education in the current curriculums for students in any of the health professions graduate programs. The institution's plan was to implement a longitudinal series of teamwork and communication activities into the different curriculums that built on each other and reinforced the core lessons we wanted to teach. To that end, they created an initiative called TeamFIRST and gave this project institutional priority. The specific project that I led focused on creating a curriculum for teamwork and patient handovers (which would cover communication) in the emergency medicine clinical rotation that included education, practice, and assessment. My target was to have a pilot course integrated into the current EM selective rotation by June 2021 and to improve the course each month using survey feedback from students and instructors involved in the curriculum. The stakeholders were the university's Quality Improvement Office, the TeamFIRST faculty and staff, the Emergency Medicine clerkship directors, residents, and students (including PA and medical students), among others. Stakeholder input was gathered via multiple rounds of thorough, recorded interviews

before the curriculum was designed so that I could drive the project forward with stakeholder needs at the forefront. I especially spent a lot of time interviewing previous EM clerkship students, the teaching residents, and the EM clerkship directors, since they knew the curriculum best and their needs would shape the education and assessment components of the project. For the institution, this would be a pilot test for TeamFIRST to see if they could successfully integrate the education and practice of teamwork and communication competencies into a clinical learning environment. It was recognized that these competencies are especially important in emergency medicine, given the more fast-paced, acute environment and the plethora of multi-level providers and endless distractions. The potential impact for society and patients is an increase in healthcare professionals who are formally trained to better at teamwork and communication and who will hopefully make fewer medical errors, improving the overall quality of patient care and patient safety.

Please describe how you measured the problem. Consider addressing the questions below. (Max 500 Words)

What data sources were used? - Was a numeric baseline OUTCOME measure obtained? - What defined the sample size? - What counterbalance measures were identified? - What numeric baseline COUNTERBALANCES were obtained? - Was the outcome measure clinically relevant? - Was the outcome measure a nationally recognized measure?

One of the first steps in developing this handover and teamwork curriculum was doing a literary search to figure out what currently exists about teamwork and handovers in emergency medicine. The result consisted of a few papers identifying some of the different factors in emergency medicine that contribute to a difficult environment for seamless teamwork and communication. These papers all stated that more work needed to be done in learning about these factors and in training people to handle these challenging aspects of emergency medicine. Therefore, my project became an implementation science project since the baseline at UTSW was that nothing existed yet to tackle the problem. The outcomes that we focused on also became more geared towards the implementation science side of QI. We chose to look at fidelity, acceptability, appropriateness, and feasibility as our short-term outcome measures and sustainability as a long-term measure. We quantified those areas by giving each term a specific definition and measure to collect. For example, for fidelity we could look at the %of students who completed a given activity the way it was meant to be done or how much of the curriculum was being properly executed. One challenge we faced in this project was quantifying the clinical impact of teaching things like teamwork and handover communication. To be able to correlate the medical provider improvement in our competencies with patient safety or clinician effectiveness requires long-term, well-structured data collection and analysis; however, this kind of study would be unable to feasibly control for a multitude of confounding variables that can influence patient care and safety. Therefore, since this project is still in the early stages, we chose to focus more on implementation science outcomes for the time being and to set up an effective curriculum. The curriculum includes both educational and practice-based assessment components. We also built in a way to track self-reported student competence and objective student performance in handovers. We created a handover assessment tool, as well as training modules for both

students and evaluators. That numerical measure of student performance in a handover became a part of us determining how effective the curriculum is. Additionally, TeamFIRST created certain core competencies of teamwork and handover communication, such as “structured communication” and “mutual performance monitoring”. I built learning objectives for the EM curriculum around these competencies. Using those learning objectives, we created surveys on knowledge, attitudes, and skills confidence and competence that we could administer to students before and after taking the course. This would help us show how effective the interventions are in practice in the clinical learning environment. To help instructors (i.e. residents and faculty) properly teach and assess student handover competence, we created an evaluator training and handover assessment tools for both provider and consult type handovers in EM and had residents take this training and use the tool to evaluate students while on rotation, giving us some numerical data on handover improvement. Finally, we had surveys for each participant so we could gather detailed, qualitative feedback.

Please describe how you analyzed the problem. Consider addressing the questions below. (Max 500 Words)

What was one factor contributing to the gap? - Were multiple factors contributing to the gap? - Was a structured root cause analysis undertaken? - What was the appropriate QI method or tool used for root cause analysis? - Was a root cause analysis performed prior to identifying potential solutions? - What was the rationale for selecting intervention(s)? - Did the project use a QI method or tool for selecting intervention(s)?

Our gap was unique, since it existed due to lack of institutional priority on this issue. Therefore, little had been done already to train students on effective teamwork and handover skills, and there were no opportunities for them to formally practice and receive feedback. Fortunately, the Emergency Medicine leaders who have been helping me design and execute the project have been very receptive to the idea and see its importance in the field of emergency medicine. They were excited to be able to teach teamwork and handover skills in a structured way and to give students practice on real patients while on their clinical rotation. Students too had vocalized that they wished that had been formally taught this topic and been allowed to practice while on rotation, since teamwork and handovers are ubiquitous in Emergency Medicine. Since this project was based on implementation science, we used the DMADV methodology (Define, Measure, Analyze, Design, and Verify/Validate) in the design and execution of this curriculum. The Define phase involved stating the aims, listing the stakeholders, conducted background research, and having in-depth conversations with stakeholders to better understand the problems at hand. We created process maps with this detailed information to show what the current state is like in the EM clinical rotation at UT Southwestern and to show what our proposed educational and assessment interventions would look like embedded within the current rotation. We then moved on to Measure, where we worked to create measures by which we could assess our curriculum. We use Critical-to-Quality trees when compiling the needs of our stakeholders and used those needs to create Process, Outcome, and Balancing Measures by which we could analyze the curriculum. We also gathered a team to run a Failure Modes and Effects Analysis so that we assess the risks inherent in the project and could prepare contingency plans for potential obstacles that would arise. For the Analyze stage, we mocked up test runs of the education and assessment sides of the curriculum and ran them with different levels of students and instructors

to get feedback and improve upon the project. We conducted surveys and focus group debriefs and used the feedback to move into the Design stage. In this stage, we iterated and improved upon the educational materials and assessment tools and processes to better suit the needs of our stakeholders and to be more appropriate to the aims, more feasible for the rotation we were integrating the curriculum into, and more acceptable to our stakeholders. We are currently in the Validate stage. We had the first pilot run of the curriculum with a small cohort of medical students who were taking the EM clerkship rotation over the summer and have begun data collection and analysis for use in further improving the curriculum. This will be an ongoing stage that helps us meet the aims and stakeholder needs and helps this project be sustainable and continually improving.

Please describe how you improved the problem. Consider addressing the questions below. (Max 500 Words)

What was the implementation of intervention(s) (date/time of go live)? - Was the target measure re-measured afterwards with comparison graph? - Was a structured plan for managing change used? - Was the project counterbalance re-measured with a comparison graph? - Was the counterbalance adversely affected? - Is the improvement in target outcome measure shown? - Was a statistical significance demonstrated in the outcome measure?

We officially piloted the education and assessment of teamwork and handover communication this summer of 2021. Due to COVID restrictions, the project was unfortunately slowed and could not benefit from a greater quantity of thorough, in-person trial runs before the official pilot. Additionally, changes within the EM rotation offerings themselves, less students doing away rotations at other institutions, and restrictions placed on student rotations had a ripple effect that continues to affect the rotation and the project now. We have had much smaller numbers of students to pilot with on the rotation this summer than we had originally anticipated. Because the baseline data for this project was 0, there was no good baseline measure we could compare to. Instead, we built in baseline measure of student performance, knowledge, and competence in different areas of teamwork and handover communication and compared them before and after going through the EM rotation to get an idea of how well the curriculum was working. The data collection is primarily done through online surveys which continue to collect data for us as students go through the rotation and fill them out. Therefore, even though we only have a few students' worth of data currently due to low rotation numbers this summer, we will continue to gather and analyze data over time. For sustainability of the initiative, we have integrated members of EM faculty at UT Southwestern and staff in the QI office to play roles as instructors for the curriculum, process owners, and data analysis experts. I also created detailed guides on every aspect of the project so that it can be managed effectively should anyone else take it on or have questions about it after I have graduated from medical school. Currently, we have seen the few students who have gone through the curriculum already show improvement in their knowledge and confidence in the different teamwork and communication competencies that we identified. In part due to new residents being transitioned in June and the third wave of COVID with the delta spike, we have had some drops in fidelity in aspects of the project where teaching residents were involved, but we have survey feedback data on those issues and are currently

working to improve those. As of now, the most unfeasible part has been the evaluator training and use of the handover evaluation tools in practice, so we are prioritizing that area for improvement. We also have comments from instructors running our few in-person educational sessions and have used those each block to make marginal improvements to the process. Once we have an adequate number of students who have gone through the curriculum, we will be able to conduct a full statistical analysis and hopefully be able to show significance in how effectively this curriculum meets our target measures.

Please describe the control phase of your project. Consider addressing the questions below.
What were the lessons learned from the project? - Was there communication to stakeholders of the summary of the project, and lessons learned? - Was a process owner identified? - Did the process owner acknowledge ownership of ongoing monitoring? - What control measures were identified? - What was the reaction plan for deficiencies identified in the control measure? - Was there at least one year of sustained monitoring demonstrated? - Was the project successfully diffused in scholarly form (i.e. poster, manuscript, etc)?

So far, we have learned many lessons. From students, we had to learn the balance between adding what they deemed a vital educational experience on this rotation, while not overburdening them with tasks. Being a student myself, I could relate to them about the busy life on clinical rotations. From instructors, we learned a lot of small lessons on how to teach learning objectives more effectively when we have to mix virtual and in-person learning and practice, and how to better engage students by using small groups, vignettes, and open-ended questions. From the clerkship directors, we learned how to adjust this curriculum so that it better fit into the big picture of the evolving EM clerkship offerings at UT Southwestern. They also taught me how to navigate some of the variability of emergency medicine and how to make the project flexible enough to bend, yet not break, due to that that variability. From the QI Office, TeamFIRST faculty, and the consultants we worked with, we learned how to fit this project in the bigger picture of institutional priority, and we drew on the knowledge and experience of diverse individuals to help polish our work. We all also learned many lessons just from trying to design and implement this project in the era of Covid's virtual education emphasis and clinical restrictions. We had to shift to a more flipped-classroom style of learning for some aspects and tried to automate as much of the data collection as possible. The process also had to be tested and designed all virtually rather than in the clinical learning environment itself, which had inherent challenges. The stakeholders were, and continue to be, engaged throughout this process. I created a detailed RACI matrix to determine who was responsible, accountable, consulted, and informed about the steps of the work going forward. I scheduled regular meetings with different stakeholders, mentors, and colleagues to ensure that everyone was on the same page and could contribute meaningfully to this curriculum. Since this projected just began its pilot this summer of 2021, there has not yet been a year of sustained data monitoring. Also, the emergency medicine clerkship rotation here is not offered every month during the year. We plan to continue monitoring the data for each subsequent block and compile it for a full analysis. I am also continually using each block's results to make improvements to the curriculum to be tested in the following block. Our team

hopes to share the data and the project in some form of submitted scholarly work over the next year or two.