

2016 Full Submission

Title: Pragmatic Learning: Quality Improvement Curriculum for Students rotating at Duke Regional Hospital

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Focused Question: Can proficiency in quality improvement (QI) skills of interprofessional (pharmacy students, medical students, physician assistant students) healthcare students be improved through an experiential QI curriculum that includes didactic instruction and participation in patient centered QI projects at clinical training sites?

Background: In 2000, the Institute of Medicine (IOM) report *To Err is Human* served as a call to action to improve patient safety 1. System failures are now recognized as major contributors to healthcare problems 2. Meaningful improvements have been difficult to achieve, however, and require a systemic, multidisciplinary approach to preventing medical errors 3.

In the last decade, the healthcare industry has moved from defining and measuring quality to public reporting of performance metrics 3. There has been a push to improve the quality of care provided to patients. The IOM and others recommend that health care professionals should prioritize quality and safety in their practice and be capable of performing effectively within evolving health care systems 4. All healthcare professionals should be competent in applying quality improvement's. Such professional development will require introduction of patient safety and quality improvement (QI) in curricula and assessment of competency in these domains.

Many professional societies have now endorsed imparting QI curriculum to healthcare students. The Association of American Medical Colleges (AAMC), The Accreditation Council for Pharmacy Education (ACPE), and Accreditation Standards for Physician Assistants (PA) education have all recommended the introduction of quality improvement and patient safety as part of their training 5-7. However learning how to conduct quality improvement and actually carrying out quality improvement are essentially one and the same; both are special forms of experiential learning 8. Learning by doing gives the students a chance to demonstrate that they can change systems and influence patient outcomes which will

transform them into lifelong learners and improvers of system performance and patient care 9.

Healthcare outcomes, system performance, and professional development are thus inextricably linked 10. Developing QI skills and knowledge assists in applying healthcare knowledge towards patient care. By improving system performance, QI knowledge and skills can bridge the gap between evidence based healthcare knowledge, healthcare delivery and improved patient outcomes.

Many interprofessional position papers have identified interdisciplinary teamwork, collaboration and evidence-based practice as the required themes for being competent in QI 11. Within the new paradigm shift from solo performers to high-functioning teams, QI and teamwork skills need to be developed and practiced in a multidisciplinary forum to achieve the best patient outcomes. Unfortunately, all health care students are not trained in effective QI skills and there is significant variation in the quantity and quality of QI instruction and evaluation in health professions education programs 12-16.

While evidence supports interprofessional collaboration and interprofessional education 17 and quality improvement work is often interprofessional, relatively little research has been done to study methods of teaching interprofessional teams of health professions students QI. The experience of the Institute of Healthcare Improvement's (IHI) Interdisciplinary Professional Education Collaborative suggests that local interdisciplinary teams of health professions students can learn quality improvement while working on real deficits in the health care system and that this learning experience can be both rewarding for students, and result in significant clinical outcomes 18,19 .

The work of the local interdisciplinary teams supported by the IHI was primarily in the outpatient setting however, and how to translate this work into the inpatient setting remains an area in need of study. Given the relative paucity of data about teaching QI in an IPE approach, there remains a lack of clarity about what method of teaching is most high yield for students, what type of faculty development is needed in preparation, and what setting is most likely to lead to improved patient outcomes now and in the future. A classroom-based curriculum using a simulated case was able to show positive changes in the interprofessional learners perceptions of the interprofessional team while teaching QI skills 20. However, sites that have used real life projects rather than simulations reported its added value to the learning experience 19.

The overarching goal of this multidisciplinary and experiential QI curriculum is to effectively embed QI knowledge and skills during education of students enabling incorporation of QI into their future practice.

Specific Aims:

1. Improve student participant's QI knowledge and skills as measured by Revised Quality Improvement Knowledge Application Tool (QIKAT-R).
2. Improve student participants' confidence in QI skills as measured by quality improvement confidence instrument (QICI).
3. Improve student participants' interprofessional teamwork perceptions as measured by Student

Perceptions of Interprofessional Clinical Education-Revised (SPICE-R) instrument.

4. Evaluate the impact of QI curriculum by faculty assessment of QI projects using Quality Improvement Proposal Assessment Tool (QIPAT-7) project evaluation tool.

Methods:

This is an interprofessional QI educational project involving second-year medical students, second-year PA students, fourth-year pharmacy students, and their mentors rotating on general internal medicine inpatient teams at Duke regional hospital (DRH) from 11/2016 to 10/2017. Although the start and end dates for students are disparate during a specified rotation, they work together for about 28 days during a given block.

Students will participate in 5 concurrent sets of program activities, in addition to their clinical learning during their internal medicine rotation at DRH.

- a) Weekly didactic sessions- Interactive, 60 minutes sessions will be geared towards teaching basic QI skills, high value cost conscious care, and teamwork concepts. Multidisciplinary QI experts and DRH Patient Safety and Clinical Quality Performance Improvement Program (PSCQC) office will support these sessions.
- b) Weekly multidisciplinary small group sessions - Following the didactic session, students will be divided into multidisciplinary small groups. Each group will be introduced to the QI projects identified based on priorities set by DRH PSCQC office. These sessions will be used to divide responsibilities for the following week and project planning. Tasks will be closely related to the weekly didactic session. Each small group will be assigned 2 interprofessional QI and system expert mentors.
- c) Weekly QI assignments - The week between didactic sessions will be used to perform QI project related activities. These activities will be closely linked to students' ongoing clinical rotation. Examples of such tasks include performing a process map, literature review for the project, data collection etc. At the beginning of each didactic session there will be discussion of student assignments, which will be facilitated by the faculty mentors.
- d) Reflective writing - Students will be instructed to write one page per week and reflect on their project experience. Students will be asked to reflect upon: their activities and role, their perception of importance of learning the skill in taking care of their patients, their reflection on importance of QI in their career, and any other recommendations for improvement projects. Students will be asked to submit their reflections anonymously in a centralized, secure web based forum. Faculty mentors will be asked to read the submissions prior to each session. At the beginning of each workshop some time will be dedicated for discussing student reflections.
- e) Presentations - During weekly seminars students will be asked to make informal presentations about their fieldwork performed during the previous week. In addition at the end of the block students will be asked to formally present their work during resident noon conference. Interested students will be given the option to stay involved for end of year scholarship opportunities including:
 - i) Poster submission and presentation at the Duke Patient Safety conference, Interprofessional Educational Collaborative Conference, and/or Collaboration Across Border Conference.
 - ii) Manuscript preparation and submission with description of the curriculum as well as findings of the

project to relevant QI and IPE journals.

Outcomes and measures

Before the start and at the end of the curriculum all students will be asked to electronically complete the QIKAT-R 21, QICI 22, and SPICE-R 23 instruments. QIKAT-R is a user-friendly, validated instrument used to assess QI knowledge and has good reliability in multidisciplinary setting. QICI is a 31-item instrument that measures confidence in six QI skill domains: describe the issue, build a team, define the problem, choose a target (for improvement), test the change, and extend improvement efforts. The SPICE-R survey is a 10 item validated and reliable tool used to measure perception towards inter-professional education and inter-professional collaborative practice. Faculty members will use the validated QIPAT-7 24 to evaluate the QI projects presentation.

Data Collection and analysis

Before and after responses on the survey instruments will be compared by using paired T tests for continuous variables and χ^2 test for categorical variables. Student reflections will also be qualitatively assessed for themes and as feedback for the curriculum. All data will be stored on password-protected, encrypted computers and Duke's preferred database (Redcap), and cloud-based storage (Duke Box) will be utilized, only accessible by approved study personnel.

IRB Status: Plan to submit

Challenges: Challenges include faculty development in QI and IPE, faculty time commitment, scheduling barriers for faculty and learners, project identification, infrastructural adequacy, for project support, and learner lack of interest in QI. We hope to mitigate these barriers by involving multidisciplinary faculty, having support from the institutional leadership and DRH PSCQC, keeping didactic sessions interactive and short, linking QI assignments with students' clinical rotation, and by requiring no more than 2 hours per week for completing QI activities. Keeping in mind IOM recommendations 4, we hope our curriculum will provide an opportunity for more faculty members to get involved in QI related activities. Faculty involvement will also endorse the importance of QI for learners.

Budget Template:

PI Effort	Responsibilities of PI and Co-PIs will include designing the curriculum, planning the implementation, supervision of the supporting staff, and coordination of weekly activities with faculty mentors as well as learners. We anticipate needing on an average 0.5 hours per week of PI and Co-PI support for activities related to the project	\$2500
Consult costs:		\$4800

	<p>Consultant costs will include support for a statistician and administrative support for a project manager. Statistician will be responsible for creating survey instruments in RedCap, selection of analytic methods, conduct analyses, and contribute to formal paper from this study (21 hours). Project manager will be responsible for providing administrative support for the project. Responsibilities of project manager will include providing overall support for the project, project management, coordinating weekly activities, providing technical support for didactic sessions, data collection, and checking in with the teams during the weekly QI activities to provide help as needed. We anticipate project manager support of 1-2 hours per week (75 hours).</p>	
Equipment:	<p>A laptop will be used to download software for the QI project as well as to coordinate activities related to the project. Examples of this software include Microsoft office, Microsoft Visio or Lucidchart for creating process maps, software to create control charts.</p>	\$1400
Supplies:	<p>We will create a resource library for the students to use as needed for the project. The resource library will include QI books that could be used as a reference for their weekly QI activities. Some examples of QI books include: fundamentals of healthcare improvement, measuring quality improvement in healthcare, Quality by design, Practice based learning and improvement. We also intend to use the supplies funds for printing handouts and laminated pocket cards outlining QI resources and tools for learners. Other expenses include costs of printing posters for presentation at local and national conferences.</p>	\$300
Travel:	<p>Travel funds will be used for expenses related to presentation of the project at national conferences.</p>	\$1000
Total Requested:		10,000

- Works Cited:**
1. Kohn L, Corrigan J, Donaldson M. Institute of medicine. To err is human building a safer health system. . 1999;ISBN 0-309-06837-1.
 2. Institute of medicine. Crossing the quality chasm: A new health system for the 21st century. 2001.
 3. Kamath A. The journey from I to we: Building effective teams. SGIM Forum. 2015; 38(4).
 4. Greener A, Kneel E, editors. Committee on the health professions education summit, institute of medicine. Health professions education: A bridge to quality. 2003.
 5. Contemporary issues in medicine: Quality of care. Medical school objectives project. . August 2001.
 6. Accreditation standards for physician assistant education, fourth edition. <http://arc-pa.org/documents/Standards4theditionwithclarifyignchanges10.2011fnl.pdf>. Accessed August, 9th, 2016.
 7. Accreditation council for pharmacy education accreditation standards and key elements for the professional program in pharmacy leading to the doctor of pharmacy degree. <https://www.acpe-accredit.org/pdf/Standards2016FINAL.pdf>. Accessed August, 9th, 2016.
 8. Batalden P, Davidoff F. Teaching quality improvement: The devil is in the details. JAMA. 2007; 298(9): 1059-1061. doi: 298/9/1059 [pii].
 9. Jones AC, Shipman SA, Ogrinc G. Key characteristics of successful quality improvement curricula in physician education: A realist review. BMJ Qual Saf. 2015;24(1):77-88. doi: 10.1136/bmjqs-2014-002846 [doi].
 10. Batalden PB, Davidoff F. What is "quality improvement" and how can it transform healthcare? Qual Saf Health Care. 2007;16(1):2-3. doi: 16/1/2 [pii].
 11. Moran KM, Harris IB, Valenta AL. Competencies for patient safety and quality improvement: A synthesis of recommendations in influential position papers. Jt Comm J Qual Patient Saf. 2016;42(4):162-169.
 12. Warholak TL, Holdford DA, West D, et al. Perspectives on educating pharmacy students about the science of safety. Am J Pharm Educ. 2011;75(7):142. doi: 10.5688/ajpe757142 [doi].
 13. Tregunno D, Ginsburg L, Clarke B, Norton P. Integrating patient safety into health professionals' curricula: A qualitative study of medical, nursing and pharmacy faculty perspectives. BMJ Qual Saf. 2014;23(3):257-264. doi: 10.1136/bmjqs-2013-001900 [doi].
 14. Teigland CL, Blasiak RC, Wilson LA, Hines RE, Meyerhoff KL, Viera AJ. Patient safety and quality improvement education: A cross-sectional study of medical students' preferences and attitudes. BMC Med Educ. 2013;13:16-6920-13-16. doi: 10.1186/1472-6920-13-16 [doi].
 15. Kayingo G, Kidd VD, Warner ML. Patient-centered medical homes and physician assistant education: Preparing the PA student for the practice of the future. J Physician Assist Educ. 2014;25(4):21-28.
 16. Kayingo G, Deon Kidd V, Gilani O, Warner ML. Primary care teams, composition, roles, and satisfaction of PA students during primary care rotations. J Physician Assist Educ. 2015;26(2):88-92.
 17. Reeves S, Perrier L, Goldman J, Freeth D, Zwarenstein M. Interprofessional education: Effects on professional practice and healthcare outcomes (update). Cochrane Database Syst Rev. 2013;(3):CD002213. doi(3):CD002213. doi: 10.1002/14651858.CD002213.pub3 [doi].
 18. Balestreire JJ, Gerrity P, Geller A, et al. Teams in a community setting: The AUHS experience. Qual Manag Health Care. 1998;6(2):31-37.
 19. Gordon PR, Carlson L, Chessman A, Kundrat ML, Morahan PS, Headrick LA. A multisite collaborative for the development of interdisciplinary education in continuous improvement for health professions

students. *Acad Med.* 1996;71(9):973-978.

20. Dobson RT, Stevenson K, Busch A, Scott DJ, Henry C, Wall PA. A quality improvement activity to promote interprofessional collaboration among health professions students. *Am J Pharm Educ.* 2009;73(4):64.

21. Singh MK, Ogrinc G, Cox KR, et al. The quality improvement knowledge application tool revised (QIKAT-R). *Acad Med.* 2014;89(10):1386-1391. doi: 10.1097/ACM.0000000000000456 [doi].

22. Hess BJ, Johnston MM, Lynn LA, Conforti LN, Holmboe ES. Development of an instrument to evaluate residents' confidence in quality improvement. *Jt Comm J Qual Patient Saf.* 2013;39(11):502-510.

23. Dominguez DG, Fike DS, MacLaughlin EJ, Zorek JA. A comparison of the validity of two instruments assessing health professional student perceptions of interprofessional education and practice. *J Interprof Care.* 2015;29(2):144-149. doi: 10.3109/13561820.2014.947360 [doi].

24. Leenstra JL, Beckman TJ, Reed DA, et al. Validation of a method for assessing resident physicians' quality improvement proposals. *J Gen Intern Med.* 2007;22(9):1330-1334. doi: 10.1007/s11606-007-0260-y [doi].