Utilizing Practice-Based Research Networks to Teach and Implement Quality Improvement in Academic Medicine

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BACKGROUND AND OBJECTIVES: A 2019 study found that between 2014 and 2017, family medicine residents had little improvement in self-assessed preparedness to lead quality improvement projects. This study explored the effectiveness of leveraging a practice-based research network (PBRN) across multiple family medicine residencies not only for implementing quality improvement projects, but also as a teaching tool designed to improve knowledge, attitudes, beliefs, and leadership skills in family medicine faculty and residents.

METHODS: Residents in family medicine residency programs and one community internal medicine program and family medicine teaching faculty participated in a PBRN-led quality improvement project (QIP) to improve colon cancer screening in their clinic. Of 101 participants, 79 (78%) were residents and 22 (22%) were faculty or attending physicians. Questions surveying participants’ knowledge and confidence related to QIP before and after the QIP were given.

RESULTS: Overall, participants reported an improvement in their basic understanding of QI concepts (P= .004). They also reported having sufficient staff and ancillary support to meaningfully participate (P= .033). Participants indicated they had more confidence in their ability to participate in a QI project (P= .002), initiate, design, and lead such a project (P= .001), and teach their peers and staff basic QI concepts (P< .001).

CONCLUSIONS: PBRNs appear to be a unique way to subjectively improve residents’ confidence in their quality improvement skills. PBRNs should be further explored as a method for educating family medicine residents in quality improvement.

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As recognized by the Accreditation Council for Graduate Medical Education (ACGME), quality improvement (QI) projects are a critical and standard component of family medicine residency training. QI projects (QIP) not only have the capacity to improve patient outcomes and delivery of care, but they also have the added benefit of incorporating lifelong learning into residents’ medical careers. By having exposure to QI techniques during their residency training, future generations of physicians will possibly be able to develop and lead evidence-based QIPs in their own practices, thereby continuously engaging in efforts to improve patient care, and enhancing population-based medicine within their clinic settings.

The current state of teaching QI to residents, however, seems ineffective in providing educationally meaningful outcomes. Implementing a longitudinal QI curriculum for their family medicine residents, Potts et al demonstrated little improvement in the residents’ self-rated ability to analyze their practice using QI methods. Similarly, a 2019 study found that between 2014 and 2017, family medicine residents had little improvement in self-assessed preparedness to lead QI projects. In order to bridge the gap for the residents and help them in future QI projects, new and innovative ways to teach QI to family medicine faculty and residents are needed. The Agency for Healthcare Research and Quality states they support the practice-based research network’s ability to improve the health of all Americans, and the potential of these networks to engage clinicians in quality improvement activities.

Evidence supporting the utility a practice-based research network (PBRN) as a teaching tool for
QI is unknown. Southern Area Patient Oriented Research Organization (SAPORO), a PBRN that focuses on primary care clinics in the Gulf South region, conducted a multi-center QI project to increase colorectal cancer screening in the primary care setting. In this study, we investigated the effectiveness of utilizing a PBRN across multiple family medicine teaching sites (six family medicine residency programs and one family medicine clinic) for not only implementing QI projects but also as a teaching tool designed to improve knowledge, skills, and attitudes in family medicine faculty and residents.

Methods
The Tulane University Institutional Research Review Board approved this quality improvement project as exempt. We took the knowledge, attitudes, and beliefs data for this study from a pre- and post-survey done as part of a QIP to improve colorectal cancer screening in primary care clinics. This was an optional QI project to improve colorectal cancer (CRC) screening rates according to United States Preventive Service Task Force Guidelines offered to both residents and faculty continuity clinics across six family medicine residency programs and one family medicine faculty department who teach in a medical school, and one private family medicine clinic who is an active preceptor of medical students. All clinics were located in Louisiana and were also members of the SAPORO PBRN. One internal medicine residency program associated with a family medicine residency program asked to participate and was allowed to join for this project. No consent was needed for the study and a waiver was obtained, as no patient identifying data was collected as part of this QIP.

Each participating clinician completed a preintervention and postintervention survey hosted on a Health Insurance Portability and Accountability Act-compliant, cloud-based survey database. The survey included baseline CRC screening rates of patient populations; quantitative and qualitative data on the feasibility of QI projects in the physician’s clinic; barriers to improving colon cancer screening rates; and assessment of physicians’ knowledge, attitudes, and beliefs about QI. We sent clinicians personalized, secure links to access their respective surveys.

We allowed each clinic site the freedom to choose two or more evidence-based QI interventions deemed appropriate to the clinic. Interventions for CRC screening varied by each site, though all sites utilized some form of print materials such as promotional pamphlets and posters by the Centers for Disease Control and Prevention, fecal immunochemical test kit instructions, and informational pocket cards for physicians to use with patients. Some sites had additional intervention components such as nurse staff education, a walk promoting colon cancer awareness, phone calls to eligible patients, or a dedicated medical assistant for the QI project. We carried out the implemented intervention for a minimum of 2 months. Table 2 demonstrates overall flow of the PBRN-implemented QIP, what educational interventions were done to educate the PBRN participants, when data was collected, and when it was dispersed to the participating sites.

We collected new data on the screening rates after implementation of the intervention. We utilized SPSS Statistics (IBM SPSS, Inc, Armonk, NY) to determine descriptive statistics and to analyze the data for any correlations. We presented preliminary data to the SAPORO Network as a whole during an annual research day.

Finalized data and site-specific data were presented to each clinic individually along with a review of which interventions were most effective in improving screening rates.

Results
We invited 219 participants to participate in the QI project, and complete data were available for 101 participants. Of 101 participants, 79 (78%) were residents, and 22 (22%) were faculty or attending physicians. Of the residents, 36 (46%) were interns at the start of the QI project, and 43 (54%) were in their second postgraduate year of training. All participants completed surveys and submitted CRC screening data on 10 patients both prior to and following the QI intervention.

### Table 1: Inclusion and Exclusion Criteria

| Inclusion Criteria                                                                 | Exclusion Criteria                                                                 |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
| • Faculty and residents practicing in a SAPORO clinic                              | • Faculty or residents who do not have an active practice in an outpatient clinic associated with SAPORO |
| • In good standing with their respective clinic and/or university                  | • Faculty or residents not in good standing or those with restricted licensure |
| • Must directly care for patients in a SAPORO clinic setting or directly oversee residents/students in such a setting | • Time spent in clinics not associated with SAPORO by a SAPORO clinician is not to be included in the demographic study |
| • Has an active unrestricted license to practice in their area of expertise         | • Patient care time spent in inpatient or emergency care settings                  |
|                                                                                  | • Visiting faculty, residents doing an away rotation at a SAPORO clinic, medical students, or other personnel not normally associated with the SAPORO clinic |

Abbreviation: SAPORO, Southern Area Patient-Oriented Research Organization.
Questions surveying participants’ knowledge and confidence related to QI showed marked improvement following the QI project (Table 3). Overall, participants reported an improvement in a basic understanding of QI concepts (\(P=.004\)). They also increasingly felt that they had sufficient staff and ancillary support to meaningfully participate in QI projects (\(P=.033\)). Participants indicated they had more confidence in their ability to participate in a QI project (\(P=.002\)); initiate, design, and lead such a project (\(P=.001\)); and teach their peers and staff basic QI concepts (\(P<.001\)).

Table 2: Practice-Based Research Network Quality Improvement Cycle

| Step 1                                      | Step 2                                      | Step 3                                      | Step 4                                      | Step 5                                      |
|---------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|
| Lecture on United Stated Cancer Colon Cancer Screening Guidelines given to each site | Surveys sent out and data gathered on 10 patients each | Baseline data presented for each site | QI interventions implemented for each site for a minimum of 2 months | Second survey is sent out to gather postintervention data |
| Descriptions of PBRN QIP and time for questions to residents and faculty at each site | Each site selected QI intervention that feasible for their clinics | Lecture on QI Plan Do Study Technique given | Monthly phone conferences held as check-ins to problem solve | Postintervention data is presented at each site and at a research day where all PBRN participated in research and QI training |

Abbreviations: PBRN, practice-based research network; QIP, quality improvement project.

Questions surveying the importance of QI generally had improved scores following the QI project, though only one question demonstrated statistically significant improvement in the response. Postintervention, participants felt more strongly that quality improvement improves patient outcomes (\(P=.044\)).

Table 3: Survey Responses Assessing QI Knowledge, Attitudes, and Beliefs

| QI Importance Questions                                      | Overall          | Faculty          | Residents         |
|--------------------------------------------------------------|------------------|------------------|-------------------|
|                                                              | Score Improved (%) | Score Got Worse (%) | \(P\) Value | Score Improved (%) | Score Got Worse (%) | \(P\) Value | Score Improved (%) | Score Got Worse (%) | \(P\) Value |
| 1. Quality improvement projects can improve faculty and staff morale. | 30 | 30 | .539 | 27 | 23 | .831 | 30 | 32 | .445 |
| 2. Quality improvement adds unnecessary administrative burden to my practice. | 37 | 22 | .131 | 41 | 14 | .071 | 35 | 24 | .356 |
| 3. Quality improvement improves patient outcomes. | 27 | 14 | .044 | 32 | 9 | .083 | 25 | 15 | .158 |
| 4. Participating in the quality improvement process helps prevent burn out. | 30 | 28 | .600 | 32 | 18 | .507 | 29 | 30 | .705 |
| 5. Participating in quality improvement can help faculty and staff feel more engaged and excited about their job. | 34 | 28 | .521 | 41 | 5 | .052 | 32 | 34 | .869 |
| 6. Quality improvement has a meaningful positive impact on me as a physician. | 30 | 31 | .836 | 23 | 32 | .439 | 32 | 30 | .604 |
| 7. Quality improvement is has meaningful positive impact on my patients. | 31 | 17 | .112 | 36 | 18 | .356 | 29 | 16 | .189 |
| 8. Participating in quality improvement is essential for my ongoing development as a physician. | 31 | 26 | .282 | 32 | 14 | .131 | 30 | 29 | .634 |

(continued on next page)
Table 3: Continued

| QI Importance Questions | Overall | Faculty | Residents |
|-------------------------|---------|---------|-----------|
|                         | Score Improved (%) | Score Got Worse (%) | P Value | Score Improved (%) | Score Got Worse (%) | P Value | Score Improved (%) | Score Got Worse (%) | P Value |
| 10 Quality improvement is mostly another checkbox I have to check off to meet unnecessary certification requirements. | 33 | 25 | .211 | 36 | 9 | .032 | 32 | 29 | .775 |
| QI Confidence Questions |         |         |          |
| 1 Quality improvement is feasible to do in a typical busy primary care clinic. | 30 | 31 | .87 | 18 | 45 | .186 | 33 | 27 | .428 |
| 2 I have sufficient time to meaningfully participate in quality improvement projects. | 33 | 23 | .071 | 23 | 23 | .782 | 35 | 23 | .041 |
| 3 I have sufficient technical support and ability to use my EHR to participate meaningfully in quality improvement projects | 35 | 24 | .102 | 36 | 23 | .396 | 34 | 24 | .16 |
| 4 I have sufficient staff and ancillary support to meaningfully participate in quality improvement projects. | 31 | 20 | .033 | 32 | 18 | .285 | 30 | 20 | .056 |
| 5 My administration is supportive of quality improvement projects that I would like to implement in my own practice. | 30 | 19 | .085 | 27 | 27 | .614 | 30 | 16 | .095 |
| 6 I feel I have a good basic understanding of quality improvement concepts. | 32 | 11 | .004 | 18 | 9 | .414 | 35 | 11 | .005 |
| 7 I feel confident in my ability to participate in a quality improvement project. | 35 | 15 | .002 | 27 | 14 | .19 | 37 | 15 | .004 |
| 8 I feel confident in my ability to initiate, design, and lead a quality improvement project. | 41 | 19 | .001 | 23 | 32 | .644 | 47 | 15 | <.001 |
| 9 I feel confident I can teach basic quality improvement concepts to other medical faculty and staff. | 44 | 16 | <.001 | 36 | 27 | .973 | 46 | 13 | <.001 |
| 10 I feel confident that I can utilize my quality improvement skills to address issues in my own clinic. | 30 | 18 | .062 | 32 | 9 | .07 | 29 | 20 | .225 |

Abbreviations: QI, quality improvement; EHR, electronic health record.

The two questions assessing potential negative perspectives on QI did not significantly improve following the project (reflected in a decreased score). Faculty reported a statistically significant improvement in the statement that continuous QI creates a positive teamwork atmosphere in the clinic (P=.021), though there were no statistically significant responses to questions regarding confidence with QI. Alternatively, residents did not report any statistically significant improvements in regards to QI importance, but improved significantly concerning confidence with QI. Residents reported improvement in feeling they had sufficient time for QI (P=.041), had a good basic understanding of QI concepts (P=.005), were able to participate in a QI project (P=.004), initiate/design/lead a QI project (P<.001), and that they could teach basic QI concepts to others (P<.001).

The five additional questions in the postintervention survey assessing each participant’s experience with the QI project were predominately positive, with almost all results (median=4, interquartile range
This study was in ADDRESS CORRECTION

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