SPECIAL SERIES: TEAMS IN CANCER CARE

quality in action

Team Science Principles Enhance Cancer Care Delivery Quality Improvement: Interdisciplinary Implementation of Breast Cancer Screening Shared Decision Making

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abstract

PURPOSE Implementing shared decision making (SDM), recommended in screening mammography by national guidelines for women age 40-49 years, faces challenges that innovations in quality improvement and team science (TS) are poised to address. We aimed to improve the effectiveness, patient-centeredness, and efficiency of SDM in primary care for breast cancer screening.

METHODS Our interdisciplinary team included primary and specialty care, psychology, epidemiology, communication science, engineering, and stakeholders (patients and clinicians). Over a 6-year period, we executed two iterative cycles of plan-do-study-act (PDSA) to develop, revise, and implement a SDM tool using TS principles. Patient and physician surveys and retrospective analysis of tool performance informed our first PDSA cycle. Patient and physician surveys, toolkit use, and clinical outcomes in the second PDSA cycle supported SDM implementation. We gathered team member assessments on the importance of individual TS activities.

RESULTS Our first PDSA cycle successfully generated a SDM tool called Breast Cancer Risk Estimator, deemed valuable by 87% of patients surveyed. Our second PDSA cycle increased Breast Cancer Risk Estimator utilization, from 2,000 sessions in 2017 to 4,097 sessions in 2019 while maintaining early-stage breast cancer diagnoses. Although TS activities such as culture, trust, and communication needed to be sustained throughout the project, shared goals, research/data infrastructure support, and leadership were more important earlier in the project and persisted in the later stages of the project.

CONCLUSION Combining rigorous quality improvement and TS principles can support the complex, interdependent, and interdisciplinary activities necessary to improve cancer care delivery exemplified by our implementation of a breast cancer screening SDM tool.

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INTRODUCTION

Breast cancer is a leading cause of death for women age 35-49 years.[1] Mammography reduces breast cancer mortality for women age between 40 and 49 years.[2-5] However, screening mammography is not without negative consequences such as increased health care utilization and patient anxiety because of false positives and benign biopsies.[6-9] Shared decision making (SDM) is recommended in national guidelines for women age 40-49 years.[2,4] The implementation of SDM for these women faces myriad challenges in practice,[10,11] revealing a familiar gap: cancer care delivery requires effective and high-performing teams to implement patient-centered programs.[12]

In this article, we highlight key quality improvement (QI) and team science (TS) principles used to help an interdisciplinary team implement voluntary SDM in primary care visits for breast cancer screening in women age 40-49 years. We used an iterative plan-do-study-act (PDSA)[13] framework with a TS lens focused on shared goals, communication, culture, research support, data management, and leadership[14] to codify and then implement an electronic health record (EHR)-embedded tool called the Breast Cancer Risk Estimator (B~CARE). Our project had two aims: (1) to establish B~CARE 1.0, a web accessible and EHR-embedded SDM tool that presents breast cancer risk factors and facilitates SDM for screening mammography in primary care focusing on the outcomes of patient/provider acceptability (patient satisfaction and provider satisfaction) and (2) to revise B~CARE 1.0 and implement B~CARE 2.0, focusing on utilization in clinical settings and diagnosis of early-stage breast cancer.

METHODS

Our QI project was conducted in the University of Wisconsin (UW) academic medical center composed

ASSOCIATED CONTENT

Data Supplement

Author affiliations and support information (if applicable) appear at the end of this article.

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of the health system (UW Health) and the medical school (UW School of Medicine and Public Health), which exists within the culture of the University (UW-Madison).

Team Science

At UW, our team was on the leading edge of developing an ecosystem in which clinicians and researchers (Data Supplement, online only) use PDSA[13] cycles to iteratively improve quality.[15,16] Medically trained team members included a radiologist specializing in breast imaging and decision support (E.S.B.); a family medicine physician, specializing in women's health (S.S.); and a clinician who has integrated decision aids into EHRs (J.K.). Clinicians were joined by experts in population health science and breast cancer policy modeling (A.T.-D.), cancer communication and digital media (D.S.), simulation modeling and optimal health care policy (O.A.), and health psychology (L.D.). The team was complemented by strong and consistent project management[17] (T.L.) to support communication, coordination tools, trainings, and process redesign.[18,19] We were supported by advocates and leaders across the enterprise, including patients[20] and clinicians.

During intense implementation periods, our team met every other week and communicated frequently by e-mail. We used strategies to convene small groups with a specific collection of the most relevant skill sets for each meeting, which added to efficiency—further attesting to the value of our project management lead (T.L.), who matched the meeting attendees to agendas and desired meeting outcomes. Coordination of expertise was the responsibility of the leads. However, each team member championed their unique area of expertise.

Our team had high task interdependence,[21] and thus, at the start in 2016, we implemented TS best practices as soon as they became available in the literature.[12,21-26] For this summary of our QI efforts, we extracted six TS principles from the literature,[14] documented to increase rigor and reproducibility, and collapsed them into four TS best practice dimensions, for simplicity. Specifically, from the study by Rolland et al,[14] we left the first (mission, vision, and goals) and the sixth (leadership) TS best practices intact. We combined the second and third TS best practices (culture of trust and communication) and the third and fourth (operations management and data management) to enable our team to match these four TS best practice dimensions (Table 1) with our PDSA process over time.

Our team asynchronously discussed the mapping of these four TS best practice dimensions to the PDSA cycles and phases of each cycle. The lead author (E.S.B.) consolidated the group consensus into Table 1, which was then checked independently by each of the authors who fed back their comments. Any disagreements were discussed and resolved, thereby reaching consensus regarding which TS behaviors were most important for each PDSA cycle and phase.

Quality Improvement

PDSA cycle 1 (January 1, 2013-December 31, 2015): Our team collaboratively developed an application for pilot funding to support development of B~CARE 1.0 for risk-based mammography SDM. We developed B~CARE 1.0 in partnership with a patient advisory committee[27]—see the Data Supplement for more details, interviews with 17 representative primary care providers (six internal medicine, eight family medicine, and three obstetrics/gynecology), and published literature related to communication techniques[28] and risk stratification methods[29] (*Plan*). Eleven providers were invited to test B~CARE 1.0 (*Do*). After these providers engaged in conversations with 51 women considering mammography using B~CARE 1.0, we surveyed these patients and providers to assess feasibility, satisfaction, and potential outcomes[29-31] (*Study*). On the basis of patient[30,32] and provider[30] input, we made modifications to B~CARE 1.0 (*Act*) in advance of implementation (Fig 1).

PDSA cycle 2 (January 1, 2016-December 31, 2018): Our team codified core components of breast cancer screening SDM via a Delphi[33]—see the Data Supplement for details of patient/provider contributions, the development of a Toolkit,[34] and alignment with UW Health clinical SDM guidelines in preparation for widespread clinical use of B~CARE 2.0 (*Plan*). During the B~CARE 2.0 rollout, we aligned organizational leadership to support a dedicated educational campaign for all primary care providers (*Do*). We gathered ongoing acceptability, utilization, and clinical outcomes data including screening rates, early-stage (Surveillance, Epidemiology, and End Results definition: stage in situ and localized) cancer diagnosis, and provider surveys (*Study*). To integrate and communicate best practices and

TABLE 1. Team Science Best Practices Associated With Project Activities at Each Stage of the PDSA Cycles According to Team Member Assessment/Consensus

Team Science Dimension[cites]	Method/Activity	PDSA Cycle 1	PDSA Cycle 2
Shared mission, vision, and goals[25,37]	Developed in funding proposals articulating all aspects of project	P, D, S, A	P, A
Culture, trust, and communication[38,39]	Continually emphasizing psychological safety	P, D, S, A	P, D, S, A
Operations and data management[17-19]	Project management, secure cloud storage	D, S	S
Leadership development and implementation[23,35,36,40]	Training in transformational leadership, team coaching	P, D, S, A	P, A

Abbreviation: PDSA, plan-do-study-act.

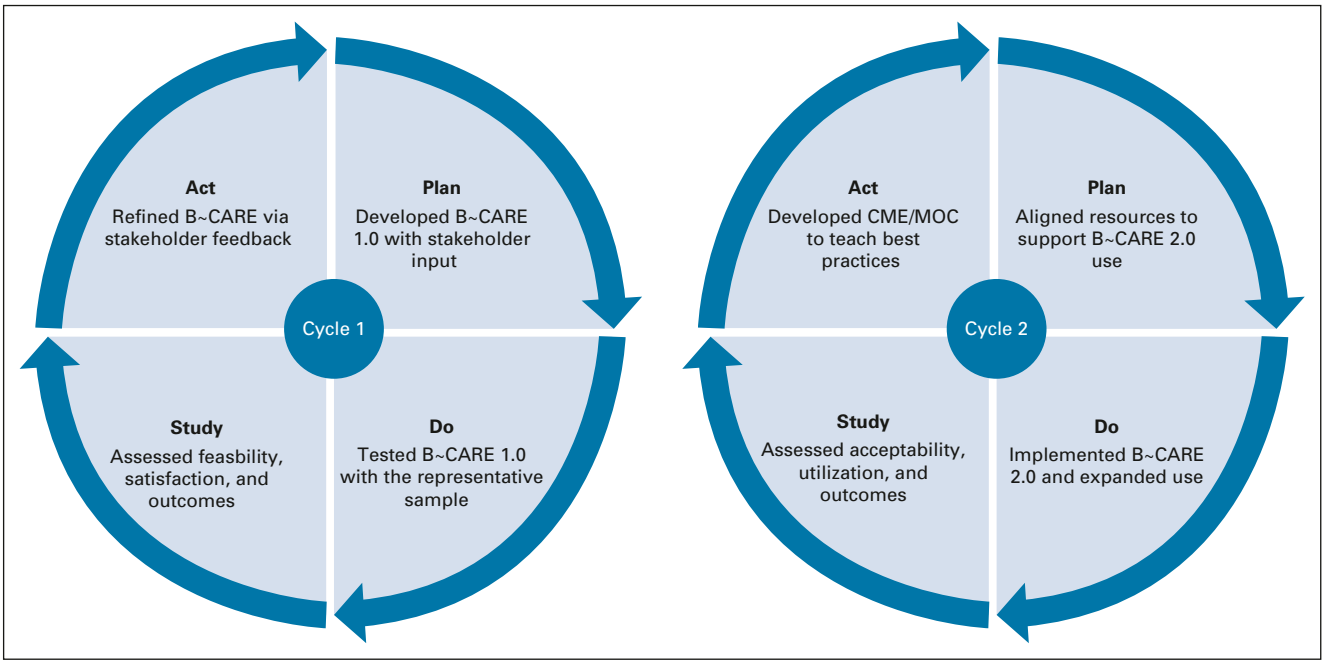

FIG 1. Graphical depiction of the activities in each of the two PDSA cycles. B~CARE, Breast Cancer Risk Estimator; CME, Continuing Medical Education; MOC, Maintenance of Certification; PDSA, plan-do-study-act.

prepare for further continuous improvement, interprofessional Continuing Medical Education (CME) and Maintenance of Certification (MOC) modules were developed and made available (*Act*). We also measured B~CARE toolkit downloads and CME/MOC participation.

RESULTS

Retrospective analysis demonstrated the feasibility of B~CARE on our patient population.[29] Patient survey results indicate that 87% (45 of 51) found use of B~CARE 2.0 to be valuable when discussing screening mammography with their primary care provider. Patient-identified challenges include the need for explanation of complex terms such as overdiagnosis and false positives. All primary care providers reported that B~CARE 2.0 facilitated SDM, noting that graphic representations of personal risk/benefit assessment improved shared understanding (eg, of breast cancer risk and of possible screening outcomes such as true and false positives) and knowledge transfer. Provider-identified barriers included not enough time for discussion although having the SDM available in the EHR helped.[28,30,31] We also found that primary care provider framing of risk and potential outcomes during the SDM interaction influenced patient satisfaction.[31]

Team consensus (Table 1) revealed that TS principles varied by the PDSA cycle and phase. For example, we needed to establish and reinforce shared goals[22] clearly and more intentionally in the first PDSA cycle, work that carried forward to the second cycle. Precise, timely, and accurate[21] communication and intentional trust building were important for both PDSA cycles and all phases. Research management and data management, once established in the first PDSA cycle, were leveraged and required less effort in the second PDSA cycle. Our sustained, interdisciplinary leadership team, especially the co-leaders from radiology and family medicine (E.S.B. and S.S., respectively), invested time in learning and implementing transformational leadership[35,36] techniques to support evidence-based TS best practice dimensions, which also extended to cycle two, with focused attention on plan and act.

Utilization of the B~CARE tool, available in the EHR and online (Fig 2), increased steadily between 2016 and 2019 without major changes in the underlying clinical population. In 2017 compared with 2019, the two full years available for cumulative analysis, B~CARE use more than doubled going from 2,000 to 4,097 sessions either through the EHR or online. The Toolkit[34] was downloaded 261 times by both local and international audiences. During the same time, health system mammography screening rates, for all medically homed patients, remained stable and the proportion of early-stage cancers remained steady or increased (Data Supplement). Fifty-three primary care providers accessed the CME module. Twenty-seven completed the module for credit (51%), all of whom proceeded to the MOC exercise.

DISCUSSION

Relying on TS principles relevant to cancer prevention and control and established QI techniques, we developed and implemented SDM for breast cancer screening targeting 40- to 49-year-old women. We found that in the first PDSA iteration, we needed to rigorously apply the TS principles,

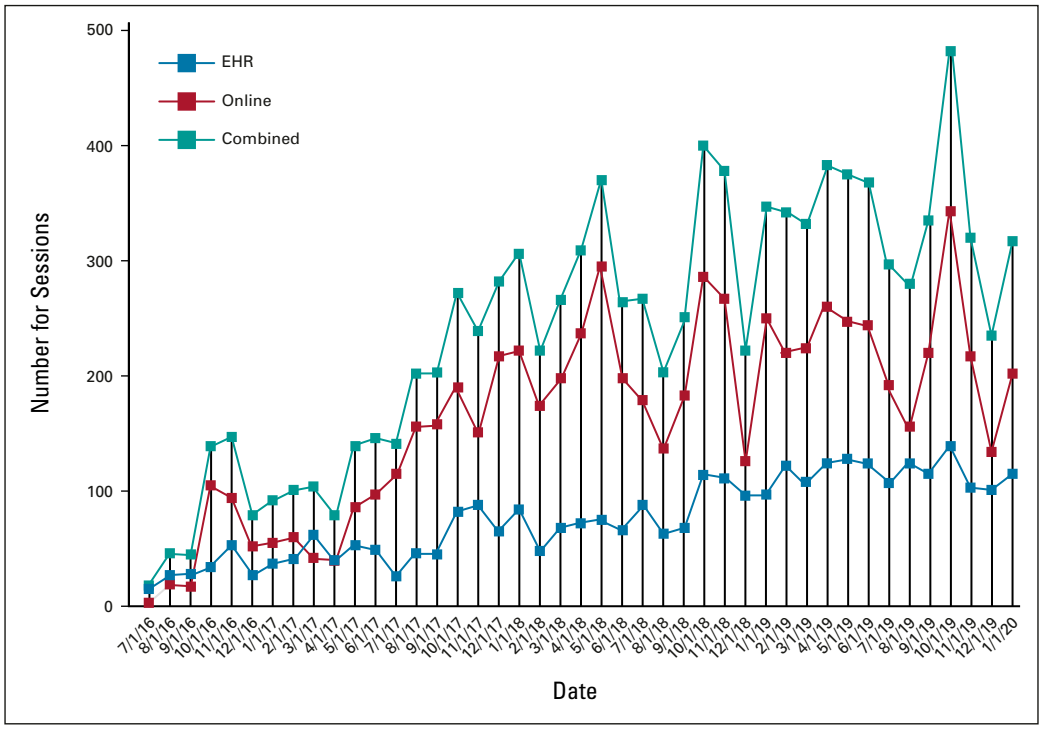

FIG 2. Monthly SDM sessions recorded after implementation of the B~CARE tool in July 2016. B~CARE, Breast Cancer Risk Estimator; SDM, shared decision making.

which we could relax slightly in the second PDSA iteration except for continuous, intentional communication and trust building. One key to our success is that our tool, available in the EHR, is convenient for busy providers. Many similar tools are only web-based[41] and thus not integrated in provider workflow in the EHR. Our investment in the creation of a toolkit and CME/MOC modules supports robust local dissemination, implementation, and sustainability as well as increasing the chances of generalizability and use in other clinical practices.

Several challenges and opportunities remain. In the future, we plan to better determine the utilization rates and effectiveness of SDM and more directly tie B~CARE use to breast cancer outcomes. In addition, mammographic screening[42] (and likely SDM rates, although this is beyond the scope of this article) decreased substantially during disruptions because of the COVID-19 pandemic, resulting in screening delays and likely future worsened breast cancer outcomes. Optimizing B~CARE to support primary care providers' ability to deliver effective, patient-centered, timely SDM for breast cancer screening will be crucially important.

In concert with successful projects like ours, the UW academic medical center has increasingly adopted PDSA[43,44] to advance our learning health system approaches to deliver clinical and operational improvement and generalizable knowledge. The literature supports using TS advances in cancer care delivery including SDM implementation[45] and EHR interventions[46] to support high-performing teams to implement patient-centered programs.[12] Merging TS and PDSA QI cycles underpins the iterative Data to Knowledge, Knowledge to Practice, and Practice to Data[47] paradigm key to advancing learning health system scalability, catalyzing evidence-based[48] cancer care delivery, and achieving improved patient outcomes.

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