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Increasing Breast Cancer Screening Rates Among Women Ages 40 to 74 in an Urban Safety Net Primary Care Clinic: A Quality Improvement Project

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Abstract

Background and Problem Description: Breast cancer continues to be the most common and second most lethal form of cancer among women in the U.S. Although there have been improvements in breast cancer screening in the US, major disparities persist. The national breast cancer screening rate for the year 2021 was 75.6%; the rate for the underserved and minority population was 54%. This QI project took place at a Federally Qualified Health Center that provides medical care to medically underserved and vulnerable populations.

Purpose and Aim: This project aimed to increase breast cancer screening at the proposed site to optimize early detection and improve clinical outcomes for underserved women ages 40 to 74. The overarching aim of this project was to develop, implement, and evaluate an outreach strategy intervention to increase breast cancer screening rates among women who were not up to date or have missed appointments. The goal was to increase BCS by 4% above baseline.

Method: The health belief model guided the development of the outreach strategy. The model used for the evaluation of this project was the Plan-Do-Check-Act cycle. Support from stakeholders was obtained and an outreach list was generated. Phone calls were placed, and participants were successfully contacted. Education was provided as needed, barriers assessed, and appointments were scheduled. A provider satisfaction survey was used to assess the feasibility and value of the outreach intervention.

Intervention: The intervention consisted of a telephone call to women who have missed screening appointments, an assessment of barriers to completing their screenings, scheduling an appointment, and offering expert education. This intervention used a navigator approach to guide women through the screening process.

Results: Sixty one percent of the patients called (n=14) were successfully contacted. Of this number, 92.85% accepted screening and scheduled an appointment for a mammogram exam and 38.46% completed the exam. One hundred percent of the providers completed the post-intervention survey and found the intervention feasible and valuable for patient care outcomes.

Conclusion: The results demonstrated that patients are aware of the need for BCS and are willing to have the exam completed. The phone call intervention provided further incentive regarding the need for timely screening. This was demonstrated by 92.85% of patients who received the phone call scheduling an appointment. Further work should consider a larger sample size.

Introduction

Breast cancer is the most prevalent cancer affecting women globally, and it affects several body organs, including breasts, blood, pancreas, and lungs (Waggoner, 2021). The development of breast cancer in the human body is attributed to tumor cells' aberrant development and invasion of the surrounding tissues. Breast cancer is diagnosed using various screening methods; although mammography is the most effective technique and is widely utilized (White et al., 2017). Screening mammography has been demonstrated to be and remains the most effective way to decrease breast cancer mortality (Chan et al., 2018; Flores et al., 2019; Molina et al., 2018a; Schwartz et al., 2021). Several perspectives of mammography are routinely applied, including medial-lateral oblique (MLO) and craniocaudal (CC), which assist in better comprehending the breast abnormalities that are present. The US Preventative Task Force recommends a biannual screening mammogram for women of average risk between the ages of 40 and 74 (USPSTF, 2023).

Problem Description

Breast cancer continues to be the most common and second most lethal form of cancer among women in the U.S. (Flores et al., 2019; Yedjou et al., 2019). Although there has been a broad effort to improve breast cancer screening in the US over the past 30 years, not all women benefit the same. While increased breast cancer screening decreases breast cancer mortality, screening remains underutilized in the U.S., more so among minority groups. For instance, Guerra et al. (2021) affirmed that about 73% of women aged 50 to 74 reported having had a mammogram within the last two years in 2018, confirming that this strategy of mammography

screening still faces challenges to achieving optimal outcomes. The probability of a woman being diagnosed with breast cancer increases, and the high rate of mortalities attributed to the disease, are due to late or poor diagnosis (White et al., 2017). According to the Center for Medicare and Medicaid Services (CMS) (2022) Office of Minority Health, early detection increases the survival rate. Just under 99% of women diagnosed with cancer in the early stages live five years or longer. In contrast, only 27% of women diagnosed at later stages survive (CMS, 2022). While there is an increased emphasis on early detection and effective treatments, there are racial and ethnic disparities in the detection and impact of the disease. For instance, according to Tong et al. (2022), there is an overall low rate of cancer screening among the American Indian, Alaska Native (AIAN), Asian, Black, and Hispanic populations compared to their White counterparts. Tsapatsaris et al. (2022) further added that low-income and ethnic/racial minority women experience barriers to accessing breast cancer screening.

The disparities have led to efforts to explore interventions that have proven effective in increasing breast cancer screening among a diverse population. However, despite this effort, there remain limited relevant studies tailored specifically to exploring effective interventions to increase breast cancer screening among the underserved population. With the increasing diversity in the United States (Waggoner, 2021), it is even more important to explore culturally sensitive ways to improve breast cancer screening among the underserved population.

Local Problem

This QI project took place in the primary care department at a Federally Qualified Health Center (FQHC) that provides medical care to medically underserved and vulnerable populations. Thirty two percent of the patient population speaks a primary language other than English, and seventy two percent of visits are from underserved populations such as low-income and elderly

patients who rely on government payers, such as Medicare, Medicaid and Health Safety Net. Breast cancer screening rates for the period of 2021 to 2022 were 54%. According to the Department of Health and Human Services (2023), breast cancer screening rates for women ages 50 to 74 in 2021 were 75.6%. The institution is below the Healthy People 2030 target goal of 80.5% (Health.gov, 2023). Minority women and women of low socioeconomic status experience delays in cancer diagnoses and increased mortality (Flores et al., 2019; Molina et al., 2018; Percac-Lima et al., 2016; Puschel et al., 2022.; Schwartz et al., 2021).

This quality improvement project aimed to identify barriers, address poor access, and increase the uptake of breast cancer screening among a diverse population. Increasing screening efforts, particularly mammography screening among the diverse group of populations, will contribute to improving the incident rate and disease burden, as well as enhance quality of life.

Available Knowledge

A PRISMA-guided literature search was undertaken to identify the most effective interventions to increase breast cancer screening (BCS) rates. The Population, Intervention, Comparison, Outcome (PICO) framework was used to guide the process for this project. Relevant studies were identified by searching five major databases: CINAHL, Medline, PubMed, OVID, and Google Scholar (see Appendix A). The search was guided by the initial exploratory PICO: Among underserved women (P), what are the most effective interventions (I) to increase breast cancer screening rates in a primary care setting (FQHC) (O)? Health and Human Services defined underserved and vulnerable populations as populations that face health, financial, and/or housing disparities, and face barriers that make it difficult to obtain health coverage and basic health care services (Health and Human Services, 2023).

Limits were set to capture research articles from 2015 to 2023 in the English language. Keywords used were breast cancer screening, underserved population, Latina or Hispanic, mammogram or mammography, strategy or intervention, and primary care. After reviewing the research articles to determine eligibility, ten were identified as relevant to this project and included in the review of the literature. The strength and quality of the samples were determined using The Johns Hopkins Nursing Evidence-Based Practice Rating Scale (JHNENP) (Dang et al., 2022).

Inclusion criteria included: Females of Latinas and/or of Hispanic ethnicity, females from underserved populations, research that was ten years old or less, and research that explored the use of an intervention. The exclusion criteria were literature review articles and women with a history of breast cancer or being treated for breast cancer. Further information can be found in Table 1A, with further synthesis in the summary table (see Appendix B).

As noted, ten studies were identified, of which eight were randomized control trials (RCT) (Beauchamp Id et al., 2020; Chan et al., n.d.; Molina et al., 2018a; Nanda et al., 2020; Percac-Lima et al., 2016; Phillips et al., n.d.; Puschel et al., 2022; Sheppard et al., 2013), and two were quasi-experimental (Flores et al., 2019; Schwartz et al., 2021). Of the ten studies, seven were conducted in the US (Flores, E., et al., (2019); Molina, Y., et al., (2018); Nanda, A., et al., (2020); Percac-Lima., et al., (2016); Phillips, L., et al., (2015); Schwartz, C., et al., (2021); Sheppard, V. B., et al., (2013), one in Chile (Puschel et al., 2022), one in Canada (Chan et al., 2018.), and one in Australia (Beauchamp Id et al., 2020). Detailed research analysis can be found in Table 1A.

Multiple research studies have identified diverse ways to increase breast cancer screening, and, although not all were aimed interventions for the underserved population, they

can be implemented and be successful in increasing breast cancer screening rates in the underserved population. The use of combined interventions were most effective in increasing breast cancer screening rates. A randomized control trial (RCT) by Phillips et al. (2015) showed that personalized letters and personalized automated phone calls were effective in increasing uptake in breast cancer screening ($p<.05$). Participants had maintained regular visits with the primary care physician before the intervention. Similarly, the study by Chan et al. (2018) showed that a postcard reminder indicating they are due for a mammogram with a letter signed by the family physician stating that they were overdue for a breast screening mammogram was effective in significantly increasing the attendance rate for screening mammogram ($p<0.001$).

Although the following two studies utilized one intervention to increase breast cancer screening, outcomes were significant. According to Schwartz et al. (2021), breast cancer risk awareness increased breast cancer screening among women 40 years and older ($p=.02$). The study by Flores et al. (2019) showed a high level of primary care physician interaction resulted in increased longitudinal adherence to screening mammograms for all ethnic/racial minority groups, including Hispanic ($p=.002$).

Six of the studies labeled in Table 2B as involving an intervention "Patient Navigator" showed overwhelming evidence of the effectiveness of using navigator intervention to increase breast cancer screening rates (Beauchamp Id et al., 2020; Molina et al., 2018a; Nanda et al., 2020; Percac-Lima et al., 2016; Puschel et al., 2022; Sheppard et al., 2013). Navigator interventions included a reminder telephone call with the opportunity to schedule a mammogram appointment during the phone call, identifying barriers and addressing them, providing motivational interviews, clarifying appointment information, and assessing the patient's knowledge about screening.

Based on the strength of the evidence reviewed, the patient navigator was the most effective intervention for the underserved population and fits within the local project site. According to Guerra et al. (2021), navigation programs can enhance the quality of measures, including patient satisfaction, compliance with treatment, and timely screening and diagnostic services. The implemented outreach intervention included a scripted phone call by the NP providing health education to patients where appropriate, orders for screening mammograms were placed as needed, offering the opportunity to schedule an appointment, and assessing barriers to screening. In addition, the NP is equipped to provide high-quality patient education and holds EMR privileges to order, schedule and/or reschedule mammogram appointments, ensuring efficient coordination of care.

Rationale

Several theoretical models have been examined that guide breast cancer screening awareness. Of the ten research studies, two identified theoretical frameworks. The study by Schwartz, et al. (2021) utilized the health belief model (HBM), which has been used in the past to identify 5 factors used to increase rates in screening mammogram among a minority population. The HBM developed by social psychologists in the 1950's will be used to guide this patient outreach quality improvement project aimed at increasing BCS rates. The theoretical framework implies that women are more likely to have a screening mammogram if they consider themselves at risk for breast cancer. In a systemic review of the literature Ritchie et al. (2010) explores seven articles looking at the effectiveness of utilizing the HBM in the uptake of screening mammogram. Triggers (cues) to action and perceived benefits to act were the most significant variables to prompt women to obtain a screening mammogram (Ritchie et al., 2021). A phone call informing the patient of the need for screening may serve as a cue and patient

education regarding benefits of early detection (perceived benefit) may prompt the patient to complete BCS. A second theoretical framework, the RE-AIM framework looks at five areas or domains, as opposed to focusing on the outcome of an intervention. The five areas are Reach, Effectiveness, Adaptation, Implementation, and Maintenance (Puschel et al., 2022). Although important, this framework was not utilized in this project.

To develop a foundational change that will lead to satisfactory improvements, one must understand the theory behind the change (Langley et al., 2009). Kurt Lewin's Change Management Model will guide the development and implementation of this QI project. The model is comprised of three straightforward but very striking steps and is known as the Unfreeze-Change-Refreeze model. The unfreeze stage entails preparing the institution to welcome the idea that change is necessary. In this project, the unfreezing involved convening the stakeholders to create awareness of the problem and demonstrate why the problem must be addressed. The second stage is when change is implemented and supported. For the change to be successful everyone involved must understand how the change will be beneficial by maintaining open communication and allowing others to accept change. In this project, change involved the implementation of the outreach program and data was collected to assess the impact. One hundred percent of the providers supported this outreach intervention as implemented. The final stage is to refreeze the institution by making the change a part of the institution's daily routine and showing appreciation to everyone for welcoming the change (MindTools, 2023). In this project refreezing involves appointing staff to deliver the outreach intervention. The project leader thanked stakeholders for embracing the change.

Purpose and Specific Aims

The purpose of this project was to implement an outreach strategy to increase BCS rates among adult underserved women receiving care at an urban safety net primary care clinic. The overarching aim was to develop, implement and evaluate an outreach strategy intervention to increase breast cancer screening rates among adult underserved women ages 40 to 74 who were not up to date and have missed appointments, receiving care at an urban safety net primary care clinic compared to baseline care. The specific aims included:

- Will obtain input and buy-in from stakeholders and leadership.
- Create a report for outreach.
- 50% of the no-show patients will successfully receive a phone call by the NP.
- 40% of the total number of patients successfully contacted will schedule a mammogram exam.
- 25 % of the no-show patients who scheduled an appointment will complete the mammogram exam.
- BCS rates will be increased by 4%.
- 85% of providers will find this outreach program feasible and valuable to patient care outcomes.

Methods

Context

The institution where this quality improvement (QI) project was implemented has four primary care clinics; Family Medicine, Adult Primary Care or General Internal Medicine (GIM) which is comprised of six suites, Geriatrics, and Pediatrics, and is considered the largest safety net hospital in New England. Quality measures or guidelines provided by the Center for Medicare and Medicaid Services (MCS) include screening services that help appraise the institution's ability to provide quality care. Quality measures were put in place to improve health

and reduce mortality. Therefore, increasing BCS will be beneficial to the patient's health and financially benefit the organization.

The QI project was conducted in one of the six suites in the Adults primary care clinic. Primary care providers work in teams of three to four physicians and one NP. An analysis of the external mapping of the microsystem was conducted to better understand the context of women ages 40 to 74 who are not up to date and have missed appointments for BCS (see Appendix C). The external mapping identified key staff members in this microsystem vital to this project, including patients, NP, physicians, nursing staff, population health team, and the radiology team. Other individuals identified who are involved in patient care are the front desk staff, the case manager, caregivers/family members, and the billing department.

Initially, there was no protocol in place at this site to aid in assessing the need for a screening mammogram. Patients in this microsystem were referred for a screening mammogram during an office visit with their primary care provider (PCP). The orders were triggered by the providers initiating an inquiry regarding the patient's last BCS. Providers were also prompted by the care gap section in the electronic medical records (EMR) to order a screening mammogram. Mammograms are recommended annually at the FQHC. There are various ways in which a mammogram appointment may be scheduled. These include radiology scheduling personnel calling the patient to schedule a mammogram appointment, patients can schedule an appointment directly in the EMR system and engaged patients, by calling the radiology department to schedule an appointment. Reminders are sent in the form of a letter via postal mail services. Additional reminders were made when patients were seen for other medical reasons and received an after-visit summary, which includes future appointments. Most recently, BCS guidelines were reviewed with PCPs and they were encouraged to order testing for qualifying patients. In

addition, at the time, there was a pilot study being conducted utilizing a population health nurse. Patients are contacted via telephone; if testing is accepted, an order is placed, and the mammogram appointment is scheduled. The order is routed to the PCP to co-sign. This pilot study does not include health education and assessment of barriers to completing BCS. Future reminders are as above. However, despite all these institutional efforts, the no-show rate is 16% compared to the 7% national rate, prompting concern among the team leader, stakeholders, and leadership.

After orders are placed, an appointment is scheduled, and patients then present to the mammography department to have the screening test completed. Normal results are communicated to the patients via mail, and they follow baseline care. Abnormal results are followed up on by the PCP and patients are referred to the appropriate specialty department for interventions.

The problem identified in this microsystem is low BCS rates. A cause-and-effect diagram was developed to identify possible causes for the low rates of BCS among women ages 40 to 74 (see Appendix D). The diagram identified several reasons for low BCS rates. The cause-and-effect diagram was divided into four categories: methods, machines, environment/people, and patient. Methods included a lack of a protocol to assess patient eligibility. Conversations regarding the need for BCS occur at the providers' discretion rather than through protocol. Protocols are important because they allow providers to offer appropriate care to patients based on evidence. Specific interventions and care do not occur automatically without protocols. Protocols standardize care and provide a guide to providers. This, in turn, improves the overall quality of care delivered by providers and care received by all patients.

The machine category included EMR not being up to date with the patient's information, making it difficult to contact the patient. Staffing issues in a busy environment where providers are focused on more urgent issues during clinic visits and overlooking screening exam needs also play a role in the low rates in BCS. The health care gap section in the EMR is intended to alert providers of the need for screening and providers are encouraged to follow the prompt and order a screening mammogram for the patient. However, this is not always effective and is impacted by the busy environment. As this project attempts to improve BCS rates, Covid-19 continues to play a significant role in this issue, including persistent staff shortages along with thousands of screening mammograms placed on hold due to the pandemic. Social, economic, and cultural factors that impact lack of health literacy, lack of awareness of the scheduled appointment or order, childcare issues, lack of insurance, transportation, fear of experiencing discomfort, and of receiving bad news, all play a role in BCS deficits.

Although several elements were identified as potential factors related to decreased rates of BCS, this QI project will focus on increasing health literacy, assessment of barriers to completing BCS, and the NP's ability to order the mammogram in addition to providing the opportunity to schedule an appointment for BCS in real-time. A force field analysis was developed to identify driving and restraining forces that currently and potentially could affect the implementation of this project (see Appendix E). Potential restraining forces for this project were persistent no-shows by the patient, despite intervention, and the likelihood that patient information may not be up to date in the EMR. Driving forces significant to this project included the desire to follow guidelines and recommendations, meet funding goals, address health disparities by increasing health awareness and risk, and provide access to BCS. Reducing the mortality rate by identifying breast cancer at an earlier stage was also significant to this project.

Intervention

Description of the Intervention

The intervention consisted of a telephone call to women who have missed screening appointments, assessment of barriers to completing their screenings, scheduling, and offering expert health education.

Pre-planning

A logic model was developed to guide the pre-planning phase of the PDSA cycle (see Appendix G). Low breast cancer screening rates were identified as a problem in the institution. Many steps were taken before the development of the intervention to increase BCS for implementation in this QI project. Potential causes of the problems and the most effective strategies to increase BCS were explored. The literature suggests that a combination of interventions is more effective than a single intervention (Beauchamp Id et al., 2020; Molina et al., 2018a; Nanda et al., 2020; Percac-Lima et al., 2016; Puschel et al., 2022; Sheppard et al., 2013).

Multiple meetings with stakeholders were necessary before the implementation of the outreach program. Preplanning was initiated in March 2023. An external mapping exercise was performed to better understand the workflow of the microsystem (see Appendix C). Similarly, a cause-and-effect diagram was developed to identify the cause of the problem of decreased BCS rates (see Appendix D). Information technology (IT) experts were consulted to assist in generating an outreach list. The NP received training by the IT and radiology team on scheduling screening mammograms. A barrier assessment tool and providers satisfaction survey were developed (see Appendix H & I). The NP reviewed the information to be delivered. Once the tools were finalized, and reviewed by the NP, the outreach program was implemented.

Intervention Implementation

The implementation of the project took place over a period of six months. With the assistance of the IT department, the first step in the process was to generate a report in the Electronic Medical Records (EMR) to identify women ages 40 to 74 who have been seen in the primary care practice in the past 18 months. This time limit was used to avoid contacting patients who are no longer receiving care in the practice. The NP ran a second report using a 24-month look back process to identify women between the ages of 40 and 74 who, had an order for a mammogram, and missed their mammogram appointment.

Once the eligible patients were identified, a phone call was placed in the patient's preferred language. Telephone calls were made during normal business hours as well as during the evening hours. A voice message was left if there was no answer. The contacted patients were offered expert health education, a screening mammogram appointment was offered, and screening mammogram orders were placed as needed. Screening appointments were scheduled depending on appointment availability and patients' preference. Barriers to screening were assessed and the patients referred for resources as needed. Each telephone call was documented in EMR. Patients who were not successfully contacted or did not accept screening were returned to baseline care.

Evaluation of the Intervention

The approach to evaluating the intervention was the Deming Cycle, also known as the Plan-Do-Check-Act (PDCA) cycle. The PDCA cycle was developed by William Edwards Deming. The model is often used to implement an improvement process in healthcare, which ensures by using small tests of change to optimize the process (Coury et al., 2017). Evidence confirms the significance of the PDCA framework in implementing interventions such as

navigator programs in diverse and underserved communities (Guerra et al., 2021). The four stages of change assist in identifying the issues, taking on those issues via change, and continued monitoring of the implemented change to make adjustments if needed (The W. Edwards Deming Institute, 2023). In the planning stage, the new intervention implementation to increase breast cancer screening involved securing the support of stakeholders and leadership and co-designing the outreach intervention with stakeholders. The second stage of the PDCA model involved implementing the identified interventions, such as the navigator process, to address barriers to accessing mammography screening. The third stage entailed tracking enrolled individuals and assessing program measures and, finally, the last stage involved optimizing the interventional program to extend its reach of the program and serve a greater area of the targeted population (Guerra et al., 2021). The effectiveness of the intervention was assessed at weeks four, eight, twelve as well as six months after the intervention was implemented by analyzing the excel data tracking tool indicating the number of no-show patients who completed a screening mammogram post-intervention (see Appendix M-1 to M-4). A survey was used to assess providers' satisfaction.

Measures and Analysis

A measures table was developed to identify processes and outcomes for the implementation of the outreach project to increase breast cancer screening by closing the gap of no-shows using a scripted phone call providing health education, assessing barriers, and aiding with scheduling a mammogram appointment. The measures table identified expected outcomes and how these outcomes were operationalized and analyzed (see Appendix J).

The first aim was to obtain input and buy-in from stakeholders and leadership.

The team leader convened with stakeholders to co-create an outreach strategy. The information was obtained during the meetings, meeting minutes and email communications. No comparison will be made. Information from the meeting minutes underwent qualitative analysis (see Appendix K).

The second aim was to create a report for outreach.

With assistance from the IT team, the project leader created a report identifying eligible women ages 40 to 74. A second list was generated to further identify patients who had an order for a screening mammogram within the past 24 months, indicating those patients who were no-shows. These reports were generated in the EMR and entered into an Excel data tracking tool as well as to maintain the privacy of the patient. This list was also used to identify the patient's race. There was no comparison of this report (see Appendix L).

The third aim was that *50% of the no-show patients will successfully receive a phone call by the NP.*

This was accomplished by maintaining a list of the contacted patients in an excel tracking tool. There was no comparison. The analysis included calculating the frequency and proportion of patients who had a successful call, in relation to the number of calls made (see Appendix M-1). The age range was also analyzed.

The fourth aim was that 40% of the total number of patients contacted will schedule a mammogram exam.

Successful scheduled screening appointments were assessed by generating and maintaining an excel tracking tool. The analysis included calculating the frequency and proportion (see Appendix M-2).

The fifth aim was that 25% of the no-show patients who scheduled an appointment will complete the mammogram exam.

Completed exams were verified by conducting a medical record review and a list was maintained in an excel spreadsheet. The comparison was to the pre-intervention screening rate of 16%. The outcome analyzed frequency, proportion, and percentage of patients completing a mammogram (see Appendix M-3).

The sixth aim was that BCS rates will be increased by 4%.

The total number of completed screenings was measured. The comparison was made to baseline. The analysis included calculating frequency, proportion, change, and percentage (see Appendix M-4).

The last aim was that 85% of primary care providers will find this outreach program feasible and valuable to patient care outcomes.

Provider satisfaction was measured using a five-point Likert scale that has been used previously. Providers were required to answer (1) Strongly Disagree, (2) Disagree, (3) Neither Agree nor Disagree, (4) Agree, (5) Strongly Agree. There was no comparison. The analysis was made by calculating the frequency and proportion of the number of providers who completed the survey in relation to the scores (see Appendix I). Answers (4) Agree and (5) Strongly Agree were counted as positive answers.

Ethical considerations

Telephone calls were made by considering patient privacy based on regulations by the Health Insurance Portability and Accountability Act (HIPAA). There was no formal IRB process to evaluate this QI project at the local site where it took place. The specific aim of this project was to improve the delivery of care and was not for research purposes. Benchmarks for this QI project were confirmed using the University of Massachusetts Boston clinical quality improvement checklist, and this project meets the criteria for QI and not human subject research (see Appendix J). The project or innovation was quality improvement and does not meet the definition of human subject research because it was not designed to generate generalizable findings but rather to provide immediate and continuous improvement feedback in the local setting in which the project was carried out. The University of Massachusetts Boston IRB has determined that quality improvement projects do not need to be reviewed by the IRB.

Results

The project implementation began in November 2023 and ended in April 2024, lasting a total of six months. Buy-in of stakeholders and leadership was obtained prior to initiating the implementation of the outreach. Meetings were held with the population health team, QI team, and radiology to review the proposed outreach intervention and obtain feedback. The project leader was assisted by IT to generate a list of women ages 40 to 74 who had an order for a screening mammogram and missed the scheduled appointment. A purposive sampling approach was used to determine the sample size of the population. A total of 35 charts were reviewed and 23 patients were included. The patients were called in the order they appeared on the outreach list. Calls were placed randomly in the morning, afternoon and once per week during the evening hours. Phone calls outside of business hours took place one evening per week.

All 23 patients were called and 13 were successfully contacted during the first call and one patient was successfully contacted during the second phone call. If the patient was not successfully contacted, a detailed voice message was left regarding the reason for the call and the call back number was provided. Calls were delivered in the patient's preferred language. Patients who did not schedule an appointment during their first phone call were referred to baseline care. If an appointment was scheduled, they were navigated based on the project flowchart (see Appendix F). Patients with scheduled appointments were tracked on the outreach list created in Excel (see Appendix M-3). If there was no active order for screening, one was placed. For patients who had prior screening done at an outside facility, a message was sent to the radiology department to request the records. Appointments for patients requiring a records request from outside facilities were scheduled at least two weeks from the day it was scheduled. This allowed time to ensure the outside records were received. Patients requiring outside record review were not scheduled for screening on the weekend due to reduced staffing.

The NP assessed barriers to completing a screening mammogram by asking one question with eight possible answers: 1. Prefer not to answer, 2. No reason, 3. Work schedule, 4. Transportation, 5. Childcare, 6. Discomfort caused by the mammogram, 7. Fear of negative outcome of the exam, 8. Other. Patients indicating the reason was not related to any of the above reasons, were given the opportunity to share the reason for missing the appointment if they desired to do so. (see Appendix H).

The EMR was checked every two weeks for completed mammogram screening. Patients who missed their appointment were returned to baseline care. Completed testing with normal results were communicated following existing protocol. The patients were sent a letter via MyChart and standard postal mail for patients who do not have an active MyChart account.

Abnormal results were communicated following the existing protocol, patients are contacted via telephone and referred for further testing, to the Breast Center or Oncologist, pending the severity of the results and or required treatment.

Convening the Stakeholders.

Aim #1: Obtain input and buy-in from stakeholders and leadership.

Multiple meetings were held individually with each department. The QI and Population Health team were actively working on ways to improve cancer screening in the organization. From past approaches used they provided information of gaps in their efforts and agreed with the approach of the outreach program. During the meeting the stakeholders supported the implementation of this QI project (see Appendix K). This aim was successfully completed.

Creating the Outreach List.

Aim #2: Create a report for outreach.

On review of 66 medical records, many patients identified as having a team PCP was found to be incorrect. Therefore, the list of eligible patients developed by IT did not capture all the patients who had a PCP on the team. Many of the patients had been seeing another provider for their care and in some cases had never seen the listed PCP. Due to this discrepancy the number of eligible patients was reduced, prompting the project leader to include another provider who is not a part of her team. Using a 24-month look back process was used to further identify eligible patients. This look back process is acceptable because it is effectively used by commercial and government payers to assign patients to providers and health care facilities who are responsible for their care and associated costs (FPM, 2023). This list was transferred to an Excel sheet and patients' full names were replaced by initials and the MRN were removed.

Numeric codes were developed to identify each patient. The list developed in the EMR was saved to provide easy identification during medical records review.

Multiple communications with IT via mail and telephone calls were necessary to create the outreach list. The initial list included all GIM patients who had a mammogram order including diagnostic testing. Additional reports were created that did not include the needed information or included patients who missed their appointment but had gone back to complete the exam. The NP verbally notified the four providers on her team and one provider outside of her team regarding contacting qualified patients for this QI project.

After multiple attempts a list was generated which included 35 eligible patients of which 23 were included after the project lead performed a chart review. The other 12 patients were not eligible (see Appendix L). Of the 23 women who were eligible to participate in this QI project, 16 were Black/African American, three were Hispanic, two were White and two were of another race. Language spoken was English, Spanish, Amharic, and Vietnamese. The average age was 59 years old. About 43.5% of the patients were between the ages of 52 and 62 and 21.7% were between the ages of 41and 52 years old. This aim was successfully completed.

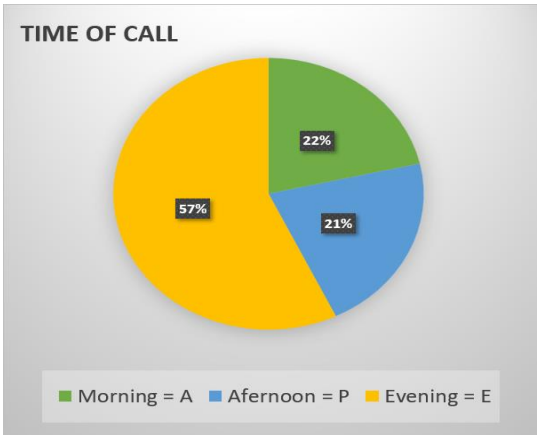
Demographic	Attribute	Number	Percentage
Gender	Female	23	100%
Race/Ethnicity	Black/African American	16	69.56%
	Hispanic	3	13.04%
	White	2	8.69%
	Other	2	8.69%
Age	41-52	5	21.7%
	53-62	10	43.5%
	63-74	8	34.8%
Language	English	18	78.26%
	Spanish	2	8.69%
	Other	3	8.69%

Table 5. Demographics

Outreach Phone Calls and Barrier Assessment.

Aim #3: 50% of the no-show patients will successfully receive a phone call by the NP.

The project leader delivered the calls in English (10) and Spanish (2). The interpreter service presently used by the institution was used for Amharic (1) and Vietnamese (1). As calls were made the time of each call was documented (A for time between 8 AM and 11:59 AM, P for time 12 PM and 5 PM, and E for time between 6 PM and 7 PM). Most of the patients contacted (57%) were called during the evening hours. Calls made during the morning and afternoon were effective at the same rate of 21% (Figure 1).



A total of 14 patients were successfully contracted of the eligible (n=23) patients. Thirteen of the 14 accepted a screening exam. The patients were returned to baseline care if they declined a screening exam or were not contacted after the second phone call was made. The expected outcome for this aim was achieved. Contact was successful with 60.9%, which was above the 50% set goal. Barriers to screening was assessed for all successful contacts. The results are outlined in table 6.

One participant indicated two reasons for missing her screening appointment which were her work schedule and fear of the discomfort caused by the exam. One patient was referred to the patient navigator for resources related to transportation. Presently there are no resources to assist patients requiring transportation for screening mammograms. Under the subject “other reasons” included: (1) communicating appointment

Reason for No Show	(n=13)	
	#	%
1. Prefer not to answer	0	0%
2. No reason	1	4.35%
3. Work schedule	3	13.04%
4. Transportation	2	8.70%
5. Childcare	0	0%
6. Discomfort caused by the exam	1	4.35%
7. Fear of negative outcome of the exam	0	0%
8. Other	7	30.43%

information, (2) lack of self-care, (3) concern about the effectiveness of the test, and (4) other schedule related conflict.

Accepted Screening exam.

Aim # 4: 40% of the total number of patients contacted will schedule a mammogram exam.

The goal of this aim was exceeded with 92.85% of the patients accepting an appointment for a screening mammogram exam. Patients expressed desire and need to have the screening completed. Appointments were scheduled between one and four months from the date of the phone call. Scheduling depended on appointments availability and patients' preferences.

Completed mammogram exams.

Aim # 5: 25 % of patients of the no-show patients who scheduled an appointment will complete the mammogram exam.

A total of 38.46% of patients who accepted screening during the outreach telephone call completed their mammogram exam. The exams were completed within a five months period. The aim was that 25% of the patients who scheduled an appointment would have completed the exam. The goal for this aim was met. Patients demonstrated interest in having the exam done, no-shows no show did not persist.

Increase in Screening Rate.

Aim # 6: BCS rates will be increased by 4%.

The intervention was effective for this outreach project. A total of 92.85% of the patients (n=14) contacted scheduled a screening mammogram exam. This aim was met. The screening rate for this outreach intervention was 21.74% and, as such, the BCS rate did increase.

Providers Satisfaction.

Aim # 7: 85% of primary care providers will find this outreach program feasible and valuable to patient care outcomes.

One hundred percent of the PCPs found this outreach program feasible and valuable to patient care outcomes and this aim was met (see Appendix I). Providers had the opportunity to provide further comments in the comment section of the survey. Four of the providers provided additional comments and one did not have additional comments. See table 7 for detailed comments. All the primary care providers were thankful to the project leader for implementing this QI project. These results surpassed the expected goal of 85%.

Table 7

Provider Satisfaction Survey Comments	
Providers (5)	#
Excitement for outcomes	1
Appreciate a model that moves screening from reactive to proactive	1
Thank you Wilder for your work to help improve mammogram screening rates among hard to screen patients!	1
Appreciate the intervention	1
No comments	1

Discussion

Summary

The literature review showed that the patient navigator approach was effective in the uptake in BCS. Six studies labeled in Table 2B as involving an intervention "Patient Navigator" show overwhelming evidence of the effectiveness of using navigator intervention to increase

breast cancer screening (Beauchamp Id et al., 2020; Molina et al., 2018a; Nanda et al., 2020; Percac-Lima et al., 2016; Puschel et al., 2022; Sheppard et al., 2013).

This QI project was developed to increase BCS rates utilizing a patient navigator outreach intervention. All the aims for this intervention were successfully met. The Health Belief Model guided the implementation of this QI project. A total of 23 women who were overdue for screening and no-show to screening mammogram exam were eligible to participate in this QI project. An outreach intervention was used which included a phone call, offered expert health education, the opportunity to schedule a mammogram exam during the phone call and barrier assessment.

Following the Health Belief Model (Ritchie et al., 2021), this outreach phone call was used to remind patients of the missed appointment (cue for action), and health education regarding early detection (perceived benefits) to prompt patient to obtain BCS. More patients than expected scheduled a screening mammogram exam, which suggests that the Health Belief Model was appropriate for this QI project. Pre and Post implementation change revealed improvement in BCS among the sample population. Changes made to the mammogram screening guidelines just prior to the project implementation may have been the cause for lower numbers in the younger population. It is also important to note that two patients rescheduled their appointment for screening mammogram exam, extending the dates into late February and April.

Most of the patients who no showed had a medical history that included severe mental illness, substance use disorder, chronic pain and other chronic illnesses raising the question of these being barriers themselves although the patients did not identify them as barriers to screening. The strengths of the project were the ability to provide expert patient education, order a screening mammogram, schedule the appointment during the phone call and barrier

assessment. Due to the busy environment of the clinic, a strength worthy of mentioning is having a staff member to follow up with patients who no-show to their screening exam. Primary care providers expressed that this project was feasible and valuable to patient care outcomes.

Interpretation

The results demonstrated that patients were aware of the need for BCS and were willing to have the exam completed. The outreach intervention provided further incentive regarding BCS screening. However, many barriers were present such as transportation, caretakers schedule, and lack of communication of information related to the appointment for a screening exam. This will require the organization to become aware and actively involved in addressing these barriers. For example, providing resources to caretakers of patients with chronic and/or disabling illnesses. Assistance may include access to a companion to travel with the patient to her appointment when caretakers are not available. This would ensure that the patient receives the necessary screening. This, however, would require greater efforts. Intervention would be costly to the organization as additional staff will be required. Transportation was identified as a barrier that would likely be less challenging to overcome. Applying for grants and funding from organizations that support cancer screening could be helpful. Utilizing text messaging to remind patients of their screening mammogram appointment would also benefit the efforts.

Illnesses such as mental health disorders and substance use are barriers to obtaining screening mammograms. This is supported by the study conducted by Thomas et al. (2018). A large sample of 14,651 women of diverse racial and ethnic background were studied. The women had severe mental illness such as schizophrenia, depression, anxiety, and bipolar. Twelve percent of the women had a history of substance use disorder. Only 24.5% of the women received a mammogram exam in the past year compared to 43% estimated annual screening rate for women

in the US general population. The findings revealed that efforts are needed to improve outreach to this population as well as placing primary care services within sites where mental health treatment is provided.

Limitations

Several elements affected the implementation of this QI project. The most significant was the misassignment of the PCP in patients' charts. Not having the correct PCP assigned can have several negative effects on data collection. This makes it difficult to track patient care. Without the correct information tracking the patient care journey effectively was challenging. The project lead was unable to capture all the patients corresponding to the providers on her team. This limited the number of patients who qualified for this QI project.

Conclusions

This QI project revealed the usefulness of an outreach intervention via telephone call in validating the importance of timely screening mammograms among underserved women. The sample population demonstrated the importance of addressing barriers to screening to reduce healthcare inequality. The sustainability of this intervention is positive. The average time for each phone call was five minutes, making the task attainable without having to hire additional staff. This outreach intervention could be incorporated into the workflow of the population health registered nurse. Sustainability of the intervention was further supported by the positive feedback by providers regarding the feasibility and value to patient care outcomes. This intervention could be utilized in the uptake of other cancer screenings such as cervical, colon, prostate, gastric and lung cancer. Further work should consider a larger sample size to confirm the effectiveness of a patient navigator approach in the uptake of BCS in this patient population.

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Appendix A

Table 1. Evidence/Matrix Table

Clinical question/topic being systematically reviewed (generic PICO format): Among underserved women (P), what are the most effective interventions (I), to increase breast cancer screening rates in a Primary Care setting (FQHC) (O)
Inclusion criteria: Females of Latinas and/or Hispanic of ethnicity, females from underserved populations, research that is ten years old or less, and research that explored the use of an intervention. Exclusion criteria: Literature review articles and women with a history of breast cancer or being treated for breast cancer.
Keywords/search terms: Breast cancer screening, underserved population, Latina or Hispanic, mammogram or mammography, strategy, or intervention primary care.
Databases Searched: CINAHL, Medline, PubMed, OVID, Google Scholar

Quantitative Studies

Author(s) /Year	Objective or purpose of the study (Identify the independent variable and the dependent variable)	Conceptual Framework AND Research Design used	Level of Evidence and Quality of Study (use John Hopkins Tool)	How was the sample recruited/ Setting	Instruments used to collect data; briefly describe the instruments.	Description of sample; Sample size	Most important significant findings <u>that answer your PICO question</u>
Beauchamp, A., et al., (2020)	1. Assess the impact of providing translated routine reminder letters on rates of booking for mammography screening within 14 days of intervention. 2. assess the impact of in-language reminder phone calls in the preferred language (and assist to book a screening appointment) to lapsed screening on rates of booking for mammography within 14 days of intervention.	No framework was identified. RCT The study lasted 6 months	IB	The sample was collected from Northwest Melbourne, Australia. Women 50 to 75 yo, due for their biannual breast screening, or lapsed screening, lived within the catchment area, or whose BreastScreen clinic was based in that catchment area. Women were selected from an administrative dataset using an automatic technique based on their eligibility. A total of 1032 eligible for trial 1. 195 for trial 2.	The standard telephone script used in usual care was translated. Caller was provided with a list of common questions and answers. Non-identifiable data was collected from the BreastScreen Victoria program and provided to the research team.	Women that are culturally and linguistically diverse. RTC 1. Sample size was a 10% difference in booking rates between intervention and usual care group: 373 per intervention was considered sufficient (based on 80% power, a Type 1 error rate of 5%). 2 RTC 2. A 15% increase in booking rate (power = 80% and Type 1 error rate = 5%) would require a total of 200. The sample sizes were not inflated to allow for drop out. RTC 1. (n=1032) (n=572) intervention (n=460) usual care (n=322) Arabic	There was statistically significant difference between the intervention group who received a phone call 64.2% ($p<0.0001$). 54.1% Arabic 70.7% Italian and those who did not book and appointment 6% 46.0% Arabic 4.7% Italian However, there was no significant difference between the translated letter and the letter in English 37% in the intervention group booked an appointment vs 62.6% who did not. ($p>0.999$). Booked appointment: Arabic 30.4% usual care 29.9% intervention Italian

	IV – 1. Translated letters in Arabic and Italian. 2. Phone call in preferred language DV- Statistically significant booking.					(n=710) Italian RTC 2. (n=195) (n=95) intervention (n=100) usual care (n=80) Arabic (n=115) Italian Women ages 50 – 75	43.4% usual care 41.7% intervention
Chan, E., et al., (2018)	Objective: determine whether signed family physician reminder letters to women overdue for screening mammography prompts rescreening. IV- Standard postcard reminder. Signed family physician letter to women overdue for breast screening. DV- women in the letter arm significantly more likely to attend to screening mammogram.	No framework was identified. RTC The study lasted 2 years	IB	Family physicians were recruited across British Columbia (BC) with women in their practice who were due for screening mammogram. The study took place in Canada. A total of 822 physicians participated and 5,638 women were randomized.	Standard reminder postcard used by the Screening Mammography Program (SMP) in BC. The Kaplan-Meier method was used to calculate confidence intervals. Statistical analysis using the SAS 9.3 software (SAS Institute Inc, Cary, NC, USA).	Sample were selected by contacting women participants in the SMP who sign consenting to be contacted for future research. Family physician practice were recruited by posting a full-page advertisement in the BC Medical Journal. Women between the ages of 51 and 73. 6-24 months overdue for return screening, residing in BC. Two-sided statistical testing with alpha=0.05, estimated number of overdue women to achieve power=0.8 was 574 per arm or 1148 total.	Women in the letter arm were significantly more likely to attend screening mammogram. At the end of six months 34.4% (947/2749) attended the SMP and received a screening mammogram compared to 24.0% (660/2749) in the control arm ($p<0.001$).

						(n=2817) intervention (n=68) excluded for having screening prior to randomization. (n=2749). (n=2821) usual care (n=72) excluded for same reason as above. (n=2749) analyzed.	

Flores, E., et al., (2019)	Purpose: To evaluate the association between interaction with PCP & longitudinal adherence with screening mammography guidelines across different racial/ethnic groups over a 10-year period. IV- maintained regular routine visits with PCP DV- Increased longitudinal adherence to screening mammogram.	No theoretical framework was identified. Quasi-experimental The study lasted 10 years.	IIB	The sample was collected from the breast imaging information and reporting system - Screening mammography performed at the institution's main campus and all affiliated community imaging sites was included. Patient were included if they had PCP within the institution and had at least 8 years of follow up. Study was conducted at MGH. MA, US A total of 9,575 participants were identified.	Self-reported demographic information- (age, gender, race/ethnicity, marital status, primary language, insurance payer) for the pts was obtained from the institution's Research Patient Data Registry. Adherence was evaluated using Wald chunk test. Analysis conducted using strata II (StataCorp, College Station, Texas)	Sample size was based on available white and non-white patients. (N=9575) (n=1483) non-white participants (n=456) African American (n=291) Hispanic (n=395) Asian (n=381) other (n=8092) white participants Provide 98% power Women between 50 and 64 years old. Mammography performed as part of a procedure or diagnostic exam were excluded. Women who developed breast cancer during the period were excluded from the study.	High level of primary care physician interaction coefficient was associated with increased longitudinal adherence to recommended screening mammography for all racial/ethnic minority group. Hispanic (P = .002)

Molina, Y., et al., (2018)	To identify the longitudinal effect of the use of navigators vs. standard care on breast cancer screening. IV – 1. Letters 2 wks prior to appt. letter stating need for mammogram, pts contact PCP for referral. 2. navigator intervention- phone call before the appt is scheduled, assessed comprehension regarding the appt, clarification for knowledge barrier, asses immediate barrier to attending appt, together developed a plan of action to address the issue(s). DV- Greater odds of	No theoretical framework was identified. RTC. The study lasted 3 years	IA	Sample was collected from 3 hospitals, two of which were sites of two multisite healthcare system. All 3 hospitals are located in the South Side of Chicago. The study was conducted in Chicago. A total of 9,506 were identified.	EMR Survey Demographic information included age, race, neighborhood, median household income.	Navigators first identified participants from hospital daily lists of new patients who had been referred for a mammography appt. Pt randomized to standard or navigator arms using a computerized randomization program. (N=9,506) (n=6102) document as ineligible. (n=254) did not attend initial appt. (n=614) missing data. Analytic Sample (n=2536). (n=741) navigated (1795) non-navigated. Women between the ages of 50 - 74	Navigated women had greater odds of screening to women randomized to standard care 45% vs. 59%, (p=0.03)

	obtaining a mammogram.						

Nanda, A., et al., (2020)	Objective – whether a two-step intervention (phone call and assistance scheduling mammograms) increased uptake over usual care. IV- phone call and the opportunity to schedule a screening mammogram in real time. Calls made by breast nurse navigator (63%), medical assistant (10% or a mammography technologist (27%). DV- significant increase in mammogram uptake after intervention.	No theoretical framework identified. RTC	IB	The sample was collected using the EMR to identify women between the age of 50-65 not having a mammogram within 2 years prior to the study established withing five internal medicine primary care clinic (IMPCC) in an urban safety net hospital (SNH) main campus. The study was conducted in Kansas City, MO. A total of 2,221 women were identified.	EMR was used to collect information. Data was analyzed using SAS version 9.4 (SAS Institute, Cary, NC).	Participants were established patients in the IMPCC – seen in the practice in the preceding 3 years. Randomization took place by clinic. A random number generator was used. 40% of the total women identified were randomized. (n=445) intervention. (n=7) excluded- not overdue or included incorrectly. (n=438) analyzed. (n=445) control (n=3) excluded-not overdue or included incorrectly. (n=442) analyzed. Median age 58	Phone call intervention significantly increased mammography uptake at 3 and 6 months. At 3 months 18% (n=78/438) 6% (n=28/442) ($p<0.0001$). At 6 months 23% (n=100/438) 12% (n=53/442) ($p<0.0001$).

Percac-Lima., et al., (2016)	Purpose: Evaluate the effect of incorporating PN population management effort to increase cancer screening in patients who are at high risk for non-adherence with screening. IV- PN contact to explore barriers, motivational interview, education, encouragement, transportation, visit preparation & accompany pts to visits if needed. Intervention is performed in the patient's language. DV- Completion of mammogram screening.	A conceptual model for breast, cervical, and CRC screening was used. RCT The study lasted eight months.	IB	IT algorithm used patient no-show history in the prior year, non-English speaking. Study was conducted in the Massachusetts General Primary Care Practice-Based Research Network (18 primary care practice including 4 community health centers). The study took place in the US. A total of 1956 high-risk patients were identified.	Information was collected using a population-based information technology system within a primary care network.	Sample (N=1612) available based on inclusion criteria. (n=175) Hispanic (n=143) Asian (n=177) African American (n=86) other (n=1031) white participants Women between 50 and 74 years old. The median age was 57. Eligible for breast cancer screening, over due for screening, have not had a mammogram or breast MRI in the past 2 years. Excluded if the had bilateral mastectomy.	Test completion over the 8 months follow up with patients in the intervention group was higher than the control group 14.7% vs 11.0% (p=.05)

Phillips, L., et al., (2015	The goal of the study if to compare the effectiveness of mailed personalized letters, personalized automated phone calls, or both on rates for cancer screening among primary care patients past due for mammography (or CRC) screening. IV- personalized mailed letters, personalized automated phone calls or both. DV- statistically significantly higher screening rate.	No framework was identified. Double blinded RCT. The study lasted 1 year	IA	Sample recruited using a 2-step process – 1st the practice searched their EMR based on age, sex and last visit. 2nd data was reviewed to verify date and type of last cancer screening. Participants eligibility: (1)-registered pt at the clinic, (2) active pt at the practice (at least 1 visit in the past 2 years), (3) 50 to 74 yo, (5) past due for mammography screening. Patient were excluded if they were deemed high risk for breast cancer or were uninsured. A total of 1401 participants were assessed for eligibility. The number of participants is adequate based on the number of variables.	Personalized letters signed by the pt's physician explaining that (1) past due for cancer screening, (2) importance of cancer screening, (3) how to schedule the screening, (4) name and number for the outreach worker to assist pts with arranging screening, (5) availability of free mammogram screening for yhe uninsured/underinsured through a state-sponsored program. Automated phone calls through commercial Trained research assistants obtained abstracted pt's information – age, sex, race/ethnicity, payment/insurance type, number of current medications (as a proxy for morbidity), and zip code of residence which was converted to median household income based on date from the 2000 US census.	Patients were excluded it they were high risk for breast cancer or uninsured. (N=271) randomized (n=90) letter interview Group 1 (personalized letter) -Non-Hispanic white 67 Non-Hispanic black 10 Other (eg, Hispanic) 9 Group 2 (Automated phone call) -Non-Hispanic white 67 Non-Hispanic black 8 Other (eg, Hispanic 9) Group 3 (Both interventions) -Non-Hispanic 71 Non-Hispanic black 12 Other (eg, Hispanic) 10 (n=88) automated call (n=93) combined intervention	The combined intervention group had a statistically higher screening rate ($P < .05$) compared with either of the single intervention group.

				The study was conducted in the Department of Family Medicine, University of Rochester Medical Center, Rochester, NY. US (A mixed urban-suburban Primary Care practice)	Baseline characteristics of pts in ea. 3 intervention group compared with $\chi 2$ test for binary variables t test fr continuous variables. Statistical significance as $P < .05$. post-test compared using the Pearson $\chi 2$ test. All statistical analysis performed using SAS software version 9.3 (SAS Institute Inc., Cary, NC).		

Puschel, K., et al., (2022)	A successful randomized controlled trial among women aged 50 to 70 in a low SES primary care clinic in Chile led to significant increase in mammography screening rates. This study objective is to establish whether the overall impact of the program was sustained over a 10-year period. IV – 1. cancer screening using standard intervention, 2. – pt advised to call their medical provider, mailed letter with booklet, mammogram order & available dates for a mammogram. 3. High impact intervention - pt advice & mailed letter as above plus phone call if an appointment	RE-AIM (Reach, Effectiveness, Adoption, Implementation, Maintenance) framework. RCT	IA	The sample was randomly selected from a number of qualified patients. Samples were selected from 3 clinics in Chile. The intervention clinic is located in El Castillo, La Pintana, Chile, an area of low socioeconomic status. The comparison clinics are located in East Puente Alto, Chile, an area of slightly older population and higher socioeconomic status. In the intervention group 1700 participants were assessed. In the comparison group 4832 (combined). The author indicates the sample is a good representation of the population of that type (women between 50 and 70, low-SES).	Data was collected from electronic medical records – rate of mammography screening. Qualitative data gathered during the study were collected via survey and key informant interview. Post-intervention qualitative data were collected within each clinic by key informants – nurses, midwives, clinic director, clinic administrators, and CAB members.	Participants were women between the ages of 50 to 70. (N=1700) (n=500) randomly selected for the intervention group (N=4832) (n=500) selected for the comparison group A computerized random number generator was used. The randomly selected women were invited to participate. If the declined another participant was selected in the same manner and invited to participate. The women in the intervention group were slightly younger a of lower socioeconomic status than the comparison groups.	The trial was effective with 51.8% of women in the low-intensity arm and 70.1% women in the high-intensity arm having mammogram. After ten years, low-SES women at the intervention clinic maintained significantly higher mammography screening rates compared to women of middle-SES in the comparison clinics (36.2% vs. 30.1% and 19.4% $p < 0.0001$). The women in the intervention clinic also had significant higher mammography screening rates compared with the women of low-SES at a

	was not scheduled in 6 wks. home visit if the appt was not sch 4 wks after the phone call. DV- Effectiveness						national level (44.2% vs. 34.2% $p < 0.0001$).

Schwartz, C., et al., (2021)	Objective – to examine whether providing individualized breast cancer risk estimates is associated with an increase in the rate of screening mammography. IV- 1. Pts informed of their risk level by their PCP (average risk or high risk). Risk status was delivered by the PCP during an office visit. The results included clinical decision support including recommendations for chemoprevention, enhanced screening with breast MRI & genetic testing Based on the results of the assessment & national	No framework was identified. Quasi-experimental The study lasted 18 months.	IIA	Women visiting their PCP who did not have a h/o breast cancer or for a PE or new pts. Staff entered information on pts self-report on h/o breast cancer or family h/o the same. Took place at 2 Primary care clinics. FQHC in Chicago Illinois, US. A total of 347 women were invited to participate.	A survey collected demographics information – race/ethnicity, birth place, age, marital status, educational level, employment status, annual household income, health insurance, clinician ever talked about breast cancer (BC) risk, perceived health status, perceived BC susceptibility, BC cultural belief, cancer fatalism, BC worry. Breast cancer risk assessment (BCRA) performed by custom software developed by the study investigators. Assessment tool includes the modified version of the Gail model, CARE model, Claus model, Pedigree Assessment Tool & the National Comprehensive Cancer Network Clinical Practice Guidelines for Genetic/Familial High-Risk Assessment.	Participants were 40 and older (eligible for mammogram). 1 of 4 randomly selected women of average risk for BC were invited to participate. All those at high risk were invited to participate. Participants were categorized by race/ethnicity. Participants were restricted to those who could complete the enrollment interview in English or Spanish. All considered medically underserved. (N=347) (n=188) -eligible for mammogram. Mean age 50.8. 70 (37.2%) were Hispanic. 114 (60.6%) were non-Hispanic African American (AA). 4 (2.1%) other racial & ethnic group (4 non-Hispanic white women). 98 (52.1%) average risk for BC.	The rate of mammography use significantly increased among women at high risk (36.6%) during usual care & 51.1& after BCRA (p=.02). Non-significant numeric increase among average-risk participants (40.8%) during usual care & (46.9%) after BCRA (p=.30).

	practice guidelines. Non-structured education delivered at the providers discretion. DV- Significant increase in mammography screening rate in risk women.					90 (47.9%) high risk for BC	

Sheppard, V. B., et al., (2013)	Pilot tests the effectiveness of a brief telephone coaching adherence intervention to address barriers to obtaining a mammography. IV- Brief telephone coaching by navigator. DV – Increase adherence rate to mammography appointment.	Social cognitive theory was used. Mixed method RCT	IA	The study was conducted at Georgetown University Capital Breast Care Center (CBCC) – provided culturally sensitive comprehensive breast cancer services to women in the Washington DC area regardless of ability to pay. 97 women were eligible.	EMR Survey – perceived risk knowledge, self-efficacy, and social-cultural factors (fear, fatalism, etc.). results from the survey were used to tailor the Telephone Coaching Adherence Project (T-CAP). Survey measures were chosen based on formative research, conceptual framework, brevity, and prior use in underserved groups. Self-efficacy scale – confidence to follow through with	Women 40 years and older. Mean age 50.3. Participants were eligible if they failed to show up to an annual appointment in the past 12 months. (n=37) randomized (n=2) Latina	Women in the T-CAP had higher adherence rate to their mammography appointment than those receiving usual care. 54% vs 46% (p=.05)

					mammogram. Five-item Likert scale from "not at all confident" to "very confident". Other studies show high reliability (alpha=.852) The Center for Epidemiological Studies Depression Scale (CES-S-20) to asses general distress. Scores from 0 to 60 with a cutoff score of 16 representing mild or significant depression symptoms. Perceived risk of breast cancer – Likert scale that ranged from much below average to much above average. Overall qualitative risk of getting breast cancer in the next 10 years. Likert scale – "very unlikely", "unlikely"," 50-50 chance", "likely" and "very likely".		

Non-Research Evidence

Authors(s)/year	Type	Setting	Findings that help answer the EBP question	Limitations	Evidence level and quality
Wack, M., (2022)	Guideline	Primary Care Clinic	Strategies to increase breast cancer screening		V / A

Appendix B

Table 2. Summary of Research Articles.

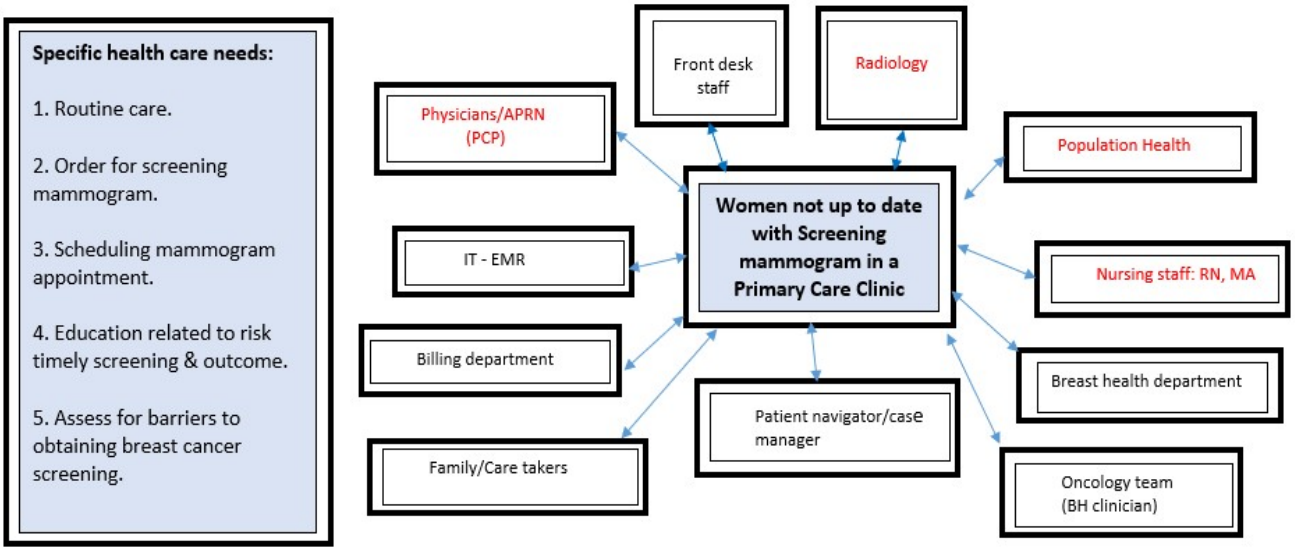
Intervention	*Number of Studies*	*Significant Outcomes*	*Level of Strength of Evidence*
Patient Navigator	A) Puschel, K., et al., (2022) women instructed to call PCP's office for mammogram order, letter with booklet, mammography order with available dates, phone calls, home visit if needed.	A) women at the intervention clinic maintained significantly higher mammography screening rates compared to women in the comparison clinics (36.2% vs. 30.1% and 19.4% $p < 0.0001$)	A) I, B (n=1000) 100% were Latinas.
	B) Molina, Y., et al., (2018) Navigator intervention – phone call, clarify appt info. Knowledge, assessing or barriers and planning to overcome these.	B) Navigated women had greater odds of screening to women randomized to standard care 45% vs. 59%, (p=0.03)	B) I, A (N=9506)
	C) Percac-Lima, S., et al., (2016) PN contact to explore barriers, motivational interview. Done in the pt's language.	C) Women who received PN intervention completed screening at a higher rate than the control group 14.7% vs 11.0% (p=.04)	C) (N=1626) (n=175) were Hispanic
	D) Sheppard, et al., (2013) Brief telephone coaching by navigator.	D) More women in the intervention group kept their appointment 54% vs 46% than those in usual care. (p=.05)	D) I, A (N=37) (n=2) Latinas
	E) Beauchamp, A., et al., (2020) Reminder phone call in preferred language.	E) There was statistically significant difference between the intervention group who received a phone call 64.2% (p<0.0001). 54.1% Arabic 70.7% Italian	E) I, B (N=1032) RCT 1 (n=322) Arabic (n=710) Italian (N=195) RCT 2 (n=80) Arabic (n=115) Italian
	F) Nanda, A., et al., (2020) Phone call & the opportunity to schedule an appt in real time. (Navigator)	F) Phone call intervention significantly increased mammography uptake at 3 and 6 months. At 3 months 18% (n=78/438) 6% (n=28/442) (p<0.0001). At 6 months 23% (n=100/438) 12% (n=53/442) (p<0.0001).	F) I,B (n=880)

Outreach	A) Phillips, L., et al., (2015) Letters and automated phone calls.	A) Statistically higher rate with combined intervention 19%, 22% & 37% ($p<.05$)	A) I, A (N=271) (n=9) were Hispanic
Education:	A) Schwartz, C., et al., (2021) Breast cancer risk (BCRA) awareness.	A) The rate of mammography significantly increased among women at high risk (36.6%) during usual care & 51.1& after BCRA (p=.02	A) II, A (n=188) (n=70) were Hispanic
Trusting relationship:	A) Flores, E., et al., (2019) Maintained regular follow up visits with PCP.	A) High level of primary care physician interaction coefficient was associated with increased longitudinal adherence to recommended screening mammography for all racial/ethnic minority group. Hispanic (P = .002)	A) II, B (n=9575) (n=291) were Hispanic
	B) Chan, E., et al., (2018) Postcard reminder with a signed family physician letter.	B) Women in the letter arm were significantly more likely to attend screening mammogram. At the end of six months 34.4% (947/2749) attended the SMP and received a screening mammogram compared to 24.0% (660/2749) in the control arm ($p<0.001$).	B) I, B (n=5498) General population

Appendix C

Figure 1: External Mapping
Project: Increasing Breast Cancer Screening Rates

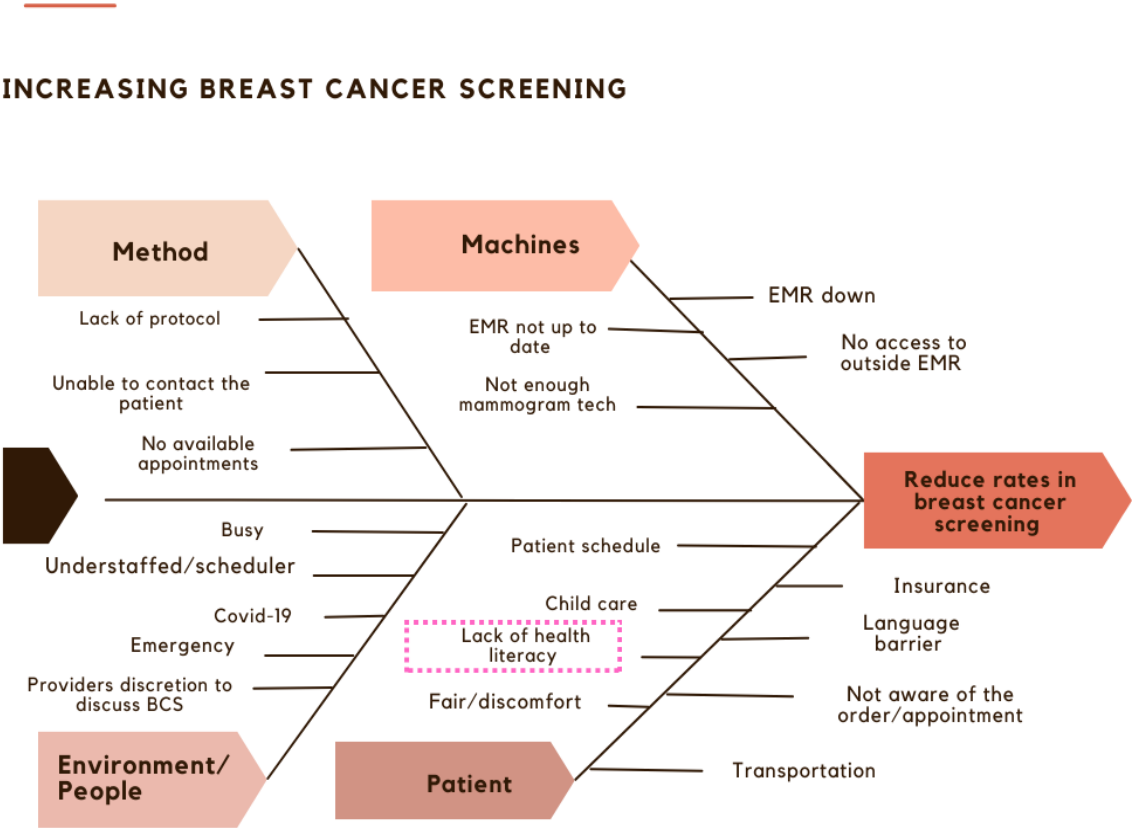
Clinical Microsystem Name: Underserved women not up to date and have missed appointment for screening mammogram in an urban safety net primary care clinic.
Subpopulation of patients: Women ages 40 to 74



Improvement Ideas: ordering mammogram not ordered by PCP, checking the EMR three weeks after the mammogram appointment was scheduled to ensure the appointment was kept and contact the patient regarding the missed appointment. Ensure the patient's contact information is up to date. Identify patients' barriers to completing BCS.

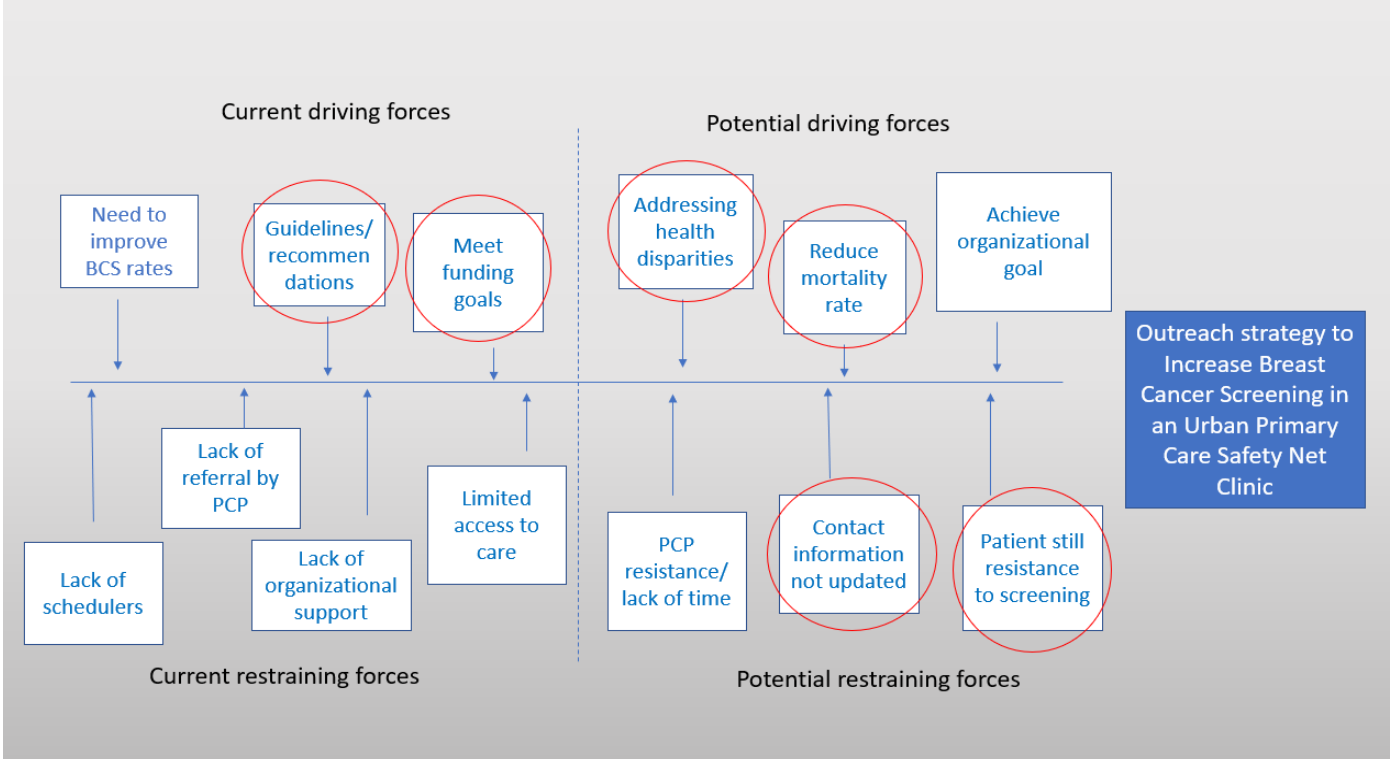
Appendix D

Diagram 1: Fishbone



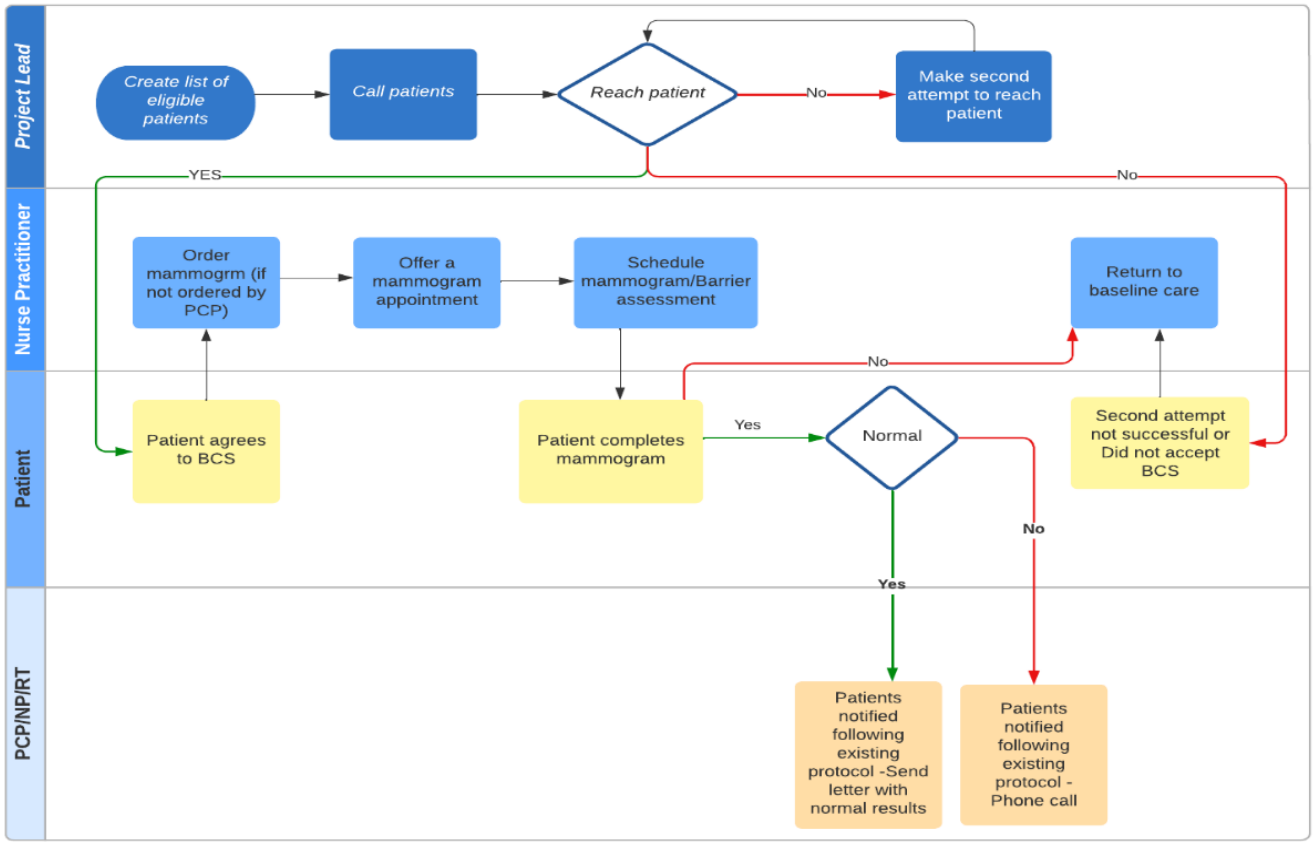
Appendix E

Force Field Analysis



Appendix F

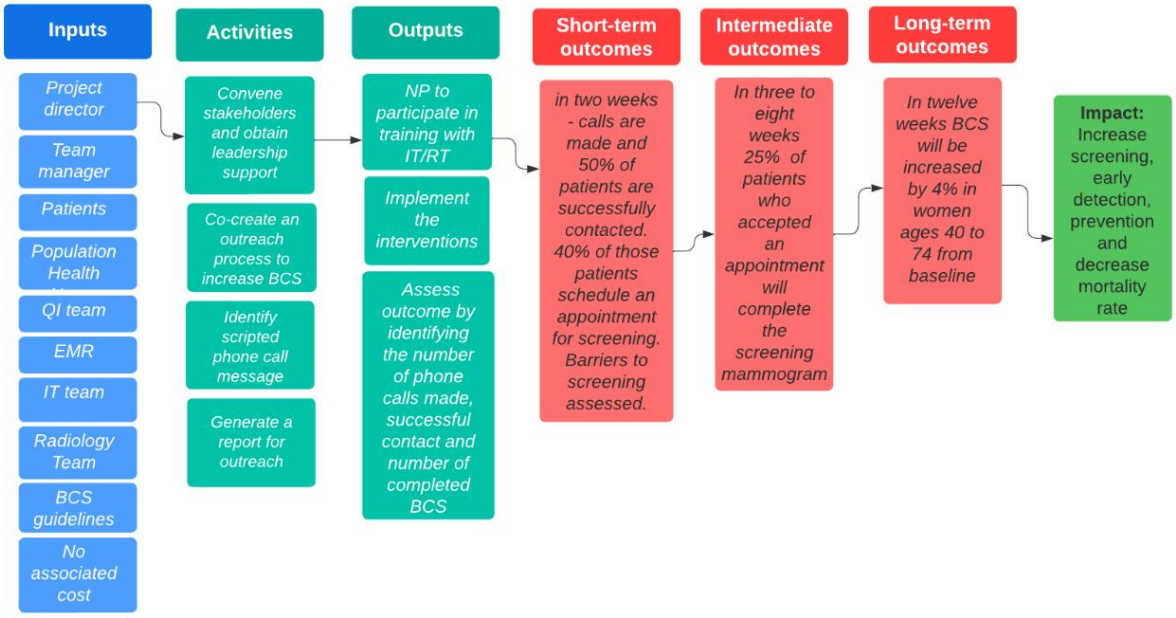
Figure 2: Flowchart



Appendix G

Figure 3: Logic Model

Problem: Low breast cancer screening rates which increases mortality in the underserved population.
Purpose: Implement an outreach strategy to increase breast cancer screening rates.



Assumptions: The implementation of an outreach strategywill increase breast cancer screening rates. Staff will be pleased with the outcome and welcome the change.

Appendix H

Reason for No-Show Survey
We would like to learn more about why patients miss appointments. Please know that your answer is not a requirement. The following options represent common reasons why patients miss appointments. Please choose from the provided selection.
1. Prefer not to answer ☐ 2. No reason ☐ 3. Work schedule ☐ 4. Transportation ☐ 5. Childcare ☐ 6. Discomfort caused by the mammogram ☐ 7. Fear of negative outcome of the exam ☐ 8. Other ☐
If other, please explain:

Barrier Assessment-Reasons for No Show

Preferred Not to Answer	0
No Reason	1
Work Schedule	3
Transportation	2
Child Care	0
Discomfort Cause by the Mammogram	1
Fear of Negative Outcome of the Exam	0
Other	7
Other Reasons Included:	
Not receiving appointment information	3
Lack of selfcare	1
Concern about the effectiveness of the test	1
Other schedule related conflict	2

Appendix I

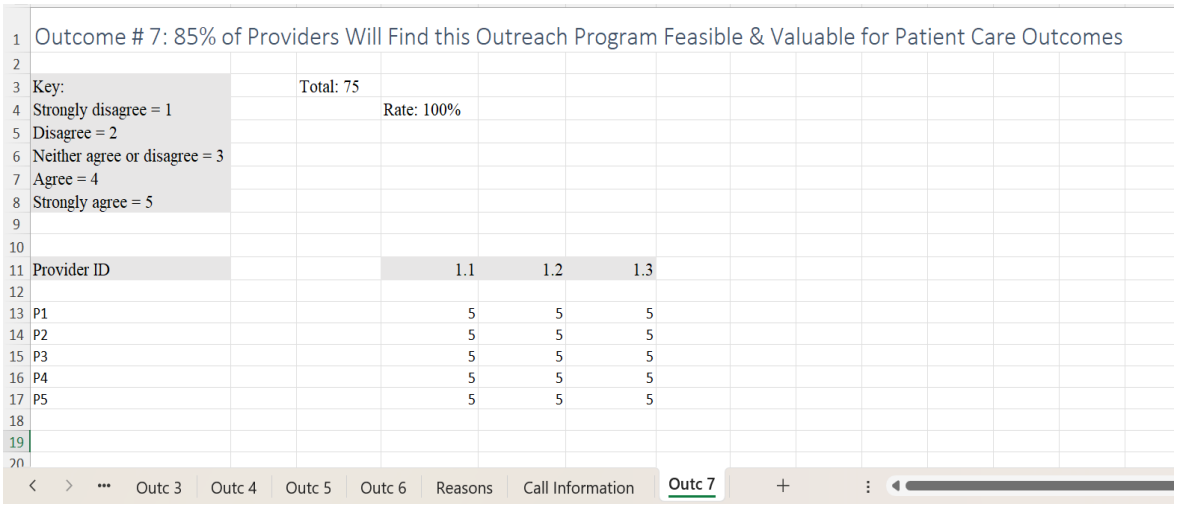
Provider Satisfaction Survey

Please provide anonymous feedback on the outreach interventions aimed at increasing breast cancer screening among women 40 to 74.

Please take a few moments to answer the questions below:

Please Rate the following:	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
	1	2	3	4	5
1.1 The outreach approach was suitable for the clinic.					
1.2 You are satisfied with the intervention as it was implemented over the last 12 weeks.					
1.3 Comments:					

Note: Answers to each item are based on Likert scale: Strongly agree (5), Agree (4), Neither agree or disagree (3), Disagree (2), Strongly disagree (1).



Outcome # 7: 85% of Providers Will Find this Outreach Program Feasible & Valuable for Patient Care Outcomes

Key:	Total: 75			
Strongly disagree = 1	Rate: 100%			
Disagree = 2				
Neither agree or disagree = 3				
Agree = 4				
Strongly agree = 5				
Provider ID	1.1	1.2	1.3	
P1	5	5	5	
P2	5	5	5	
P3	5	5	5	
P4	5	5	5	
P5	5	5	5	

Outc 3 | Outc 4 | Outc 5 | Outc 6 | Reasons | Call Information | Outc 7

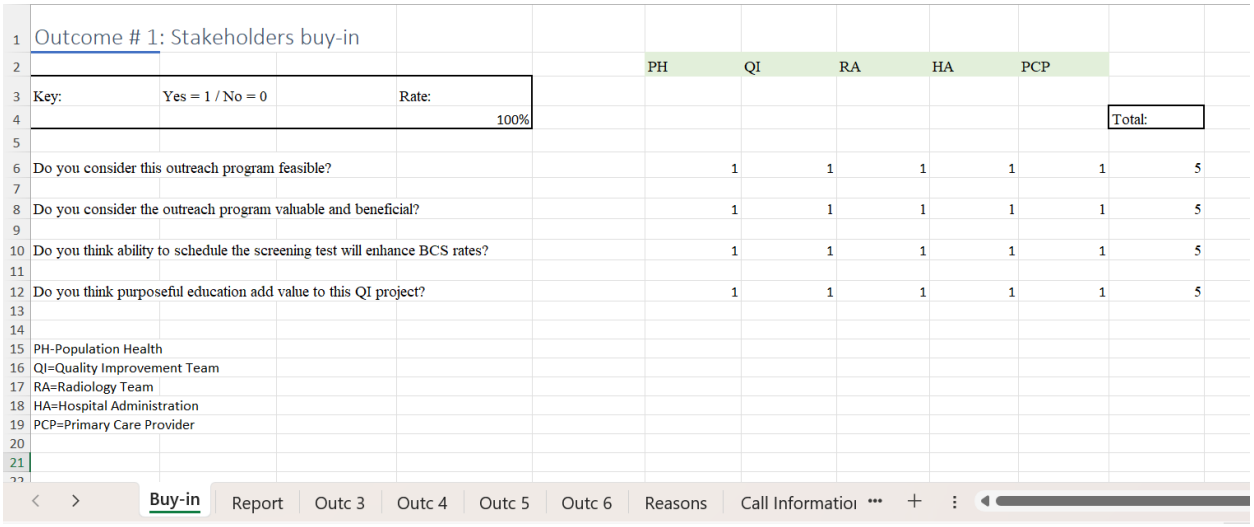
Appendix J

Table 3: Measures Table

Measures				Analysis
Expected outcomes	How operationalize/ measure	Where will you get the information	Will you have a comparison	Analysis
Will obtain input and by-in from stakeholders and leadership	Working together with QI team, population health team, & the Radiology team to co-design the outreach intervention.	Meetings/meeting minutes	No	Draw qualitative information from meeting/meeting minutes
Create a report for outreach	Generate a report of women ages 40 to 74 seen by the PCP in the past 18 months. Had order for a mammogram in the past 24 months and no-show.	The list will be generated in Epic with the assist of the IT team	No	N/A
50% of the no-show patients will successfully receive a scripted phone call by the NP.	Patient is contacted at first attempt. Scripted calls will be extended to 7 PM. Patients not contacted will receive a second phone call. Return to baseline care if no contact or do not schedule an appointment.	Maintain a list in the excel tracking tool with the patients who were contacted.	No	Frequency and proportion Patients who have a successful call, in relation to number of calls made.
40% of the total number of patients contacted will schedule a mammogram exam.	Patient receives scripted purposeful health education, offer an appointment.	Assess screening by generating and maintaining a report in an excel tracking tool.	No	Frequency and proportion Number of patients who scheduled a mammogram in relation to those who received the scripted message.
25% of the no-show patients who scheduled an appointment will complete the mammogram exam.	Increase BCS awareness with scripted phone call and offer an appointment during the call.	Chart review	Pre-intervention.	Frequency, proportion, and percentage of patients completing a mammogram. Completed screening/scheduling
BCS rates will be increased by 4%	Measuring the number of completed screenings.	No-show list in the excel tracking tool.	Compare to baseline – Post-program results to pre-program results.	Frequency, proportion, change and percentage.
85% of Primary care providers will find this outreach program feasible and valuable to patient care outcomes.	Assess feasibility of use and view on impact on patient care. Will use a scaled survey that already exist and proven to be effective.	Using a survey that evaluates the effectiveness of the intervention.	No	Frequency, proportion Number of providers who completed the survey in relation to the scores.

Appendix K

Aim # 1



Outcome # 1: Stakeholders buy-in

			PH	QI	RA	HA	PCP	
Key:	Yes = 1 / No = 0	Rate:						
		100%						Total:
Do you consider this outreach program feasible?			1	1	1	1	1	5
Do you consider the outreach program valuable and beneficial?			1	1	1	1	1	5
Do you think ability to schedule the screening test will enhance BCS rates?			1	1	1	1	1	5
Do you think purposeful education add value to this QI project?			1	1	1	1	1	5

PH-Population Health
QI=Quality Improvement Team
RA=Radiology Team
HA=Hospital Administration
PCP=Primary Care Provider

Buy-in | Report | Outc 3 | Outc 4 | Outc 5 | Outc 6 | Reasons | Call Informatio

Appendix L

Aim # 2

Outcome # 2: Develop an Outreach Report

Key: Yes = 1, No = 0

Patient ID	Age	Race/Ethnicity	Team PCP	Overdue for screening	First Mammogram	Screening Due Date	No-show for appointment	No Show date	Need External Rec
WC1	66	AA	1	1	0	4/17/2020	1	11/24/2021	
TK2	61	Ethiopian	1	1			1	12/8/2021	
BC3	54	AA	1	1	0	3/28/2019	1	4/14/2022	1
SM4	56	Hispanic	1	1	0	6/16/2022	1	7/16/2022	
SI5	65	Caucation	1	1	0	9/30/2023	1	7/16/2022	1
BJ6	41	AA	1	1	0	9/30/2023	1	7/22/2022	
LY7	47	AA	1	1	0	7/15/2022	1	9/22/2022	
HL8	51	AA	1	1	0	7/26/2022	1	10/14/2022	
RG9	55	Hispanic	1	1	0	4/9/2023	1	11/26/2022	
BK10	51	AA	1	1	0	10/6/2021	1	11/30/2022	
YF11	57	AA	1	1	0	2/21/2021	1	5/3/2023	
PL12	55	Asian	1	1	0	5/7/2022	1	7/25/2023	
CS13	56	AA	1	1	?		1	9/21/2023	
IL14	55	AA	0	1	0	9/1/2023	1	6/26/2022	
HS15	69	AA	0	1	?	7/15/2023	1	7/29/2023	
JRA16	53	AA	0	1	0	9/11/2023	1	3/17/2023	
BN17	50	AA	0	1	0	7/21/2023	1	7/8/2017	
CVK18	60	AA	0	1	0	9/14/2023	1	5/18/2023	
AH19	67	White	0	1	0	1/14/2023	1	10/15/2019	
KTB20	68	AA	0	1	0	12/2/2022	1	10/2/2021	
BA21	73	Hispanic	0	1	0	4/12/2023	1	11/10/2022	
ME22	73	AA	0	1	0	4/3/2023	1	7/28/2022	
GT23	56	AA	0	1	0	3/19/2023	1	6/24/2023	

Buy-in | Report | Outc 3 | Outc 4 | Outc 5 | Outc 6 | Reasons | Call Informatio

Appendix M-1

Aim # 3

Outcome # 3: 50% of Patients Will Receive a Call

Key: Yes = 1, No = 0

Patient ID	Age	Call Date	Contact Made	Purposeful Education delivered	Barrier to Screening Assessed	2nd Call	2nd Call Date	Contact Made	Total Contact
WC1	66	11/6/2023	0			1	11/22/2023	0	
TK2	61	11/15/2023	0			1	11/30/2023	0	0
BC3	54	11/6/2023	1		1				1
SM4	56	11/15/2023	0			1	11/30/2023	0	0
SI5	65	11/15/2023	1		1				1
BJ6	41	11/10/2023	1		1				1
LY7	47	11/21/2023	1	0	1				1
HL8	51	11/21/2023	1		1				1
RG9	55	11/21/2023	1		1				1
BK10	51	11/15/2023	1	1- basic need for screening	1				1
YF11	57	11/22/2023	1		1				1
PL12	55	11/22/2023	0				12/6/2023	0	0
CS13	56	11/22/2023	0	0	1		12/6/2023	0	0
IL14	60	11/30/2023	1	Patient know what to expect & no ?	1				1
HS15	69	11/30/2023	1	0					1
JRA16	50	11/30/2023	0	0		1	12/13/2023	0	0
BN17	60	11/30/2023	1	0	1				1
CVK18	67	11/30/2023	1	1 - info regarding use of Tomo	1				1
AH19	68	12/4/2023	0	0	1	1	12/18/2023	1	1
KTB20	73	12/4/2023	0			1	12/18/2023	0	0
BA21	73	12/4/2023	0			1	12/18/2023	0	0
ME22	73	12/6/2023	1	0	1				1
GT23	56	12/18/2023	0			1	1/2/2024	0	
	23	59.304	13	0	14	8	0	1	14
									60.86956522

Report | Outc 3 | Outc 4 | Outc 5 | Outc 6 | Reasons | Call Information | Outc

Appendix M-2

Aim # 4

Outcome # 4: 40% of Patients Contacted Will Schedule a Mammogram

Key: Yes = 1
No = 0

Patient ID	Age	Total Contact	Accepted Screening	Return to Baseline care	Active Order	Order Placed	Appointment Scheduled	Appointment Date
WC1	66	0		1				
TK2	61	0		1				
BC3	54	1	1		1	0	1	12/7/2023
SM4	56	0		1				
SI5	65	1	1		1	0	1	12/14/2023
BJ6	41	1	1		0	1	1	12/1/2023
LY7	47	1	1		1	0	1	12/26/2023
HL8	51	1	1		1	0	1	12/23/2023
RG9	55	1	1		1	0	1	1/12/2024
BK10	51	1	1		0	1	1	2/5/2024
YF11	57	1	1		1	0	1	2/27/2024
PL12	55	0		1				
CS13	56	0		1				
IL14	60	1	1		1	0	1	1/6/2024
HS15	69	1	0		1	0	0	
JRA16	50	0		1				
BN17	60	1	1		1	0	1	1/8/2024
CVK18	67	1	1		1	0	1	1/5/2024
AH19	68	1	1		1	0	1	2/21/2024
KTB20	73	0		1				
BA21	73	0		1				
ME22	73	1	1		1	0	1	4/24/2024
GT23	56	0		1				
23	59.30435	14	13	9	12	2	13	0
			92.85714286					

Buy-in | Report | Outc 3 | Outc 4 | Outc 5 | Outc 6 | Reasons | Call Informatio

Appendix M-3

Aim # 5

Outcome # 5: 25% of Patients Who Scheduled an Appointment Will Complete the Mammogram Exam

Key: Yes = 1
No = 0

Patient ID	Age	Accepted Screening	Test Completed	Normal	Referred to present workflow
WC1	66				
TK2	61				
BC3	54	1	0		
SM4	56				
SI5	65	1	0		
BJ6	41	1	1	0	1
LY7	47	1	1	0	1
HL8	51	1	1	1	
RG9	55	1	0		
BK10	51	1	0		
YF11	57	1	0		
PL12	55				
CS13	56				
IL14	60	1	0		
HS15	69	0			
JRA16	50				
BN17	60	1	0		
CVK18	67	1	1	1	
AH19	68	1	1	1	
KTB20	73				
BA21	73				
ME22	73	1			
GT23	56				
23	59.30435	13	5	3	2
			38.46153846		

Report | Outc 3 | Outc 4 | Outc 5 | Outc 6 | Reasons | Call Information

Appendix M-4

Aim # 6

Outcome # 6: BCS Will Increase by 4%

Key:	Yes = 1	
	No = 0	
Patient ID	Age	Test Completed
WC1	66	
TK2	61	
BC3	54	0
SM4	56	
SI5	65	0
BJ6	41	1
LY7	47	1
HL8	51	1
RG9	55	0
BK10	51	0
YF11	57	0
PL12	55	
CS13	56	
IL14	60	0
HS15	69	
JRA16	50	
BN17	60	0
CVK18	67	1
AH19	68	1
KTB20	73	
BA21	73	
ME22	73	0
GT23	56	
23	59.30435	5
		21.73913043

< > Buy-in | Report | Outc 3 | Outc 4 | Outc 5 | Outc 6

Appendix N

Table 4

CLINICAL QUALITY IMPROVEMENT CHECKLIST		
Date: 03/30/2023	**Project Leader: Wilder Pinnock, FNP**	
Project Title: Increasing breast cancer screening rates among underserved women in an urban safety net primary care clinic.		
Institution where the project will be conducted: GIM at Boston Medical Center		
Instructions: Answer YES or NO to each of the following statements about QI projects.	**YES**	**NO**
The specific aim is to improve the process or deliver of care with established/ accepted practice standards, or to implement change according to mandates of the health facilities' Quality Improvement programs. There is no intention of using the data for research purposes.	**X**	
The project is **NOT** designed to answer a research question or test a hypothesis and is **NOT** intended to develop or contribute to generalizable knowledge.	**X**	
The project does **NOT** follow a research design (e.g. hypothesis testing or group comparison [randomization, control groups, prospective comparison groups, cross-sectional, case control]). The project does **NOT** follow a protocol that over-rides clinical decision-making.	**X**	
The project involves implementation of established and tested practice standards (evidence based practice) and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does **NOT** develop paradigms or untested methods or new untested standards.	**X**	
The project involves implementation or care practices and interventions that are consensus-based or evidence-based. The project does **NOT** seek to test an intervention that is beyond current science and experience.	**X**	
The project has been discussed with the QA/QI department where the project will be conducted and involves staff who are working at, or patients/clients/individuals who are seen at the facility where the project will be carried out.	**X**	
The project has **NO** funding from federal agencies or research-focused organizations, and is not receiving funding for implementation research.	**X**	
The clinical practice unit (hospital, clinic, division, or care group) agrees that this is a QI project that will be implemented to improve the process or delivery of care.	**X**	
The project leader/DNP student has discussed and reviewed the checklist with the project Course Faculty. The project leader/DNP student will **NOT** refer to the project as research in any written or oral presentations or publications.	**X**	
ANSWER KEY: If the answer to **ALL** of these questions is **YES**, the activity can be considered a Clinical Quality Improvement activity that does not meet the definition of human research. **UMB IRB review is not required. Keep a dated copy of the checklist in your files.** If the answer to ANY of these questions is NO, the project must be submitted to the IRB for review.		