

A PROSPECTIVE QUALITY IMPROVEMENT PROJECT

A PROSPECTIVE QUALITY IMPROVEMENT PROJECT USING A MAMMOGRAPHY
RISK ASSESSMENT TOOL TO INCREASE SCREENING MAMMOGRAM USE WITH
LOW-INCOME HISPANIC WOMEN

A Doctor of Nursing Practice Project Report

by

TAMMY L. WALKER-SMITH

BA, Louisiana Tech University, 1992
AD Nursing, Victoria College, 1995
MHA, Kennedy Western University, 1999
BSN/MSN, Texas A & M- University, 2009

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TAMMY L. WALKER-SMITH, MHA, MSN, APRN, FNP

This Doctor of Nursing Practice Project Report meets the standards for scope and quality of Texas A&M University-Corpus Christi College of Nursing and Health Sciences and is hereby approved.

Sara A. Baldwin, Ph.D., RN
Chair/Liaison

Christina Murphy, Ph.D., RN
Content/Expert Committee Member

Susan Dyess, Ph.D., RN
Faculty Advisor/Committee Member

August 2018

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DEDICATION

I would like to dedicate this page to all the friends and family members who supported me through this journey.

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ACKNOWLEDGEMENTS

I would like to thank my committee chair, Dr. Sara Baldwin, and my committee members, Dr. Susan Dyess, and Dr. Christina Murphey for their guidance and support throughout the course of this Quality Improvement project. A special thank you is extended to Dr. S. Gabram for giving permission to use the Provider Practice Survey for this project.

Thanks also go to my friends and colleagues and the department faculty and staff for making my time at Texas A&M University-Corpus Christi an enjoyable experience. I also want to extend my gratitude to my parents for their love and support throughout the years. I would not be where I am today without them. I also want to thank my husband for encouraging me to follow my passion and adjusting to the many changes in schedules and plans in order to complete assignments, sometimes late into the night.

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ABSTRACT

Breast cancer is the second leading cause of cancer mortality among U.S. women. Hispanic women experience a lower 5-year survival rate of 79% compared to 91% among non-Hispanic White women. The purpose of this DNP project was to design an evidence-based quality improvement (QI) project to improve the screening mammogram completion rates by implementing concurrent educational and clinic referral tool systemic strategies in a primary care clinic. Medline®, CINAHL®, and the Cochrane Collection®, databases were used to identify key studies between 2013-2018 that addressed the disparity of low-income Hispanic women, and evidence-based practice breast cancer risk assessments based on risk factors and current screening guidelines. The evidence-based tools used were the Breast Cancer Risk Assessment Tool and the National Health Interview Survey, available in English and Spanish. Once the tools triggered a nurse referral, health providers determined if a screening mammogram order was needed. This provided a systematic change process for early detection and improved screening mammogram rates for women between the ages of 50-74. The QI project findings addressed evidence-based interventions that improved screening mammogram rates 7.21% in a three-month period. The outcomes discussed in this report provide guidance for new policy considerations and clinical protocols.

Keywords: Primary care, breast cancer risk assessment, evidence-based breast cancer screening tools, screening mammogram, and breast cancer screening, breast cancer, breast cancer risk factors, Hispanic, and Mexican American

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A Prospective Quality Improvement Project Using Mammography Risk Assessment Tools to Increase Screening Mammogram Use with Hispanic Women

Breast cancer is the second leading cause of cancer mortality among U.S. women. (American Cancer Society, 2017). According to the American Cancer Society (2017) unacceptably high late-stage breast cancer disparities continue to exist among Hispanic women when compared to Non-Hispanic White women (2011-2015). In the United States, breast cancer 5-year survival rates have steadily improved to 91 percent among Non-Hispanic White women due to early stage diagnoses using screening mammograms (American Cancer Society, 2015). In contrast, the 5-year survival rates for Hispanic women are considerably lower at 79 percent (American Cancer Society, 2015). Between 1987-2013, Hispanic women experienced the lowest national screening mammogram rates among all ethnic groups at 67 percent (National Cancer Institute, 2015).

In Texas, the American Cancer Society (2017) estimates a 13 percent lower 5-year survival rate among Hispanic women and an 8 percent lower early breast cancer detection rate. This five percent cancer disparity gap is due in part to barriers such as lack of access to services and a lack of an established clinical protocol in primary care clinics. Health system issues contributing to lower screening rates in this setting include minimal use of evidence-based breast cancer risk screening tools, a lack of provider awareness, and missed screening eligibility communication opportunities (Gabram et al., 2009; Kerber et al., 2016; Peterson et al., 2016).

The Doctor of Nursing Practice (DNP) Project setting is situated within Nueces County, an underserved region in South Texas with a population of approximately 309,000 people where 63.4 percent of the residents are identified as Hispanic (US Census Bureau, 2016). In this geographic region, primary clinics in the DNP project setting are administered by a regional non-profit healthcare system (HCS). This HCS provides primary care to a targeted population

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considered low-income and medically underserved (S. Wachtel, HCS Director of Innovation and Research, personal communication, September 6, 2017). Primary care services for this population are funded through a state/county Medicaid waiver program referred to as the Nueces County Hospital District (NCHD). The ethnic composition of women participating in the NCHD is largely Hispanic women (76 percent), followed by White (17.5 percent), and African American (5 percent) (NCHD Database Report generated October 10, 2017).

According to the health facility's database program, the baseline mammogram completion rate in the previous two-years for women in the NCHD program was 55 percent (Athena QI Database Report generated on October 10th, 2017). This rate reflects a significant 12 percent screening mammogram gap when compared to the U.S. mammogram rate of 67 percent among Hispanic women (National Cancer Institute, 2015). The Healthy People 2020 recommendation (objective C-17) that 81.1% of women have one MG at least every 2 years provides a platform for improving disparity gaps and access to preventive services for early detection and treatment of breast cancer (USDHHS, 2014).

Problem Statement and Purpose

At a South Texas HCS, the screening mammogram rates are unacceptably low for Hispanic women compared to the national rate. This notable 12 percent gap in mammogram completion rates created a need to investigate primary care clinic screening mammogram practices and potential actions. In women seeking NCHD services, is an intake interview risk assessment / breast cancer screening tool and nurse referral process more effective compared to standard clinic practice in identifying a patient's mammogram needs, and how does this affect screening mammogram completion rates over three-months, using a South Texas HCS 's approved quality measure guideline. The primary purpose of this DNP project was to design an evidence-based

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quality improvement project to improve the screening mammogram completion rates by implementing concurrent educational and clinic referral tool systemic strategies in a HCS's primary care clinic. A letter of support was provided to the DNP student to provide support for the project site allocation and planning (see Appendix A). An interdisciplinary team composed of HCS administrators, health providers, nurses, and community health workers met to investigate potential causes of low mammography completion and develop interventions to reverse this trend (see Table 1 and 2). The facility's staff from the primary care clinics and nurse administrators were involved throughout the process (see Table 3).

Theoretical Framework for Practice Change

The framework used for organizing the DNP project was the Knowledge-To Action (KTA) Framework by Graham and colleagues (2006). The KTA asserts that through knowledge creation and action cycle incorporation, knowledge can be refined to create change in clinical practice. This framework was used in the DNP Project because of its utility to synthesize knowledge in and among interdisciplinary groups and tailor EBP tools specific to staff's knowledge barriers (Field, Booth, Ilott, & Gerrish, 2014). The steps most relevant to the implementation phases of the project are: (a) Assessment of barriers to knowledge use through the use of provider practice surveys and pre-and-post-training knowledge surveys, (b) Adaptation to local context using clinical staff training sessions tailored to the facility and population challenges, and (c) Monitoring intervention knowledge use by comparing mammogram completion rates before, during, and after the three-month intervention period (Graham et al., 2006). These KTA action cycle steps assist in mobilizing healthcare systems change, and evaluating clinic practice patterns and intervention effectiveness (Field et al., 2014). Problem identification, barrier resolution, and interventions derived from knowledge gained and

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sustained, are all underlying strategic aspects of this framework (Field et al., 2014). The KTA framework encourages behavior changes in a predictable manner (Field et al., 2014; White, Dudley-Brown, & Terhaar, 2016).

In a Canadian KTA application project, students searched for strategic breast cancer screening guideline dissemination approaches using the KTA framework (Munce et al., 2013). The authors' focused on using the Integrated Knowledge Translation (IKA) to develop a plan to implement breast cancer screening guidelines in the clinic setting. Their interdisciplinary plan included assessing barriers to provider knowledge, as well as determining what processes promote evidence-based breast cancer screening guidelines to change practice patterns and improve patient outcomes (Munce et al., 2013). The key lesson learned was the importance of interdisciplinary process integration to positively impact evidence-based breast cancer screening guideline QI efforts (Munce et al., 2013). Thus, using the KTA framework has the potential to facilitate the training of interprofessional groups using EBP interventions, translate knowledge into referral initiation, and facilitate the overall change process in the DNP project.

Project Description

This section provides a review of studies focused on improving screening mammogram completion rates and breast cancer screening tools, preventive care, clinic and provider use of evidence-based breast cancer screening tools, and interdisciplinary team members strategies to complement streamlined clinic processes to identify women in need of a screening mammogram.

Literature Review

A computer search was conducted using the following databases: MEDLINE®, CINAHL®, and the Cochrane Collection® for the years 2013- 2018 with a portable document format (pdf) available in English. Descriptive terms used for searching databases were; breast cancer, breast

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cancer risk factors, breast cancer screening, screening mammogram, primary care, breast cancer risk assessment, evidence-based breast cancer screening tools, Hispanic, and Mexican American. The terms from this search broadened the search to evidence-based breast cancer screening tools such as the Breast Cancer Risk Assessment Tool (BCRAT) and the National Health Interview Survey (NHIS) (see Table 4 and 5).

The literature review section provides an overview of studies that use BCRAT and NHIS tools to identify women past due for a mammogram and/or at risk for increased for breast cancer. This section also reviews evidence-based interventions and outcomes that addressed screening mammogram rates across the ethnicity spectrum. Several studies incorporating education for nurses, providers, and/or community health workers were identified that used consistent breast cancer screening recommendations and processes to identify women with potential elevated 5-year breast cancer prediction scores (see Table 6).

Familial inherited co-morbidities were positively correlated with early detection using breast cancer risk assessment tools (Gabram et al., 2009; Kerber et al., 2016; Nair et al., 2017). The risk assessment tool includes breast cancer risk factors such as one's personal or family history of breast cancer, positive BRCA1 or BRCA2 gene mutations, previous breast biopsy results, age, and ethnicity for the Breast Cancer Risk Assessment 5-year prediction score (National Cancer Institute, 2011). This is important because Hispanic women have a 20 percent greater chance of mortality from breast cancer and have a higher BRCA1 and BRCA2 genetic mutation risk compared to NHW women (Haile et al., 2012; Hunt, 2016).

Two studies found that a lack of provider familiarity (71 percent) with the BCRAT affected risk assessment opportunities and the strongest barrier identified for patients was a lack of provider recommendations for preventive screenings (Mahon, 2015; Peterson et al., 2016).

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Gabram et al. (2009) used a Practice Pattern Survey to better understand provider practice patterns for breast cancer risk, familiarity with the BCRAT, and interest in educational training sessions before providing sessions with pre-and post-training surveys (see Table 7). As a result, providing breast cancer risk education to providers improved identification of women at high-risk for breast cancer and may provide an opportunity for early detection and treatment of other disease processes (Gabram et al., 2009; Kerber et al., 2016; Nair et al., 2017). The primary evaluation and training purpose among these studies was to decrease barriers that prevent the use of valid prediction tools (Edwards & Seibert, 2010; Field et al., 2014; Gabram et al., 2009). Several studies incorporating the breast cancer risk assessment screening measures noted potential detection of other familial inherited co-morbidities that these patients were at risk for (Gabram et al., 2009; Kerber et al., 2016; Nair et al., 2017).

A multidisciplinary approach to risk assessment screening of patients using a language specific and culturally competent approach was found to improve patient-provider communication and trust (Mahon, 2015; Simon et al., 2013). Multiple studies found that providers who discuss health promotion and / or preventive screening with their patients set the expectation for risk reduction, encouraging healthy behaviors, and lessening patient worries through positive behavior changes (Bully, Sánchez, Zabaleta-del-Olmo, Pombo, & Grandes, 2015; Gabram et al., 2009; Simon et al., 2013). This communication theme was consistent across global disciplines. For example, Korean American community health workers were taught health literacy communication skills in a community-based setting. The study found that after providing education, pamphlets, and group training, the screening mammogram rates improved significantly over a 6-month period significantly, improving from 10 to 56.1 percent (Hae-Ra et al., 2017).

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Additional research studies used community health workers (CHW) to promote breast screening education and risk factor awareness (Keating et al., 2014; Paalosalo-Harris & Skirton, 2017). Community Health Promoters (CHP's) who participated in a 10-hour training session on breast cancer screening promotion received pre-and post-training surveys with post-training surveys reflecting a significant improvement ($p < 0.001$) compared to the pre-training survey. Surveys were administered again between three and six-months after the training session to determine their knowledge retention and found no change in the initial post-training results ($p < 0.001$) (Keating et al., 2014). Based on these results, the training sessions were extended to other primary care clinic staff with the goal of providing early detection promotion efforts to a larger number of people through expanded outreach efforts (Hae-Ra et al., 2017; Keating et al., 2014; Paalosalo-Harris & Skirton, 2017). Sandoval et al. (2017) conducted a cross-sectional study ($n = 5,345$ women 50-74 years of age) between 1992-2014. Women experiencing low SES were provided with an organized breast cancer screening program where screening data was provided for the study through the State of Geneva, Switzerland. At the onset of the study, 30.5 percent of women had never had a screening mammogram; however, the rate decreased to 3.6 percent by the end of the study which indicated an organized breast cancer screening program provides low-income women more opportunities for obtaining routine breast cancer screenings (Sandoval et al., 2017).

Two separate studies determined that BCRAT's breast cancer predictive validity was determined based on calibrated adjustments for Hispanic women and women of other ethnicities using a breast cancer 5-year prediction score (Banegas et al., 2012; Schonfeld et al., 2010). One of the studies compared 6,353 Hispanic and 128,976 NHW women (50-79 years of age). The change in breast cancer incidence rates from different years resulted in a need for a change in the

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SEER breast cancer incidence rate years for calibration to be changed to 1993-2007 to calibrate for Hispanic women (O/E ratio= 0.98, 95% CI= 0.96-1.01; $p= 0.2$). These screening tool adjustments have been built into the National Cancer Institute website for use with the BCRAT and provide calculated risk scores based on individual risk factors (National Cancer Institute, 2011).

In 2000, 2005 and 2019, the NHIS conducted a cross-sectional survey of 23,116 women using the NHIS and the BCRAT (modified Gail Model). The study reported a positive correlation (OR: 0.684, $p<0.001$) between minority Hispanic ethnicity and mammogram disparities compared to NHW women; Hispanic women were also found to have limited healthcare access and more often of low-socioeconomic status with an odds ratio of 0.752, $p<0.05$ compared to NHW women (Elewonibi, Thierry, & Miranda, 2018). The NHIS identifies important routine patient screening mammogram practices whereas the BCRAT identifies the patient's breast cancer risk factors (Centers for Disease Control and Prevention & National Center for Health Statistics, 2017; National Cancer Institute, 2011). The NHIS question addresses whether the patient is past due for a routine screening mammogram (Centers for Disease Control and Prevention & National Center for Health Statistics, 2017). A review of multiple studies between 1976-1990 reported reduced mortality rates by as much as 25 percent for women aged 50 and over when the integration of routine patient history screening questions resulted in screening mammograms. The use of such screening questions may decrease mortality by as much as 40-45% for women diagnosed with breast cancer (Barduchi Ohl, Barduchi Ohl, Ribeiro Chavaglia, & Erlach Goldman, 2016).

This review provides important knowledge summarizing findings of screening mammography pertinent to this population of women. Knowledge of the BRCAT and NHIS

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screening tools that will be useful in developing specific aims and methods to promote screening mammogram completion in this population of women. Details for this project's methods are examined next.

The Goal Statement and Specific Aims

The primary goal of the DNP Project is to increase screening mammogram completion rates by one percent for a three-month period (February to May 2018). The specific aims of this project are to:

1. Increase Clinic staff's knowledge of evidence-based risk assessment tools for breast cancer screening purposes and how to use them effectively
2. Increase screening mammogram referral initiation and completion rates for qualified participants.

Methods

This section provides an overview of the DNP Project's database population, setting, planned process (see Appendix B), proposed interventions, rationale for proposed analyses, and measurement tools. **Population**

The available database population for this analysis was 1650 women. Potential subjects were low-income women who were registered as NCHD clients and were between 50-74 years of age. There were not any exclusions from the database based on any setting limitation within the database. In this project, women were screening mammogram complete if they obtained at least one screening mammogram in the last 24 months. For the purposes of this project, screening mammogram completion is defined as any mammogram completed within the last 24 months.

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Setting

The DNP project site was a not-for-profit health care system (HCS) located in South Texas with three primary care clinics located in Nueces County (Nueces County Hospital District, 2018). The participating primary care clinics used the USPSTF breast cancer screening recommendations (U. S. Preventive Services Task Force, 2016). The qualified participants included Nueces County Hospital District (NCHD) women (50-74 years of age) receiving an intake interview between February – May 2018.

Planning Interventions

Prior to planning interventions, several barriers were identified prior to DNP project development. A Gap Analysis was conducted as part of formal course work that identified a need for breast cancer screening best-practice interventions (see Table 1). The interventions for the DNP quality improvement (QI) project will include evidence-based national best practice strategies such as providing training to clinic staff and providers (see Table 2) with pre-and post-training surveys (see Table 7), initiating breast cancer risk assessment screening tools (see Table 4 and 5), and using a nurse referral (see Table 8) process to increase initiation and completion of screening mammogram rates for this population (see Table 1 and 2) (Banegas et al., 2012; Edwards & Seibert, 2010; Elewonibi et al., 2018; Gabram et al., 2009; U. S. Preventive Services Task Force, 2016). For a cause and effect explanation, a fishbone diagram is provided (see Figure 1). This project is closely aligned with DNP essential number 7: Clinical prevention and population health. The DNP essential provides a goal of improving preventive breast cancer screening and population health with early detection of breast cancer (American Association of Colleges of Nursing, 2006).

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The HCS facility's clinic managers collaboratively developed a risk assessment table (see Table 9). The DNP project was an interdisciplinary team involved in a series of planning sessions (see Table 3). A cost-benefit analysis with an anticipated one percent increase in mammogram completion rates per month for a three-month period resulted in an expenditure of \$3,266 for facility expenses including staff and office supplies (see Table 10) (Office Finder, n.d.).

Interventions

Using the Knowledge to Action Framework (KTA), the project interventions were multilayered: (a) Administering a Provider Practice Pattern Survey (see Table 11) to determine clinic health providers' familiarity with screening tool and practice patterns, (b) Administering pre-and post-training knowledge surveys among clinic staff (community health workers, nurses, nurse practitioners, and physicians) (Gabram et al., 2009; Kerber et al., 2016; Nair et al., 2017), (c) Adopting the BCRAT and the NHIS during member intake, (d) Identifying NCHD members with positive screening triggers for generating a nurse referral, and (e) Notifying providers of the referral to determine whether a screening mammogram order was needed. Data was collected using the HCS's QI internal database and referrals generated.

Rationale and Analysis

Several studies have validated the positive impact made by CHWs in increasing mammogram completion rates (Hae-Ra et al., 2017; Keating et al., 2014; Paalosalo-Harris & Skirton, 2017). The BCRAT predict a 5-year breast cancer risk score with an acceptable prediction validity among all ethnicities (Banegas et al., 2012). The NHIS mammogram question predictably identifies women past due for a routine screening mammogram, beyond the 24 month frequency period (Centers for Disease Control and Prevention & National Center for

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Health Statistics, 2017). The knowledge survey was not previously tested for validity or reliability. The screening tools and knowledge survey will be tested for reliability with before and after comparisons of monthly mammogram completion rates by the facility's Athena QI database without identifiers (K. Migliore, HCS Database Director, personal communication, September 27, 2017). Quantitative data analysis of practice pattern surveys, nurse referrals, and mammogram completion rates will be reported as percentages, and the pre-and post-training surveys will be reported as dependent group t-tests with Cohen's *d* and effect size (Polit, 2010).

Measurement Tools

The BCRAT predict a 5-year breast cancer risk score with an acceptable prediction validity among all ethnicities (Banegas et al., 2012). The NHIS mammogram question predictably identifies women past due for a routine screening mammogram, beyond the 24 month frequency period (Centers for Disease Control and Prevention & National Center for Health Statistics, 2017). The knowledge survey was not previously tested for validity or reliability. The screening tools and knowledge survey will be tested for reliability as well as before and after comparisons of monthly mammogram completion rates by the facility's Athena QI database without identifiers (K. Migliore, HCS database director personal communication, September 27, 2017). Quantitative data analysis will be reported as percentages, and dependent group t-tests with Cohen's *d* and the effect size (Polit, 2010).

Data Analysis

The data were analyzed utilizing SPSS version 25 (IBM Corp., 2017) by the investigator with consultation from committee chair Dr. Sara Baldwin. Statistical support was received from Kamiar Kouzekanani, Ph.D.

Ethical Considerations

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The DNP project was approved by CHRISTUS Health and Texas A & M University Institutional Review Boards as a quality improvement project thus exempted from full IRB approval. This project received no financial support nor were there any conflicts of interest to report during the completion of this project.

Results

This section provides a description of the study sample, and a summary of results according to each specific aim. A discussion of project challenges and consequences is also included.

Description of the Study Sample

Over the course of the three-month project, clinic staff and providers combined totaled 18 clinic professionals who received pre-and post-training surveys and training for the BCRAT and NHIS, of those 8 were providers who also completed the provider practice survey. The NCHD participants included 146 qualified women between the ages of 50-74 who received the BCRAT and NHIS screening during the intake interview process to determine if these women were of high-risk for a 5-year breast cancer prediction score and / or past due for a screening mammogram beyond the 24-month parameter set for this project's mammogram completion definition.

Results from Specific Aim 1: Increase Clinic staff's knowledge of evidence-based risk assessment tools for breast cancer screening purposes and how to use them effectively

The three-month member screening period began once the scheduled training was completed with clinic staff and providers. The clinic staff and providers' pre-and post-training surveys reveal significant knowledge improvement $t(17) = 4.37, p < 0.01$ with Cohen's $d = 1.21$

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and the effect size ($\alpha = 0.52$), which is a medium effect that represents 0.52 standard deviation units as shown in Table 12.

Table 12.

Clinic Staff's Pre-and-post Training Knowledge Survey

Variable	N	SD	Paired pre-post t-test	Sig. (2-tailed)
Pre-test	18	1.720	-----	-----
Post-test	18	2.906	-----	-----
Pre-post	18	2.805	-4.369	0.000

* $p < 0.05$

The finding of whether the tools were used effectively is reflected in the number of women that triggered the BCRAT and/ or NHIS and received a nurse referral. Of the 146 women who were screened, 81 (55.5 percent) women generated a nurse referral and 65 (44.5 percent) women did not generate a nurse referral. The screening tool triggers for the nurse referral were as follows: BCRAT= 16.1 percent (n=13), NHIS= 69.1 percent (n=56), and dual tool triggers BCRAT & NHIS=14.8 percent (n=12). One other key finding involved determining whether language was a barrier and found that only 2 (1.36 percent) of the 146 women screened chose to have the interview conducted in Spanish. This finding was helpful in determining language was not a barrier to past mammogram completion rates.

Results from Specific Aim 2: Increase screening mammogram referral initiation and completion rates for qualified participants.

The number of nurse referrals generated (n=81) provided the mammogram initiation process, which was not being used previously by this healthcare system. Mammogram completion rates were monitored over the three-month period and compared to the baseline (58 percent) as follows: (a) First month= 62.3 percent (increased 4.3 percent), (b) Second month=

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63.5 percent (increased 1.2 percent), and (c) Third month= 65.21 percent (increased 1.71 percent) as shown in Table 13. The three-month total for mammogram completion rates increased 7.21 percent which is significant. Routine clinical practices before project interventions were initiated provided a 3.2 percent increase over a four-month period (October 2017 to February 2018). The DNP project's goal to increase mammogram completion rates 1 percent per month for three-months was surpassed and was found more effective than routine clinic practices that do not use evidence-based risk assessment tools.

Table 13.

Mammogram Completion Rates (3-month accumulation)

Timeline	% Mammogram Completion Rate	% Improvement with QI Interventions
Initial Data 10/2017	54.8%	-----
Baseline: 2/2018	58%	-----
1 st month 3/2018	62.3%	4.3%
2 nd month 4/2018	63.5%	1.2%
3 rd month 5/2018	65.21%	1.7%
Total 1 st -3 rd mo.	-----	7.21%

The disparity gap for mammogram completion rates decreased from an 8.7 percent baseline gap to a 1.5 percent gap by the end of the three-month period after staff and providers received training on the risk assessment tools. Language was thought to be a possible barrier that led to Nueces County's disparity gap; however, less than 2 percent of women preferred the screening in Spanish (see Table 14). The Provider Practice Pattern Survey provided a baseline to assess the provider practice patterns and possible cause for the disparity gap and it was found that of the eight providers that participated in the survey, 100 percent reported they did not use the modified Gail risk model (BCRAT) for their patients (question #6) (see Table 15). The most striking barrier that was identified in this survey was providers' lack of knowledge and

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familiarity with the BCRA. These statistics were surprising with demographic data revealing 87.5 percent of the participating providers are female.

Project Challenges and Consequences

The evolution of communication and ensuring that clinic nurses received the nurse referrals occurred in the first month's manager's meeting when inconsistencies of the number of referrals received versus those sent did not match. The concern for possible missed referrals prompted a process change to include in-person delivery of nurse referrals to clinic sites every Wednesday for the remainder of the twelve-week period. This process change provided consistent referral receipt for clinic staff to have up to date forms available for provider review. Another communication issue in the project arose when the database director moved out of state and later resigned. This added a level of difficulty to make contact the current database director and later link up with her replacement; however, the PD's facilitator was able to provide the new contact information for the database director and the temporary database manager to ensure QI database reports were generated and provided every month on time.

Discussion

The purpose of this DNP quality improvement project was to design an evidence-based quality improvement project to improve the screening mammogram completion rates by implementing concurrent educational and clinic referral tool systemic strategies in a HCS's primary care clinic. The project examined the problem of late-stage diagnoses among women residing in Nueces County and utilizing Nueces County Health District's primary care services between February 26, 2018 and May 26, 2018. Health policy and clinical implications, recommendations for future practice, and identified barriers will be examined.

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The increasing incidence of late-stage diagnosis of breast cancer among low-income Hispanic women necessitates well-documented progress in delivery of breast cancer screening services in the primary clinic setting. This study is an important contribution to the knowledge base about breast cancer screening quality improvement. Women who are at risk for not obtaining breast cancer screening can be targeted for intervention using the assessment tools and clinic protocol and ultimately improve screening mammogram completion and reduce breast cancer mortality in this medically underserved population. This project documents that MG screening rates are well below *Healthy People 2020* national goals and below the MG screening rates observed nationally (Introduction, 4) (USDHHS, 2014). The mammogram completion rate in this project improved 7.21 percent in three months which is a 225 percent greater improvement compared to routine practice patterns. The 7.21 percent improvement was 240 percent greater than the goal of 3 percent over a three-month period.

The sample size among the women and validation of mammography completion using electronic database records was one of the chief strengths in this analysis. Significant findings from this project can be used to help guide health policy. Based on the database's validation methods, there is reason to believe that these findings and implications from the project can be effectively used in developing health policy for preventive care services with this population.

Since this study included a higher risk sampling of primarily Hispanic women within one specific program in Nueces County, these results cannot be generalized to all low-income Hispanic women. More samples of Hispanic women who live throughout this region in both rural and urban settings are needed to improve the generalizability of this project's findings. Recommendations for future quality improvement work:

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Based on the findings and conclusions of this project, the following recommendations for future studies to advance clinical practice are proposed:

1. Continue to use the BCRAT and NHIS screenings together either with the CHWs in the intake interview process or during triage for the initial or annual patient visit immediately prior to seeing the provider. Clinic managers will decide how to integrate key components of this project to achieve sustainability in specific clinics.
2. Develop contextually rich models that incorporate women's input into screening services that are adaptable and emphasize a Hispanic community-health system partnership. Address barriers from a woman's health perspective, when working with Hispanic women.
3. Future QI work should address whether providers are recommending MGs at clinic visits. Utilization of preventive or primary care services and missed opportunities for screening mammograms have been previously reported in this paper (Literature review). Future development and testing of a provider-counseled or nurse-counseled screening mammogram intervention for Hispanic women are needed to achieve progress toward HP 2020 national objective C-17 which recommends primary care providers counsel their at-risk patients about breast cancer screening (USDHHS, 2014) Future health policy within the setting's HCS, which is administered through the USDHHS, needs to consider guidelines for counseling NCHD women for screening mammogram completion.
4. Monitor the number of late versus early stage breast cancer incidence for these clinic sites and determine if the increase in mammogram completion rates has contributed to a lower late stage breast cancer incidence and lower 5-year survival rate.
5. Develop a process for providers to further evaluate patients that trigger a nurse referral

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based on elevated BCRA scores and establish set criteria for genetic counseling referrals due to familial history of breast cancer.

Project barriers that may have affected project outcomes included:

1. The health provider's reluctance to order a mammogram for a new patient without seeing them first, even after receiving training on the screening tools. This bias may have delayed the ordering of screening mammograms for women that generated a nurse referral. Another barrier was difficulty accessing the database director due to her moving out of the area. The PD's clinical facilitator was integral in maintaining the link to ensure timely database reports were provided.
2. Uneven access to clinic managers and nurses to discuss the progress of the referrals on several occasions. However, persistence and building a rapport provided a point of contact to manage time-sensitive issues. The PD and clinical preceptor were available for the healthcare system to share the tools and processes implemented.

Conclusion

This project's dissemination of findings was shared with the healthcare system's clinic managers and V.P of Missions with ensuing discussion of the project's implications. This project will also be shared with nursing professionals at an upcoming Doctoral Nursing Practice Conference, Fall 2018.

Future directions of this program of research include screening mammogram interventions geared to systematic improvements based on the strengths and barriers identified in this study. If so, efforts to target improvements in outreach and referrals may eventually lead to a reduction in breast cancer mortality and health care disparity among this population.

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Appendix A Letter of Support



November 9, 2017

Dr. Susan Dyess
Associate Dean for Graduate Nurse Programs
College of Nursing and Health Sciences
Texas A&M University – Corpus Christi
6300 Ocean Drive
Corpus Christi, TX 78412

Dear Dr. Dyess,

The purpose of this letter is to provide *Tammy Walker-Smith*, a Doctor of Nursing Practice student at Texas A&M University College of Nursing and Health Sciences, support in conducting a quality improvement project at *CHRISTUS Spohn Walk-in Clinics*. The project, "Assessing Screening Mammogram Needs and Breast Cancer Risks among Nueces County Hospital District Members," entails evaluating staff's knowledge before and after training on the Breast Cancer Risk Assessment Tool (BCRAT), the National Health Information Survey (NHIS), and breast cancer risk factors. Once training is completed, the use of the BCRAT and NHIS will be initiated during the intake interview by community health workers for Nueces County Hospital District female members between the ages of 50-74. Those who receive a high-risk score from the BCRAT and /or are identified as past-due for a screening mammogram will receive a nurse referral. The referrals, number of screening mammogram orders received and completed will be tracked, as well as the monthly breast cancer adherence rate over the three-month period the process is initiated.

The purpose of this project is to: (1) provide increased clinical staff and patient breast cancer risk perception, knowledge, and awareness using a BCRAT and the NHIS, (2) initiate a referral process to improve early detection for those patients who are at high risk for breast cancer and / or past due for a screening mammogram, and (3) improve gaps in mammogram adherence rates and patient outcomes (a minimum of 1% increase in breast cancer screening adherence per month x three months). CHRISTUS Spohn Walk-in Clinics were selected for this project because the NCHD members are a predominantly Hispanic and underserved population and there is an identified 11.9% gap in breast cancer adherence among NCHD members. Tammy Walker-Smith is *not* employed at this institution, but has an interest in improving care at this facility.

I, Dr. Sheryl Wachtel, Director of Clinical Innovation & Community Health Development at CHRISTUS Spohn Health System, do hereby fully and enthusiastically support Tammy Walker-Smith in the conduct of this quality improvement project, "Assessing Screening Mammogram Needs and Breast Cancer Risks among Nueces County Hospital District Members" at CHRISTUS Spohn Walk-in Clinics. A HIPAA compliance form has been signed by Tammy Walker-Smith to access quality indicators in the electronic medical record. De-identified logs will be obtained every month for three months to determine the number of screenings and nurse referrals that occur. Data from the Athena program will be de-identified by Kristen Migliore, Database Director, and will provide mammogram order and completion data to Tammy Walker-Smith for analysis.

Sincerely,

A handwritten signature in black ink, appearing to read "Sheryl Wachtel".

Sheryl Wachtel, RN, PhD, CNS-CC, CCRN-K
Director, Clinical Innovation and Community Health Development

2606 Hospital Blvd • Corpus Christi TX 78405
Tel 361.902.4000

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Appendix B

DNP Project Gantt Chart

[DNP Project], [TAMUCC]

Project Lead: [Tammy Walker-Smith]

Show Weekends (Daily view only)

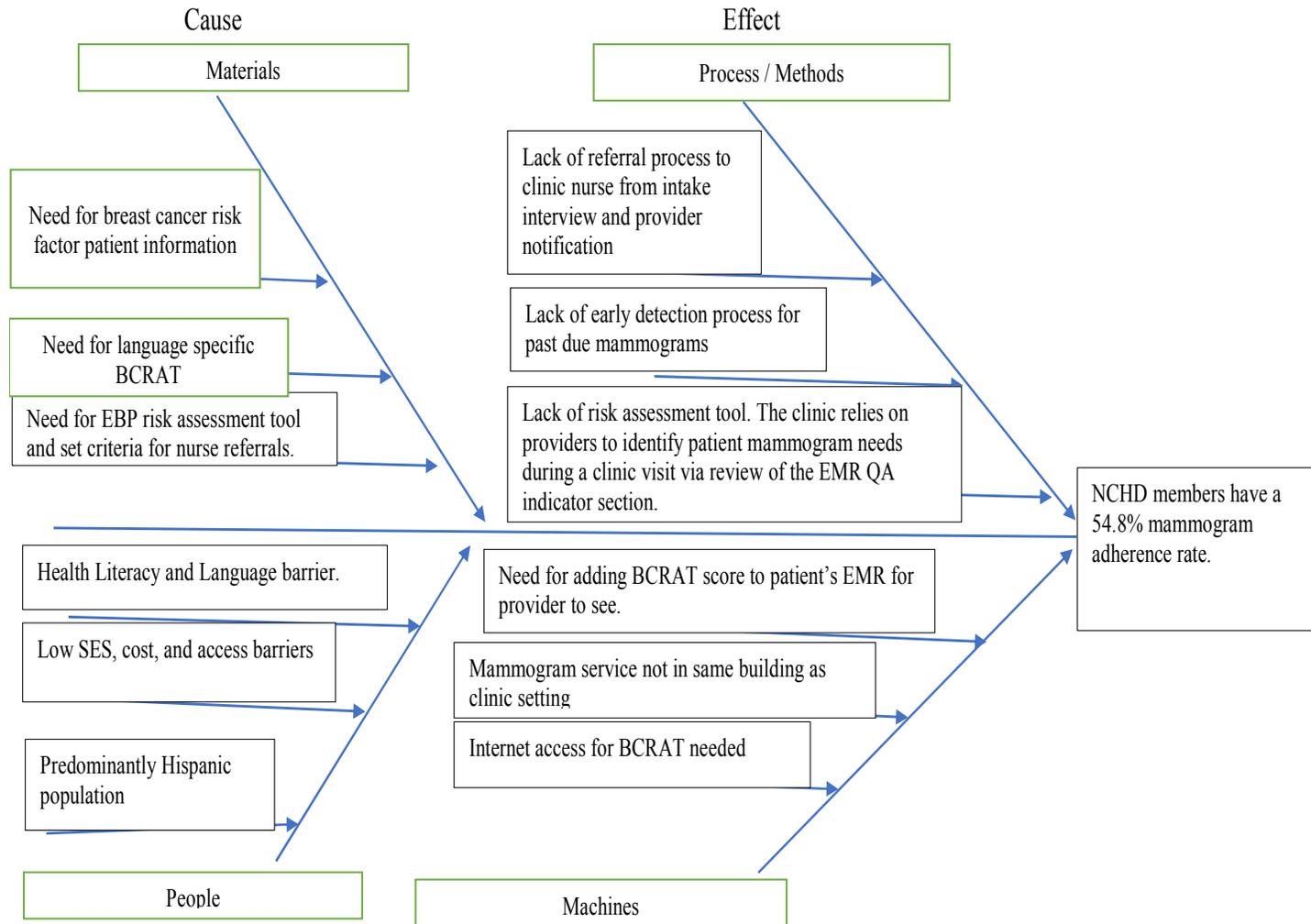
Start: Tue 10/10/2017
 End: Wed 8/15/2018
 Today: Thu 10/12/2017

Display: Monthly
 Month: 1

WBS	Task	Predecessors	Actual Start	Actual End	Work Days	Cal Days	% Done	Color	Actual Start	Actual End	01 - Oct - 17	01 - Nov - 17	01 - Dec - 17	01 - Jan - 18	01 - Feb - 18	01 - Mar - 18	01 - Apr - 18	01 - May - 18	01 - Jun - 18	01 - Jul - 18	01 - Aug - 18	
1	Begin Project	TW							1/2/1900	1/2/1900												
1.1	Translate EBP tools to Spanish and	TW	Tue 10/10/17	Tue 10/17/17			100%	r	10/10/2017	10/17/2017												
1.2	Complete IRB proposal	TW	Wed 10/25/17	Wed 11/08/17			100%	b	10/25/2017	11/15/2017												
1.3	Train Clinical staff on EBP tools	TW	Tue 2/20/18	Fri 3/09/18			100%	p	2/20/2018	3/9/2018												
1.4	Pre-survey of staffs knowledge	TW	Tue 2/20/18	Fri 3/09/18			100%	k	11/22/2017	11/22/2017												
1.5	Post-survey of staffs knowledge	TW	Tue 2/20/18	Fri 3/09/18			100%	r	11/29/2017	11/29/2017												
1.6	Plan Data collection with Data Anal	TW/KM	Wed 11/29/17	Fri 6/01/18			100%	g	11/29/2017	6/1/2018												
1.7	Practice run for EBP tool roll out	W/ Sylvi	Tue 2/20/18	Thu 2/22/18			100%	y	2/20/2018	2/22/2018												
2	EBP tool initiated with patients	TW/CHW	Mon 2/26/18	Fri 5/25/18			100%	r	2/26/2018	5/25/2018												
2.1	Collect mammogram order data	Nurse	Mon 2/26/18	Fri 5/25/18			100%	b	2/26/2018	5/25/2018												
2.2	Count mammograms completed	TW	Mon 3/05/18	Fri 5/25/18	5		100%	p	3/5/2018	5/25/2018												
2.3	Log Eng. /Spanish tools complete	CHW	Mon 2/26/18	Fri 5/25/18		18	100%	o	2/26/2018	5/25/2018												
2.4	Count complete Questions in Eng/Span	TW	Mon 3/05/18	Fri 5/25/18		7	100%	k	4/3/2018	6/1/2018												
2.5	Count # of nurse referrals for MG	TW	Mon 3/05/18	Fri 5/25/18	4		100%	g	3/5/2018	5/25/2018												
2.6	Run Monthly MG Report	KM	Thu 2/01/18	Fri 6/01/18		4	100%	p	2/1/2018	6/1/2018												
2.7	Analyze Data	TW	Fri 6/01/18	Thu 6/21/18	5		100%	b	6/1/2018	6/21/2018												
2.8	Debrief Clinic staff	TW	Fri 6/01/18	Fri 6/15/18	5		100%	g	6/1/2018	6/15/2018												
2.9	Share findings with Spohn	TW	Fri 6/01/18	Wed 7/11/18	1		100%	k	6/1/2018	7/11/2018												
3	Complete DNP Project Report	TW	Thu 6/14/18	Wed 7/25/18			100%		6/14/2018	7/25/2018												

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Figure 1 Cause and Effect Fishbone Diagram



(Moran, Burson, & Conrad, 2017) (Sharon Elwin, personal communication, November 1, 2017)

Table 1.

Breast Cancer Screening Best Practices vs. CHRISTUS Spohn’s Practices

	National Level	CHRISTUS Spohn Clinic	CHRISTUS Spohn Clinic
Best Practice	Policy / process recommended and / or in use	Policy / process in place and / or in use	No policy / process in place and / or in use
BCRAT	XXX		XXX
NHIS	XXX		XXX
USPSTF BCS recommendations	XXX- National average for Hispanic population 66.7% adherence.	XXX- Has policy, w/ 54.8% adherence.	N/A
Recommend staff’s pre-and post-educational training testing	XXX		XXX
Utilize CHW for Referral process for high risk patients identified	XXX		XXX

(Centers for Disease Control and Prevention & National Center for Health Statistics, 2017; Edwards & Seibert, 2010; Elewonibi et al., 2018; Hae-Ra et al., 2017; National Cancer Institute, 2011; U. S. Preventive Services Task Force, 2016) (Dr. S. Wachtel, Director of Innovation and Research, personal interview September 2017)

Table 2.

Gap Analysis Evaluation for CHRISTUS Spohn Clinics

Best Practice	Best Practice Strategies	How CHRISTUS Spohn’s practices differ from best practices	Barriers to best practice implementation	Will implement best practice (Yes / No; why not)
Use of the BCRAT and NHIS	Screen for risk factors on initial patient intake interview	Does not screen specifically for risk factors	Unaware of BCRAT or NHIS tools available	Yes
	Utilize CHW as patient educators for BCS recommendations	Does not use CHWs for BCS patient education	CHWs need training on BCRAT and NHIS to provide accurate information to patients	Yes
Follow USPSTF BCS recommendations	Provide well visit screening annually to determine gaps in care	Does not consistently schedule annual well visit for patients	Problem visits take priority over preventive well visits.	-Yes, will screen with intake interview and refer to clinic nurse.
	Provide a screening mammogram every other year	Does not order screening mammograms consistently for women b/w 50-74	-Does not have a risk assessment screening tool. - Providers do not utilize QA indicators consistently to track preventive care needs.	-Yes - Provide reminder of QA indicators.
Provide pre-and post-breast cancer risk assessment training testing	Test staff’s knowledge baseline before training for BCRAT and NHIS	Has not conducted staff’s baseline knowledge for BCRAT or NHIS	Has not initiated since not using screening tools	Yes
	Test staff after training to determine if knowledge gained is retained and utilization of BCRAT and NHIS is consistent and fully understood.	Has not conducted training for BCRAT or NHIS to be able to do a post-test evaluation	Has not initiated since not using screening tools	Yes

(Agency for Healthcare Research and Quality, n.d.; Centers for Disease Control and Prevention & National Center for Health Statistics, 2017; Edwards & Seibert, 2010; Hae-Ra et al., 2017; National Cancer Institute, 2011; U. S. Preventive Services Task Force, 2016) (Dr. S. Wachtel, Director of Innovation and Research, personal interview, September 27, 2017; Sharon Elwin, Coordinator of Community Health, personal communication, November 1, 2017).

Table 3.

Interdisciplinary Team Members and Function

Team member(s)	Project Function	Contribution to DNP project
Tammy Walker-Smith- PD	DNP student	Planned, coordinated, implemented, and evaluated project interventions
Dr. Sara Baldwin- TAMUCC DNP professor	Faculty Liaison	Provided expertise, oversight, and guidance for DNP project.
Dr. S. Dyess-TAMUCC Dean of Graduate Studies	Faculty Advisor	Provided expertise in research and project implementation to ensure the project is organized and planned appropriately.
Dr. C. Murphey- Undergraduate Nursing Manager	Content Expert	Provided expertise in women's health.
Dr. S. Wachtel- Director of Clinical Innovation and Community Health Development	Facilitator for CHRISTUS Spohn	Approved processes and site implementation.
Kristen Migliore- Database Director	Generated Athena QI database reports for mammogram completion rates and tracked vital statistics for CHRISTUS Spohn.	Provided database query report findings to the PD
Community Health Workers	Conduct intake interviews for NCHD members in Spohn clinic setting.	Integrated BCRAT and NHIS screenings into intake interview and generated nurse referrals based on set criteria.
Clinic Nurses and nurse managers	Received nurse referrals.	Ensured nurse referrals were given to clinic providers in a timely manner and scheduled mammograms ordered as a result.
Sharon Elwin- Project-Coordinator Community Health	Manages CHWs and intake office issues for CHRISTUS Spohn walk-in clinics	Provided support to staff for training and implementation. She transmitted referrals electronically to clinic managers for the first month of the project.
Clinic Providers	Manage patient care in the clinic setting.	Reviewed nurse referral forms and ordered screening mammograms as determined based on risk factors /

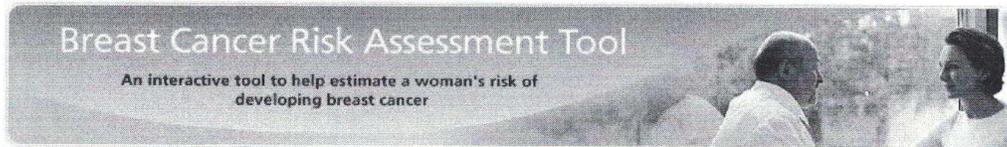
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		screening tool triggers reported.
Arnoldo Canales- Certified Translator and database staff	Translates English to Spanish for communication with patients and works with the database manager for generating Athena QI database reports.	Translated screening tools to Spanish. He also ran the final report in the database programmed by the database director after she had resigned from CHRISTUS Spohn.
Carmen Hernandez- TAMUCC Nursing Professor	Fluent in Spanish.	Back translated the Spanish to English to ensure the translation of the BCRAT and NHIS tools were accurate before use with NCHD members.

Table 4.

Breast Cancer Risk Assessment Tool

<https://www.cancer.gov/bcrisktool/>



Last modified date: 05/16/2011

> **Get Started with the Risk Tool**

About the Tool

Breast Cancer Risk Factors

Download Source Code

Page Options

Print Page

Quick Links

[Breast Cancer Home Page](#)

[Breast Cancer: Prevention, Genetics, Causes](#)

[Current Clinical Trials: Breast Cancer *In Situ*: Treatment](#)

[Current Clinical Trials: Breast Cancer Prevention](#)

[Current Clinical Trials: Breast Cancer Screening](#)

[Breast Cancer Risk in American Women](#)



Need Help?

Contact us by phone, Web, and e-mail
1-800-4-CANCER

The Breast Cancer Risk Assessment Tool is an interactive tool designed by scientists at the National Cancer Institute (NCI) and the [National Surgical Adjuvant Breast and Bowel Project \(NSABP\)](#) to estimate a woman's risk of developing [invasive breast cancer](#). See [About the Tool](#) for more information.

The Breast Cancer Risk Assessment Tool may be updated periodically as new data or research becomes available.

Risk Tool

(Click a question number for a brief explanation, or [read all explanations](#).)

1. Does the woman have a medical history of any breast cancer or of [ductal carcinoma in situ \(DCIS\)](#) or [lobular carcinoma in situ \(LCIS\)](#) or has she received previous radiation therapy to the chest for treatment of Hodgkin lymphoma?
2. Does the woman have a mutation in either the *BRCA1* or *BRCA2* gene, or a diagnosis of a genetic syndrome that may be associated with elevated risk of breast cancer?
3. What is the woman's age?
This tool only calculates risk for women 35 years of age or older.
4. What was the woman's age at the time of her first [menstrual period](#)?
5. What was the woman's age at the time of her first live birth of a child?
6. How many of the woman's first-degree relatives - mother, sisters, daughters - have had breast cancer?
7. Has the woman ever had a breast [biopsy](#)?
 - 7a. How many breast biopsies (positive or negative) has the woman had?
 - 7b. Has the woman had at least one breast biopsy with [atypical hyperplasia](#)?
8. What is the woman's race/ethnicity?
- 8a. What is the sub race/ethnicity?

Calculate Risk >

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Table 5.
NHIS Mammogram Question

- 1.) Have you had a mammogram in the last 12 months? (12 months will be replaced with 24 months to follow USPSTF recommendations).

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2016 NHIS Questionnaire - Sample Adult
Adult Access to Health Care & Utilization

Document Version Date: 01-Sep-17

Question ID: AAU.540_00.010 **Instrument Variable Name:** APSMAM **QuestionnaireFileName:** Sample Adult

QuestionText: Have you had a Mammogram DURING THE PAST 12 MONTHS?

*Read if necessary.

A mammogram is an x-ray of each breast to look for breast cancer.

- 1 Yes
- 2 No
- 7 Refused
- 9 Don't know

UniverseText: Female sample adults 30+

SkipInstructions: <1,2,R,D> if AGE GE 40 [gotoAPSCOL];
Else if AGE<40> [goto APSDIET]

Table 6.

Analysis of Relevant Studies

Author(s) /Year/Title	Research Purpose and Question	Research Design	Sample (and size)	Instruments (validity and reliability)	Findings	Treatment/Intervention
Keating, N., Kouri, E., Arreola H., Méndez O., Magaña L., Knaul M. (2014).	Purpose: To promote improvements in healthcare staff's breast cancer knowledge. Question: Is the train-the-trainer program in two Mexican states effective at improving knowledge among professional and non-professional community health workers?	Descriptive analysis via survey questions conducted over a 3 and 6-month period in Mexico.	2820 professional health promoters (PHP) and community health promoters(CHP)	43-item knowledge survey. Paired t-tests and chi-square tests.	The use of PHP and CHP allowed greater access to screen women for breast cancer risk. Post-training improved the knowledge of professional health promoters about breast cancer as the leading cause of death for women (86% to 99%, $p < .001$), risk factor awareness (7.0-8.2 of 10, $p < .001$) (Keating et al., 2014).	Knowledge assessment and retentions of PHP and CHP after training.
Simon, M., Ragas, D., Nonzee, N., Phisuthikul, A. Luu, T. Dong, X.Q. (2013).	Purpose: Patient-provider communication and the effects this has on preventive screening for patients. Question: Do Spanish-speaking patients who experience a combination of patient-provider language concordance and discordance impact perceptions of low-income women receiving breast and cervical cancer care?	Observational study using a purposive sample using the Chronic care model and Socio-ecological model from March 2008-December 2010.	78 participants	Questions were coded via the inductive methodological approach with Cohen's Kappa	Participants responded positively to providers who spoke Spanish when asking patients questions more so than English speaking participants. Hispanic participants made up 54% of the participants and 100% of those Spoke Spanish, of those the language concordance was as follows: concordant ($n=10$, 27%), discordance ($n=14$, 38%), mixed-concordance ($n=13$, 35%) (Simon et al., 2013)	Providers spoke with participants in their preferred language and participant response was evaluated for perception of positive response / behavior.
Traxler et al. (2014).	Purpose: To identify high risk minority women for breast or ovarian cancer using an evidence-based screening tool. Question: Is the application of the Breast Cancer Referral Screening Tool (B-RST) in Georgia public health centers primarily serving minority and disadvantaged women and is the screening tool effective for identification, education, and follow-up?	Descriptive interview and Educational Knowledge testing from 2012-2013 (13 months).	2159 women and 73 clinical staff members	Staff Interviewed patients for family history to determine risk factors for cancer through descriptive analysis.	14 (12.7%) of patients qualified for BRCA testing based on family history of breast cancer and two had an abnormal BRCA test results (Traxler et al., 2014).	Knowledge assessment of screening tool with a pre-and post-training test. Family history collection, breast cancer genetics referral screening tool, and BRCA testing.
Kerber. et al. (2016).	Purpose: To identify minority women with a high risk of breast or ovarian cancer.	Georgia Breast Cancer Genomics Project from 2011-2014. A systematic collection of health history, referrals of	5,400 women	Interview of family history to determine risk factors. Pilot	The screening process helped to identify high risk women early. Also, gaps were considerable from different	Breast cancer genetics referral screening (B-RST).

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Author(s) /Year/Title	Research Purpose and Question	Research Design	Sample (and size)	Instruments (validity and reliability)	Findings	Treatment/Intervention
	Question: Does evidence-based multi-disciplinary care that emphasizes care coordination, screening practices, and addressing health disparities that focus on preventing illnesses improve patient care?	high-risk patients, and genetic testing was analyzed.		surveys and clinician knowledge surveys.	healthcare staff and providers with knowledge of risk factors for cancer. Those identified as high risk (5%) from screening tools totaled $n=25$. Providers surveyed were lacking knowledge of BRCA mutation risk in a woman with a personal or family history of ovarian cancer (3.9%, $p=0.78$) (Kerber et al., 2016).	Genetic counseling and testing.
Sandoval J., Theler J., Cullati S., Bouchardi C., Manor O., Gaspoz J., & Guessous I. (2017).	Purpose: To determine the improvement in mammogram adherence after a screening mammogram program was initiated in Switzerland. Question: Would the introduction of an organized screening mammogram program have a mitigating effect on women of lower socio-economic status (SES) and associated disparities?	Stratified random-sampling and yearly cross-sectional survey from 1992-2014.	5345 women	Sensitivity analysis with adjusted prevalence ratios. Unadjusted and multivariable Poisson regression models.	The lower the education of the women, the higher the unscreened percentage was. The screening program decreased the percentage of women unscreened from 30.5% to 3.6% (Sandoval et al., 2017).	Screening mammogram programs improved screening mammogram rates independently of a woman's educational level.
Markovitz A., Alexander J., Lantz P., & Paustian M. (2015).	Purpose: To determine if the PCMH is effective in improving preventive screening services. Question: Is there a relationship between a patient centered medical home (PCMH) and cancer screening based on SES and primary care practice patterns?	Multi-variable cross-classified linear model from 2009-2012.	323 practices	Weighted means of specific characteristics for SES and preventive screenings.	Cancer screening outcomes were improved with a correlation with PHCM and increased breast cancer screening services by 5.4%, 95% CI, 1.5% to 9.3% and cervical cancer screening by 4.2%, 95% CI, 1.4% to 6.9% (Markovitz, Alexander, Lantz, & Paustian, 2015).	Patient-centered medical home (PCMH) with the Physician group incentive program.
Haas J. et al. (2016).	Purpose: To explore the attitudes of women's health providers on recent breast and cervical cancer screening changes, practices, and patient preference (Haas et al., 2016). Question: Have the changes on breast and cervical screening recommendations changes provider perception and practice patterns?	Self-reported confidential survey of women's health provider attitudes on breast and cervical cancer screening guideline changes from September – December 2014 (Haas et al., 2016)	385 PCP respondents	Multivariate logistic regression model	1.) Mammography was recommended over USPSTF recommended frequency by 75% of those providers. 2.) Annual mammography for women age 50-74 was reported by 65.4% of providers compared to biannually frequency of 21.0% of provider recommendation. 3.) Annual mammograms for women aged 40-49 was recommended by 40% of providers.	Survey of women's health providers for provider attitude towards new guidelines for breast and cervical recommendations, current practice patterns of recommendations to patients, and patient requests for testing at certain age ranges for mammogram screening (Haas et al., 2016).

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Author(s) /Year/Title	Research Purpose and Question	Research Design	Sample (and size)	Instruments (validity and reliability)	Findings	Treatment/Intervention
					4.) Gynecologists and non-physicians reported overuse of breast cancer screening compared to 2009 recommendations (Haas et al., 2016).	
Paalosalo-Harris, K. Skirton, H. (2017).	Purpose: Identify key factors in women with a family history of breast cancer in relation to risk perception and preventive screening behaviors (Paalosalo-Harris & Skirton, 2017). Question: Is there a relationship between risk perception and protective behaviors of health for those with a family history of breast cancer?	Mixed method systematic review using quantitative data published ranging from 2004-2014.	9 articles, one of the nine articles included two studies for a total of 10 studies reviewed.	1.) Thematic narrative and 2.) Quantitative data in narrative form (Paalosalo-Harris & Skirton, 2017)	1.) Health protective behaviors and risk perception of breast cancer was correlated 2.) Clinical recommendations were followed, but self-monitoring of health protective behavior was not as well regulated (Paalosalo-Harris & Skirton, 2017).	Review of literature and correlations for structured themes: risk perception and health protective behaviors (Paalosalo-Harris & Skirton, 2017)
Roman L., Meghea C., Ford S., Penner L., Hamade H., Estes T., & Williams K. (2014).	Purpose: A correlation was sought for underserved minorities and non-adherence to breast cancer cervical screenings due to risk factors. Question: Is there an association between breast and cervical cancer screening among minority groups and co-occurring risk factors?	Exploratory study. Ken Keeper randomized control trial from January 2011 -April 2012.	514 women in Detroit, Michigan.	Bi-variate logistic analysis for Latinas only. Other groups were analyzed with multivariate logistic analysis. Breast Cancer Literacy Assessment Tool (BCLAT) and the Cervical Cancer Literacy Assessment Tool (CCLAT).	Lack of provider recommendations impacted screening adherence rates. Latina women who had less than a high school education included 66.67%, of those, 69.23% had inadequate breast health literacy, and 70.77% had inadequate cervical cancer literacy. Only 47.69% of the Latina women had a clinical breast exam in the last 12 months, 50% had a screening mammogram in the last 12 months, and 67.69% had a pap test in the last three years (Roman et al., 2014).	Questionnaire was administered to study participants.
Banegas, M., Leng M., Graubard B.; Morales, L. (2013).	Purpose: To determine if the NHIS when used to determine the BCRAT prediction for sub-groups of Hispanic women were accurate. Question: Is the NHIS survey data with the Breast Cancer Risk Assessment Tool 5-year prediction of breast cancer accurate for sub-groups of Hispanic women?	Multistage cluster probability sample design with the 2000 and 2005 National Health Interview Survey Cancer Control Module.	19,517 women	Multiple linear regression model with absolute risk calculation. SAS software was used in calculation.	Using the BCRAT, Hispanic women had a lower risk compared to Caucasians and Cuban American women. All Hispanic women had a 2.6% BCRAT 5-year absolute risk of breast cancer >/_ to 1.67% where as non-Hispanic white women had a 19.55% 5-year risk (Banegas, Leng, Graubard, & Morales, 2013).	Multi-stage regression was used to determine breast cancer risk for Hispanic women compared to non-Hispanic white women.
Elewoniki B., Thierry, A.,	Purpose: This study seeks to determine if socio-economic status is an underlying	National Health Interview Survey (NHIS)-cross-sectional nationally	23,116 women	Logistic regression model using the Gail model and the	Mammogram disparities of minority ethnicities were much higher than Caucasian	NHIS and risk indicators used with the Cancer Control

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Author(s) /Year/Title	Research Purpose and Question	Research Design	Sample (and size)	Instruments (validity and reliability)	Findings	Treatment/Intervention
Miranda P. (2016).	cause of low mammography rates for Hispanic women. Question: Is the NHIS reliable in determining race and nativity disparities among women for breast cancer screenings?	represented survey from 200, 2005, and 2010.		Propensity score methodology.	women due limited care access and lower socio-economic status. Mexican women receiving a screening mammogram had an odds ratio of 0.752, $p < 0.05$ when compared to non-Hispanic white women (Elewonibi et al., 2018).	Supplements modules that assess risk indicators.

Table 7.

Clinic Staff Pre-and Post-Training Knowledge Survey

Age: _____ Gender _____ Educational level _____

- 1.) What cancer is the most common cancer for women?
 - A. Breast
 - B. Pancreatic
 - C. Colon
 - D. Lung
- 2.) What breast cancer screening tool are you familiar with and comfortable using with patients?
 - A. I am not familiar with any breast cancer screening tools
 - B. Breast Cancer Risk Assessment Tool (BCRAT)
 - C. Breast Cancer Genetics Referral Screening Tool (B-RST)
 - D. Both B & C
- 3.) What risk factors affect a woman's 5-year prediction score?
 - A. Age
 - B. First degree family member with breast cancer history
 - C. History of breast biopsy
 - D. Known BRCA 1 or BRCA 2 gene mutation
 - E. All of the above
- 4.) Which ethnicity has the highest non-adherence for screening mammograms?
 - A. Caucasians
 - B. Asian
 - C. African Americans
 - D. Hispanic
- 5.) Which ethnicity has the highest cause of death from breast cancer?
 - A. Caucasian
 - B. Hispanic
 - C. Asian
 - D. African American
- 6.) In 2013, how many women were diagnosed with breast cancer?
 - A. 500,246
 - B. 145,982
 - C. 230,815
 - D. None of the above
- 7.) What is the adherence rate nationally for African American women?
 - A. 77.5%
 - B. 45.9%
 - C. 85.2%
 - D. None of these
- 8.) What is the adherence rate nationally for Hispanic women?
 - A. 55.2%
 - B. 75.8%
 - C. 66.7%

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- D. None of these
- 9.) What is the breast cancer adherence rate for the NCHD members?
- A. 85.8%
 - B. 54.8%
 - C. 75.4%
 - D. None of the above
- 10.) What percentage of NCHD members are Hispanic?
- A. 75.95%
 - B. 88.2%
 - C. 68%
 - D. 46%
- 11.) Is the Breast Cancer Risk Assessment Tool evidence based?
- A. Yes
 - B. No
- 12.) Do you trust the risk prediction of this tool?
- A. Yes
 - B. No
- 13.) What breast cancer screening recommendations are currently recommended for women aged 50-74 for CHRISTUS Spohn patients?
- A. Screening mammogram annually
 - B. Screening mammogram every other year
 - C. Genetics counseling
 - D. Breast self-exam only
- 14.) If a patient is identified as high risk for breast cancer and / or is past due for a screening mammogram during the intake interview process, would a nurse referral form help streamline screening mammogram orders?
- A. No
 - B. Yes
- 15.) Would early identification of mammogram needs and intervention help provide a platform for members to discuss the importance of breast cancer screening?
- A. Yes
 - B. No

Table 9.

Population Risk Assessment

Risk	Impact	Probability	Countermeasure	Facilitators	Barriers	Action
1.) Cultural beliefs / misconceptions	May see questions as intrusive	3	Explain reason for questions.	Most clinic staff are female.	1.) Spouse objecting to questions. 2.) Time constraints.	Ask permission.
2.) Language barrier	Significant if staff not bi-lingual.	2	EBP tools translated for consistency.	Clinic staff are bi-lingual	Different dialect of Spanish spoken.	Re-schedule patient.
3.) Winter season- patient is sick	May not feel like staying.	2	Schedule members that are healthy.	Provide phone number of clinic.	1.) patient's child gets sick.	Re-schedule appointment.
4.) Use public transportation	Weather and bus times.	3	Have a list of bus times.	Free bus vouchers available.	kids returning home from school.	Re-schedule appointment.
5.) Patient confidentiality breach	Significant if patient names reported	1	Names removed before data shared	Data analysis director	Possible malfunction of Athena Program	Establish reporting process with de-identifiers

Dr. S. Wachtel, Director of Innovation and Research, personal communication, September 7, 2017

Table 10.

Preliminary Budget

Cost Category	Budget	Expected	Difference	Description / Comment
Project Expenses				
Direct Costs (Project expenses)				
CHW staff @ \$12/hr.	\$1,680	\$1,680	0	70 surveys/wk. x 10 min each = 140 hours. (400 /mo. x .70= 280 surveys completed)
RN staff @ \$25/hr.	\$350	\$350	0	10 min /day x 3 months= 14 hours total
Printer paper	\$15	\$15	0	1 ream/month x 3 months @ \$5/ream= \$15
Printer Ink	\$150	\$150	0	1 cartridge / month x 3 months. Each cartridge @ \$50 x 3= \$150
Indirect Costs (fixed costs)				
Rent	\$4,164	\$4,164	0	\$1,388/mo. X 3 months for 500 sq. ft. office
Electricity	\$200	\$200	0	\$2 / day x 3 months= \$200
Internet	\$150	\$150	0	\$50/month x 3 months= \$150
Phones x 3	\$270	\$270	0	\$90 x 3 months
Total Project Expenses	\$6,979	\$6,979	0	
Project Revenue				
Mammogram screening	\$67,815	\$67,815	\$0	\$75 / mammogram x 904 = \$67,815. 1650 qualified female members x .548=904. Goal is to increase by 1% per month x 3 months= 49.5 additional mammograms in three months.
Total Project Revenue	\$3,712.50	\$3,712.50	\$0	
Project Benefit / Loss				
Total Revenue	\$67,815	\$71,527.5	\$3,712.5	
Less Expenses	\$6,979	\$6,979	\$0	
Total Project Benefit / Loss	-\$3,266.50	-\$3,266.50	\$0	

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(Office Finder, n.d. ;(Dr. S. Wachtel, personal communication, November 1, 2017)

Table 11.

Provider Practice Pattern Survey

Provider Practice Survey

Age: _____ Gender: _____ Degree Level: _____

Specialty: _____ Years in Practice: _____

1.) Do patients routinely present to your practice inquiring about their risk for

Breast cancer (BC) and treatment options?

a.) Yes

b.) No

2.) On average, how many patients per month present for a discussion about

BC risk?

3.) Do you initiate more in-depth risk assessment questions for patients you

determine to be at risk for BC?

a.) Yes

b.) No or unknown

4.) On average, how many patients per month do you identify at increased risk

for BC?

5.) What percentage of your patients are you determining BC risk (Circle choice)?

a.) 0%

b.) 1–25%

c.) 26–50%

d.) 51–75%

e.) 76–100%

6.) Are you using the modified Gail risk assessment for 5 and 10-year risk for

BC?

a.) Yes

b.) No

7.) Do you refer patients at increased risk for BC to a specialist?

a.) Yes

b.) No or unknown

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8.) Type of specialist to which patients at increased risk for BC are referred*

- a.) Breast Surgeon
- b.) Medical Oncologist
- c.) General Surgeon
- d.) Cancer Geneticist
- e.) Other

9.) If you are reluctant to care for patients at increased risk for BC risk, what

are your major concerns?

- a.) Lack of training
- b.) Malpractice concerns
- c.) Patient anxiety
- d.) Lack of acceptable reimbursement
- e.) No interest
- f.) Other

10.) Are you interested in an educational program that would give you

information to assess risk for BC and outline treatment recommendations?

- a.) Yes
- b.) No

(Gabram et al., 2009)

Table 12.

Clinic Staff's Pre-and-post Training Knowledge Survey Results

Variable	N	SD	Paired pre-post t-test	Sig. (2-tailed)
Pre-test	18	1.720	-----	-----
Post-test	18	2.906	-----	-----
Pre-post	18	2.805	-4.369	0.000

Table 13.

Mammogram Completion Rates (3-month accumulation)

Timeline	% Mammogram Completion Rate	% Improvement with QI Interventions
Initial Data 10/2017	54.8%	-----
Baseline: 2/2018	58%	-----
1 st month 3/2018	62.3%	4.3%
2 nd month 4/2018	63.5%	1.2%
3 rd month 5/2018	65.21%	1.7%
Total 1 st -3 rd mo.	-----	7.21%

Table 14.

Translation of BCRAT and NHIS from English to Spanish

1. Does the woman have a medical history of any breast cancer or of [ductal carcinoma in situ \(DCIS\)](#) or [lobular carcinoma in situ \(LCIS\)](#) or has she received previous radiation therapy to the chest for treatment of Hodgkin lymphoma?

1. ¿Tiene la paciente antecedentes de cáncer de mama o carcinoma ductal in situ (DCIS) o carcinoma lobular in situ (LCIS) o ha recibido radioterapia previa en el tórax para el tratamiento del linfoma de Hodgkin?
2. Does the woman have a mutation in either the [BRCA1](#) or [BRCA2](#) gene, or a diagnosis of a genetic syndrome that may be associated with elevated risk of breast cancer?
¿Tiene la paciente una mutación en el gene BRCA1 o BRCA2, o un diagnóstico de síndrome genético que puede estar asociado con un riesgo elevado de cáncer de mama?
3. What is the woman's age?
This tool only calculates risk for women 35 years of age or older.
3. ¿Qué edad tiene la paciente?
4. What was the woman's age at the time of her first [menstrual period](#)?
¿Que edad tenia la paciente cuando tuvo su primer periodo menstrual?
5. What was the woman's age at the time of her first live birth of a child?
Que edad tenia la paciente cuando tuvo su primer niño o niña con vida?
6. How many of the woman's first-degree relatives - mother, sisters, daughters - have had breast cancer?
¿Cual es la historia familiar de la paciente (madres, heremanas, hijas) con respecto al cancer de mama?
7. Has the woman ever had a breast [biopsy](#)?
¿Alguna vez la paciente se ha realizado un biopsia de mama?
- 7a. How many breast biopsies (positive or negative) has the woman had?
¿Indique cuantas biopsias de mama (positivas o negativas) se ha realizado la paciente?

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[7b.](#) Has the woman had at least one breast biopsy with [atypical hyperplasia](#)?

¿Especifique si los resultados de la biopsia de mama de la paciente han sido anormales por los menos una vez?

[8.](#) What is the woman's race/ethnicity?

¿Cuál es la raza / etnia de la paciente?

[8a.](#) What is the sub race/ethnicity?

8a. ¿Cual es la sub-raza / etnia?

¿Cual es su pais de origen?

NHIS Questions

1.) Have you had a mammogram in the last 24 months?

Se ha echo usted un Mamograma en los ultimos 24 meses?

Table 15.

Practice Pattern Survey Results

- 1.) Do your patients routinely present to your practice inquiring about their risk for breast cancer and treatment options?
 - a.) Yes – 25%
 - b.) No-75%
- 2.) On average how many patients per month present for a discussion about breast cancer risk?
 - a.) 0= 62.5%
 - b.) </=1= 12.5%
 - c.) <10= 12.5%
 - d.) 100= 12.5%
- 3.) Do you initiate more in-depth risk assessment questions for patients you determine to be at risk for BC?
 - a.) N0/unknown=25%
 - b.) Yes=75%
- 4.) On average, how many patients per month do you identify at increased risk for breast cancer?
 - a.) 0/no answer=62.5%
 - b.) 3-4=12.5%
 - c.) 5-6=12.5%
 - d.) <10%=12.5%
- 5.) What percentage of your patients are you determining breast cancer risk?
 - a.) 0% =50% answered “a”
 - b.) 1-25%= 25% answered “b”
 - c.) 26-50%= 12.5% answered “c”
 - d.) 51-75%= 0% answered “c”
 - e.) 76-100%= 12.5% answered “e”
- 6.) Are you using the modified Gail risk assessment for 5 and 10 year risk for breast cancer?
 - a.) Yes= 0%
 - b.) No=100%
- 7.) Do you refer patients at increased risk for breast cancer to a specialist?
 - a.) Yes= 25%
 - b.) No=75%
- 8.) Type of specialist to which patients at increased risk for breast cancer are referred?
 - a.) Breast surgeon=0%
 - b.) Medical Oncologist= 12.5%
 - c.) General Surgeon= 25%
 - d.) Cancer Geneticist=0%
 - e.) Other= 37.5%

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- 9.) If you were reluctant to care for patients at increased risk for breast cancer, what are your major concerns?
- a.) Lack of training= 12.5%
 - b.) Malpractice concerns= 0%
 - c.) Patient anxiety= 0%
 - d.) Lack of acceptable reimbursement= 0%
 - e.) No interest= 0%
 - f.) Other= 62.5%
 - g.) No answer= 25%
- 10.) Are you interested in an educational program that would give you information to assess risk for breast cancer and outline treatment recommendations?
- a.) No=25%
 - b.) Yes=75%