
BREAST CANCER SCREENING

U. S. Department of Health and Human Services
Health Resources and Services Administration



Contents

QUALITY MEASURE: BREAST CANCER SCREENING.....	1
Measure Description	1
Part 1: Introduction	1
Performance Measurement: Breast Cancer Screening.....	4
Part 2: Characteristics for Success: Breast Cancer Screening	8
Part 3: Implementation of Quality Measure: Breast Cancer Screening	14
Critical Pathway for Breast Cancer Screening.....	15
Factors That Impact the Critical Pathway.....	19
Data Infrastructure: Breast Cancer Screening.....	23
Data Infrastructure to Monitor the Performance Measure—An Overview	23
Implementation of Quality Measure: Breast Cancer Screening	24
Part 4: Improvement Strategies: Breast Cancer Screening	29
What Changes Can an Organization Make?	29
How Can an Organization Make Those Changes?	40
How Can an Organization Know That Changes Caused an Improvement?.....	42
Part 5: Holding the Gains and Spreading Improvement	43
Holding the Gains	43
Spreading Improvement.....	44
Part 6: Supporting Information	44
Case Study	44
References.....	44
Additional Resources	46

CLINICAL QUALITY MEASURE: BREAST CANCER SCREENING

The goals of this module are to provide a detailed overview of the **Breast Cancer Screening** quality measure, outline the intended use for this measure, and highlight the benefits of implementing this clinical quality measure into an organization's quality improvement (QI) program.

Measure Description

Name	Description	Numerator	Denominator	Source	Reference
Breast Cancer Screening	Percentage of women 40 to 69 years of age who had a mammogram	Women in the denominator who received one or more mammograms during the measurement year or the year prior to the measurement year	All women patients aged 42 to 69 years of age during the measurement year or year prior to the measurement year	NQF	http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=392#k=breast+Cancer+screening

Part 1: Introduction

Breast cancer is the most common female cancer in the United States for every major ethnic group and the second most common cause of cancer death in women. Annually, approximately 182,460 American women are diagnosed with breast cancer, and 40,480 die from the disease.¹ The lifetime probability of developing breast cancer is one in six overall (one in eight for invasive disease).² Even if breast cancer incidence cannot be substantially reduced for some women who are at high risk for developing the disease, the risk of death from breast cancer can be reduced by regular mammography screening. Breast cancer screening improves earlier discovery of the disease while it is more treatable and has not spread.

There are interracial differences in breast cancer incidence as shown in **Figure 1.1: Rates of Female Breast Cancer**.³ As an example, data from the American Cancer Society (ACS) indicates that the highest rates occur in Whites (133 cases per 100,000 women). The rates are lower in Blacks (118 per 100,000), Asian Americans/Pacific Islanders (89 per 100,000), Hispanic/Latina women (89 per 100,000), and American Indians/Alaska Natives (70 per 100,000).⁴

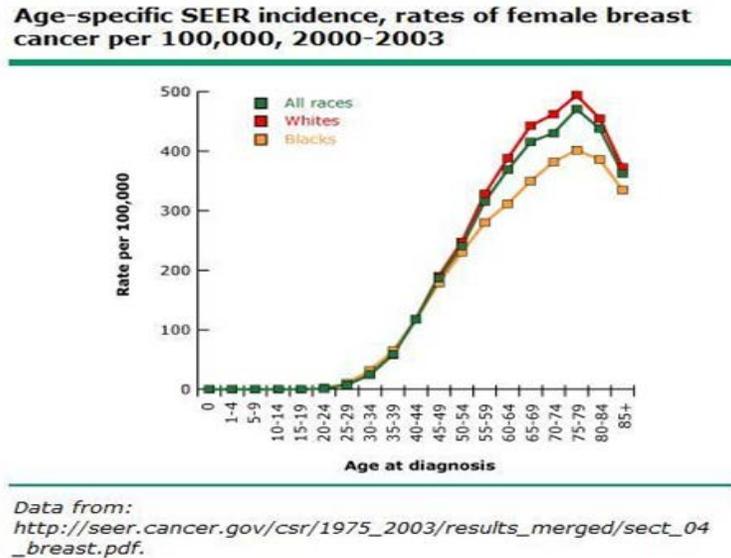


Figure 1.1: Rates of Female Breast Cancer

Much of these ethnic differences are attributable to factors associated with lifestyle and socioeconomic status, for example, access to screening and treatment services, which may explain some of the disparities in survival that are attributed solely to race. Genetic and biologic factors also may contribute.⁵ For example, there are two observations noted in Black women. First, Black women have an earlier age peak than White women.⁶ Secondly, Black women have higher mortality rates from breast cancer than White women despite the lower incidence overall. This is due to a more advanced stage at diagnosis plus a higher stage-specific mortality. Some data suggests that Black women have more aggressive cancers (e.g., hormone receptor-negative) associated with a higher mortality rate.⁷

The mortality rate from breast cancer has been decreasing since 1990. Some of the decline in mortality may be due to screening. Using seven different statistical models, estimates of the total reduction proportion in overall U.S. breast cancer mortality that was attributable to mammogram screening ranged from 28 to 65 percent (median 46 percent), with adjuvant treatment accounting for the rest. These results suggest breast cancer mortality in the United States has dropped about 10 percent because of screening.⁸

Breast cancer mortality rates in Black women in the United States declined somewhat less. Black women may have their breast cancer diagnosed at a later stage due to lower use of mammography. A study of over one million women who had at least one mammogram between 1996 and 2002 found that Black women were more likely to have inadequate mammographic screening than White women (RR 1.2, 95% CI 1.2-1.2).⁹ This discrepancy was even more striking among women diagnosed with breast cancer (RR 1.6, 1.5-1.8). Black women were more likely to have large, advanced-stage, high-grade, and lymph-node positive breast tumors. Differences in size, stage, and lymph-node positivity (though not grade) were no longer significant when Black and White women with the same screening history were compared.

Women of higher socioeconomic status are at greater risk for breast cancer—up to a twofold increase in incidence from lowest to the highest strata. There are also significant variations in the prevalence of breast cancer regionally in the United States.¹⁰ The influence of socioeconomic status (educational, occupational, and economic level) and regional norms is thought to reflect differing reproductive patterns with respect to parity, age at first birth, age at menarche, and use of screening mammography.

Current and evolving clinical issues include determining who should be screened (risk stratification, age to begin screening, age to stop) and what method should be used for screening. There is a strong consensus that routine screening mammography should be offered to women aged 50 to 69 years. There is less agreement about the following components of breast cancer screening: routine mammography screening for women aged 40 to 49 or over 70, the frequency of mammography screening, and the role of exams, such as, clinical breast exam and breast self-examination. Shared decision making with patients becomes particularly important when addressing these areas where the evidence is less clear. Absolute mortality benefit for women screened annually starting at age 40 years is 4 per 10,000 at 10.7 years.¹¹ The comparable number for women screened annually starting at age 50 years is approximately 5 per 1,000. Absolute benefit is approximately one percent overall but depends on inherent breast cancer risk, which rises with age.

Mammography remains the mainstay of screening for breast cancer and is able to detect cancers before they are palpable.¹² Film and digital mammography are equally efficacious for screening overall. Digital techniques may be preferred for premenopausal women, those with dense breasts, and those with significant fears about radiation exposure, but they are significantly more expensive than film techniques.¹³ Other imaging techniques play an important role in additional diagnostic evaluations for women with positive screening tests. Ultrasonography is commonly used for diagnostic follow-up of an abnormality seen on screening mammography and to clarify features of a potential lesion. The role of magnetic resonance imaging (MRI) for breast cancer screening is emerging; MRI screening, in combination with mammography, is currently targeted at high-risk patients. Newer tests, such as tomography, are under evaluation.¹⁴ Imaging studies cannot establish a diagnosis of cancer. Rather, they identify patients with abnormal findings who must then be further evaluated with follow-up imaging or a biopsy. The diagnosis of cancer is dependent on obtaining a tissue sample.

Other screening strategies, including clinical breast exam (CBE) and breast self-exam (BSE), are significantly less sensitive to detect breast cancers, but they continue to be used in conjunction with mammography. The National Breast and Cervical Cancer Early Detection Program, which studied the value of CBE in the community setting where procedural guidelines for performing the examination were not dictated, found CBE still detected about five percent of cancers that were not visible on mammography.¹⁵ Breast self-examination has not demonstrated significant additional benefit to mammographic screening although there is some evidence that cancers may be detected earlier.¹⁶

Although the challenge is daunting, it is clear that experts *do* know how to screen for breast cancer and are continually increasing public knowledge about screening recommendations. The scientific literature, centers of excellence in breast cancer screening, and the experience of health

care organizations are consistent in pointing to common themes in effective breast cancer screening programs.

Performance Measurement: Breast Cancer Screening

Measuring performance allows an organization to document how care is currently provided and sets the foundation for improvement. The **Breast Cancer Screening** clinical quality measure is designed to measure the percentage of patients aged 40 to 69 years who have been screened for breast cancer with mammography during the measurement year or year prior to the measurement year. This measure is intended to ensure appropriate screening for those women of average risk for breast cancer. The goal is to further reduce the morbidity and mortality associated with breast cancer by ensuring that patients access mammography, a highly effective screening test for breast cancer, at least biennially.

Higher risk women are those with a prior history of breast cancer, certain familial syndromes, and specific genetic markers. These women may require screening at an earlier age, additional imaging techniques, and screening at more frequent intervals. Further discussion about this evolving topic is beyond the scope of this module, but additional information can be obtained in the medical literature, including these resources:

- Saslow D, Boetes C, Burke W et al. American Cancer Society Guidelines for Breast Screening with MRI as an Adjunct to Mammography. *CA—A Cancer Journal for Clinicians*. 2007;57:75-89.¹⁷
- Alfonso, Nelia; Women at High Risk for Breast Cancer—What the Primary Care Provider Needs to Know, *The Journal of the American Board of Family Medicine* 22 (1): 43-50 (2009) <http://jabfm.org/cgi/content/full/22/1/43>¹⁸

Measuring performance on this quality measure encourages an organization to improve systems so that all women of appropriate age have access to regular and ongoing screening for breast cancer. The performance measurement for this clinical quality measure focuses on systems for **Breast Cancer Screening** for women of average risk, but work to improve performance on this measure will likely improve **Breast Cancer Screening** for all women.

Consider the characteristics of an effective performance measure and the Institute of Medicine (IOM) framework, [*Envisioning the National Healthcare Quality Report*](#):

- *Relevance*: Does the performance measure relate to a frequently-occurring condition or have an impact on patients at an organization's facility?
- *Measurability*: Can the performance measure realistically and efficiently be quantified given the facility's finite resources?
- *Accuracy*: Is the performance measure based on accepted guidelines or developed through formal group decision-making methods?
- *Feasibility*: Can the performance rate associated with the performance measure realistically be improved given the limitations of the clinical services and patient population?

To ensure that a performance measure has these characteristics, it is often based on, or aligned with, current [evidence-based medicine](#) and proven measures.

The quality measure below was developed in alignment with national clinical practice guidelines and other performance measures that have been vetted through a national consensus process. The **Breast Cancer Screening** measure aligns with measures endorsed by the National Committee for Quality Assurance (NCQA) and similar performance metrics used by HRSA grantees and programs.

Clinical Quality Measure: Breast Cancer Screening

Name	Description	Numerator	Denominator	Source	Reference
Breast Cancer Screening	Percentage of women 40 to 69 years of age who had a mammogram	Women in the denominator who received one or more mammograms during the measurement year or the year prior to the measurement year	All women patients aged 42 to 69 years of age during the measurement year or year prior to the measurement year	NQF	http://www.qualityforum.org/MeasureDetails.aspx?actid=0&SubmissionId=392#k=breast+Cancer+screening

As with all performance measures, there are essential inclusions, exclusions, and clarifications required to ensure an organization collects and reports data in the same way. This allows an organization using the measure to compare itself with others. Detailed specifications for the measure, with descriptions of inclusion and exclusion criteria, are found in the section, [Part 3: Data Infrastructure: Breast Cancer Screening](#).

Practical Considerations

Note: Health care professionals should be familiar with several key topics to appropriately screen women for breast cancer. Advanced discussion is beyond the scope of this module, but the reader is encouraged to review other resources for further information, including those listed here.

Risk Factors Associated with Breast Cancer

Patients commonly ask health care professionals about risks associated with breast cancer and what can be done to prevent it. Current evidence about risk factors and breast cancer is summarized in [Figure 1.2: Risk and Protective Factors](#). These risks can be used to guide screening but are not intended to predict individual risk. An organization should leverage opportunities to discuss the following modifiable risk factors to minimize breast cancer risks with women, in addition to recommending screening mammography:

- Minimize the duration of postmenopausal hormones; consider non-estrogenic alternatives (e.g., bisphosphonates for treatment of osteoporosis)
- Have the first child at an earlier age

- Breastfeed for at least six months
- Avoid adult weight gain and maintain a healthy weight to reduce postmenopausal breast cancer risk; however, it has not been fully demonstrated that a specific diet, food group, or vitamin supplements reduce risks
- Limit alcohol consumption
- Maintain regular physical exercise

Understanding Benefits and Harms of Screening

The benefits of screening have been delineated throughout this module. Screening recommendations carefully balance the benefits and harms associated with various screening techniques. Mammography is clearly beneficial to detect cancer before symptoms are evident, but is not without harms. With the advent of readily accessible information, harms may be presented to patients in a manner that is frightening and out of context. Understanding the potential harms, such as, false positive screenings, radiation exposure, and discomfort, allows a frank dialogue of risks and benefits that are patient centered. A detailed discussion is beyond the scope of this module, but an organization may find this resource helpful to understand the benefits and harms of mammography screening.

Type of Factors	Risk Group		
	Low Risk	High Risk	Relative Risk
Risk Factors			
Deleterious BRCA1/BRCA2 genes	Negative	Positive	3.0 – 7.0
Mother or sister with breast cancer	No	Yes	2.5
Age	30 – 34	70 – 74	18.0
Age at menarche	>14	<12	1.5
Age at first birth	<20	>30	1.9 – 2.5
Age at menopause	<45	>55	2.0
Use of contraceptive pills	Never	Past/current use	1.07 to 1.2
HRT (estrogen + progestin)	Never	Current	1.2
Alcohol	None	2 to 5 drinks/day	1.4
Breast density on mammography (percents)	0	≥75	1.8 to 6.0
Bone Density	Lowest quartile	Highest quartile	2.7 to 3.5
History of a benign breast biopsy	No	Yes	1.7
History of atypical hyperplasia on biopsy	No	Yes	3.7
Protective Factors			
Breast Feeding (months)	≥16	0	0.73
Parity	≥5	0	0.71
Recreational exercise	Yes	No	0.75
Post menopause body mass index (kg/m ²)	<22.9	>30.7	0.63
Oophorectomy before age 35 years	Yes	No	0.3
Aspirin	≥Once/week for ≥6 mos.	Nonusers	0.79

Adapted from Clemons, M, Goss, P. Estrogen and the risk of breast cancer. N Engl J Med 2001; 344:276."

Figure 1.2: Risk and Protective Factors for Developing Breast Cancer

The Importance of Shared Decision Making

Most national authorities agree that women should begin mammography screening by age 50. The consensus is lower for screening those aged 40 to 50 years. From an overall population perspective, the risks are greater than the benefits, but an organization is encouraged to consider individual patient risks and benefits when making its screening recommendations. At the time of this writing, the American Cancer Society, American College of Radiology, American Medical Association, National Cancer Institute, American College of Obstetrics and Gynecology, and the National Comprehensive Cancer Network (NCCN) recommend starting routine screening at age 40 years.^{19 20 21 22 23 24} The American Academy of Family Physicians recommends screening mammography every one to two years for women ages 40 and older.²⁵ After a careful review of data in 2009, the United States Preventive Services Task Force (USPSTF) updated its previous recommendation to begin routine screening at age 50 years.²⁶

There is also remaining controversy about annual versus biennial mammography screening. There is a consensus that mammography screening intervals should not exceed two years.

It is important for an organization to discuss patients' individual risks, their fears of diagnosis and harm from the screening, cultural influences, previous experiences, values, and perceived barriers to screening that might impact individual decisions. Salient highlights of the discussion and decision reached should be documented in the medical record for all female patients aged 40 years and older.

Improvement Experience: Breast Cancer Screening

The **Breast Cancer Screening** measure was chosen to align with existing measures. The data demonstrating the experience with these measures is discussed briefly in this section.

The importance of **Breast Cancer Screening** as part of comprehensive preventive care for women is widely accepted. Systematic approaches are necessary to achieve improvements in the quality of care delivery and reliable screening for patients. Improvements in mammography rates since the 1990s have been attributed to increased insurance coverage for this test, subsidized mammography services for low-income women, and educational outreach to providers and the public.²⁷ As shown in **Figure 1.3: Number of Women Receiving Mammograms between 1991 and 2002**, the CDC-sponsored National Breast and Cervical Cancer Early Detection Program (NBCCEDP) demonstrated that outreach, community partnerships, and financial subsidy of the cost of testing improved mammogram screening rates during that time period.

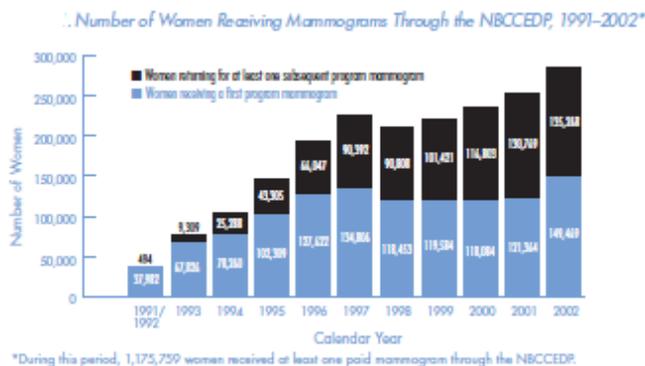


Figure 1.3: Number of Women Receiving Mammograms between 1991 and 2002

HRSA-sponsored programs, including Federally Qualified Health Centers, demonstrated improvement in screening rates, which increased from 62.5 percent in 1995 to 75.7 percent in 2002, as evidenced by the 2002 Health Center User Program.²⁸ Beginning in 2002, HRSA sponsored targeted improvement efforts to increase screening rates for breast, colon, and cervical cancer. Following tested improvement methodologies, health care teams were able to make statistically-significant improvements in the breast cancer screening rates. [Improvement strategies and results are outlined in the resource that can be found here.](#)

In 2009, NCQA data revealed continued improvement of mammography screening rates from 2008. The following rates indicate there has been improvement, but more work needs to be done:

- Commercial - 70.2 percent
- Medicare - 68 percent
- Medicaid - 50.8 percent

Putting systems in place to track performance enable an organization to better understand how effectively it is able to screen a population of patients for breast cancer. Women of this age range often comprise a large percentage of the total number of patients in a practice, so systems must be robust to track interval care for large numbers of individuals. These same tracking systems can facilitate appropriate management and follow-up for patients with positive screening tests and provide critical steps to connect patients with prompt appropriate care.

Part 2: Characteristics for Success: Breast Cancer Screening

Organizations that were successful in improving **Breast Cancer Screening** for patients approached the issue in a systematic way, with careful attention to the factors that have an impact on effectively screening a targeted population. Although clinics may differ in specific workflow, documentation, and staffing models, organizations that experienced successful improvement efforts shared these three fundamental characteristics:

1. Clear direction
2. Functional infrastructure for quality improvement
3. Commitment from leadership

1. Clear Direction

Successful organizations found it is important to define clearly what they are trying to accomplish. Most often in improvement work, leadership defines an aim that guides an organization's efforts. An aim is a written, measurable, and time-sensitive statement of the accomplishments a team expects to achieve from its improvement efforts. The aim statement contains a general description of the work, the system of focus, and numerical goals. The aim statement includes a very specific indication of what success looks like and may include guidance that further frames the work, including methodologies to be used and budgetary and staffing limitations. Examples of tools used by [QI teams](#) to create their aim statements include [Aim Worksheet and Aim Statement Checklist](#). Additional information, including tools and resources to assist an organization in developing its aim statement, can be found in the [Readiness Assessment and Developing Project Aims](#) module. A completed aim statement for the measure, **Breast Cancer Screening**, is shown in **Example 2.1: Assessing the Aim Statement for Green Valley Family Health Center (GVFHC) Using the Aim Statement Checklist**.

The following hypothetical example provides an aim statement created by the QI team of a fictional health center, Green Valley Family Health Center, and the checklist the team used to assess its completed aim statement. Using the Aim Statement Checklist to assess the QI team's aim statement reassures the team included the necessary components of the aim statement for its improvement project.

**Example 2.1: Assessing the Aim Statement for Green Valley Family Health Center (GVFHC)
Using the Aim Statement Checklist**

Aim Statement: *Over the next 12 months, we will redesign the care systems of Green Valley Family Health Center to ensure that 90 percent of women aged 40 to 69 years have been screened for breast cancer with mammography within the past two years. We will begin with women cared for by Dr. Laurel's practice and spread to Dr. Burt's practice beginning in month 13 or sooner, if possible.*

Guidance:

- *Community partnerships should be leveraged*
- *A key focus will be systems for patient outreach*

Here is an example of how GVFHC evaluated its aim statement using the Aim Statement Checklist:

Aim Statement Checklist for Example 2.1:

- ✓ What is expected to happen?
GVFHC: More patients of the targeted age will complete breast cancer screening with mammography
- ✓ Time period to achieve the aim?
GVFHC: 12 months
- ✓ Which systems will be improved?
GVFHC: Care systems that improve completion of mammographic screening
- ✓ What is the target population?
GVFHC: Female patients in Dr. Laurel's practice aged 40 to 69 years
- ✓ Specific numerical goals?
GVFHC: 90 percent of eligible women will be screened

As noted, the GVFHC improvement team will work together with its community partnerships and focus on patient outreach.

Evaluating what others achieved provides appropriate context for choosing the numerical portion of an organization's aim. While the goal of *100 percent of patients completing breast cancer screening with mammography* is optimal, an organization can set an appropriate and realistic goal based on the review of comparable data after consideration of the payer mix of the patient population served. For some measures, it may be possible to find examples of benchmark data, which demonstrates the performance of a best practice. It is important to consider an organization's particular patient population when making comparisons to others' achievements. An organization may consider socioeconomic status and race/ethnicity of the population served, organizational size, payer mix, availability of screening, and other criteria in an effort to achieve an accurate comparison. Reviewing what others accomplished may help an organization to understand what is feasible to achieve. The numerical part of the aim should be obtainable, yet high enough to challenge the team to substantially and meaningfully improve. Additional guidance about setting aims can be found in the [Readiness Assessment and Developing Project Aims](#) module. The NCQA Healthcare Effectiveness Data and Information Set (HEDIS) Data Set is one source to consider when choosing an aim or comparing the performance of the measure,

Breast Cancer Screening.³¹ Current data is accessible from the [Trending and Benchmarks](#) section. Of note is the considerable variation among the regions, which correspond to the Health and Human Services Regions of the United States. Sources of data for additional comparisons vary regionally but may include payers, State programs, aggregate HRSA program data, and State or regional quality improvement programs.

2. Functional Infrastructure for Quality Improvement

Successful organizations found that improvement work requires a systematic approach to measuring performance, testing small changes, and tracking the impact of those changes over time. This section describes four essential components of an infrastructure to support quality improvement efforts, including:

- Quality improvement teams
- Tools and resources
- Organizing improvements
- Building on the efforts of others by using changes that worked

There is considerable variation in how this infrastructure is created and maintained. It is important that each component is addressed in a way that fits an organization.

Quality Improvement Teams

Multidisciplinary QI teams are typically tasked to carry out this work. For improvement focused on **Breast Cancer Screening**, it is important to include a provider who wants to focus on increasing the number of patients screened for breast cancer, i.e., a *provider champion* for improvement.³² In addition to the provider champion, other appropriate members of a QI team may include:

- Nurses
- Case managers
- Patient outreach specialist
- Patient navigator
- Scheduling staff
- Information specialist
- Community partners, such as, local hospitals, imaging centers, and breast cancer advocacy groups
- Other staff involved in the patient care process, such as, receptionists, wellness specialists, administrative staff, medical assistants, pharmacists, and health coaches

It should be noted that patients can add value to the QI process when prepared to participate in a meaningful way. The reference manual by the National Quality Center (NQC), [A Guide to Consumer Involvement](#), has practical ideas to assist an organization on how to involve patients in its QI process.³³

There are no wrong answers here. Members of a team bring expert knowledge of the work they do to support cancer screening for patients. Together, the team learns where and how its individual actions intersect and how each can have an impact on patients' breast cancer screening. The ability to think from a systems perspective and the will to improve breast cancer screening rates for patients are the primary prerequisites that contribute to a successful improvement team. A more advanced discussion on forming an improvement team can be found in the [Improvement Teams](#) module.

Tools and Resources

It is important that a QI team have the tools and resources necessary to achieve its established organizational aim. Some personnel may struggle shifting from the daily work of patient care to their roles on the quality improvement team. Those challenges can be straight forward, such as, coordinating meeting times or developing content for the meetings to support the team's quality improvement efforts. Successful QI teams learned that organizing meetings efficiently is essential in their improvement efforts. Tools can help a QI team to structure meetings that focus its scheduled time on improvement efforts. Another useful tool includes one that displays data in a way that makes sense to the team members. These types of tools are commonly used by improvement teams to remain focused on the work of improvement. The most important resource needs are uninterrupted time to focus on quality improvement and autonomy to test changes responsibly. Additional team resources and tools can be found in the [Improvement Teams](#) module.

Organizing Improvements

Successful organizations learned that planning an approach to change is essential. Change is, by nature, unsettling for some and presenting a clear direction and methodology can be reassuring. Most organizations with quality improvement experience adopted methodologies to help them organize their improvements.

As a QI team approaches improvement of breast cancer screening rates, it should use quality models already embraced by its organization. For example, many organizations adopted the [Care Model](#) to organize their approaches to implementing quality improvement changes. Others successfully embraced the LEAN approach; both of these models provide a framework for a health care organization to plan and move toward implementing its improvement efforts. There is no single model that is considered correct. Organizational alignment of methodology makes sense from the perspective of efficient training. A consistent quality improvement approach and the sharing of improvement ideas among members of a quality team can facilitate the replication of QI activities across an organization and maximize the impact of the overall QI program.

Just as organizations that are experienced in quality improvement activities adopted quality models that guide their work, many embraced a change methodology. A change methodology guides the actual change process, which involves managing *how* changes are made as opposed to *what* changes are made.

For some organizations, all changes are approved by a decision leader and then implemented. Others use a committee structure to evaluate and implement changes. Again, there is no right or wrong methodology, but one change methodology that has been found to be particularly helpful in quality improvement is called the [Model for Improvement](#). The Model for Improvement, developed by Associates in Process Improvement, is a simple, yet powerful, tool for accelerating improvement. The model is not meant to replace a change model that an organization may already be using, but rather to accelerate improvement. This model has been used successfully by health care organizations to improve many different health care processes and outcomes.

The Model for Improvement encourages small, rapid-cycle tests of changes. In improvement, this has a distinct advantage in decreasing the time it takes for changes resulting in improvement to be implemented. This methodology also directly involves the individuals who do the work, which provides additional insights into how to rapidly improve care processes. Advance discussions can be found in the module [Managing Data for Performance Improvement](#) module.

Building on the Efforts of Others by Using Changes that Worked

One hallmark that successful organizations found beneficial in advancing their quality improvement programs is that everyone across the organization uses the same tools and language to make continuous improvements.

Specific *change ideas* that worked for others to successfully improve mammography completion rates are detailed later in this module in the [Changes that Work](#) section. Additionally, an organization that has improvement experience in another measurement area, such as, prenatal care, chronic disease care, or immunizations, often adapts the successful tools to use with this measure.

3. Commitment from Leadership

For quality improvement efforts to be effective and sustained, leaders must show commitment to them. Typically, leaders may make a commitment to specific target areas for improvement once they consider the overall needs of the organization, requirements of funders, and how the proposed efforts align with the organization's mission and strategic plan. Leaders that consider quality improvement efforts as an "add-on" may be unable to maintain QI as a priority as other realities compete for the organization's attention and resources. Successful leaders in quality improvement integrate and align QI activities as part of their daily business operations.

A quality improvement team needs to have leadership commitment expressed in a tangible way. Often, it is an explicit dedication of resources, which may include team meeting time, data support, and specific planned opportunities that communicate actionable improvement suggestions to an organization's leadership. The authority of the improvement team and any constraining parameters should be clear. Detailed information highlighting the important role of leadership in a QI project can be found in the [Quality Improvement](#) module.

Below is a hypothetical case study that is followed throughout the module and depicts the effort of a fictional QI team as it focuses on improving the rate of mammography screening of women accessing care in its organization.

The Problem:

Green Valley Family Health Center provides a full range of health services to several communities across a rural, mountainous region. They are staffed by two FTE providers, two medical assistants (MAs), a part-time nurse, and a full-time receptionist who also functions as the medical records clerk. The clinic serves about 3,500 unduplicated individuals and has a growing prevalence of aging “baby boomers” in its patient population. Providers dictate notes and maintain paper charts. The clinic has had some experience with improvement and uses a registry to manage 163 diabetic patients. Recently, a patient was diagnosed with moderately advanced breast cancer. Unfortunately, the patient had not completed mammography screening in four years. Although there were scattered recommendations and orders for mammography on the chart, the providers realized that their approach to screening was not systematic. They wondered if the cancer could have been caught earlier with better outreach and follow-up systems in place.

Part 3: Implementation of Quality Measure: Breast Cancer Screening

Before following the steps in Part 3, an organization should first make a commitment to increase the rate of breast cancer screening with mammography and complete the initial steps outlined in the previous section that include:

- Developing an aim statement
- Creating an infrastructure for improvement
- Obtaining commitment from leadership

Performance on this measure indicates how effectively all the steps of the processes used to deliver care work together so that breast cancer screening with mammography is optimized. Because there are so many factors that can have an impact on whether patients receive screening mammography, it helps to visualize how these steps are mapped. The next section defines *Critical Pathway* and illustrates the application of this concept to test improvements to improve breast cancer screening in female patients.

The case study continues...

The Approach:

The organization agreed to focus on improving cancer screening rates and chose to begin with breast cancer screening due to its recent experience. It knew that improvements would benefit many of its patients, as older women comprised a significant proportion of the patient population. The team maintained a registry for patients with diabetes, but the number of women in the targeted age range for breast cancer screening would involve significantly more patients and thus more data to be entered. The CEO recognized that resources needed to be dedicated to this effort but struggled to allocate them in challenging economic times. The team agreed to allocate resources to better understand its position before committing to an improvement initiative. The team agreed to look further at the current breast cancer screening rate for patients of one provider to better inform its decision. The organization then made several critical decisions:

1. Focus on the **Breast Cancer Screening** clinical quality measure to guide its efforts.
2. Invest resources to evaluate where it was regarding that particular measure and where it wanted to be based on national benchmarks.
3. Limit this evaluation to the patients of one willing provider, Dr. Laurel.

For baseline information, the team recognized that even sampling the increased number of patients in the target population would necessitate additional data entry resources. The organization decided to hire a college student, who returned to the area for summer, to enter a randomized sample into the registry. Fortunately, one of the MAs was adept at using the registry system and was willing to teach the student. While it was not a long-term solution, the team could evaluate its needs more appropriately after the sampling process.

Critical Pathway for Breast Cancer Screening

A critical pathway, also known as a clinical pathway, is a visual depiction of the process steps that result in a particular service or care. The sequence and relationship among the steps are displayed, which reveals a *map* of the care process. Additional information, including tools and resources regarding the mapping of care processes, can be found in the [Redesigning a System of Care to Promote QI](#) module. In an ideal world, the care process is reflective of evidence-based medical guidelines. Evidence-based medicine aims to apply the best available evidence gained from the scientific method for medical decision making.³⁴ There are a number of evidence-based recommendations for **Breast Cancer Screening**, including those listed and referenced earlier in this module.

A map of the care process steps that incorporates all of the known evidence and follows respected evidence-based medical guidelines can be considered the *idealized critical pathway*. While the guidelines for **Breast Cancer Screening** do not completely align, there are recommended steps with shared decision making that incorporate individual risk, including age, known family history, individual risk factors along with patient preferences. The purpose of listing these steps is to reflect current best practices for breast cancer screening and to form a systematic method to consider the systems of care that underpin appropriate screening. It is important to emphasize that clinical evidence and guidelines will evolve as knowledge progresses; therefore, the idealized critical pathway may evolve over time and not meet the needs of every individual.

Note: Please consider the following regarding critical pathways:

- There can be more than one way to depict the idealized critical pathway.
- Authorities vary on critical issues that have an impact on important decisions in medicine, and there is latitude within guidelines for variation related to less critical matters.
- It is important that an organization agrees on the guidelines with which to align. There are multiple specific guidelines that address processes to optimize mammographic screening for breast cancer. An organization may interpret those guidelines differently than illustrated in Figure 3.1. If so, creation of a different schematic that reflects its interpretation of the best evidence is encouraged. References are located in *Part 6: Supporting Information* at the end of this module.

In **Figure 3.1**, the schematic for **Critical Pathway for Breast Cancer Screening** incorporates available evidence and represents an idealized critical pathway for care to optimize breast cancer screening. The boxes represent typical steps in care delivery. If these steps happen reliably and well, effective screening is accomplished.

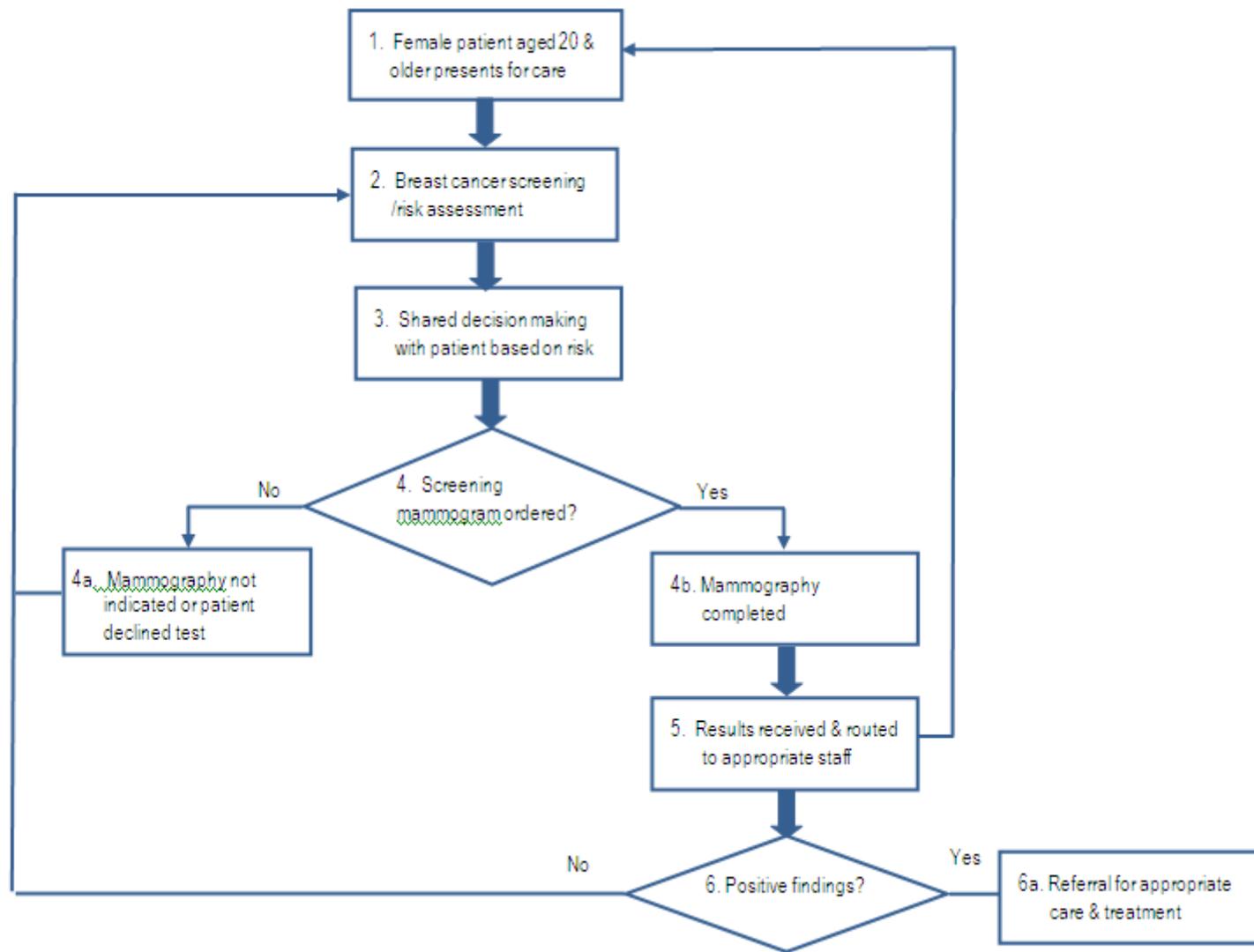


Figure 3.1: Critical Pathway for Breast Cancer Screening

Walkthrough of the Idealized Critical Pathway

The steps illustrated in the schematic reflect a system for breast cancer screening that is working well. This pathway extends beyond the boundaries of what is assessed with the **Breast Cancer Screening** clinical quality measure as important aspects of care for women of high risk precede the age range targeted in the measure. These steps are pertinent to effective breast cancer screening in general and encompass breast cancer screening for patients of average risk:

1. All female patients should have readily available information about breast cancer and other age-appropriate screening. Family and personal medical histories should be obtained for all patients.
2. Prescreening and education using the recommended clinical guidelines that are tailored toward the patient's risk serve as opportunities for prevention. Female patients in their twenties should be assessed specifically for risk factors for breast disease and offered a clinical breast exam at least every three years until age 39, and annually thereafter.³⁵ Patients at high risk, especially those with genetic factors, such as, breast cancer susceptibility or BCRA gene mutations, should be managed according to prevailing guidelines for these high risk patients. A risking tool, such as the [*Gail Model*](#), takes into account race and ethnicity and is available online.
3. A patient-provider partnership is needed to ensure that decisions made respect patients' wants, needs, and preferences, and those patients have the education and support they require to make informed decisions and participate in their own care.³⁶ Patients aged 40 years and older with average risk for breast cancer should discuss the pros and cons of screening mammography with their care providers. Patients aged 50 years and older with average risk for breast cancer should be strongly encouraged to complete screening mammography.
4. Through the screening and risk assessment step, the provider determines with the patient that screening mammography should be ordered.
 - 4a. If the patient does not meet the screening guidelines, she is not screened. Interim and follow-up care is then discussed to ensure that the patient understands the risks for breast cancer and what can be done to mitigate those risks. Guidelines are emphasized so the patient understands the benefits and limitations of breast self exams and appropriate follow-up if risk factors change. Appropriate follow-up screening occurs in a timely manner and the cycle repeats. In addition, patients may choose to decline screening even if strongly encouraged by the health care team. Patients should be periodically re-assessed and supported to complete screenings as per current guidelines.
 - 4b. Ensuring that breast cancer screening has been completed is essential for preventive care. Mammography is often not done on site and simply ordering a mammogram does not mean it will be completed. Care teams should invite a conversation about any barriers – real or perceived – to completing the mammography and work together with patients to mitigate those barriers.
5. Establishing a process to retrieve and review mammography results is important for tracking the number of completed screenings and patient's adherence to recommended guidelines. Internal systems should clearly define who reviews the results of both positive and negative screenings.

6. Patient notification of the results provides an opportunity to involve the patient in her care plan and educate her about healthy behaviors to minimize breast cancer risks. Appropriate follow-up to the screening is important and, regardless of the result, should include timely notification to the patient.
- 6a. Negative screening results should prompt interval screening recommendations per the adopted guidelines.
- 6b. Positive results should be communicated to the patient in a culturally-sensitive manner. Treatment information and advice should be provided to the patient with an appropriate referral for additional diagnostic testing or treatment.

The cycle repeats with appropriate interval screening, including outreach to patients as needed.

A quality improvement team benefits from mapping out how care is actually provided. Once it is able to evaluate where there are potential opportunities for improvement, it can use some of the improvement ideas that have worked for others, as outlined in [Table 4.2: Sample Changes That Work](#).

A couple of important notes:

- An organization may adopt additional guidelines that include other important preventive care parameters for women or focus on other cancer screening recommendations. The USPTF has recommendations for evidence-based screening based on age.
- A critical pathway can also be constructed to illustrate *how care is currently provided* within an organization (the existing pathway). Understanding the gap between an organization's *existing* critical pathway (how you provide care now), and the *idealized* critical pathway (how to provide reliable, evidence-based care aligned with current guidelines), forms the basis for improvement efforts.

Factors That Impact the Critical Pathway

In addition to understanding the steps for **Breast Cancer Screening**, factors that interfere with optimal care should be understood. As there may be several of these factors, a QI team may find it helpful to focus its attention on factors that interfere with ideal outcomes. This becomes especially useful as plans are developed to mitigate these factors.

Factors that have an impact on **Breast Cancer Screening** can be organized into those that are patient-related, relative to the care team, and a result of the health system. Overlaps exist in these categorizations, but it is useful to consider factors that have an impact on care processes from each perspective to avoid overlooking important ones.

Patient factors are characteristics that patients possess, or have control over, that have an impact on care. Examples of patient factors are age, race, diet, and lifestyle choices. Common patient factors may need to be addressed more systematically, such as, a targeted approach to address low health literacy, or a systematic approach to educate staff on the cultural norms of a new

refugee population. Examples of how patient factors may influence breast cancer screening include:

- **Age**—the incidence of breast cancer increases with age
- **Cultural differences**—cultural norms about weight vary, family planning choices, and perceptions of mammography may vary
- **Health literacy**—creates barriers in understanding and following a care plan
- **Work status**—may create care access issues; shift work may influence care plan
- **Co-morbid diagnosis**—may create barriers to screening
- **Socioeconomic status**—may have an impact on access to affordable screening
- **Urban versus rural**—access to screening may be limited in rural areas (as highlighted in a recent publication)³⁷

Care team factors are controlled by the care team. These types of factors may include care processes, workflows, how staff follows procedures, and how effectively the team works together. Care team factors that may influence **Breast Cancer Screening** include:

- Processes staff use to outreach to or educate patients to ensure periodic care based on level of risk
- Procedures that provide culturally-competent care to address the patient’s cultural norms about cancer screening and mammography
- Processes that provide comprehensive care for patients who are seen regardless of reason for visit
- Providers who may dislike doing breast cancer screenings

Health system factors are controlled at the *high level* of an organization and often involve finance and operational issues. Health system factors that may influence **Breast Cancer Screening** include:

- **Cost**—co-pays and availability of subsidies for mammography
- **Scheduling systems**—availability of evening and weekend appointments and wait time may have an impact on access
- **Location**—no transportation or unsafe location may present barriers to keeping appointments

These factors, when added to the critical pathway, create another dimension to the map as shown in **Figure 3.2**:

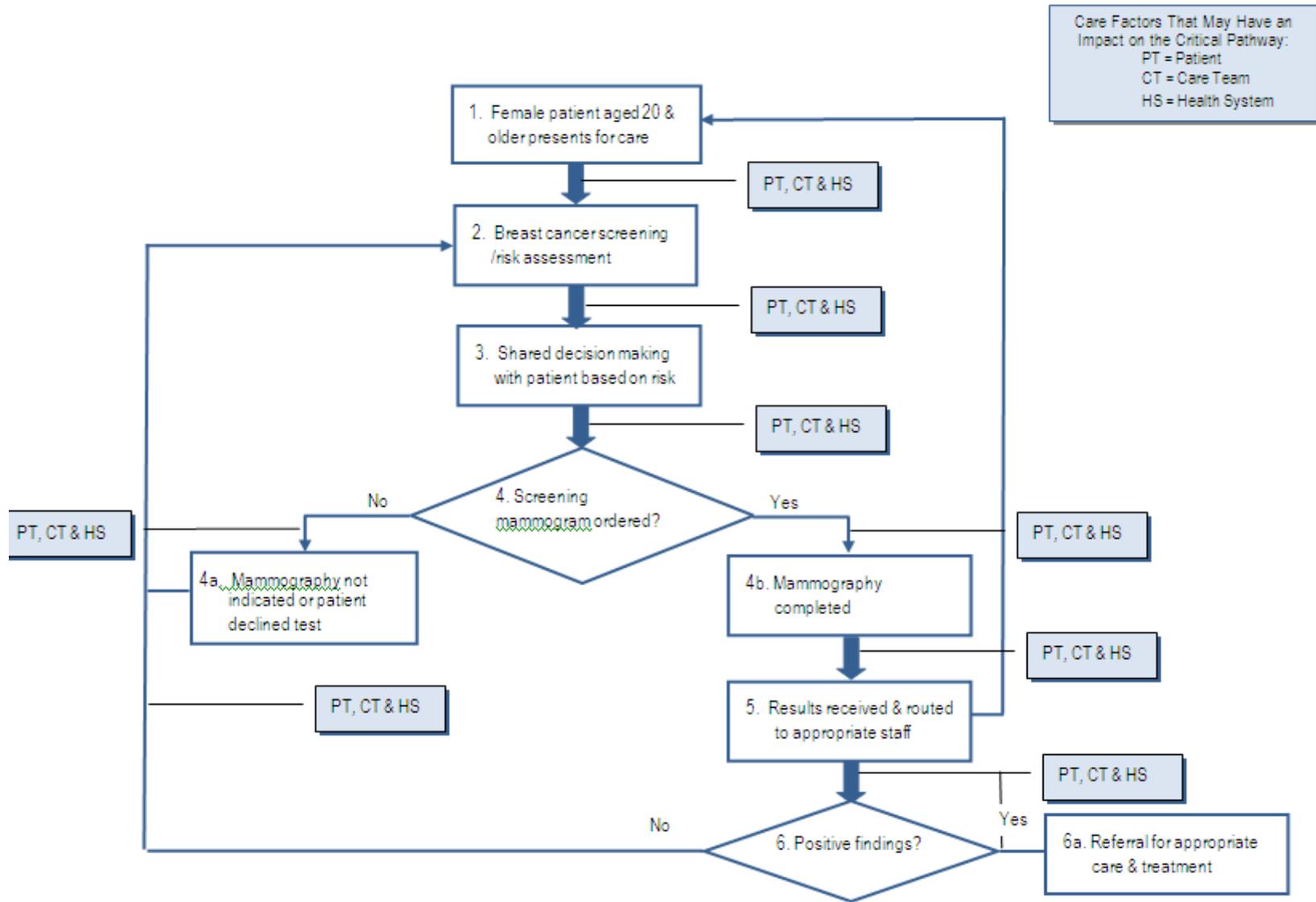


Figure 3.2: Care Factors that Impact the Critical Pathway for Breast Cancer Screening

Next, a team may identify specific factors that pertain to the way care is provided for its patients. The team may look at **Step 4b: Mammography completed** and **Step 5: Results received and routed to appropriate staff** of the critical pathway. What factors have an impact on how effectively, timely, and reliably Step 5 follows Step 4b? It is tempting to consider the first thoughts that come to mind, but teams are best served by systematically thinking through the potential impact of each category. **Example 3.1** illustrates a team’s output:

Example 3.1: A Team’s Brainstorming Session

The team did some quick checking and found that patients would often state that mammography had been completed but results were not available and no follow-up had been initiated. Using this information, the team brainstormed on factors that would likely have an impact on the arrow (or opportunity) between Steps 4b and 5 of the critical pathway for **Breast Cancer Screening**.

Factor Category	Factors Pertinent to Our Organization – Steps
Patient	Patients live in a geographically diverse area and go to one of four imaging centers.
Care Team	Staff writes orders for “screening mammography” on a prescription pad but does not record which imaging center the patient plans to visit. That means the clinic does not know who to contact for results and the imaging center cannot assist by reporting no-shows. There is no expected screening date and no prompt for staff to follow up following the screening. There are no systems to outreach to patients who are beyond the expected interval period for mammography screening.
Health Systems	“No news is good news” policy about test results so patients cannot prompt to learn results; two imaging centers use a mobile unit which is available only one day per week; there are no formalized relationships between the clinic and the imaging centers that might facilitate communication about results.

Now that the team has thought through some of the challenges, it is able to focus its improvement efforts for this particular part of the care system.

The team continues to look at different parts of the pathway to identify relevant impacts for each part. Once it is able to evaluate where there are potential opportunities for improvement, it can use this information to target its efforts. Additional examples of strategies to improve care for the **Breast Cancer Screening quality measure** are described in the [Improvement Strategies](#) section of this module.

Once the team visualizes the pathway and identifies opportunities for improved care, the next step is to collect and track data to test and document them. First, a QI team needs to determine *how* to collect data to support its improvement work. This step is essential for understanding the performance of its current care processes, before improvements are applied, and then monitoring its performance over time.

Data Infrastructure: Breast Cancer Screening

This section begins to address the critical role of data throughout the improvement process. It is important to recognize that different types of data are collected during the improvement project. First, data to calculate and monitor the **Breast Cancer Screening** performance measure results is needed. Monitoring a performance measure involves calculating the measure over time and is used to track progress toward a numerical aim. This section provides an overview of what is needed. A detailed and stepwise approach follows to explain the types of infrastructure elements needed to gather data to support improvement. Second, changes an organization is making to improve care processes and their effects must be tracked. Tracking the impact of changes reassures the team that the changes caused their intended effects.

Data Infrastructure to Monitor the Performance Measure—An Overview

There are three major purposes for maintaining a data infrastructure for quality improvement work:

- To know the starting baseline
- To track and monitor performance as changes are implemented
- To perform systematic analysis and interpretation of data in preparation for action

The first step to creating a data infrastructure for monitoring the performance measure is to determine the baseline. A baseline is the calculation of a measure before a quality improvement project is initiated. It is later used as the basis for comparison as changes are made throughout the improvement process. For the **Breast Cancer Screening** measure, an organization can determine the percentage of patients aged 40 to 69 years who have had a mammogram during the last two years. Performance reflects the current organizational infrastructure and the patient's interactions with existing care processes and the care team.

Baseline data is compared to subsequent data calculated similarly to monitor the impact of quality improvement efforts. The details of how to calculate the data must be determined to ensure that the calculation is accurate and reproducible. The difference between how an organization provides care now (baseline) and how it wants to provide care (aim) is the gap that must be closed by the improvement work.

The next step of data infrastructure development involves a process in place to calculate the measure over time as improvements are tested. A QI team's work is to make changes, and it is prudent to monitor that those changes result in achieving the stated aim. This involves deciding how often to calculate the measure and adhering to the calculation methodology.

Finally, an organization's data infrastructure must include systematic processes that allow analysis, interpretation, and action on the data collected. Knowledge of performance is insufficient for improvement. It is important for an organization to understand why performance is measured and to predict which changes will increase breast cancer screening rates with mammography based on an organization's specific situation. Collecting data related to specific

changes and overall progress related to achieving an organization's specified aim are important to improvement work. The next section describes in more detail how to develop a data infrastructure to support improvement.

Implementation of Quality Measure:: Breast Cancer Screening

This section explores each step to create the data infrastructure used to improve performance on the measure, **Breast Cancer Screening**.

Source: NQF

Description: Percentage of women aged 40 to 69 years who had a mammogram.

Rationale/Purpose: Breast cancer continues to be a leading cause of morbidity and mortality in the U.S. female adult population. The goal is to further reduce the morbidity and mortality associated with breast cancer. Regular mammograms for women aged 50 to 69 years can reduce breast cancer mortality by up to 35 percent through early detection, and a mammogram can detect breast cancer one to four years before a woman can feel the lump. Mammography can also detect 80 to 90 percent of breast cancers in women without symptoms.

Numerator/Denominator:

Numerator: Women in the denominator who received one or more mammograms during the measurement year or the year prior to the measurement year.

Denominator: All women patients aged 42 to 69 years during the measurement year or year prior to the measurement year.

Denominator Exclusions/Inclusions/Notes/Comments:

Denominator Exclusion: Women who had a bilateral mastectomy and for whom administrative data does not indicate that a mammogram was performed; the bilateral mastectomy must have occurred by December 31 of the measurement year.

Numerator/Exclusions/Notes/Comments:

Numerator Exclusions: None

Numerator Inclusions: Documentation in the medical record must include: a note indicating the date the test was performed and the result of the finding (or a copy of a mammogram result), or a note that documents the date and results from a test ordered by another provider.

1. Step 1 - Determine and Evaluate the Baseline

As previously discussed, a *baseline for improvement* is a calculation that provides a snapshot of the performance of the *systems* of care for a measure before improvements are applied. The baseline is determined by calculating the measure and collecting the information for the numerator and denominator.

Determination of a baseline is accomplished by actually calculating the measure and requires that the information for the numerator and denominator be collected. There are several methods to collect this information. While electronic methods are more efficient once established, manual chart audits using [random sampling techniques](#) are equally valid.

Consistent data collection sources and methodologies are critical to ensure reliable data. Please note that the tables referenced in this section are from the *NQF-Endorsed National Voluntary Consensus Standards for Physician-Focused Ambulatory Care [Appendix A- NCOA Measure Technical Specifications](#)*.

The following tables depict a decision algorithm for the measure, **Breast Cancer Screening**. The algorithm outlines the steps that an organization follows to determine its baseline and monitor improvements for **Breast Cancer Screening**.

Identify the Denominator	
The denominator for this measure is all women patients aged 42 to 69 years of age during the measurement year or year prior to the measurement year.	
a. Use a two-year date range: the measurement year and the year prior to the measurement year.	
b. Choose a selection method	Use date of birth or age from EHR or Practice Management System to identify women who are aged 42 to 69 as of December 31 of the measurement year
c. Exclude women who had a bilateral mastectomy and for whom administrative data does not indicate that a mammogram was performed; the bilateral mastectomy must have occurred by December 31 of the measurement year	<p>Use these codes or operative reports to verify bilateral mastectomy:</p> <ul style="list-style-type: none"> i. Bilateral mastectomy <ul style="list-style-type: none"> a. CPT Codes: 19180, 19200, 19220, 19240, 19303- 19307 WITH Modifier .50 or modifier code 09950* b. ICD-9-CM Procedure: 85.42, 85.44, 85.46, 85.48 ii. Unilateral mastectomy (must have 2 separate occurrences on 2 different dates of service) <ul style="list-style-type: none"> a. CPT Codes: 19180, 19200, 19220, 19240, 19303-19307 b. ICD-9-CM Procedure: 85.41, 85.43, 85.45, 85.47 <p>*50 or 09950 modifier codes indicate the procedure was bilateral and performed during the same operative session.</p>

Identify the Numerator	
Based on an organization's systems, evaluate all of the individuals who remain in the denominator and choose a method to determine those who should be included in the numerator--women in the denominator who received one or more mammograms during the measurement year or the year prior to the measurement year.	
a. Administrative Method: Audit all submitted claims or encounters for patients in the denominator and include those with the following codes:	
i. CPT: 76083, 76090-76092, 77055 – 77057, or	
ii. HCPCS: G0202, G0204, G0206, or	
iii. ICD-9-CM Diagnosis: V76.11, V76.12, or	
iv. ICD-9-CM Procedure: 87.36, 87.37, or	
v. UB Revenue: 0401, 0403	
b. Medical Record Audit: Audit all patients in the denominator or use valid sampling methodology. The records audited may be electronic or paper. Include the patient in the numerator if the documentation in the medical record includes:	
i. a note indicating the date the test was performed and the result of the finding, or	
ii. a copy of a mammogram result, or	
iii. a note that documents the date and results from a test ordered by another provider	

Calculate the Measure

Divide the numerator by the denominator and multiply by 100 to get the percentage of women who received mammograms between the ages of 40 to 69 years.

Compare an organization's performance to national benchmarks and other available data. [The NCOA Web site](#) updates national and State performance on this measure on an annual basis. Note that there is considerable variation among practices reporting. Other opportunities for comparison data are from payers, State cancer control programs, State and regional quality improvement organizations, as well as aggregate reports for specific HRSA-funded programs.

Decide if the performance is satisfactory based on available data from reliable sources. It is important to consider the organizational capacity and constraints, but it is recommended that an organization's aim is high. An organization with a low performance may want to allow a longer time to achieve excellence, but striving to reach screening rate greater than 75 percent is feasible for most. If the performance is satisfactory, an organization may wish to choose another measure and focus on other systems of care.

If the performance is unsatisfactory, consider adopting the measure and using it to monitor improvements to the care delivery system. An organization should understand that if a measure is adopted for improvement, ongoing and regular measurement is necessary to reach and sustain its organizational goals. More information regarding measurement can be found within the [Managing Data for Performance Improvement](#) module.

Evaluate the baseline. Initially, a team compares its baseline to the performance it hopes to achieve. It is important to remember this gap in performance is defined as the difference between how the care processes work now (baseline) and how an organization wants them to work (aim). An organization may often modify its aim or timeline after analyzing its baseline measurement and considering the patient population and organizational constraints.

As an organization moves forward, the baseline is used to monitor and compare improvements in care over time. While it is important for an organization to stay focused on its aim, it is equally significant to periodically celebrate the interim successes.

2. Step 2 - Create a reliable way to monitor performance over time as improvements are tested.

An organization should standardize its processes and workflows to ensure the team collects and calculates performance data the same way over time. An organization should

- a. Document exactly how the data is captured so staff turnover does not interfere with the methodology.
- b. Determine the frequency that performance will be calculated. Frequent data collection is often associated with higher levels of improvement. Monthly measurement is recommended, if feasible, as it is associated with a higher level of team engagement and success. If it is infeasible, quarterly measurements may be obtained. Less frequent performance measurements are adequate for reporting

purposes, but do not adequately support improvement efforts. An advanced discussion can be found in the [Managing Data for Performance Improvement](#) module.

- c. Chart and display results. A simple chart audit form is appropriate for manual audits and can be repeated frequently as desired. Results of multiple audits can be presented in a graphic format to demonstrate trends.

Note: The frequency of team meetings is not necessarily prescribed for success. Many successful teams meet once a week while others may meet bi-weekly when focusing their improvement efforts on any given measure. Success of these meetings is rather the output of the team members' active engagement in the meeting and being prepared to report on recent improvement findings. More information, including resources and tools for developing and implementing effective team meetings can be found in the [Improvement Teams](#) module.

3. Step 3 - Create systematic processes that allow an organization to analyze, interpret, and act on the data collected.

Having the data is not enough. Improvement work involves thinking about the data and deciding what to do based on that analysis. A QI team needs to put processes in place – team meetings, scheduled reports, and periodic meetings with senior leaders, to use the data tracked. This section describes how a QI team may accomplish the work of creating actionable plans based on the data collected. In **Example 3.2: QI at Team Pathways Health**, the hypothetical scenario illustrates how a fictional team may use these concepts to act on its data.

- a. **Analyze: What are the data trends?** Tracking performance over time for the measure, **Breast Cancer Screening**, is critical to successful improvement, but calculation of performance is not enough. It is important for a team to meet to analyze the data on a regular basis. QI teams that are experienced in looking at data recognize these common patterns:
 - Performance is improving
 - Performance is decreasing
 - Performance is flat
 - Performance has no recognizable pattern

Additional examples of common data patterns are provided with further explanation in the [Managing Data for Performance Improvement](#) module. It is typical for a team to see little movement in its data over the first several months. If a team has chosen to monitor an associated process measure, such as, the percent of no-show patients who are rescheduled for breast cancer screening, performance improvement may be evident more quickly. Regardless, it is important that a QI team review performance progress regularly. A QI team that meets regularly and calculates performance monthly should spend part of one meeting each month reviewing its progress to date.

- b. **Interpret: What do these data trends mean?** A QI team needs to then interpret what these data trends mean within the context of its own organization. If performance is increasing, but has not yet reached the numerical aim, perhaps the changes in place are having the desired effect and the aim will be reached over time. If performance is decreasing, what has changed? Are there new care process changes, a failure of registry data input, or a large increase in those patients included in the registry? If performance is flat, did the organization maximize the benefits from changes implemented or was there some regression to the former way of doing things? Improvement trends that have reached a plateau may indicate that an organization needs to think differently about future changes. A few suggestions that an organization may consider when experiencing a plateau in performance improvement are listed below:
- i. Consider looking at outliers to determine barriers to patient access to mammography, for example, lack of insurance, transportation, or language and cultural differences.
 - ii. Consider changes in a different part of the framework to get improvement back on track. If using a critical pathway approach, an organization may look at the steps prior to where the problem seems to be. If a Care Model approach is used and the team worked hard on delivery system design issues, opportunities to better leverage the clinical information systems or engage the community may be considered.

Interpretation of data over time is critical in determining where a team will target its efforts. Additional tools that can assist a team in understanding underlying causes for data trends are beyond the scope of this manual but are discussed in detail in a monograph that was published by the NQC, [A Modern Paradigm for Improving Healthcare Quality](#).

- c. **Act: Make decisions based on data.** Once a QI team has a better understanding of what the data means, efforts should be targeted to further advance the performance toward the aim. Often the decisions are made at the team level about what to tackle first. Then small tests of change can be accomplished to determine what improvements could be implemented to enhance performance. The practice of using small tests of change actually allows multiple changes to be tested simultaneously.

An advanced discussion on how to use the data collected to advance an organization's improvement, including resources and tools to support improvement, can be found in the **Managing Data for Performance Improvement** module.

Example 3.2: QI Team at Pathways Health

The Quality Improvement (QI) Team at Pathways Health worked diligently to improve breast cancer screening over the last several months. The team focused on patient education and outreach as well as internal tracking systems. But during the last three months, the performance remained the same at 50 percent, which was below its aim of having greater than 90 percent of women ages 40 to 69 years screened for breast cancer.

Analysis: The team noted improvement initially. Registry input, care processes, and patient volumes seemed to be stable but performance was flat for the last three months.

The team leader asked for a list of those patients who had a mammogram ordered but did not have the test completed—outliers for the measure. Further study of these specific cases found that over half of those patients

were uninsured.

Interpretation: Because there was initial improvement followed by several months of flat performance, the team leader looked for obvious changes in processes that would have an impact on performance, but found none. The team leader interpreted the data to mean that initial changes provided some improvement, but not enough to achieve its aim and have the desired impact. More work was needed. The team leader employed a common strategy to find additional opportunities; i.e., he looked at the population not in compliance (the outliers) for a common cause to be addressed. In this case, a common thread was that patients were coming in for care, had orders for the screening but were not able to follow through with testing.

This information allowed the team to consider ways to assist uninsured patients with following through on mammography screening. They looked at *Sample Changes that Work* (Table 4.2) for ideas then added suggestions based on its own patient population. The team decided to increase focus on access to testing. One of the MAs took the lead in contacting the State cancer control program. As it turned out, a number of resources were available to offset the cost of mammography screening. The clinic decided to enroll in the State-based program to reach the lowest income women and another program offered by a private foundation to access culturally-appropriate materials to augment its education efforts.

Act: The information gathered from the analysis and interpretation of the data allowed the team to focus its next efforts. Since numerous patients were not following through with testing, the team targeted its efforts on improving access to affordable testing. This enabled the team to focus on PDSAs to test changes specific to these areas and monitor its progress.

A QI team leader needs to monitor the pace of the progress over time. If there is insufficient progress to meet the specified aim, reasons should be analyzed and addressed. One organization may choose to accelerate its improvement efforts; another may decide to extend its initial allotment of time to achieve its aim and consider other constraints within the organization.

Part 4: Improvement Strategies: Breast Cancer Screening

The actual improvement process is composed of three steps that respond to the following questions:

1. What changes can an organization make?
2. How can an organization make those changes?
3. How can an organization know the changes caused an improvement?

What Changes Can an Organization Make?

It is important to understand that improvement requires change, but not all change results in improvement. Considering all of the possible changes that can be made to health care systems, considerable effort has been dedicated to creating various quality improvement strategies providing a framework that organizes possible changes into logical categories. Frameworks for change in health care quality improvement are known as *quality models* and have been tested to guide change. In fact, considering that there are limited resources to dedicate to improvement, most organizations adopt one or more quality models to guide their improvement efforts. There is not a right or wrong approach, and there are many areas of overlap in quality models. Experienced quality improvement teams often use multiple strategies to overcome challenges as they progress. Two approaches often used by teams that are working to improve performance on **Breast Cancer Screening** include the *Care Model* approach and the *Critical Pathway* approach.

The case study continues...

The Improvement Journey:

Over the next several weeks, the registry was populated with data from Dr. Laurel's patients. Using the parameters specified for the measure's numerator and denominator, performance was calculated as 49 percent of patients without a timely mammogram. Although Dr. Laurel knew things were not good, she was disappointed by the findings and strongly advocated for improvements. Because there was such a gap in performance and its goal, the organization decided on a formal effort. It took the following steps:

1. Received support from leadership. Dr. Laurel requested that all clinical staff be involved, but the CEO felt that the organization could not afford that level of resource support. They negotiated a two-hour kickoff meeting and a one-hour meeting each week for up to three staff members. They decided that only Dr. Laurel would actively participate from the provider staff and that the project would initially focus on her patients only. In addition, the MA would continue to have a few additional hours each week to keep the registry up to date and run monthly progress reports. Although active participation was limited to one provider, everyone would be kept up to date during monthly staff meetings.
2. A Breast Cancer Screening Improvement Team was formed. Dr. Laurel played a clinical leadership role and the MA, who functioned both as an MA and the registry expert, was invited to attend. The receptionist had a strong family history of breast cancer and was anxious to participate. Because of the diversity of the population served, the team decided to get some ideas from patients about their experiences to understand opportunities for improvement. The receptionist agreed to keep track of all documentation related to the project and to ensure the meetings stayed on track. The MA agreed to monitor the time and to provide insights into her role on the care team as well as data. Dr. Laurel agreed to provide clinical leadership and also to provide or facilitate any training that would benefit the team.
3. The team developed the following aim statement: *Over the next 12 months, we will redesign the care systems of Green Valley Family Health Center to ensure that 90 percent of women aged 40 to 69 years have been screened for breast cancer with mammography within the past two years. We will begin with women cared for by Dr. Laurel's practice and spread to Dr. Burt's practice beginning in month 13 or sooner, if possible.*

Guidance:

 - *Community partnerships should be leveraged*
 - *A key focus will be systems for patient outreach*
4. The team agreed to try out strategies to make sure the MA received all data collected at the time of the visit for data entry. It also decided to look at the previous month's data during its team meeting on the second Thursday of each month.
5. The focus was on what the team could do to improve breast cancer screening as quickly as possible. The team chose the Care Model improvement strategy.

1. Care Model Approach: Implementing the changes described in the Care Model, as shown in **Figure 4.1**, is a proven method to improve care delivery. The Care Model is an organizational framework for change and is organized into six domains:

- a. Organization of Health Care
- b. Clinical Information Systems
- c. Delivery System Design
- d. Decision Support
- e. Community
- f. Self-Management Support

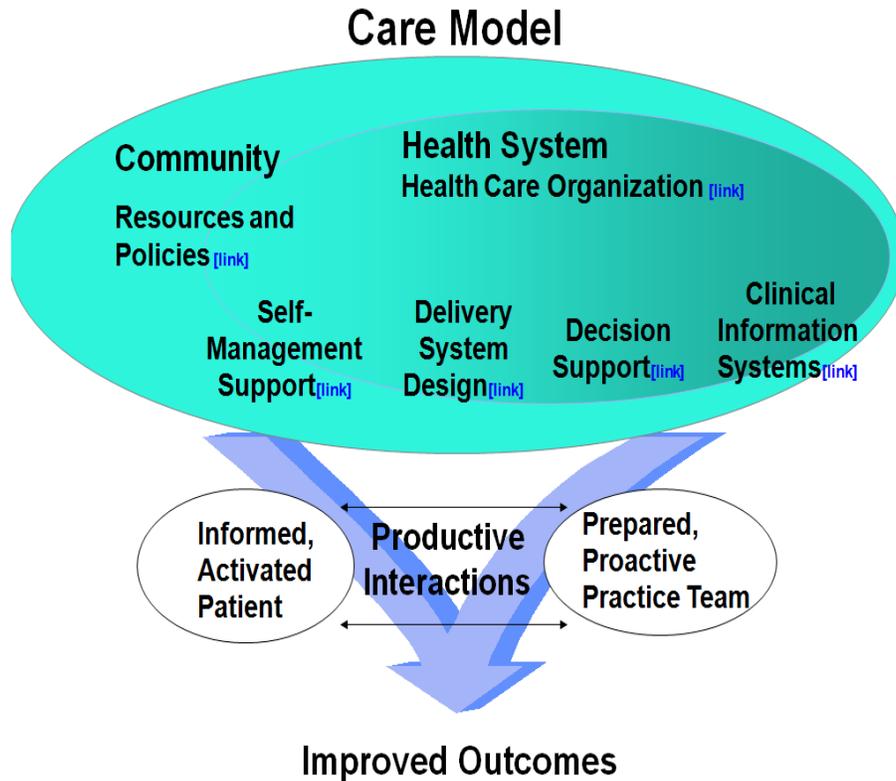


Figure 4.1: The Care Model

Changes within these domains can effectively leverage transformation of a current reactive care system to one that better supports proactive or preventive care. If an organization does not have general experience with the Care Model, reading the [Care Model](#) before proceeding is recommended. The Care Model recognizes that preventive care is ongoing and requires more proactive care than the health care system often provides. The Care Model is implemented to improve care by working in six domains, defined below, that transform the way care is delivered:

Community—To improve the health of the population, a health care organization reaches out to form powerful alliances and partnerships with State programs, local agencies, schools, faith organizations, businesses, and clubs.

Organization of Health Care—A health care system can create an environment in which organized efforts to improve the preventive care of people take hold and flourish.

Self Management—Effective self management is very different from telling patients what to do. Patients have a central role in determining their care and one that fosters a sense of responsibility for their own health.

Delivery System Design—Delivery of patient care requires not only to determine what care is needed, but to clarify roles and tasks to ensure the patient receives the care; that all of the clinicians, who take care of a patient, have centralized, up-to-date information about the patient’s status, and make follow-up a part of their standard procedures.

Decision Support—Treatment decisions need to be based on explicit, proven guidelines supported by at least one defining study. A health care organization integrates these guidelines into the day-to-day practice of primary care providers in an accessible and easy-to-use manner.

Clinical Information System—A registry, that is, an information system that can track individual patients and populations of patients, is a necessity when managing chronic illness or preventive care.

Definitions above are adapted from the Institute for Healthcare Improvement Web site.³⁸

In **Table 4.1: Care Model Key Changes**, key changes are presented that have been used successfully to improve breast cancer screening within the Care Model framework.

Table 4.1: Care Model Key Changes

Community	Organization of Health Care	Self Management	Delivery System Design	Decision Support	Clinical Information System
Partner with local specialists to provide free screenings	Integrate Care Model and Model for Improvement into organization’s infrastructure	Short education sessions with patients to explain the purpose and procedure of screening	Empower MAs to prepare and complete relevant screening referral paperwork, put referral in chart for signage, and make appointments for patients to have screenings done before PCP sees patient	Ensure that providers and other staff receive education regarding ethnic/cultural diversity	Use database or information system to identify special needs of ethnic/cultural patients in various areas, such as, interpreter services, preferred language for written materials, and primary language spoken
Partner with local mammography center to hold Saturday screenings for patients during a “Breast Health Awareness” event	Conduct initial and ongoing organizational cultural competency self assessments	Ensure that patients get relevant information and education; make appointments for screenings, and ensure follow-up on results is done on site	MAs discuss cancer screening with patients, if appropriate, followed by nursing staff who reinforces education before PCP sees patient	Use a cancer screening card that lists screening tests and dates performed; this prompts PCP to discuss during patient visit	Track and review measures regularly and provide systematic feedback
Partner with AmeriCorps to do outreach to patients, such as, calls to remind them of their appointments for screenings; patient education on various screening tests, and follow-ups if patients missed or rescheduled appointments	Integrate cultural and linguistic competence-related measures into their internal audits, performance improvement programs, patient satisfaction assessments, and outcome-based evaluations	Easy-to-read instructions and patient education tools with pictures concerning cancer screening, procedures, and follow-up	Transportation is provided to off-site screening centers	Provider report cards serve as important and useful tools for providing feedback on quality of care being provided	Use the registry to generate reminders and care-planning tools for individual patients

Breast Cancer Screening

<p>Create links to referral sites and screening centers to encourage a consistent continuum of care for patients</p>	<p>Senior leadership makes quality improvement and Care Model a priority within organization and cultivates an organization of excellence</p>	<p>Develop or adopt instruction pamphlets and patient education tools to facilitate discussions and patient self management</p>	<p>Use ‘standing orders’ for guideline-based screening tests for breast cancer</p>	<p>Adopt evidence-based guidelines and practices for testing and screening throughout organization</p>	<p>Continuous monitoring of data to help create and facilitate excitement about the work</p>
<p>Recruit interns (paid or voluntary) from local schools, community organizations, and volunteer centers</p>	<p>Determine most appropriate process for screening at all levels and operationalize it into the entire system, including competency testing, audits, job descriptions, annual reviews and performance appraisals, workflows, policies, procedures, scheduling, and budgetary impact for overall system reengineering</p>	<p>Send personalized letters to patients that alert them of need for screening--especially for patients who do not come in often for care</p>	<p>Develop or adopt patient release forms for patients referred to screening service centers and specialists to ensure that test results are provided to the organization</p>	<p>Prompts and reminders for providers, including chart-based and computerized reminders, audits, and feedback to improve cancer screening</p>	<p>Perform quality assurance checks to ensure that data is being captured and entered appropriately</p>

This toolkit is meant as a guide to help organize ideas, but is also designed to allow flexibility for creative planning.

Note: An organization may choose to adapt and refine a tool to assist improvement for the measure, **Breast Cancer Screening**. Testing the measure before fully implementing it offers a way to try something new and modify it before additional resources are spent.

The case study continues....

The QI Team:

The initial meeting was the launch meeting and time was spent looking at the baseline data, understanding the care model and doing a baseline assessment, ACIC, that had been adapted for cancer screening. The team also reviewed the model for improvement change methodology. It was asked to reflect on opportunities within the delivery system design domain as it had scored particularly low there. Changes that worked for others in that area were distributed to energize the team's thinking.

- 2. Critical Pathway Approach:** As with all critical pathways, good performance relies on many different systems and processes working together efficiently. An organization is encouraged to map its own critical pathway for **Breast Cancer Screening** or refer to the schematic in **Figure 4.2**. Often when a QI team maps its pathways, it readily can see how complex each step is. It is common for different team members to do the same step differently. Workflow inefficiencies become clear when an organization visualizes how each step is completed and the interdependencies among the steps. Some teams are overwhelmed by the possibilities of changes that can be made in their systems; others focus only on a specific group of factors.

One way to organize the factors that have an impact on the systems is to consider that some are controlled by the patient, others are primarily controlled by the care team, and still others are inherent in the system of care delivery. All three sets of changes must be considered to improve systems of care. In general, these categories can be defined as follows:

- **Patient changes**—efforts to support self management, patient engagement, and navigation of the care system
- **Care team changes**—changes in job duties or workflows that assist to retain patients in care and ensure timely evidence-based breast cancer screening
- **Health system changes**—changes that have an impact on how care is delivered, independent of who delivers it

A team should use the steps along the critical pathway to target improvements. For this measure, **Breast Cancer Screening**, influences on performance begin by ensuring female patients are screened appropriately for risk factors for breast cancer beginning in their twenties.

An organization should ensure patients are appropriately educated regarding the importance of regularly updating the health care team about their risks and have enough knowledge to participate in shared decision making as they grow older. Providing

education to patients also affords an organization the opportunity to assess patient barriers to testing, such as, lack of insurance or cost. Successful organizations have often aligned resources in the community for mammography screening at a reduced cost for patients creating a true partnership in patient care.

An organization can think through each part of the critical pathway in turn, teasing out what happens and what could be improved. In **Table 4.2**, changes that have worked for other QI teams are matched with the part of the system on which they have the most impact. These ideas are not meant to be inclusive, but to start a dialogue of what may improve each part of the critical pathway in an organization, and thus improve it overall.

Changes That Work

Table 4.2: Sample Changes That Work Are Aligned with the Critical Pathway for Breast Cancer Screening in Figure 4.2

Number/Area of Critical Pathway		Patient Changes	Care Team Changes	Health System Changes
1	Female patients aged 20 years and older present for care	<ul style="list-style-type: none"> Educate patients with resources that describe breast cancer and age-appropriate screening Assess barriers to breast cancer screening; address barriers in partnership with patients 	<ul style="list-style-type: none"> Promote breast cancer screenings (mammograms) for patients 40 and older at every patient encounter Ensure messaging from the care team regarding importance of periodic screening Query electronic medical records or billing system monthly (patients 50 and older) 	<ul style="list-style-type: none"> Prompts for breast cancer screening (mammograms for patients 40 and older) due at point of care – registry and flow sheets Implement standing orders for screening per protocol
2	Breast cancer screening and risk assessment	<ul style="list-style-type: none"> Education for patients on importance of breast cancer screening (mammograms) including guidelines Assess patient beliefs for screenings Assist with appropriate self-management goal setting and strategies to overcome barriers Consider health literacy screening Provide evidence-based guidelines for breast cancer screening including risk assessments 	<ul style="list-style-type: none"> Designate care team member to outreach to patients due for breast cancer screening (mammograms) Culturally-competent education for patients to support breast cancer screening (mammograms) Continued education for age-appropriate screening and risk assessment Providers should agree on guidelines so that care among providers is congruent 	<ul style="list-style-type: none"> CME’s for providers that support culturally-competent screening and education supporting appropriate breast cancer screening Display culturally-appropriate posters and brochures in patient areas to encourage patients to talk to providers about breast cancer screening and mammograms Clinical guidelines for breast cancer risk assessment and age appropriate screenings
3	Shared decision making based on risk	<ul style="list-style-type: none"> Education for patients on importance of breast cancer screening, including guidelines in a culturally-competent manner 	<ul style="list-style-type: none"> Share clinical guidelines in patient-friendly format Share screening procedure Ensure screening is ordered when it is due, regardless of reason for visit Document current care plan and share copy with the patient Ensure access for patients who need additional support 	<ul style="list-style-type: none"> Provide list of free or low-cost mammography services Develop routine mammogram referrals for female patients 40 and older
4	Screening mammogram ordered	<ul style="list-style-type: none"> Provide evidence-based guidelines for breast cancer screening including risk 	<ul style="list-style-type: none"> Continued education for age-appropriate screening and risk 	<ul style="list-style-type: none"> Clinical guidelines for breast cancer risk assessment and age-appropriate

Breast Cancer Screening

		<p>assessments</p> <ul style="list-style-type: none"> • Consider health literacy screening 	<p>assessment</p> <ul style="list-style-type: none"> • Providers should agree on guidelines so that care among providers is congruent 	<p>screenings</p> <ul style="list-style-type: none"> • Providers have continuing educational opportunities to stay current with appropriate interventions • Prompts for screening are not turned off when test is ordered, but rather when results received
4a	Mammography not indicated or patient declined	<ul style="list-style-type: none"> • Education for patients on importance of breast cancer screening including guidelines and risk factors • Assist with appropriate self management 	<ul style="list-style-type: none"> • Continued education for age-appropriate screening and risk assessment • Providers should agree on guidelines so that care among providers is congruent 	<ul style="list-style-type: none"> • Patient routinely given documentation of current care plan • Tools to support breast cancer screening • Providers have continuing educational opportunities to stay current with appropriate interventions • Display culturally-appropriate posters and brochures in patient areas to encourage patients to talk to providers about screening
4b	Mammography completed	<ul style="list-style-type: none"> • Education on follow-up and importance of receiving test results once complete 	<ul style="list-style-type: none"> • Document current care/treatment plan and share copy with the patient • Recall system/log to ensure screening complete 	<ul style="list-style-type: none"> • Implement patient follow-up and recall system to ensure screening follow-through • Clear procedures for how screening results are routed once received – usually to a provider or another health professional who can act on the results by protocol
5	Results received and routed to appropriate staff	<ul style="list-style-type: none"> • Education for patients on importance of receiving test results 	<ul style="list-style-type: none"> • Ensure outreach to patient with test results and achieving targets per guidelines; <i>no news is good news</i> strategy for notifying patients about mammogram results is not aligned with good care • Set clear expectations for follow-up 	<ul style="list-style-type: none"> • Monitor patient contacted with results • Set data tracking and evaluation systems for timely patient contact • Implement a tracking system that monitors screening results and prompts if results not logged as expected
6	Positive findings?	<ul style="list-style-type: none"> • Education on the importance of treatment of positive findings • Resources for patient support 	<ul style="list-style-type: none"> • General referral for treatment • Help patients to make follow-up appointments • Assess current care plan, barriers to following care plan, and collaborate with patient on care plan modifications 	<ul style="list-style-type: none"> • Partnerships with specialist for low-cost interventions • Culturally-competent education materials readily available for specialist referral

Breast Cancer Screening

6a	Referral for appropriate care and treatment	<ul style="list-style-type: none">• Schedule self-management support between visits as indicated• Ensure patients get the relevant information, education, and make appointments for follow-up care	<ul style="list-style-type: none">• Set clear expectations for follow-up• Assess current care plan, barriers to following care plan, and collaborate with patient on care plan modifications• Patient satisfaction survey on navigating system	<ul style="list-style-type: none">• Ensure patient receives guidance about access to the practice with interim concerns• Financial considerations and referral source for low-cost interventions• Implement Patient Satisfaction Survey for Breast Health Navigation
-----------	---	--	--	--

This toolkit is meant as a guide to help organize ideas, but is also designed to allow flexibility for creative planning.

Note: An organization may choose to adapt and refine a tool to assist improvement for the measure, **Breast Cancer Screening**. Testing the measure before fully implementing it offers a way to try something new and modify it before additional resources are spent.

How Can an Organization Make Those Changes?

Earlier in this module, examples are provided of changes (Critical Pathway and Care Model) that have led to improved organizational systems of care and better patient health outcomes. Because every change is not necessarily an improvement, changes must be tested and studied to determine whether the change improves the quality of care. This concept is addressed in detail in the [Managing Data for Performance Improvement](#) module.

It is important that these changes be tested in the context of an organization's staff, current processes, and patients. The goal is that the change results in lasting improvements within an organization.

Organizations commonly use tools to manage change as they work to improve their systems. For a further discussion of change management, refer to the [Managing Data for Performance Improvement](#) and [Redesigning a System of Care to Promote QI](#) modules. Here are a couple of tools that are worth mentioning in the context of this measure:

1. Small tests of change – [Model for Improvement and PDSA](#) (Plan-Do-Study-Act)
2. [Process mapping](#)

1. *Model for Improvement*

The *Model for Improvement* identifies aim, measure, and change strategies by asking three questions: ³⁹

AIM	What are we trying to accomplish?
MEASURE	How will we know that a change is an improvement?
CHANGE	What changes can we make that will result in improvement?

These questions are followed by the use of learning cycles to plan and test changes in systems and processes. These are referred to as PDSA (Plan-Do-Study-Act) cycles. The PDSA Cycle is a test-and-learning method for discovering effective and efficient ways to change a current process. In **Figure 4.3: The PDSA Cycle**, the graphic provides a visual of the PDSA process:



Figure 4.3: The PDSA Cycle

An organization focusing its improvement efforts on **Breast Cancer Screening** for its patients benefits from implementing PDSAs to test change processes that have an impact on access to preventive care. Those organizational processes tested may focus on outreach, operational procedures, or patient education interventions ensuring that patients have timely access to care. A few examples of such processes relating to **Breast Cancer Screening** are listed below:

- What system is in place to provide patients with timely reminders regarding breast cancer screening?
- What are the assigned roles, duties, and tasks for planned visits to a multidisciplinary care team? Are members of the team cross-trained?
- Does the patient population understand its specific role in breast cancer screening or is there an opportunity for education?
- Is there an opportunity to educate the community on the importance of cancer screening, including breast cancer, in a group visit setting?
- Are there cultural, linguistic, and literacy barriers that the organization may need to address?

As an organization plans to test a change, it should specify *who, what, where, and when* so that all staff know their roles clearly. Careful planning results in successful tests of change. Documentation of what happened – the *S* or study part of the PDSA – is also important. This can help a team to understand the impact of changes to a process as unanticipated consequences may occur.

Tips for Testing Changes

- Keep the changes small and continue testing.
- Involve care teams that have a strong interest in improving cancer screening.
- Study the results after each change. All changes are not improvements; do not continue testing something that does not work!
- If stuck, involve others who do the work even if they are not on the improvement team.
- Make sure that overall aims are improving; changes in one part of a complex system sometimes have an adverse effect in another.

2. *Process Mapping*

Process mapping is another valuable tool that an organization focused on improvement often uses. A process map provides a visual diagram of a sequence of events that result in a particular outcome. Many organizations use this tool to evaluate a current process and again when restructuring a process.

The purpose of process mapping is to use diagramming to understand the current process; i.e., how a process currently works within the organization. By looking at the steps, their sequence, who performs each step, and how efficiently the process works, a team can often visualize opportunities for improvement.

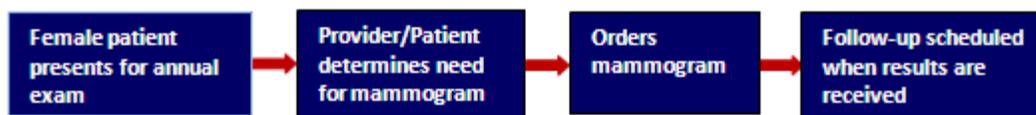
Process mapping can be used before or in conjunction with a PDSA cycle. Often, mapping out the current process uncovers unwanted variation. In other words, different staff may perform the process differently, or the process is changed on certain days or by specific providers. By looking at the process map, a team may be able to identify gaps and variation in the process that have an impact on breast cancer screening.

The case study continues...

PDSA Cycles in Action:

At the second meeting, the team was very excited to think about all the ideas it had considered. The team leader recognized that the change needed to be manageable and not disrupt the flow of the clinic. The team decided to map out its current system of care using process mapping. Then it agreed to address each step of the process combining what it knew about its patients and organization and stealing shamelessly from ideas that worked for others to improve delivery system design. The team agreed that as it prioritized each step for improvement, it would create PDSAs to test the changes.

The process of care for breast cancer screening currently was straight forward:



With the help of the patient advisory group, the team first tackled the process for determining the need for a mammogram. This included incorporating the risking tool into the workflow of all female patients annually (regardless of reason for visit), developing standing orders for MAs based on ACS guidelines, and streamlining processes for referral for mammography. This included documentation of the facility that would be accessed and an estimated date of the screening so that follow-up could occur. The patients were relieved to know that they would be contacted about the results of their screening by familiar clinic personnel.

Process mapping, when used effectively, can identify opportunities for improvement, and support testing changes in the current system of care. Additional information, including tools and resources to assist an organization in adapting process mapping as an improvement strategy within its organization, can be found in the [Redesigning a System of Care to Promote QI](#) module.

How Can an Organization Know That Changes Caused an Improvement?

Measures and data are necessary to answer this question. Data is needed to assess and understand the impact of changes designed to meet an organization's specified aim. Measurement is essential in order to be convinced that changes are leading to improvement. Organizations that have experienced successful improvement efforts found that data, when shared with staff and patients outside the core improvement team, led to the *spread of improvement* strategies, in turn generating interest and excitement in the overall quality improvement process.

Measures are collected prior to beginning the improvement process and continue on a regularly scheduled basis throughout the improvement program. Once an organization reaches its

specified goal, frequency of data collection may be reduced. Additional information regarding frequency of data collection, tracking, and analyzing data can be found in the [Managing Data for Performance Improvement](#) module.

Part 5: Holding the Gains and Spreading Improvement

Holding the Gains

Once an organization has redesigned the process for breast cancer screening, it can be tempting to move on to other issues and stop monitoring the process. Ongoing monitoring ensures that an organization *holds the gains* over time.

Although an organization may be able to reduce the frequency of monitoring the process, some ongoing assessment of the measure is necessary to ensure an organization continues to meet its intended goal. Processes that work well now may need to change as the environment shifts. Because all systems are dynamic, they change unless efforts are made to ensure that the improvements continue. Organizations often do a few simple things to ensure that successful changes are embedded in the daily work. Examples include:

1. Change the procedure book to reflect the new care process.
2. Include key tasks in the new process as part of job descriptions.
3. Adjust the expectations for performance to include attention to quality improvement and teamwork to improve care.
4. Re-align hiring procedures to recruit individuals who are flexible and committed to quality improvement.

The case study continues...

Sustaining Improvements:

A year later...

About 85 percent of Dr. Laurel's patients have had their mammograms as indicated based on the last audit, and the team is working diligently to reach their goal of over 90 percent. Even though the team is still working toward its aim, it has made considerable progress and learned much along the way. Because the results have been communicated at staff meetings, other providers are interested in adopting some of these changes that work and to follow the results in a registry. Confident it could make meaningful changes as a team, it expanded the team quality improvement project to include other metrics pertinent to cervical cancer screening and planned to tackle colorectal cancer screening in the near future. It used the NCQA Physician Recognition Program as a guide to choose measures and to develop appropriate aims. It remained focused on one care team to test changes to achieve its aim initially, but the organizational leadership was committed to do more; excellence in cancer screening across the organization became a strategic priority. Over the subsequent two years, the clinic made substantial improvement and is now known countywide for the excellence of its cancer screening programs.

Spreading Improvement

Spread can be defined differently based on an organization's defined target population for the improvement effort. An organization often begins an improvement intervention on a smaller scale, possibly focusing on one site or one provider's patient panel, and then increases the population of focus (POF) or the number of providers. Spread can mean spreading improvements to another area of an organization. An organization can still focus on breast cancer screening but also include other or all providers that provide care to women. Ideally, others can learn from the initial improvement experience and implement the interventions of the improvement team in their own environments. Spread of this kind is often at an accelerated pace as there is experience about changes that work within the organization. Once it has successfully reached its goal for **Breast Cancer Screening**, an organization may choose another measure to improve other aspects of care for women or cancer screening. Good sources for cancer screening measure sets include:

- [NCQA](#)
- [NQF](#)

Another option is to target a different topic or another population of patients. An organization may evaluate organizational priorities as it did when initially choosing the **Breast Cancer Screening** measure and begin to plan for its next improvement effort. Additional information on *Holding the Gains and Spreading Improvements* , including specific resources and tools to support an organization's improvement program, can be found in the [Redesigning a System of Care to Promote QI](#) module.

Part 6: Supporting Information

Case Study

To gain insight into how one QI team approached this measure, review a case study highlighting Green Valley Family Health Center's approach to improving **Breast Cancer Screening** performance.

References

1. Cancer statistics, 2009. Jemal A; Siegel R; Ward E; Hao Y; Xu J; Thun MJ *CA Cancer J Clin.* 2009 Jul-Aug;59(4):225-49. Epub 2009 May 27.
2. [Seer Cancer Statistics Review 1975-2008.](#)
3. Arslan, AA, Formenti, SC. Mammography in developing countries: the risks associated with globalizing the experiences of the Western world. *Nat Clin Pract Oncol* 2009; 6:136.
4. American Cancer Society Breast Cancer Facts and Figures 2008 available online at <http://www.cancer.org/Research/CancerFactsFigures/index>
5. Race, socioeconomic status, and breast cancer treatment and survival. Bradley CJ; Given CW; Roberts C *J Natl Cancer Inst* 2002 Apr 3;94(7):490-6
6. American Cancer Society Breast Cancer Facts and Figures 2008 available online at <http://www.cancer.org/Research/CancerFactsFigures/index>

7. Race, breast cancer subtypes, and survival in the Carolina Breast Cancer Study. AU Carey LA; Perou CM; Livasy CA; Dressler LG; Cowan D; Conway K; Karaca G; Troester MA; Tse CK; Edmiston S; Deming SL; Geradts J; Cheang MC; Nielsen TO; Moorman PG; Earp HS; Millikan RC SO JAMA. 2006 Jun 7;295(21):2492-502.
8. Berry, DA, Cronin, KA, Plevritis, SK, et al. Effect of screening and adjuvant therapy on mortality from breast cancer. N Engl J Med 2005; 353:1784.
9. Smith-Bindman, R, Miglioretti, DL, Lurie, N, et al. Does utilization of screening mammography explain racial and ethnic differences in breast cancer?. Ann Intern Med 2006; 144:541.
10. Sturgeon, SR, Schairer, C, Gail, M, et al. Geographic variation in mortality from breast cancer among white women in the United States. J Natl Cancer Inst 1995; 87:1846.
11. Moss SM, Cuckle H, Evans A, et al.: Effect of mammographic screening from age 40 years on breast cancer mortality at 10 years' follow-up: a randomised controlled trial. Lancet 368 (9552): 2053-60, 2006.
12. American Academy of Family Physicians. A-E: recommendations for clinical preventive services. Leawood, Kan: American Academy of Family Physicians; 2010. Available at: <http://www.aafp.org/online/en/home/clinical/exam/a-e.html>
13. Diagnostic performance of digital versus film mammography for breast-cancer screening. Pisano ED; Gatsonis C; Hendrick E; Yaffe M; Baum JK; Acharyya S; Conant EF; Fajardo LL; Bassett L; D'Orsi C; Jong R; Rebner M N Engl J Med 2005 Oct 27;353(17):1773-83. Epub 2005 Sep 16.
14. Tailored supplemental screening for breast cancer: what now and what next? AU Berg WA SO AJR Am J Roentgenol. 2009 Feb;192(2):390-9
15. Bobo, JK, Lee, NC, Thames, SF. Findings from 752 081 clinical breast examinations reported to a national screening program from 1995 through 1998. J Natl Cancer Inst 2000; 92:971.
16. Breast self-examination in relation to the occurrence of advanced breast cancer. AU Newcomb PA; Weiss NS; Storer BE; Scholes D; Young BE; Voigt LF SO J Natl Cancer Inst 1991 Feb 20;83(4):260-5.
17. Saslow D, Boetes C, Burke W et al. American Cancer Society Guidelines for Breast Screening with MRI as an Adjunct to Mammography. *CA—A Cancer Journal for Clinicians*. 2007;57:75-89.
18. Alfonso, Nelia; Women at High Risk for Breast Cancer—What the Primary Care Provider Needs to Know *The Journal of the American Board of Family Medicine* 22 (1): 43-50 (2009) <http://jabfm.org/cgi/content/full/22/1/43>
19. Smith, RA, Cokkinides, V, Brawley, OW. Cancer screening in the United States, 2009: a review of current American Cancer Society guidelines and issues in cancer screening. CA Cancer J Clin 2009; 59:27.
20. www.acr.org/SecondaryMainMenuCategories/quality_safety/guidelines/breast/Screening_Diagnostic.aspx
21. <http://www.ama-assn.org/ama/pub/about-ama.page?>
22. www.cancer.gov/cancertopics/pdq/screening/breast/HealthProfessional/page2
23. American College of Obstetricians and Gynecologists. Primary and preventive care: Periodic assessments. ACOG Committee Opinion 246. Washington, DC: ACOG, 2000.

24. Bevers, TB, Anderson, BO, Bonaccio, E, et al. NCCN Clinical Practice Guidelines in Oncology: Breast Cancer Screening and Diagnosis. *J Natl Compr Canc Netw* 2009; 7:1060.
25. Periodic Health Examinations: Summary of AAFP Policy Recommendations & Age Charts. (<http://www.aafp.org/online/en/home/clinical/exam/breastcancer.html>) (Accessed 2009).
26. Nelson, HD, Tyne, K, Naik, A, et al. Screening for Breast Cancer: An Update for the U.S. Preventive Services Task Force. *Ann Intern Med* 2009; 151:727
27. Swan J, Breen N, Coates RJ, Rimer BK, Lee NC. Progress in cancer screening practices in the United States: results from the 2000 National Health Interview Survey. *Cancer*. 2003 Mar 15;97(6):1528-1540
28. HRSA Program - Discontinued
29. Taplin S et al, *Medical Care*, V46(9) supplement1:S74-S83
30. AIM SMART Worksheet - <http://www.mdanderson.org/education-and-research/resources-for-professionals/clinical-tools-and-resources/clinical-safety-and-effectiveness-educational-program/pdca/smart-worksheet.doc>
31. <http://mchb.hrsa.gov/whusa10/index.html> - the rates from the 2009 State of Health Care report.
32. Adapted from pre-work manual used in HRSA sponsored Health Disparities Collaborative www.healthdisparities.net
33. NQC "A Guide to Consumer Involvement"
<http://nationalqualitycenter.org/index.cfm/6142/13260>
34. Timmermans S, Mauck A (2005). "The promises and pitfalls of evidence-based medicine". *Health Aff (Millwood)* 24 (1): 18–28. doi:10.1377/hlthaff.24.1.18. PMID 15647212.
35. American Cancer Society Guidelines for Early Breast Cancer Detection, 2003
36. Institute of Medicine. *Envisioning the National Healthcare Quality Report*. 2000. Washington, DC, National Academy of Sciences.
37. Trends in Cervical and Breast Cancer Screening Practices Among Women in Rural and Urban Areas of the United States
38. Adapted from Chronic Care Model...
39. Langley G., Nolan K., Nolan T., Norman C., Provost L. *The Improvement Guide: A Practical Approach to Enhancing Organizational Performance*. San Francisco. Jossey-Bass, 1996.

Additional Resources

1. Mandelblatt, JS, Cronin, KA, Bailey, S, et al. Effects of Mammography Screening Under Different Screening Schedules: Model Estimates of Potential Benefits and Harms. *Ann Intern Med* 2009; 151:738. Good discussion of risks and benefits
2. <http://www.ahrq.gov/clinic/prevenix.htm>
3. <http://www.ahrq.gov/clinic/ppipix.htm#tools>

4. Saslow D, Hannan J, Osuch J, et al. Clinical breast examination: practical recommendations for optimizing performance and reporting. *CA Cancer J Clin.* 2004;54:327-344. [PMID: 15537576]
5. Barton MB, Harris R, Fletcher SW. The rational clinical examination. Does this patient have breast cancer? The screening clinical breast examination: should it be done? How? *JAMA.* 1999;282:1270-1280. [PMID: 10517431]
6. Baron RC, Rimer BK, Breslow RA, et al; Task Force on Community Preventive Services. Client-directed interventions to increase community demand for breast, cervical, and colorectal cancer screening a systematic review. *Am J Prev Med.* 2008;35:S26-S66.
7. U.S. Preventive Services Task Force. Screening for breast cancer: recommendations and rationale. *Ann Intern Med.* 2002;137:344-346. [PMID: 12204019]
8. Nelson HD, Tyne K, Naik A, Bougatsos C, Chan BK, Humphrey L. Screening for breast cancer: an update for the U.S. Preventive Services Task Force. *Ann Intern Med.* 2009;151:727-737.
9. American Cancer Society. How many women get breast cancer? Overview: breast cancer. Atlanta, Ga: American Cancer Society; 2009. Available at: <http://www.cancer.org/Cancer/BreastCancer/OverviewGuide/breast-cancer-overview-key-statistics>
10. National Cancer Institute. Surveillance Epidemiology and End Results. SEER stat fact sheets: breast cancer. Bethesda, Md: National Cancer Institute; 2009. Available at: <http://seer.cancer.gov/statfacts/html/breast.html> Accessed
11. Horner MJ, Ries LAG, Krapcho M, et al, eds. Surveillance Epidemiology and End Results. SEER cancer statistics review, 1975-2008, National Cancer Institute. Bethesda, Md: National Cancer Institute; 2009. Available at: [Seer Cancer Statistics Review 1975-2008](#)
12. Breast Cancer Surveillance Consortium. Evaluating screening performance in practice. Bethesda, Md: National Cancer Institute; 2004. Available at: <http://breastscreening.cancer.gov/espp.pdf> Accessed September 25, 2009. [PDF file, 935 KB; PDF Help]
13. Pisano ED, Gatsonis C, Hendrick E, et al; Digital Mammographic Imaging Screening Trial (DMIST) Investigators Group.
14. Diagnostic performance of digital versus film mammography for breast-cancer screening. *N Engl J Med.* 2005;353:1773-1783. [PMID: 16169887]
15. Kriege M, Brekelmans CT, Boetes C, et al; Magnetic Resonance Imaging Screening Study Group. Efficacy of MRI and mammography for breast-cancer screening in women with a familial or genetic predisposition. *N Engl J Med.* 2004;351:427-437. [PMID: 15282350]
16. Recommendation Statement From USPSTF: Screening for Breast Cancer (See www.Medscape.com)
17. Nelson HD, Tyne K, Naik A, et al. Screening for Breast Cancer: Systematic Evidence Review Update for the U.S. Preventive Services Task Force. Evidence Synthesis No. 74. Rockville, Md: Agency for Healthcare Research and Quality; 2009. AHRQ publication 10-05142-EF-1.

18. National Cancer Institute. Effect of screening on breast cancer mortality. Atlanta, Ga: National Cancer Institute; 2009. Available at: <http://www.cancer.gov/cancertopics/pdq/screening/breast/healthprofessional/page5>
19. American Cancer Society. American Cancer Society Guidelines for the Early Detection of Cancer. Atlanta, Ga: American Cancer Society; 2009. Available at: <http://www.cancer.org/Healthy/FindCancerEarly/CancerScreeningGuidelines/american-cancer-society-guidelines-for-the-early-detection-of-cancer>
40. American Medical Association. H-525.993. Mammography screening in asymptomatic women forty years and older. Chicago, Ill: American Medical Association; 2002. Available at: <http://www.ama-assn.org/ama/pub/about-ama.page?>
20. National Comprehensive Cancer Network. NCCN Clinical Practice Guidelines in Oncology™: breast cancer, v.1.2009 [Registration Required]. Fort Washington, Pa: National Comprehensive Cancer Network; 2009. Available at: http://www.nccn.org/professionals/physician_gls/f_guidelines.asp
21. American Academy of Family Physicians. A-E: recommendations for clinical preventive services. Leawood, Kan: American Academy of Family Physicians; 2009. Available at: <http://www.aafp.org/online/en/home/clinical/exam/a-e.html>
22. Qaseem A, Snow V, Sherif K, Aronson M, Weiss KB, Owens DK; Clinical Efficacy Assessment Subcommittee of the American College of Physicians. Screening mammography for women 40 to 49 years of age: a clinical practice guideline from the American College of Physicians. *Ann Intern Med.* 2007;146:511-5155.
23. Ringash J; Canadian Task Force on Preventive Health Care. Preventive health care, 2001 update: screening mammography among women aged 40-49 years at average risk of breast cancer. *CMAJ.* 2001;164:469-476.
24. (ACOG) American College of Obstetricians and Gynecologists. ACOG practice bulletin. Clinical management guidelines for obstetrician-gynecologists. Number 42, April 2003. Breast cancer screening. *Obstet Gynecol.* 2003;101:821-831. [PMID: 12685457]
25. World Health Organization. Screening for breast cancer. Geneva, Switzerland: World Health Organization, 2009. Available at: <http://www.who.int/cancer/detection/breastcancer/en/index.html>
26. <http://www.cancer.gov/cancertopics/pdq/screening/breast/Patient/page3> Patient information from the NCI regarding breast cancer screening.
27. <http://www.cancer.gov/cancertopics/pdq/screening/breast/HealthProfessional> PDQ information for health professionals provides peer reviewed ongoing updates for topics regarding cancer for health professionals that is updated on an ongoing basis.
28. [Cancer Collaborative Toolkit – Sept 2008](#)