Breast Pathway Vision Report

September 2020

Saskatchewan Health Authority

Saskatchewan Cancer Agency

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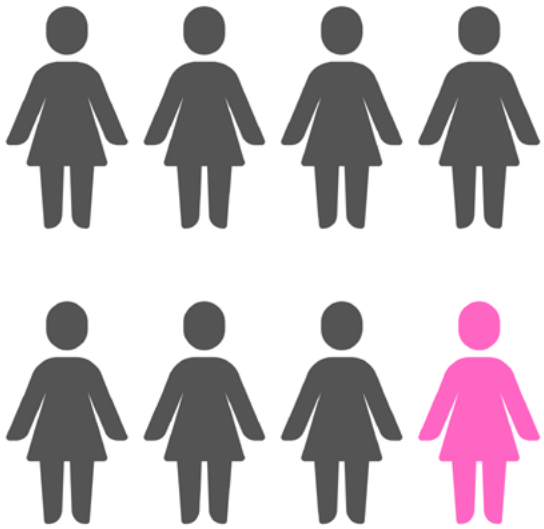
Purpose of the Vision Report:

The Breast Pathway Vision Report was developed by the Saskatchewan Cancer Agency and the Saskatchewan Health Authority in collaboration with several stakeholders. The Report is intended to be a guide to developing more effective programming to help ensure all Saskatchewan women receive more equitable access to breast health services that are timely, high quality, efficient, safe and client-centered.

The Breast Pathway Vision Report is not intended to, and does not, deal with the availability of breast health services for women with particular breast health characteristics. For this reason, nothing in the Report should be taken as being a comment or commitment on the services available to such women, nor should it be relied upon for that purpose.



One in eight women will develop breast cancer

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1 Acknowledgements and Forward

This report presents the breast pathway vision of the breast cancer care continuum from prevention to diagnostic follow-up.

Development of the breast pathway vision has been possible with the contribution and participation of patients, representatives from the Indigenous community, Saskatchewan Health Authority, Saskatchewan Cancer Agency, Ministry of Health, eHealth Saskatchewan, community radiologists, Saskatchewan Medical Association, Saskatchewan Association of Nurse Practitioners and the dedication of staff who serve clients. See Appendix A for a list of participants.

The breast pathway project team is appreciative of other stakeholders, in Saskatchewan and throughout Canada, who supported this project by providing information.

Forward

Breast cancer is the most frequently diagnosed cancer among Canadian women and the second leading cause of cancer death. One in eight women in Saskatchewan will develop breast cancer in their lifetime. One of the highest risk factors for breast cancer is age. More than 80 percent of breast cancer is diagnosed in women over the age of 50. Annual mammography screening beginning at age 40 has the largest mortality reduction benefit in terms of life years gained.[157]

Saskatchewan's Screening Program for Breast Cancer has provided services to women throughout the province since 1990. Saskatchewan Health Authority and community radiology provide diagnostic and assessment services. As Saskatchewan's population continues to grow and evolve, it is important that these services remain person-centered, high quality, efficient, accessible and timely.

The Breast Pathway Project started as a Saskatchewan Cancer Agency strategic initiative to support the strategic goal to maximize participation and ensure appropriate follow-up in screening programs in order to improve early diagnosis. Two issues identified were that the breast cancer screening participation rate of 39 percent is below the national target of 70 percent, and that Saskatchewan women receive different services depending on the facility she attends.

Early in the project, it was evident the breast pathway expanded beyond the Saskatchewan Cancer Agency. In May 2018, a partnership was formed with the Saskatchewan Health Authority. The primary objective of the Breast Pathway Project is to review breast health awareness, breast cancer detection and diagnostic services to ensure the current and future needs of Saskatchewan women are being met.

The vision for the Breast Pathway Project is rooted in the *Patient First Review*, which calls for changes to how patients experience the health system, how health services are delivered, and how the system is administered.[154] "Saskatchewan patients deserve health care characterized by quality standards and leading clinical practices."[154]

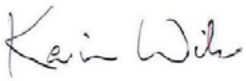
The breast pathway vision includes analysis and recommendations which align with primary objectives, guiding principles and assumptions. (See Appendix B). There are seven themes:

- education and promotion
- client referral
- centralized booking
- quality assurance
- mammography delivery
- navigation
- diagnostic follow-up

Recommendations and deliverables (see Appendix J) are grouped and rolled up to the following:

1. Transition the delivery of the screening mammography exam from the Saskatchewan Cancer Agency to the Saskatchewan Health Authority.
2. Improve the delivery of screening and diagnostic mammography by standardizing consistent processes and technology tools across Saskatchewan.
3. Centralize the booking of mammography appointments to effectively manage test delivery using a consistent process.
4. Update the breast cancer screening program to serve a wider range of women.
5. Implement standard measures for quality and processes to support continuous improvement.
6. Update educational and promotional programs to reflect changes and increase the participation of breast cancer screening.

Dr. Paul Babyn
Saskatchewan Health Authority



Kevin Wilson
Saskatchewan Cancer Agency

2 Introduction

Breast cancer is the most frequently diagnosed cancer among Canadian women and the second leading cause of cancer death. One in eight women in Saskatchewan will develop breast cancer in their lifetime. Mammography is the most widely available, cost effective, quickest modality for the detection of breast cancer, is highly accurate, and is the only modality proven to reduce mortality from breast cancer.

In Saskatchewan, breast screening is provided by the Saskatchewan Cancer Agency clinics and mobile bus, mid-sized hospitals in the Saskatchewan Health Authority, and community radiology centres. Women due for screening are encouraged to book their mammogram through the Screening Program for Breast Cancer. However, at times the healthcare provider may refer the client to a community radiology centre.

The Breast Pathway Project started as a Saskatchewan Cancer Agency strategic initiative to support the strategic goal to maximize participation and ensure appropriate follow-up in screening programs in order to improve early diagnosis. Two issues identified were that the breast cancer screening participation rate of 39 percent is below the national target of 70 percent, and that Saskatchewan women receive different services depending on the facility she attends.

Early in the project, it was evident the breast pathway expanded beyond the Saskatchewan Cancer Agency. In May 2018, a partnership between the Saskatchewan Cancer Agency and the Saskatchewan Health Authority formed to ensure all Saskatchewan women receive equitable access to person-centered, high quality, safe breast screening and follow-up care.

On October 29, 2018, representatives from Saskatchewan Cancer Agency, Saskatchewan Health Authority, Ministry of Health, eHealth Saskatchewan, community radiologists and patients gathered to attend a breast pathway visioning day. The full-day session provided stakeholders involved in Saskatchewan's breast screening and follow-up care with the opportunity to share knowledge about current processes and gather ideas for improvements. It was an informative and productive day, and a great way to ensure all stakeholders were all on the same page and ready to move forward with improving the breast pathway for women in Saskatchewan. Figure one is the pathway for the breast cancer care continuum.

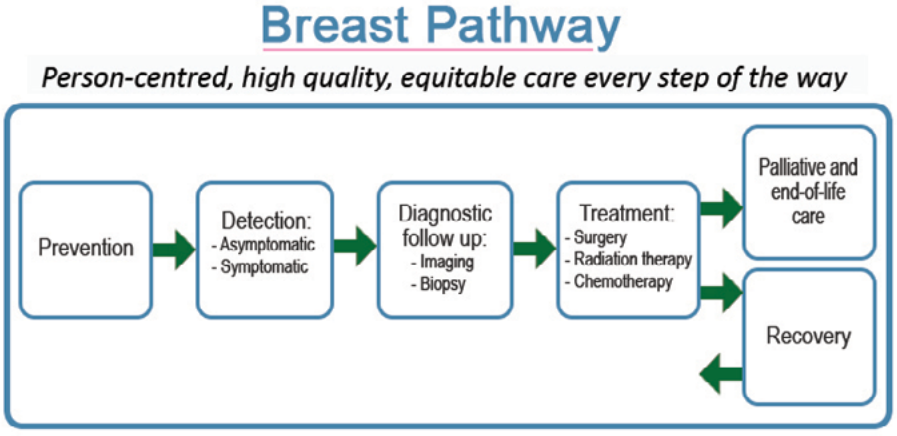


Figure 1. Pathway for the Breast Cancer Care Continuum

On April 15, 2019, a second workshop occurred. The design day continued to address the issue that not all women in Saskatchewan receive equitable access to services that are person-centered, high quality, timely, efficient, and safe. This collaborative, engaging day enabled stakeholders to participate and work together with a focus on achieving a common goal of improving the breast pathway for women in Saskatchewan. Participants included patients, representatives from the Indigenous community, Saskatchewan Cancer Agency, Saskatchewan Health Authority, Ministry of Health, eHealth Saskatchewan, community radiologists, Saskatchewan Medical Association and Saskatchewan Association of Nurse Practitioners.

After the design day, work continued to analyze the pathway, clarify processes, identify constraints and benefits and weigh potential impacts. Project governance was established with a leadership team and steering committee to solidify the vision and determine a strategic direction. The breast pathway analysis and vision align with primary objectives, guiding principles and assumptions agreed to by the Steering Committee. (See Appendix B). Recommendations and deliverables are included with the analysis of each theme. (See Appendix J). The following is the mission statement and primary objective for the breast pathway project:

> *Saskatchewan's Screening Program for Breast Cancer has provided services to women throughout the province for over 28 years. As Saskatchewan's population continues to grow and evolve, it is important that these services remain client-centered, high quality, efficient, accessible and timely. The primary objective of the Breast Pathway Phase 1 Project is to review breast health awareness, breast cancer detection and diagnostic services to ensure that the current and future needs of Saskatchewan women are being met.*

This report presents the vision developed for the Breast Pathway Phase 1. The vision is rooted in the *Patient First Review*, which calls for changes to how patients experience the health system, how health services are delivered, and how the system is administered.[154] The *Patient First Review* states, "Saskatchewan patients deserve health care characterized by quality standards and leading clinical practices."[154]

The term client and patient may be interchanged throughout the report.

This report aligns with national, provincial and the Saskatchewan Health Authority strategies.

Patient-Centered Care

- The needs of the patient come first
- "Nothing about me, without me."
- Every patient is the only patient.
- Enter the patient's world; see the situation through the patient's eyes.

Don Berwick, MD

Former President & CEO, Institute for Healthcare Improvement

- The Canadian Partnership Against Cancer is an independent, not-for-profit organization funded by the Canadian government to facilitate action on cancer control in Canada. Canadian Partnership Against Cancer works with cancer experts, other charitable organizations, all levels of government, cancer agencies, national health organizations, cancer patients and survivors and others to implement the Canadian Strategy for Cancer Control. Strategies include diagnosing cancer faster, accurately and at an earlier stage, delivering high-quality care in a sustainable, world-class system and eliminating barriers to women getting the care they need.
- The Saskatchewan Ministry of Health's mandate is through leadership and partnership, a commitment to achieve a responsive, integrated and efficient healthy system that puts the patient first. The Ministry's strategies include ensuring seamless patient care at all points in the health system, and strengthening appropriateness of care.
- A goal of the Saskatchewan Health Authority strategic plan is to deliver connected care to the people of Saskatchewan. This involves establishing collaborative teams of health professionals, including physicians, and community partners to provide fully integrated services to meet the health needs of individuals and communities, reducing reliance on emergency and acute care services. For Diagnostic Imaging, including mammography services, the goal is specified as consistent provincial standards and tools with improved access to care and services in imaging.

3 Client Perspective

Assessing client perspectives is essential to evaluating the mammogram experience. Women view the experience and its quality from a different perspective than that of health professionals. In Saskatchewan, the Screening Program for Breast Cancer has undertaken a number of surveys over the years to elicit views on the mammogram experience. These surveys demonstrate what aspects of the mammogram experience are important and what aspects cause anxiety and distress.

In Saskatchewan, the women accessing the breast screening service are a very diverse group reflecting the growing diversity of Saskatchewan's population. The health system struggles to meet the needs of this diverse client base that uses the breast screening service.

For women living in rural or remote locations attending screening can be very difficult, as it requires coordination of travel options, additional fuel expenses, and often taking time off work. The mobile mammography bus that travels to rural locations is very appreciated by the residents in these areas, although some clients expressed the concern about the accuracy of these units and the need to follow-up in a screening centre because of poor imaging results. Many women would definitely travel to a screening location if it meant that they would have a better quality test or if follow-up tests could be done at the time of screening. Obtaining mammography is further complicated by some women's access to transportation.

As for scheduling of screening appointments, some women found it difficult to ensure that they would be available months in advance of the booked appointment. Attendance at these appointments could be difficult due to things like the variability of the weather and unforeseen circumstances. In immigrant populations there can be potential language barriers that prevent women from feeling comfortable attending screening without a translator to help navigate the screening appointment. Some jurisdictions, like Ontario, have an Indigenous Navigator[124] that provides support and advocacy for First Nations, Inuit, and Métis women. These navigators can help women communicate with the care staff, arrange language and cultural translation services, and access other cancer services if need be.

In the Canadian Agency for Drugs and Technologies in Health *Screening and Diagnostic Services for People at Risk of Breast Cancers*,[72] some women expressed confusion over the breast cancer screening guidelines, the availability of screening services, and what screening could actually do or detect.

Conflicting messages from the media make it difficult for many women to feel comfortable with their own screening behavior and decision-making. Some women, predominately from marginalized communities, indicated that they were not aware if screening services were available to them because screening centres were not located in their communities. They also indicated that more education about preventative care was

needed in places other than medical clinics as many women do not access these clinics, and are not aware that screening is for well women. One of the Saskatchewan Cancer Agency's patient representatives said one of the biggest challenges for First Nation's women is that "having a mammogram is an unknown event and the only way to make it a known event is through education." Education about breast screening needs to be more culturally aware of what First Nations and immigrant groups need to help them understand what a mammogram is and why it is important to their health.

Many women expressed that their healthcare provider influenced their decision to get screened, and trusted that if they were encouraged to get screened then they would do so. A positive relationship with one's healthcare provider encourages confidence and comfort in attendance at screening.

Women described the ways that family members, friends, or acquaintances stories would impact their own decisions to pursue screening or not. Many women talked about the strong example their own mother or grandmother was for them regarding the importance of getting screened for breast cancer.

A good portion of women expressed the discomfort they felt with the screening procedure both in terms of the physical pressing and prodding as well as who would be actually doing the procedure. It was particularly important for women to receive care from other women that were attentive to their concerns for modesty and respect.

In summary, the satisfaction surveys yielded five quality factors women feel impact their experience when undergoing the mammogram procedure. These are:

1. Respect for client-centered values, preferences and expressed needs. This includes
    - dignity, privacy and cultural issues.
    - shared decision-making with regard to options for testing and treatment.
2. Co-ordination and integration of care
    - services need to be coordinated throughout the journey.
    - seamless care.
    - timely results with minimal waits to decrease anxiety.
    - options for diagnostic testing at the screening facility to facilitate travel and decrease anxiety.
3. Information, communication and education on
    - clinical status, progress, prognosis.
    - possible harms of testing, treatments discussed with the client.
    - explanation of the procedure before testing and treatment.
    - the option to receive “abnormal” results by phone call or in-person from healthcare provider.
4. Physical Comfort
    - minimize the discomfort of the procedure as much as possible.
    - use the best technology to prevent repeated tests or inconclusive results.
5. Access to care
    - pay attention to how much time is spent waiting for a screening test, results, or diagnostic appointment.
    - ease of travel and minimal distance to locations with accessible parking reduces barriers.
    - efficient public transportation in larger communities also reduces barriers.

4 Vision for the Breast Pathway

Analysis for the Breast Pathway vision includes seven themes:

- education and promotion
- client referral
- centralized booking
- quality assurance
- mammography delivery
- navigation
- diagnostic follow-up

Person-centered and quality care are umbrella concepts touching each of the points in the breast pathway vision. Recommendations and deliverables are included with the analysis of each theme. (See Appendix J). Figure two displays the seven themes analyzed for the future state of the breast pathway.

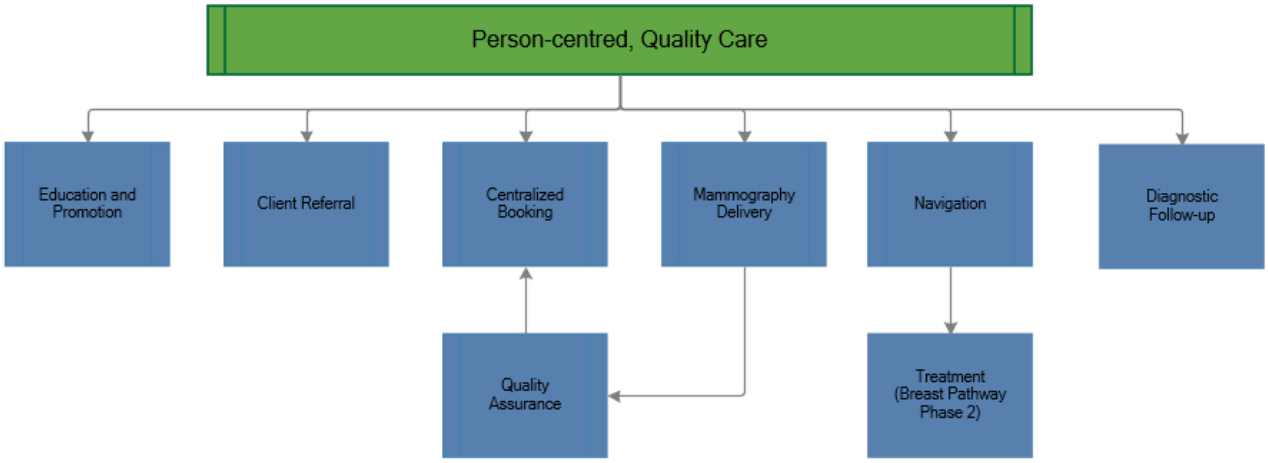


Figure 2. Themes for Future State of the Breast Pathway

4.1 Education and Promotion

Breast screening participation rates are a compound measure of a program's ability to attract and retain the target population throughout the duration of their screening eligibility.[373] The success and effectiveness of an organized population-based screening program is achieving a participation rate of 70 percent.

In 2011, a review of Canadian data between 2004 and 2006 for women ages 50-69 of programmatic, fee-for-service mammography and self-reporting was completed.[162]

- Saskatchewan's participation for programmatic screening for 24 months was 48.3 percent.[162]
- Overall use for the combination of programmatic screening mammography and fee-for-service at 24 months was 60.9 percent.[162]
- Women self-reported receiving a mammogram during the 24 months at 63.7 percent.[162]

In Saskatchewan, the current participation rate has dropped to 39 percent. This section answers the questions "what is impacting the declining participation" and "what actions can be taken to increase participation" in the screening program?

Understanding of the barriers and potential impacts to participation is important to help answer the questions. Barriers to access for different populations is included in the client referral section.

A number of themes emerged from the client perspective section, the Visioning and Design days, as well as the literature search. These include:

- Women may be confused by the conflicting information available.
- A supportive, informed, engaged healthcare provider is an important factor for participation.
- Awareness of the program is not as wide spread as desired which is suboptimal.
- Information, education and promotion create awareness and encourage participation.

Background

A significant proportion of the target population needs to routinely participate in screening to reduce mortality rate from breast cancer and improve outcomes.[2,38,108] Participation is defined as the number of eligible women who have had a screening mammogram within a two-year period. [108] Retention rate is defined as the

percentage of screen eligible women who have had a subsequent breast screening mammogram.[108] The national participation target rate for Canada is set at 70 percent, and 90 percent for the retention rate.[108] Saskatchewan's Screening Program for Breast Cancer participation rate is 39 percent and the retention rate is 71.9 percent.[313]

Figure three displays the change in Saskatchewan's Screening Program for Breast Cancer participation rate from 1990-2015.

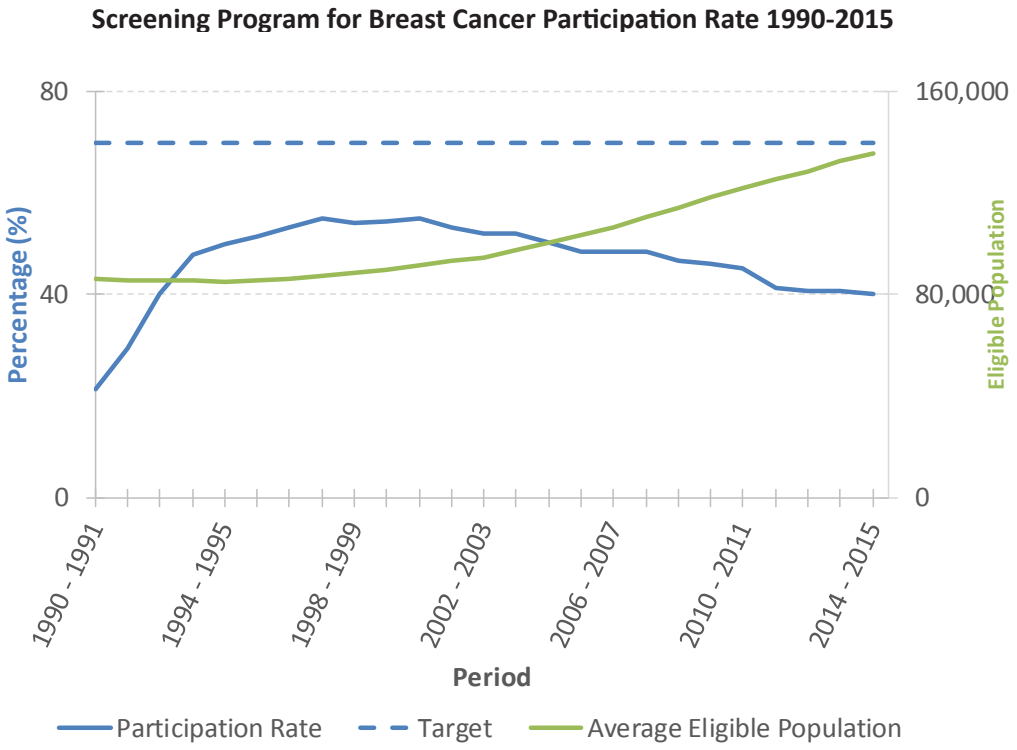


Figure 3. Participation Rate for Screening Program for Breast Cancer

An effective engagement plan helps to ensure appropriate levels of participation and retention. The plan should include strategies for accessible screening and capacity to fulfill screening and necessary follow-up, encouraging women's informed participation including personal invitation, engaging the community through information programs, involvement of healthcare providers and strategies targeting groups of women with lower participation rates.[108]

The Canadian Partnership Against Cancer has identified determinants for the promotion and access of a screening program. More information regarding these can be found in *Quality Determinants of Breast Cancer Screening with Mammography in Canada*.[108] The categories of determinants are:

- Promotion strategies to build awareness for individual women, the community, and program promotion aimed at health professionals.
- Educating the healthcare provider about mammography screening focus.
- Enabling informed decisions.
- Capacity.
- Client experience and satisfaction.

Many factors influence informed participation and should be considered when inviting women for screening, planning outreach initiatives, determining where a mobile unit will be set up, and developing messages.[108]

Factors women report as influencers to participate in screening include:

- A positive, trusting relationship with their healthcare provider who encourages them would influence a client to be screened.[72]
- Family members, friends, or acquaintances stories affect decisions to pursue screening or not.[72]
- The strong example their own mother or grandmother was for them regarding the importance of getting screened for breast cancer.[72]
- Factors that may influence participation include past and present behaviors, personal attributes of the person, such as age, and socioeconomic status.[72]

A recent report, based on the 2008 Canadian Community Health Survey,[189] states that the most common reason for women not having a mammogram in the past two years was that they did not think it was necessary.[108] Barriers to participation are covered in the client referral section. Some examples are: [72,108]

- Client experience:
  - Inequities in access and availability to cancer services.
  - Discriminatory treatment and may not feel culturally safe.
  - Fear of pain and embarrassment, lack of trust, and language barriers.
- Awareness and education:
  - Lack of awareness and knowledge along with conflicting information of the benefits of participation in a screening program, understanding how the program pertains to them, the recommended screening interval, and the misconception that a referral from a physician was necessary.
  - Lack of physician recommendation and not having a regular healthcare provider.
  - Not aware if screening services were available to them because screening centres were not located in their communities.
  - Saskatchewan Cancer Agency's First Nations patient representative said one of the biggest challenges for her people is that "having a mammogram is an unknown event and the only way to make it a known event is through education."
  - Conflicting messages from the media may affect their decision-making.
- The current Screening Program for Breast Cancer eligibility guidelines have been a barrier to some women participating. These guidelines require updating for certain populations as discussed in sections client referral and expanding the age of breast screening.

Women are saying they want more education in an easy-to-understand format, available in a variety of languages, and preventive care information to increase awareness that screening is for well people.[72,108]

All Canadian breast screening programs include educational and promotional components to encourage informed participation in screening among the target population. Some key highlights from the Canadian Partnership Against Cancer *Breast Cancer Screening in Canada: Environmental Scan* are:[98]

- In most jurisdictions, breast-screening programs accept physician and self-referral.
- Participants are also recruited into provincial and territorial breast screening programs using a variety of strategies:
  - Letters of invitation is a recruitment strategy in six provinces.
  - Inviting women to return at regular intervals with recall letters or postcards.
  - Other recruitment strategies include advertising, referrals from nurse practitioners, phone calls and recommendations from healthcare providers.
- Seven Canadian jurisdictions have implemented strategies to connect with First Nations, Métis and Inuit. Identified strategies are in the *Environmental Scan Table 14*.[98]

- Strategies to help address participation in underserved populations focus primarily on individuals in rural communities, new immigrants and low-income individuals. These strategies are in the *Environmental Scan* Table 15.[98]
- Seven provinces have implemented strategies to help improve screening participants' experience. These strategies are in the *Environmental Scan* Table 16[98] and primarily include the use of nurse navigators.

British Columbia's Breast Screening Program[38] uses a media campaign to recruit participants. Additional ongoing promotion and education activities include:[38]

- Production of new promotional tools, such as brochures, posters, marketing giveaways, bookmarks and postcards that communicate the benefits of mammography.
- Working with ethnic and First Nations groups to develop customized materials and culturally sensitive approaches to increase understanding and interest in screening.
- Regular media advertisements to promote the mobile mammography service.
- A "@BCCancer" Twitter account that promotes relevant information about cancer screening including upcoming mobile visits in communities around the province.
- A Facebook page, @BCCancerScreening, promotes breast screening, including upcoming mobile visits, an open platform for information sharing and video promotions.
- A website, www.bccancer.bc.ca/screening/breast, to support informed decision for screening.
- Regular presence at health fairs and events throughout the province by the British Columbia Cancer Prevention group.
- A client satisfaction survey, who are randomly selected from across the province, is sent to 1,000 participants each month.
- In 2020, the British Columbia Cancer Agency and the University of British Columbia conducted a province wide needs assessment to address the potential gaps in cancer screening practices.[56] The assessment incorporated a number of recommendations, including the family physicians believed education is a high priority, and welcome this training.[56]

Cancer Care Manitoba[114] focuses much of their education on prevention by using the study, *The Canadian Population Attributable Risk of Cancer*, as a resource for planning breast cancer education. This study estimates the number and percentage of cancer cases in Canada due to modifiable lifestyle, environmental risk factors and infectious agent risk factors. It investigates how changes to these risk factors through prevention could affect the number of cancer cases in the future.[66]

Provincial mammography screening programs do not offer or advise women to seek counseling prior to entering their programs. Women receive an invitation to enroll in the screening program, and ordering subsequent mammograms once registered is usually automatic. This reduces opportunities for women to revisit an initial decision to start screening. For women who discuss screening with their healthcare provider, current inconsistent recommendations on the harms and benefits of screening create uncertainty about what information to discuss.[313]

Breast screening programs across Canada create and distribute provincial or territorial educational materials in a variety of manners. These can be posters, pamphlets, guidelines, and other educational materials distributed in ways to reach as many women as possible. Social media is increasingly used within screening programs.

Each breast screening program has a website where relevant breast screening information is available for both the public and healthcare professional:

- Several sites have videos and visuals to help learn about breast screening.
  - Cancer Care Manitoba BreastCheck:[114]

- Visuals showing breast abnormalities to raise women's awareness and encourage follow-up with their healthcare provider. This is available as a bookmark and used as a promotional item.
- Visuals to aid explanation of follow-up tests that may be required after an abnormal screening mammogram.
- Videos include "What to expect at a mammogram" and "Should I get checked?"

- British Columbia Breast Cancer Screening has online videos available in English and other languages prevalent in British Columbia communities. One video explains compression and why it is needed.[41]
- Nova Scotia Breast Screening Program website combines diagnostic and screening criteria and provides wait time information to assist with selecting an appointment.[270]
- Some sites have information to help both the client and their healthcare provider with informed decision making including:
  - Information on the harms and benefits of breast screening.
  - Decision aids and risk factor guidelines.
  - Talking points and discussion guidelines for the healthcare provider.

4.1.1 Education

Education for breast health includes the client, community and healthcare providers.

4.1.1.1 Client and Community

Efforts to increase public awareness and reduce stigma about breast cancer can result in more women who have breast cancer symptoms or breast concerns seeking prompt and reliable care. [280] Breast cancer survivors or women undergoing breast cancer treatments can provide insight into effective messaging and help identify barriers to breast cancer early detection.[72]

Breast health awareness efforts include teaching:

- Early detection and follow-up provides for the best outcome. The majority of women treated early for breast cancer will recover after treatment to live healthy and productive lives.
- Breast cancer symptoms, such as palpable lumps or asymmetric thickening, skin changes, nipple changes, especially those that worsen over time, should have timely medical evaluation.[280]
- Risk factors can be lifestyle-related, including the use of birth control pills, hormone therapy after menopause, having children, drinking alcohol, being overweight or obese, and not being physically active. "Women need to become familiar with all of the risk factors. For those they can control, they need to make smart lifestyle decisions that can lower the risk," said Tuite.[185]
- The risk of age-related breast cancer.
- Most women who get breast cancer have no known risk factors and no history of the disease in their families.[141]

4.1.1.2 Healthcare Providers

The U.S. Preventive Services Task Force[362] created controversy when it released updated recommendations on mammogram screening, advocating biennial screening for women 50-74 and downgrading the importance of screening for women in their 40's. Numerous professional societies spoke out against these recommendations saying reduced screening would result in many more breast cancer deaths. The American Cancer Society[12] updated its screening guidelines in 2015.[368]

With the volumes of information on the internet, informed women are playing a more active role in their own health care. This easy access can be a double-edged sword as conflicting ideas can emerge. Healthcare providers need to help separate fact from speculation and provide guidance.[376]

A public health review reported that many factors other than clinical guidelines influence physicians in their decision-making with clients, including their colleague's recommendations. Physicians may at times be as influenced by anecdotal, clinical, and personal experience as they are by evidence generated from conventional sources such as systematic reviews. [337]

As new information emerges about mammogram screening frequency, breast density and alternate screening modalities, healthcare providers need to be prepared to help women navigate these important topics. [376]

Opportunistic screening may be provided in health care settings outside of screening programs. From a public health perspective, organized screening is superior to opportunistic screening, because it has greater potential to reduce cancer mortality rates and it decreases overall cost of individual screening.[280]

Another benefit to the health care system is screening mammograms through an organized screening program cost less than through a diagnostic facility.

4.1.2 Promotion and Awareness Strategies

Breast screening awareness campaigns[4,49,185,256,345] encourage participation in screening and provide information on the signs and symptoms of breast cancer to assist with early detection while it is most treatable. The following are examples of campaigns: [38,215]

4.1.2.1 Breast Cancer Awareness Month

October is designated as Breast Cancer Awareness Month. Pink, the breast cancer awareness color symbol, is everywhere from bumper stickers, pins, football players' uniforms and other.[49] Promotion campaigns build awareness through the publicizing of mammograms, sponsoring breast cancer organization walks, provision of information and other creative ideas.[185]

British Columbia Breast Cancer Screening partnered with Corus Entertainment and Global BC through the campaign "Mammolanche – A Movement for Mammograms" to increase screening awareness and mammography appointments across British Columbia. The campaign included a commercial on Global, public service announcements featuring Global BC personalities, and stories on Facebook and Twitter. The campaign was successful in helping the Breast Screening Program meet its goal of achieving 48,000 screening appointments in October and November 2018.[38]

4.1.2.2 Storytelling and Sharing Personal Experiences

To help others understand the importance of breast screening and raise awareness, one strategy is to share stories to use as a conversation starter. Storytelling can help reduce stigma by showing the priority audience women who are 'just like them.' [345]

An example of storytelling is from Coppafeel, a United Kingdom breast cancer charity. The 'Grab Life by the Boobs' campaign was launched as part of their ongoing efforts to encourage young people to check their breasts regularly.[152] Although breast self-exam is controversial, this type of video still provides awareness of breast health. This campaign encouraged young people affected by breast cancer to share their stories on the website, Coppafeel.[152]

4.1.2.3 Encouraging Loved Ones

Getting loved ones to realize the importance of routine breast cancer screening is an important step in raising breast cancer awareness. Casual conversations, referring them to a website or brochures providing detailed screening information are good ways to encourage others.[345]

An example is from Know Your Lemons Foundation,[231] an infographic created in 2017 by Corrine Beaumont. After losing loved ones to breast cancer, she produced easy-to-read graphics to help women recognize common

symptoms. Beaumont altered images of lemons arranged inside an egg box to resemble common signs. Women often find their own abnormalities and this poster can encourage follow-up with their healthcare provider. The use of fruit widens the image's reach, as it can be displayed in more public places than a medically precise diagram.

4.1.2.4 Social Media Accounts

Accounts on various social media spread awareness about Breast Cancer Awareness month on Facebook, Twitter or Instagram accounts. Encourage others to do the same.[312,345]

4.1.2.5 Promotional Material

Besides wearing and showing pink as the signature color of breast cancer awareness in October, there are various other promotional products available to distribute at special events such as t-shirts, pens, blankets, and pins containing the pink ribbon symbol.[345]

4.1.2.6 Leveraging Partnerships

It is possible to maximize reach and mobilize support by strengthening existing partnerships and building new relationships. For example, collaboration with key opinion leaders or celebrities to act as 'goodwill Ambassadors' for health communication initiatives.[307]

4.1.2.7 Enhancing Offline Action with Online Interaction

Offline activities can be enhanced with online components to achieve objectives. Tactics can include hashtags to promote and monitor an event and geotagging to increase visibility.[312]

Current State in Saskatchewan

Saskatchewan's Screening Program for Breast Cancer education and promotion strategies include: [313,317]

- Attendance at community events such as health fairs, tradeshows and professional conferences to promote the screening program. Information shared can be through presentations and displays including brochures, handouts and promotional items.
- Meeting with healthcare providers to provide information on the screening program services, benefits for clients and health care practices. The two main groups are the Saskatchewan International Physicians Practice Association[361] and the medical residents.
- Providing English information and educational resources regarding screening tests and cancer are available. These include information sheets, posters and brochures. Some are available online.
- The Saskatchewan Cancer Agency website with links to the Screening Program for Breast Cancer.[317] Screening guidelines and information are available in English. A video showing a breast cancer patient is included.
- Advertising in the form of radio, television and print, including a comprehensive advertising campaign in October.
- Raising awareness, and funds for Touchdown for Dreams, at the "Pink Game" in October through a partnership with the Saskatchewan Roughriders and Cameco.
- Conducting client surveys, however not on a regular basis. Responses indicated general satisfaction with the program. Areas identified for improvement related to communication including explaining the possibility of receiving a recall for additional imaging, desire for more details on possible discomfort and pain during screening.
- Breast cancer awareness in October has included draws for women obtaining a screening mammogram that month, edible treats and sometimes flowers at the screening clinics.
- A navigation program is available for women who have an abnormal screening mammogram.

- A mammography mobile bus[319] visits communities for those communities where clients do not have easy access to a larger mammogram facility. Advertising of the upcoming mobile bus visit begins approximately 8 weeks prior to the arrival in the community.
- Education and awareness through community visits on the Northern Health Bus.

The Provincial Auditor is an independent Officer of the Legislative Assembly in Saskatchewan for the Government of Saskatcewan.[289] The external auditors provide assurance and advice to the Legislative Assembly and the public on the management, governance, and effective use of public resources. [289] In 2016, the Provincial Auditor completed a performance audit to assess the effectiveness of the Saskatchewan Cancer Agency's processes to deliver its systematic population-based screening program for breast cancer. The Provincial Auditor recommended evaluating the success of its Screening Program for Breast Cancer promotional activities, and developing a strategy to engage physicians to increase awareness of the screening program.

Considerations

- The Canadian Partnership Against Cancer identified the following key issues for future attention:[108]
    1. Informed decision-making to ensure women who participate in screening are properly informed. Screening programs should consider more attention to the potential harms in the formulation of screening recommendations. Better ways should be developed to inform women of the risks and benefits of screening and ensure that the process has provided them with the necessary information in an understandable format. Participation targets are primarily based on the absolute number of women screened and ignore the quality of the decision made to participate.
    2. Measuring client satisfaction, which is an important quality indicator for organized screening programs. There is a current need for a more sensitive measurement tool and an alternative implementation method. The Quality Determinants Working Group is considering the development of a valid, reliable, standardized instrument to measure client satisfaction.
- It is important to develop measurements of the awareness strategies implemented to determine if the desired outcome is achieved or if improvements are required.
- The recommended accountable for Saskatchewan's delivery of mammography services is the

Saskatchewan Health Authority. As screening and diagnostic mammography are part of these services, it is important for the Health Authority and the Cancer Agency to collaborate to ensure consistent clear communication for the public and healthcare providers regarding education and promotion.

Figure four represents the future state for education and promotion in the breast pathway.

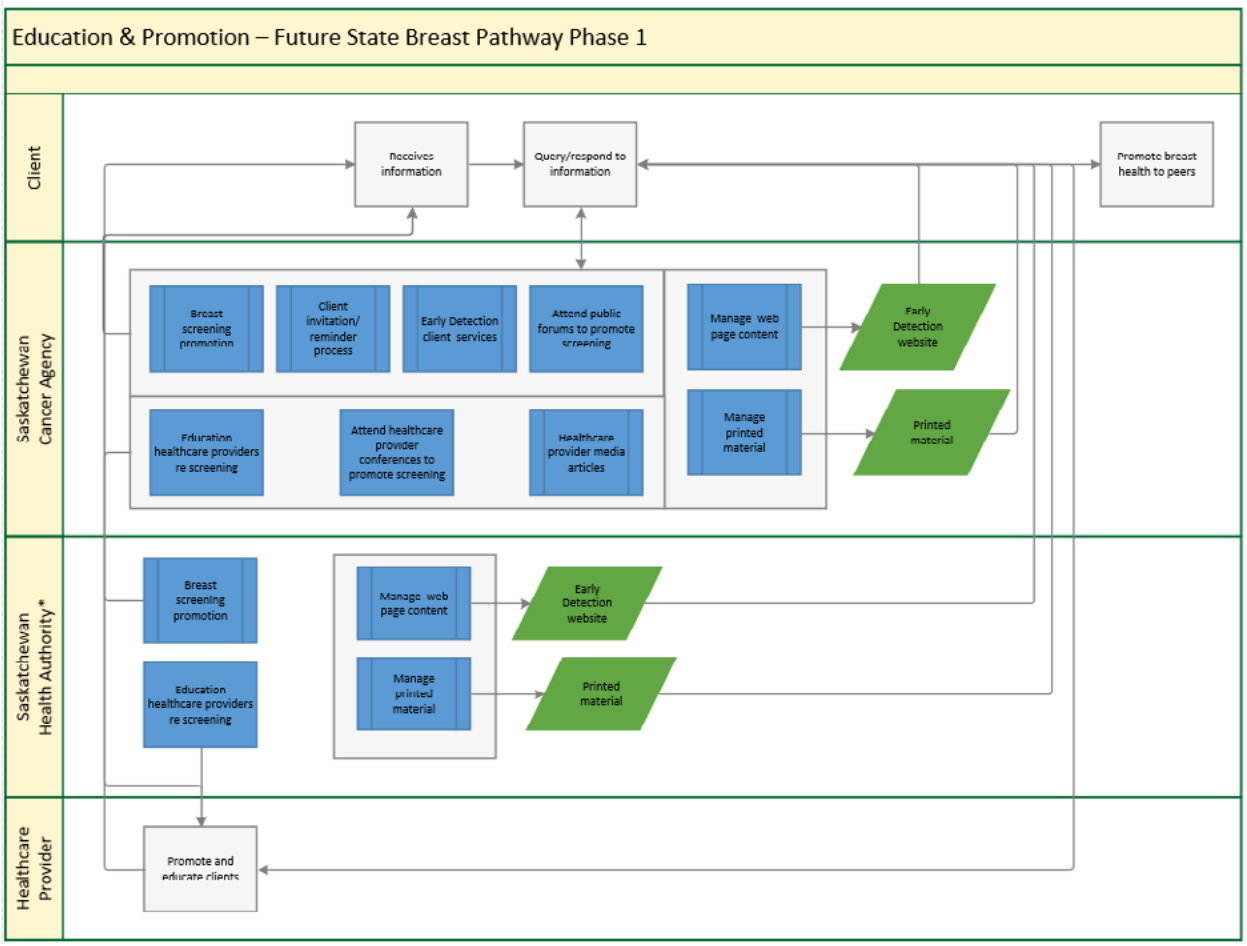


Figure 4. Future State – Education and Promotion for Breast Pathway Phase 1 Continuum

*SHA includes all facilities who offer mammography services, including mid-sized hospitals & agreements with community providers.

Recommendations

Upon reviewing the above information and analysis, this section recommends the following:

- Develop an engagement plan regarding screening that includes education, promotion, and communication to inform women about screening.
  - Enhance and distribute educational resources for the public and healthcare providers.
  - Enhance promotion of breast screening services.
  - Enhance communication and client experience.

4.2 Client Referral

The client referral process supports entry into the breast pathway when the individual is eligible or requires the service. Currently, clients are eligible for the Screening Program for Breast Cancer by letter invitation starting at

age 50. Screening may take place outside of an organized program when a healthcare provider refers someone to a diagnostic centre while they meet the criteria for a screening mammogram.[98,99] This is called opportunistic screening which influences the participation rate, that is currently 39 percent in Saskatchewan. A screening program operates most efficiency when there is a 70 percent participation rate.[99] Opportunistic screening may result in delays of follow-up appointments.

Self-referral is the ability for potential clients to enter the breast pathway themselves and directly access centralized booking. This may be in response to a Screening Program for Breast Cancer invitation or to breast cancer awareness gained through education and promotion efforts. In the simplest form, self-referral would be available with a toll-free number, that would be very similar to individuals responding to the invitation letter today. However, many clients exhibit a preference for other communication methods, such as a website, text or email.

Regardless of the method of contact, the potential client would be required to answer a series of questions designed to confirm screening program eligibility. Over the phone, centralized booking staff would walk the caller through the questions via a prepared script. If the request was via a web interface, the questions would be presented electronically.

The current Screening Program for Breast Cancer eligibility guidelines require updating to include women who may require additional considerations. There are populations who may not participate for a variety of reasons, including but not limited to, cultural safety, lack of awareness, and understanding of the screening program and the services it offers.[102]

Background

Organized breast screening programs ensure there is a certain standard of care including the monitoring and evaluation of outcomes. One of the essential components of organized screening includes high enrolment and participation.[99] The Canadian Partnership Against Cancer sets the national participation target at 70 percent.[99]

Barriers impacting breast screening participation and the collection of true participation rates and outcomes include:

- Breast screening takes place inside and outside organized programs throughout Canada, with the exception of Nova Scotia, that has been successful in eliminating opportunistic screening. Opportunistic screening takes place outside of an organized program when a healthcare provider refers someone to a diagnostic centre when they meet the criteria for a screening mammogram.[98,99] Opportunistic screening impacts the collection of accurate data when participation and outcome information is not shared with screening programs.
- Inequities in access to cancer services along the cancer care continuum, from screening to end-of-life care, are linked to a variety of socioeconomic, geographic, and demographic factors. Barriers to access can be sorted into four categories:
  - availability of services,
  - financial barriers
  - non-financial barriers to presentation of health care needs
  - barriers to equitable treatment.[191]
- For a variety of reasons, some women choose not to participate or return to a screening program. For example, newcomers who are unfamiliar to prevention and screening underuse these services.[220]
- Some women reported they would like access to information about breast screening that is easy to understand and available in a variety of languages. Some women were not aware of the benefits of participation in a screening program while others do not believe the program pertains to them. Others have experienced discriminatory treatment and may not feel culturally safe.[72,96,98,99,191]

- In 2008, the Canadian Community Health Survey[189] reported the main factors associated with non-use of screening mammograms were low socio-economic status, not having a regular physician, not seeing a healthcare provider in the past year and being a smoker. Additionally, lower use is seen among First Nations women, recent immigrants and women born in Asia.[191]

The majority of Canadian organized breast cancer screening programs provide mammograms to asymptomatic women at average risk for breast cancer every two years starting at age 50 until age 74 or 75. Most jurisdictions accept women under the age of 50, screening every one to two years if they meet specific criteria, are identified as high risk or have a healthcare provider recommendation.[98,99] Examples include British Columbia Cancer Agency Physician Protocol for Screening Mammograms[35] and CancerCare Manitoba BreastCheck Screening Guidelines.[117]

Breast screening programs recruit participants using a variety of strategies. Six provinces use invitation letters. British Columbia Breast Screening Program[41] only uses media campaigns as a recruitment strategy.[98] In most jurisdictions, participants can be referred to breast cancer screening programs through a healthcare provider or self-referral.[98]

Seven provinces have implemented strategies to help address participation in underserved populations, including social media campaigns, presentations, and program material focusing on increasing awareness and education on breast cancer screening. Other strategies are geared towards healthcare providers, who in turn work directly with underserved populations.[98]

Current State in Saskatchewan

Saskatchewan's Screening Program for Breast Cancer current target population is asymptomatic women between the ages of 50-74.

- Women in the target age group are invited to participate in the screening program by an invitation letter, followed by a reminder letter if they do not schedule an appointment.
- The person calls the toll-free number to book a mammogram appointment. The receptionist asks a series of questions to ensure eligibility in the screening program. (See Appendix C).
- Women older than 75 are welcome to attend, however they are not actively recruited with an invitation or recall letter.
- Women who have not accessed the Screening Program from ages 50-69 will stop receiving an invitation letter from ages 70-74.
- Women who require a mammogram and do not meet the screening criteria are referred back to their healthcare provider to request breast imaging at a diagnostic centre.
- The program is self-referral and therefore a healthcare provider referral is not required.
- There is variation within the program whether a person with a healthcare provider referral will be accepted, referred to a diagnostic centre or referred back to the ordering healthcare provider.

Screening mammograms do occur in Saskatchewan outside of the screening program. The mammogram reports are not sent to the screening program, contributing to questioning if the October 2019 rate of 39 percent is the true participation rate.

For 2020-21, the Saskatchewan Health Research Foundation will fund Dr. Cheryl Camillo, University of Regina, in the Establishment Grant competition. Dr. Camillo's research project is *Maximizing Saskatchewan Breast Cancer Screening Program Rates through Patient-Partnered Research*. There are many possible barriers to participation, and this research will help understand and describe barriers faced by various sub-groups of Saskatchewan women.

There are clients who may require additional consideration to attend a screening facility. Additional support for these individuals and their healthcare provider may be required. These include, but are not limited to, women:

- at or above average risk for breast cancer

- with breast implants
- in underserved populations
- with lobular carcinoma in situ
- diagnosed with cancer greater than five years
- expanding the breast screening age

4.2.1 At or Above Average Risk for Breast Cancer

All women are at risk for breast cancer, but not all women have the same risk. Experts use a client's personal and family medical history, genetic tests, lifestyle and exposures, and other factors to assess risk and make recommendations for breast screening and risk management.[184] Risk assessment information and calculators are available to women and healthcare providers in various provinces and organizations to assist with the determination of risk. Examples are Alberta Health Services Screening for Life risk calculator,[8] CancerCare Manitoba health care provider Guidelines for Cancer Screening[117] and Facing Our Risk of Cancer Empowered[184] promotional pamphlet.

4.2.1.1 Screening for Women at Elevated Risk

Women at elevated risk are defined as those with a greater than average risk for developing breast cancer, but less than the highest risk group. Ten provincial and territorial breast cancer screening programs manage clients at elevated risk of developing breast cancer. Women at elevated risk generally have a screening mammogram annually starting at age 40.[98] There is variation in the criteria used to define elevated risk, including breast density.[98]

Dense breast tissue is an independent risk factor for cancer.[40] Dense breast tissue displays as white on a mammogram, as does a cancerous tissue and therefore tumors can be masked. Delayed or missed diagnosis is more likely to occur due to this masking effect.

There is currently controversy regarding the management of dense breasts. A recent study evaluated supplemental screening with MRI. Women with very dense breasts received a mammogram and an MRI. It led to fewer missed cancers but also a high percentage of false alarms.[30,310]

There is variation across Canada how screening programs report density. It may be reported as a percentage of glandular tissue, such as ≥50 percent (Alberta) or ≥75 percent, A/B/C/D or nomenclature.[98] The distribution of the population in each category varies: 10 percent of women have fatty breasts; 40 percent have scattered densities; 40 percent are heterogeneously dense and 10 percent have extremely dense breasts.

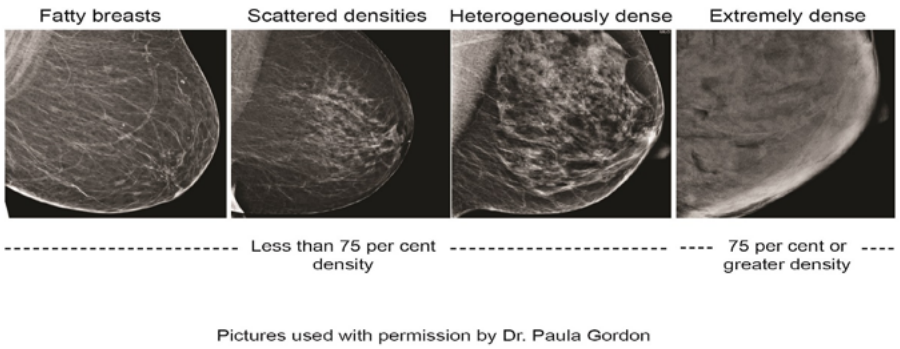


Image is from the Dense Breast Leaflet. Pictures used with permission from Dr. Paula Gordon.

Women who have extremely dense breasts have a four-six greater risk of breast cancer than the women with

fatty breasts. The majority of women are in the other two categories. When those two categories are compared regarding breast density risk, women with heterogeneously dense breasts have a one-point-two times greater breast cancer risk than those who have scattered densities. Women with extremely dense breasts have approximately two times the risk of breast cancer of women who have scattered densities.

British Columbia reports breast density to all screening program participants and provides information to facilitate discussion between the participant and their healthcare provider.[98]

Current State in Saskatchewan

In Saskatchewan, breast density can be subjective and is currently not reported in a standard format in screening and diagnostic mammograms. It can be difficult to determine between the breast density categories with the potential for exposing women to a greater lifetime dose of radiation, or not referring them for annual mammography as required. Approaches to standardizing breast density are available including supplemental software and artificial intelligence.

A radiologist may recommend annual mammography with tomosynthesis, if available, or supplemental ultrasound in conjunction with mammography. Magnetic Resonance Imaging (MRI) may be recommended, however, breast density alone is not an indication for MRI screening. The MRI waiting list is long and breast MRI is only available in two/four Saskatchewan cities. A screening MRI takes longer to complete than a mammogram and is a more expensive test.[194]

Women receiving a mammogram through the Screening Program for Breast Cancer and who are identified with breast density over 75 percent receive a normal results letter followed by a letter and an information leaflet explaining breast density. Women with dense breasts are invited to return to the Screening Program for Breast Cancer on an annual basis.[318]

4.2.1.2 Screening for Women at High Risk

Women at high risk have a greater lifetime risk of developing breast cancer or developing more aggressive breast cancers at an earlier age.[98,184,300] The definition of high risk for developing breast cancer varies across Canada. Screening programs manage high-risk participants by recommending: [98,125,126]

- Annual screening starting as early as 30 and stopping at age 69 or 74.
- Mammography, MRI and ultrasound screening.

Current State in Saskatchewan

In Saskatchewan, the healthcare provider manages women with high risk for developing breast cancer. The healthcare provider and radiologist determine when to begin, and how often to screen. Some women, especially those living in Saskatoon, may be referred to the High Risk Breast Cancer Clinic at Saskatoon City Hospital.[320,325] The Screening Program for Breast Cancer and the High Risk Breast Cancer Clinic operate independently.

4.2.2 Breast Implants

The risk for breast cancer does not change with implants.[126] Some women believe their breast implants make them ineligible for a mammogram, however implants should not prevent a person from being screened with a mammogram.[331] Even though implants do not prevent women from accessing mammography, mammograms are unable to efficiently go through the implant of silicone or saline. Women with implants require additional images to obtain better images of the front part of each breast. A 3D mammogram, tomosynthesis, will produce additional images for the radiologist to better evaluate breast tissue.[126,331]

Some women have breast implants after their mastectomy. Depending on the type of mastectomy, some women still require breast screening. These include:

- a unilateral mastectomy as a mammogram is required on the unaffected breast.
- nipple sparing mastectomy as a small amount of remaining breast tissue needs to be screened.[16]

The American Cancer Society recommends a person with breast implants participate in regular screening mammograms.[16] The Canadian Association of Radiologists *Practice Guidelines and Technical Standards for Breast Imaging and Intervention,* addresses breast implants with suspected complications to be evaluated with diagnostic imaging.[80]

The majority of screening programs within Canada do not include women with breast implants in their screening eligibility criteria.[98]

Current State in Saskatchewan

Saskatchewan's Screening Program for Breast Cancer does not offer screening for women with breast implants. Women with breast implants attend a diagnostic facility to obtain a mammogram.

4.2.3 Underserved Populations

Various groups are included in the underserved populations. These populations may not obtain screening mammograms as frequently as other populations. Underserved populations include:

- lesbian, gay, bisexual, transgender (binary or non-binary), questioning, queer, intersex, agender, asexual or two spirit (LGBTQIA2S+)
- women with disabilities
- newcomers and immigrants
- First Nations, Métis and Inuit
- geographically isolated.

The Provincial Auditor is an independent Officer of the Legislative Assembly in Saskatchewan.[289] The external auditors of the Government of Saskatchewan provide assurance and advice to the Legislative Assembly and the public on the management, governance, and effective use of public resources. [289] In 2016, the Provincial Auditor completed a performance audit to assess the effectiveness of the Saskatchewan Cancer Agency's processes to deliver its systematic population-based screening program for breast cancer. The Provincial Auditor recommended analyzing information on difficult-to-screen populations to assess whether sufficient strategies are in place to reach these individuals for screening.[287,288]

4.2.3.1 Lesbian, Gay, Bisexual, Transgender (Binary or Non-Binary), Questioning, Queer, Intersex, Agender, Asexual or Two Spirit

The LGBTQIA2S+ community reports a number of reasons they delayed or did not seek preventive care.

One was the uncertainty of the recommendation for screening guidelines citing the need for more inclusive education on breast health.[351] The community also reports facing barriers to accessing health care and have had negative experiences within health care that impact whether they get regular mammograms, leading to later stage diagnosis.[14,164,352]

4.2.3.1.1 Screening for Breast Cancer in Transgender and/or Gender-Diverse People

Taking gender-affirming hormones like estrogen for more than five years increases the risk of developing breast cancer. Screening is recommended every two years at age 50 and five to ten years of feminizing hormone use. Providers and persons should discuss risks of over-screening and complete an assessment of individual risk

factors. Risk score calculators may be unreliable for use with transgender and/or gender-diverse people.[14,93,164,352]

4.2.3.1.2 Screening for Chest Cancer in Transgender and Gender-Diverse People

Some transgender and/or gender-diverse people may not identify as having breasts and prefer the term "chest" instead. It is hard to prioritize breast cancer screening, especially if the process is at odds with their gender identity.[91,92,164]

It is important for transgender and/or gender-diverse people in the target age group to screen every two years for cancer in the chest area, even if they have had top surgery. [91,92,164] Screening guidelines are available:

- British Columbia Breast Screening Program has a policy *Breast and Chest Screening for Transgender, Two-Spirit and Gender-Diverse People*.[42]
- British Columbia Family Practice Oncology network journal provides guidelines as a resource for the healthcare provider and the community.[242,351]
- Nova Scotia Breast Screening Program has developed a clinical practice guideline for breast cancer screening for transgender people.[98]

Current State in Saskatchewan

In Saskatchewan, the Screening Program for Breast Cancer receives a weekly download from Saskatchewan's eHealth software, Person Health Registration System. It identifies persons as male or female. The Screening Program for Breast Cancer invites female ages 50-74. This process does not ensure, for instance, that a trans man with breasts or remaining breast tissue is offered screening. There are no current policies for LGBTQIA2S+ people in the Screening Program for Breast Cancer.

4.2.3.2 Women with Disabilities

Disabled women are as likely to get breast cancer as other women, yet this population tends to screen less often than women without disabilities do. Disabilities may include cognitive, physical and hearing impairment. Every person needs to have regular screening tests.[136,358]

4.2.3.2.1 Women with Cognitive Disabilities

Women with cognitive disabilities can face many barriers to accessing screening, including lack of understanding that prevents them making an informed choice whether or not to accept their invitation. Some organizations have created resources to assist women with cognitive disabilities and their caregivers. Some examples are:

- Public Health England's easy read invitation and appointment letter and easy guide to breast screening leaflet for women with learning disabilities.[294]
- Breast Cancer Care, a research and care charity in Scotland, provides a resource picture pamphlet with simple language to help women with learning difficulties explore and understand their own experiences: *Know your Breasts: A quick guide to being breast aware* [Pamphlet].[61]
- Breast Cancer Now, a merged research and care charity in Scotland between Breast Cancer Care and Breast Cancer Now, provides a webpage for supporting women with learning disabilities.[62] This includes: *What happens at a breast clinic?* [Pamphlet].[63]
- National Health Service, the publicly funded national health care system in England, provides a video '*Going for a Mammogram*'[264] and *easy care guide* [Pamphlet] for women with special needs and their care giver.[294]

4.2.3.2.2 Women with Physical Disabilities

Women with chronic disabling conditions often refrain from preventive screening. Research shows that they are less likely to participate in breast cancer screening due to multiple environmental barriers related that impede their access to screening centres:[358]

- Centres may not be designed to accommodate women with mobility issues.
- Mammography equipment may not adjust enough for some women to easily get into the right position or to sit, if needed.[358]

British Columbia Breast Cancer Screening has developed a Special Needs (Limited Mobility) policy[45] to provide staff with a process for assisting women with physical disabilities.

Current State in Saskatchewan

In Saskatchewan, the Screening Program for Breast Cancer does not have a documented policy. Clients who identify as special needs receive time slots for two appointments. If the client does not have the capacity to provide implied consent, staff ask for a substitute decision-maker, following the Saskatchewan Cancer Agency policy, *Patient Consent for Treatment or Procedure*.[316]

4.2.3.3 Newcomers and Immigrants

Immigrants underuse preventive services. Newcomers to Canada encounter barriers such as unfamiliarity with the Canadian health care system and may not understand their rights to service. This may be exacerbated by a lack of fluency in Canada's official languages, either English or French.[111] There is evidence that language may explain many differences in service utilization and health outcomes.[191]

Current State in Saskatchewan

Saskatchewan's Screening Program for Breast Cancer has a number of strategies to address breast cancer screening participation in underserved populations. The Early Detection Coordinators:

- present at events attended by underserved populations, such as Open Door Society.[305]
- introduce the screening programs to internationally trained physicians wishing to practice medicine in Saskatchewan.[361]
- provide educational presentations or promotional material at healthcare provider conferences.

4.2.3.4 First Nations, Métis and Inuit

In general, Canadian participation rates for breast cancer screening are much lower among First Nations, Métis and Inuit than non-Indigenous women. There is considerable variation in screening participation across geographic locations.[98,220] Breast screening programs have implemented a variety of strategies to connect with First Nations, Métis and Inuit.[98] The key themes are:

- engaging with First Nations, Métis and Inuit in decision making and informing approaches to culturally appropriate screening.
- reaching First Nations, Métis and Inuit through program resources.
- engaging healthcare providers working directly with First Nations, Métis and Inuit communities.

CancerCare Manitoba created the *First Nations Patient Guide*,[120] a person guide handbook. The handbook provides information about cancer, introduces the person to their health care team and helps them prepare for their first appointment.

British Columbia Breast Screening Program has taken many steps to include the indigenous community as supporters. Two new mammography mobile units included a logo with an Indigenous design. A smudging ceremony occurred before commencing service of the new unit and elders were encouraged to promote the service in their communities.[32] The mobile unit visits 40 First Nations reserves on an annual basis.[43]

Current State in Saskatchewan

At the Saskatchewan Cancer Agency, the following are practices are used:

- The Northern Health Bus[315] travels the northern part of the province providing information to groups about the importance of screening. These groups can include First Nations, new immigrants, low-income individuals and individuals in rural communities.
- The Early Detection Coordinator and Client Navigator collaborate with health care facilities to assist with making appointments for women who do not speak English and those who do not have phones or mail.
- As an organization, the Saskatchewan Cancer Agency is working to honour the Truth and Reconciliation calls to action, numbers 18-24 related to health care.[359]
- The mammography mobile bus[319] provides services closer to home for northern and rural communities. Each community is informed of the mammography mobile bus schedule.

4.2.3.5 Geographically Isolated Women

CancerCare Manitoba developed the Underserved Populations Program to assist women who may have trouble getting cancer screening or receiving cancer treatment and support. Individuals and their family members talk directly to a nurse navigator who will provide support by addressing system issues that cause barriers or delays. Barriers women may experience can include geographical, language, cultural and other barriers. [119]

Other provinces have implemented strategies to address participation in underserved populations, primarily focusing on individuals in rural communities, new immigrants and low-income individuals.[98]

Current State in Saskatchewan

Saskatchewan's Screening Program for Breast Cancer mammography mobile bus[319] provides services closer to home for geographically isolated women in northern and rural communities.[319]

4.2.4 Lobular Carcinoma In Situ

Lobular carcinoma in situ is usually an incidental finding on a biopsy for suspicious mammographic calcifications. It is a marker for possible associated carcinoma, and is indicative of increased risk of the person developing cancer in either breast. Women with lobular carcinoma in situ should be offered annual screening mammography.[64] The majority of breast screening programs across Canada include women with lobular carcinoma in situ in their screening eligibility criteria.[98]

Current State in Saskatchewan

Saskatchewan's Screening Program for Breast Cancer does not invite women with the diagnosis of lobular carcinoma in situ to the program. Healthcare providers follow these women and refer them to diagnostic imaging services. These women may not be referred for regular mammography, putting them at risk for delayed detection of breast cancer.

4.2.5 Cancer Diagnosis Greater than Five Years

Women who have a cancer diagnosis greater than five years can return to the regular screening mammography cycle every two years.

Current State in Saskatchewan

Saskatchewan's Screening Program for Breast Cancer current software is not programmable to invite women diagnosed with breast cancer greater than five years ago. These women continue to receive a diagnostic mammogram in the community. These women may not be notified they are due for a screening mammogram, putting them at risk for delayed detection of breast cancer.

4.2.6 Expanding the Breast Screening Age

One of the highest risk factors for breast cancer is age. More than 80 percent of breast cancer is diagnosed in women over the age of 50. Annual mammographic screening beginning at age 40 has the largest mortality reduction benefit in terms of life years gained. [157]

All Canadian provinces and territories offer breast screening through an organized program to women ages 50-69. Many provinces expand the age to 74. Six provinces use invitation letters as a recruitment strategy for women ages 50-74.[98] Nine provinces and territories offer screening through their organized screening program to women ages 40-49. For these provinces and territories, screening uptake for ages 40-49 is between 23 and 26 percent. There is variation whether screening is offered annually or biennially for the 40-49 age group. There is variation whether a physician referral is required.

Nova Scotia has been screening women ages 40-49 since the program started in 1991. "A conscious decision was made in 1991 to accept them into the screening program; the cost to the health care system is less and these women can be tracked with readily available outcomes. If women ages 40-49 were accommodated through physician referrals in the diagnostic sector, the diagnostic sector would become overwhelmed and the true diagnostic persons would suffer increased wait times."[268] (Annual Report, p. 69-71)

The Canadian Task Force on Preventative Health Care reports that the decision to undergo screening for women ages 40-49 is conditional on the relative value a person places on possible benefits and harms from screening. Care providers should engage women in this age category in shared decision-making when they express an interest in being screened.[113] The Canadian Task Force on Preventative Health Care recommends routine screening with mammography every two to three years for women ages 50-74 years.[113] No recommendations are made for women ages 75 and older, given the lack of data. [113]

The Canadian Association of Radiologists recommends annual screening mammography for asymptomatic women ages 40-49.[80] These guidelines follow the American College of Radiology,[18] American College of Physicians,[17] and United States Preventive Services Task Force.[362] In February 2019, the Canadian Association of Radiologists issued a statement regarding the Task Force guidelines. It stated, "From the CAR's perspective, the Task Force guidelines rely heavily on older research and lack substantial input from breast imaging experts. The Task Force ignored recent studies, such as the large observational Pan Canadian Study of Mammographic Screening. This study of 2.8 million Canadian women who participated in Canadian Screening Programs, demonstrated a 40 percent overall mortality benefit from screening (Coldman et al, JNCI 10/2014). Other current research, based on the use of newer technology, shows a similar benefit to screening, with a reduction in breast cancer mortality ranging from 40-60 percent (Tabar et al, Cancer 11/2018)."[85]

The booklet, *Information on Mammography for Women Aged 40 and Older: A Decision Aid for Breast Cancer Screening in Canada*,[291] is for women to increase their knowledge to make better informed decisions regarding screening mammography. It identifies some of the possible benefits and harms. Benefits may be peace of mind, catching cancer at an early stage, simpler treatment and reduced chance of dying from breast cancer. Harms are worry from false alarms, extra tests, no improvement in length or quality of life and unnecessary diagnosis.[246]

Randomized trials and observational studies indicate the main benefit from screening is a reduction of breast-cancer related death. The main harm of screening is detecting a cancer that most likely would not have caused harm or early death if left untreated.

Current State in Saskatchewan

Saskatchewan's Screening Program for Breast Cancer screens women ages 50-74 every two years who meet specific criteria.[318] The criteria includes no symptoms of breast cancer, no breast implants, not on active follow-up for breast cancer and cancer free for five years. Women over 75 are welcome to attend the screening program. Women ages 40-49 are not screened through the program and are required to attend a diagnostic facility.

In Saskatchewan, the number of women developing breast cancer has increased since 1980.[129] (See Appendix D).

Considerations

Client referral processes support entry into the breast pathway when the client is eligible or requires the service. The following are important considerations for a self-referral process.

- Providing a safe welcoming and culturally responsive environment is essential to ensure that women seek care and return for follow-up.
- The full extent of inequalities in screening is unknown as relevant data is not collected, data may not be easily accessible or there is lack of evidence on reasons for the inequality.[279]
- There are many benefits to having a comprehensive policy and procedure manual to assist staff in a standard approach to processes such as assisting persons with disabilities. A policy and procedure manual is not currently available in breast screening.
- Standardized referral process is required to support a centralized booking process.
- Women prefer various methods to book appointments and receive notification of needing a mammogram, such as online bookings, emails or texts.
- Leveraging of the provincial information technology systems is key to creating the changes required to fulfill some of the considerations.

- The Screening Program for Breast Cancer does not currently follow the Canadian Association of Radiology guidelines, that recommends annual screening for women ages 40-49 who are asymptomatic.
- To expand screening to include women ages 40-49 and comply with the Canadian Task Force on Preventive Health Care screening guidelines,[113] an individual can visit a healthcare provider to discuss the benefits and harms of screening. They can obtain a requisition to attend the Screening Program for Breast Cancer and only one requisition is required to be active in the program.
- A client referral process would take appointment requests from three sources:
  - Screening Program for Breast Cancer invitation
  - a healthcare provider referral
  - self-referrals.

These requests will be processed through a single entry point discussed in the centralized booking section.

Figure five represents the future state for client referral for breast pathway.

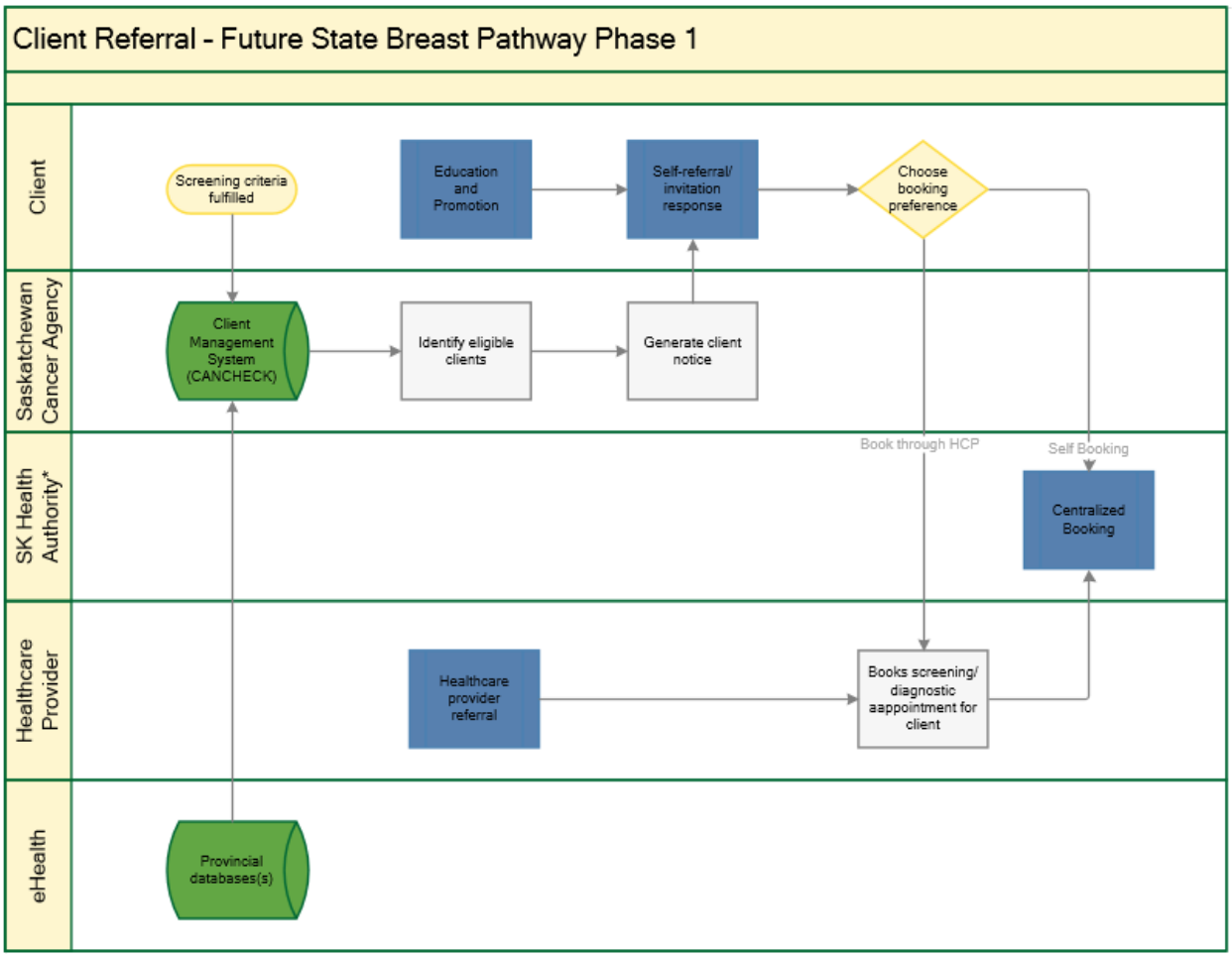


Figure 5. Future State – Client Referral for Breast Pathway Phase 1

*SHA includes all facilities who offer mammography services, including mid-sized hospitals & agreements with community providers.

Recommendations

Upon reviewing the above information and analysis, this section recommends the following:

- Create a standard referral process for provincial mammography.
- Expand the ages for breast screening to include women ages 40-49.
- Leverage the provincial information technology systems.
- Enhance education and promotion of the awareness of breast screening.
- Develop and implement best practices resources.

4.3 Centralized Booking

A centralized booking process would move away from healthcare providers booking mammography tests to a location towards a model where all mammography, screening and diagnostic, is scheduled and booked through a central hub. The hub has the ability to book at all approved locations in Saskatchewan including the mammography mobile bus, mid-sized hospitals, and community practices.

A centralized booking process provides numerous benefits to the individual and the associated service providers. Benefits include:

- supporting an equitable client experience
- providing a centralized data source for quality and performance tracking
- navigating wait times

Background

Wait times are a highly visible indicator of performance in health care. No other metric tells the state of a process so clearly. Long wait times are a primary driver of client dissatisfaction that has attracted increasing public attention due to the negative effects of waiting on client's satisfaction with health care.[68,233] Wait time reduction is critical as extensive wait times are reported to cause distress and drive adverse health issues among people.[75]

Longer waits and variation in wait times occur when there is an open schedule slot. Improving client flow and scheduling problems will help to reduce wait times. There are many principles for improving access to the open appointment time.[254] Understanding the balance between demand and capacity and applying queuing theory to the schedule are two principles. If we can reduce the number of queues or lines, we can actually reduce the time it takes in the total wait time inside the system.

Wait times to see a specialist vary geographically. Women want to know they are receiving the same access to service, the same quality of exams in the same timeframe as every other person with the same condition. Individual preferences of time, facility, and travel ability should be accommodated. Women prefer access to advanced imaging in their local community, especially those with decreased mobility or who are dependent on others or resources such as public transit to attend their tests.[233,254]

A number of studies investigated how to reduce wait times for a specialist, medical imaging appointments, and tests. [233,254] Recommendations from these documents are:

- Adjust scheduling practices to facilitate the movement of people to facilities with lower wait times. Wait times improve through the redirection of people who are willing and able to travel for shorter wait times.
- Encourage facilities to share the wait list, improve the usage of underused facilities and save money through increased efficiencies. There is improved likelihood a person will have their exam based on urgency of condition by combining wait lists into a single wait list.

- Inform clients booking the exam anywhere in the province is possible, as they are often not aware of this.
- Use a centralized booking system to increase the efficient use of existing equipment, benefit from data acquired and improve the system response to demand fluctuations.
- Incorporate best practice guidelines and decision tools to improve appropriateness of the test and contribute to uniform high exam quality.

Single entry models in health care allow people to see the next-available provider and have been shown to improve wait times.[219] Central booking may be referred to as call centres, centralized booking, pooled referrals, centralized intake, shared waitlists and referral management systems.

The common goal for all these systems is better use of available openings, thereby reducing wait time for the person. The systems defined can be as simple as providing a toll-free number to book an appointment, or a more complex system where the referral is sent to a common location. The referral is held in a shared waitlist queue and the person is booked when a time slot is available.

Centralized booking is used in a number of sites across Canada. There is no online booking for screening mammography. Some examples are:

- In Alberta, a toll-free number is available to book screening mammograms. Diagnostic mammograms are provided by community partners and are not booked through this number.[7]
- In British Columbia, a central call centre provides a single referral process, that includes a regional requisition. Approximately half of all screening mammograms are booked through this central site, with the other half being booked through British Columbia Breast Screening Program toll-free line.[363]
- In Manitoba, a toll-free number is available for women to book screening mammograms. A central intake office in Winnipeg provides a single point of entry for all faxed or mailed elective diagnostic imaging requisitions across the region.[371]
- In Nova Scotia, all breast imaging is booked through central booking. Eligible women self-refer by calling a toll-free number. For diagnostic breast imaging, the healthcare provider faxes a requisition to Central Booking. A triage tool assists with determining if criteria is met for booking mammograms. Wait times are posted on the website.[270]
- In Ontario, a central intake model is used for booking breast imaging and interventional radiology.[167] A toll-free line is used for booking screening mammograms and general inquiries. Physician referrals are required for booking diagnostic mammography and biopsies. Referrals arrive to a common fax.[167]

There are numerous ways to implement centralized booking. These systems can provide a number of benefits including the following:[75,95,174,195,213,219,233,377,378]

- Improved person access and wait times by incorporating schedules and appointment availability into a single booking system.
- Shared waitlist distributes referrals more evenly and wait times are rebalanced so extremely lengthy waits are eliminated. Person choice and access are enhanced.
- Standard referral form provides relevant, clear and consistent information as to urgency and nature of the exam to help with informed booking decisions.
- Enhanced data to support improvement of measuring and monitoring of outcomes.
- Referral guidelines and provincial standards are incorporated into order entry and software is used to prompt the ordering of exams in a consistent way.
- Reduction of inappropriate referrals.
- Improved client management resulting in more timely care. Knowing how many persons are currently on wait lists, what they are waiting for and how long they have been waiting, creates the opportunity to shift resources, shift persons and prioritize procedures to help achieve wait time targets.

- Increased efficiency through electronic transfer of scheduling requests and client information.
- Decreased time and effort involved in booking, changing or cancelling tests.
- Online booking requests are tied to the complete health record resulting in reduced delays from missed communications.
- Electronic visibility helps to identify areas for improvement or increased efficiency.

Current State in Saskatchewan

4.3.1 Saskatchewan Cancer Agency

Saskatchewan's Screening Program for Breast Cancer provides a toll-free number to schedule a screening mammogram. Locations include Saskatoon and Regina Screening Program for Breast Cancer centres, the mobile bus, and those mid-sized hospital sites contracted to provide screening. After confirming screening eligibility, the mammogram is scheduled for the location, preferred date and time. Women who do not meet screening criteria are referred back to their healthcare provider for referral to a diagnostic facility.

Mid-sized hospital screening locations provide their availability to the Screening Program. The appointment schedule is created in the Screening Program for Breast Cancer's software. Prior to the screening date, the schedule is faxed to the mid-sized hospital. If someone cancels their appointment, the centre may not be notified, as the schedule is not shared electronically.

Women scheduled for a screening mammogram at the Regina or Saskatoon centre and the mobile bus receive a reminder call from the Screening Program for Breast Cancer staff the day before their appointment. Clients attending a mid-sized hospitals do not receive this reminder call.

4.3.2 Saskatchewan Health Authority

In Saskatchewan, each health region purchased the software Cerner Radiology Information System[169] for booking and completing medical imaging exams. When the health system amalgamated into the Saskatchewan Health Authority, there was significant variation in the scheduling processes and wait times for medical imaging.

Currently, each medical imaging department directs the logistics of their schedule independently. There is no automated ability to view and share schedules. There is a lack of infrastructure for a pooled referral process with automated levelling of the workload. At this time, redistribution of workload is organized on a case-by-case approach. The desired outcome is the ability to redistribute the work across the organization choosing location by capacity and wait time.

Healthcare providers refer persons to a specific facility for a variety of reasons such as location, personal preference, familiarity, available wait time information and or comfort with the booking processes. Some healthcare providers send a requisition to a number of facilities and then book into the one with the first opening. This affects the wait time and does not provide for accurate provincial wait time data. This can also be a reason for no shows and the appointment time slot goes unused.

The provincial goal is to centralize booking operations across the province starting with the two tests with the biggest impact on demand, CT and MRI. The structure is being built to develop the model to provide control over waitlist management and assist with access and appropriateness.

Saskatchewan Health Authority contracts community radiology partners for the required number of MRI and CT exams. Community radiologists access Saskatchewan Health Authority's Radiology Information System to schedule exams completed in the community. This provides Saskatchewan Health Authority with the ability to track patients.

4.3.3 eHealth Saskatchewan

With the implementation of technological innovations, such as patient portals, patients have electronic access to their personal health information. Saskatchewan's eHealth portal, MySaskHealthRecord,[171] can provide educational resources, reminders for upcoming visits or tests, and the ability to check on scheduled appointments. Patients can access test results, including medical imaging reports on MySaskHealthRecord.

There is potential to use MySaskHealthRecord for online booking of tests, such as screening mammograms, or reminders to book a screening mammogram.[171,251] Before online booking can be used, consolidation of the 13 sites across Saskatchewan Health Authority and Saskatchewan Cancer Agency using the Radiology Information System[169] is required.

Considerations

There are various aspects to consider implementing mammography centralized booking. These include:

- A key benefit to a centralized booking model through one accountable is the visibility of the entire breast pathway in one system. This benefits the client, their healthcare provider and the health care system.
- Wait list management can support equitable client experience.
- Electronic referral submission would simplify the process with digital technology availability.
- Triage algorithms and other booking tools are required to ensure standard processes. Expert stakeholders should create these. Each modality requires a different set of indications and contraindications for optimal operation and practice.
- Integration of ordering referral guidelines and online decision support tools will benefit physicians and their clients. These tools support physicians to ensure their exam requests are appropriate, complete and reducing wait time delays. These can be an electronic submission process.
- Standard requisitions and templates are required to both support a robust scheduling process and capture reportable elements to facilitate data collection for quality measurement.
- Analytic tools in the provincial Radiology Information System (RIS), Picture Archiving System (PACS), and PowerScribe[169] support quality assurance measurement.
- Images embedded in provincial PACS supports a peer review process. Use of the provincial RIS and PACS system currently varies within the province. Community radiologists use their own system and upload to the provincial RIS and PACS. Currently, SCA does not use RIS for reporting results.
- To create an efficient centralized booking system, all mammography sites will be required to fully adopt a provincial model scheduling system.

Figure six represents the future state for mammography centralized booking for Breast Pathway.

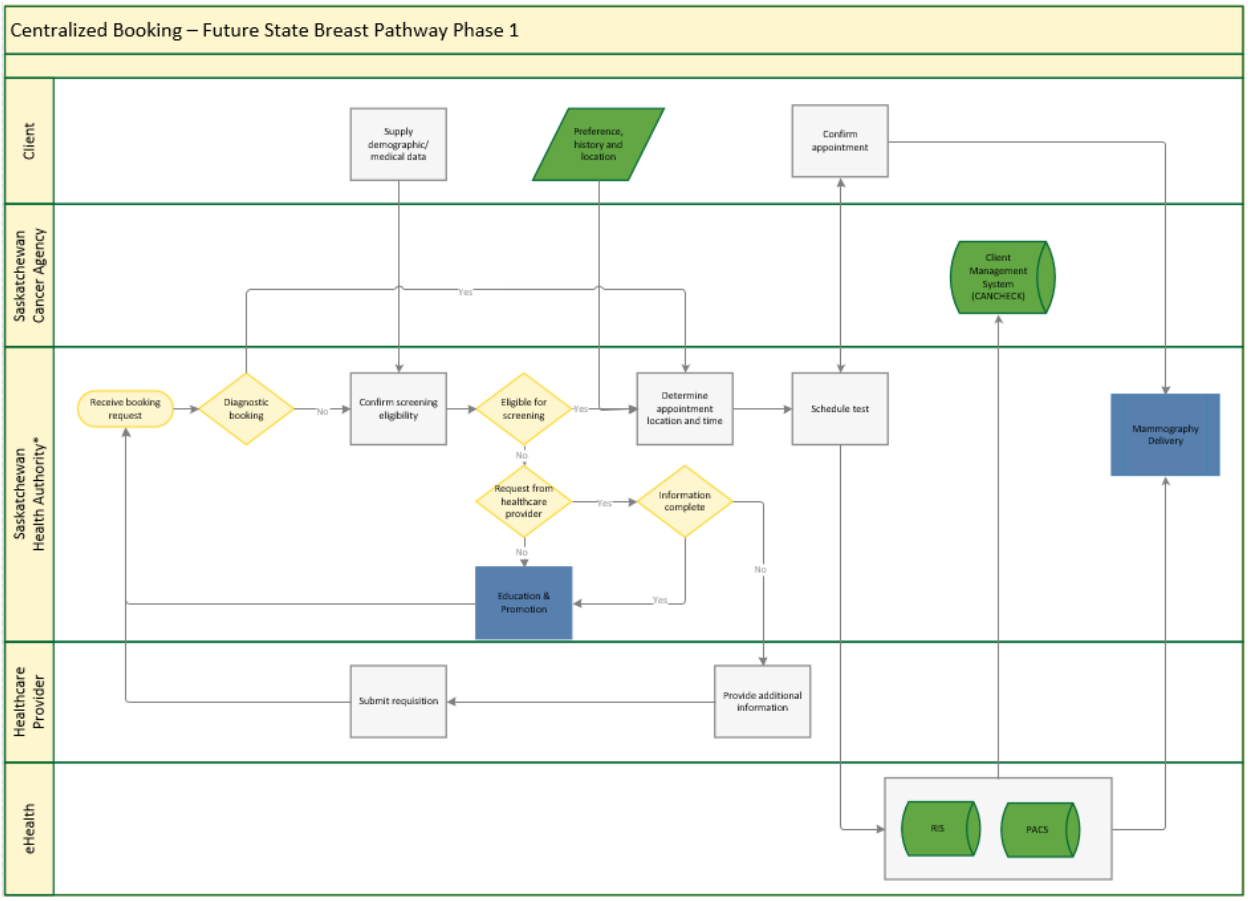


Figure 6. Future State – Centralized Booking for Breast Pathway Phase 1 Continuum

*SHA includes all facilities who offer mammography services, including mid-sized hospitals & agreements with community providers.

Recommendations

Upon reviewing the above information and analysis, this section recommends the following:

- Administer a standard centralized mammography booking process for all mammography appointments within the province through one accountable jurisdiction, that is Saskatchewan Health Authority.
- Leverage the provincial information technology systems.

4.4 Quality Assurance

Mammography is the most widely available, cost effective, quickest modality for the detection of breast cancer, is highly accurate, and is the only modality proven to reduce mortality from breast cancer. However, in order to have an effective mammography service it is essential to meet rigorous quality requirements. It is important to determine the current state for quality assurance, build upon the good practices and determine gaps that require improvement. The quality assurance analysis aligns with primary objectives, guiding principles and assumptions. (See Appendix B). While quality is key across the continuum, this analysis will focus on the interpretation and reporting phase.

Quality assurance provides the following benefits:

- comprehensive quality assurance program established and implemented across the continuum
- established and implemented standard processes across the continuum
- promotion of continuous improvement in the breast pathway to ensure all eligible women have access to a consistent high-quality service wherever they live

Background

Across Canada, there are various approaches to meet quality assurance for provincial delivery models and service needs. However, quality assurance practices for breast cancer screening programs are generally based on guidelines and recommendations from the Canadian Association of Radiologists (CAR),[80] Canadian Partnership against Cancer (CPAC),[99] Canadian Association of Medical Radiation Technologists (CAMRT),[78] and include references to other national and international guidelines and recommendations.

The *CAR Practice Guidelines and Technical Standards for Breast Imaging and Intervention*[80] provides breast imaging practice guidelines for performing and interpreting breast imaging as well as breast interventional procedures. The guidelines serve as an educational tool and provide minimum requirements.

The CAR *Mammography Accreditation Program* (CAR-MAP)[83] ensures the quality of mammography images meets the highest standards. Each accredited mammography centre is assessed for compliance in four (4) quality areas. These include personnel requirements, quality control, equipment specifications, and breast image quality. Centres participate in accreditation renewals every three years, with an annual update.

Canadian Partnership against Cancer's report *Breast Cancer Screening in Canada: Monitoring and Evaluation of Quality Indicators – Results Report, January 2011 to December 2012*[99] provides quality indicators (page 10) for organized breast cancer screening programs in Canada. These indicators confirm that the short-term objectives of a successful screening program are met on an ongoing basis and continually strive to increase the benefits of screening while minimizing the harms. They guide the promotion of consistent calculation of key evaluation indicators for monitoring and evaluation across programs and over time.[99]

In addition to guidelines and indicators set by CAR, CPAC, and CAMRT, provincial programs also establish additional key evaluation indicators to monitor. Some examples are:

- CancerCare Manitoba's Timeline Model for the Breast Cancer Patient Journey from suspicion of cancer to treatment in sixty days.[341] (page 13).
- Nova Scotia Breast Cancer Screening Program's quarterly Wait time report.[267]

The established performance measures and indicators focus on screening mammography. Currently, Canadian performance indicators for diagnostic mammography and interventional radiology are not available. However, there are international published performance indicators for diagnostic mammography and interventional radiology:

- The American College of Radiology *BI-RADS Atlas® 5th Edition*[19] (page 28) published benchmarks for diagnostic mammography. Ottawa Rose Ages Breast Health Centre in Canada[356] uses this resource.
- Performance cutoff points according to type of diagnostic mammography were published in the article *Identifying Minimally Acceptable Interpretive Performance Criteria* (Carney, 2013).[127]
- The European Commission published standards for suggested thresholds for core biopsy performance.[207]
- The American College of Radiology Breast Biopsy Accreditation Program includes performance indicators for stereotactic biopsies.[22]

Current State in Saskatchewan

In Saskatchewan, the Diagnostic Imaging Quality Assurance Program[147] defines standards of practice and principles to produce a high level of radiological care that ensures the provision of an acceptable quality of person care in Diagnostic Imaging. The standards state, "procedures should be systematically monitored and evaluated as part of overall QI program of the facility calling for monitoring to include evaluation of the radiologist interpretation as well as the appropriateness of the exam".[147] Definitions and targets for outcomes and performance indicators are not included.

Quality Assurance Practices

Quality assurance is a broad topic involving several practices. Major themes include:

- key performance indicators and reports
- reading volume
- peer learning and mentorship
- double reading and artificial intelligence
- provincial quality assurance committee
- common systems and standards
- quality assurance accountability

4.4.1 Key Performance Indicators and Reports

4.4.1.1 Individual Key Performance Indicator Reports

Standardized reporting of key performance indicators is a necessary practice and has been crucial for radiologists to be aware of their performance relative to targets, as well as their peers. Report cards is a form of regular reporting of a number of metrics for a radiologist's performance, with key next steps and goals to improve and meet desired targets.[276] Standardized reporting mechanisms and reports vary in complexity and delivery, however, their main purpose remains the same.

- In the United Kingdom, performance is reported quarterly with recommendations for improvement.[295,296] Annual quality control and quality assurance monitoring is done at a national level and information is available online for each radiologist to view their performance compared to others.
- Multiple programs in Canada identified report cards as key to ensuring radiologists understand their performance and how that compares to that of their peers. Measures commonly included are cancer detection rate, positive predictive value, false positives, reading volumes, and abnormal call rate.
- One province has an annual individual statistics package. The package includes a narrative format to facilitate interpretation, aggregate years' data to decrease concern from statistical annual variation in detection, and semi-individualized prescription for practice optimization.[276]
- Alberta Breast Cancer Screening Program's annual report, *Individual Screening Mammographer Feedback,*[5] is comprised of many metrics intended to guide individual practice by comparing quality assurance performance to established targets and relative to provincial peers.
- Nova Scotia Breast Screening Program's annual report card, *Radiologist Report Card*,[269] provides performance data for key CPAC indicators with aggregate data to decrease concern from statistical annual variation in detection.

A critical requirement when considering potential action for performance target outliers is they should be considered within the specific practice setting and overall assessment of all related performance measures.[99,127,128,178]

Current State in Saskatchewan

In Saskatchewan, the Screening Program for Breast Cancer radiologists receive the annual report card *Radiologist Statistics,* [178] which is based on key CPAC indicators. This report allows radiologists to view how their performance on metrics compares with set benchmarks and averages across the province. This report includes aggregate data, provided by the Cancer Registry department. There is a lag time of two years for coding. Currently in 2020, data is being coded for 2018. Radiologists have expressed a desire to receive additional data, such as true and false positive rates and BI-RADS®[19] statistical data.

Radiologists reading for the Screening Program for Breast Cancer report that receiving data in a timely manner will enable quality improvement action. For example, quarterly abnormal call rates would be valuable.

Standard performance measures for diagnostic interpretation are not available. Some radiologists within the province do not receive any formal performance indicator data.

4.4.1.2 Key Performance Indicator Reports for Screening Programs

An advantage of organized screening programs is the ability to monitor key performance indicators to ensure the maximum benefits of screening and harms are minimized through a cycle of continuous quality improvement.

The Canadian Partnership Against Cancer has 13 quality indicators and targets identified in the *Quality Determinants of Breast Cancer Screening with Mammography in Canada*, page 51 and 52.[108]

A key quality indicator is the abnormal call rate, the percentage of mammograms identified as abnormal at program screen[108] which require additional testing and follow-up. It is most meaningful when considered in the context of positive predictive value, cancer detection rate, post-screen cancer rate, and breast cancer incidence rate. A high abnormal call rate could increase the false-positive rate and result in unnecessary follow-up tests. Abnormal call rate is generally higher for first-time screens, as initial screens detect prevalent cancers and subsequent screens are compared with previous findings. Abnormal call rate may also be affected by the recommended screening interval, the screening technology used, radiologist experience, radiology and reading volumes, the incidence of breast cancer, and population characteristics such as age and breast density.[99,304,307]

Canadian Partnership Against Cancer developed a framework to address that Canada's abnormal call rate has been increasing over time. As of July 2020, the framework is available on the website as *Pan-Canadian Framework for Action to Address Abnormal Call Rates in Breast Cancer Screening*.[276,307] In Canada, the abnormal call rate exceeds current national target values of less than ten percent of initial screens and less than five percent of subsequent screens and vary widely across Canada. The abnormal call rates for subsequent screens ranged from 4.2 percent in Saskatchewan to 15.6 percent in Prince Edward Island, in 2013-2014 to 2017.[276]

Current State in Saskatchewan

The Provincial Auditor is an independent Officer of the Legislative Assembly in Saskatchewan.[289] The external auditors of the Government of Saskatchewan provide assurance and advice to the Legislative Assembly and the public on the management, governance, and effective use of public resources. [289] In 2016, the Provincial Auditor completed a performance audit to assess the effectiveness of the Saskatchewan Cancer Agency's processes to deliver its systematic population-based screening program for breast cancer. The Provincial Auditor provided two recommendations regarding quality.[287,288]

- Broaden the use of key quality indicators relevant to Saskatchewan to regularly analyze the performance of its Screening Program.
- Periodically report to senior management, the Board, and the public on key Screening Program for Breast Cancer performance information.

The Saskatchewan Cancer Agency participates in the Canadian Breast Cancer Screening network, a national committee hosted by Canadian Partnership Against Cancer. The Screening Program for Breast Cancer submits data to Canadian Partnership Against Cancer to report the quality indicators to compare national results with established targets.

It is useful to compare Saskatchewan's Screening Program for Breast Cancer to other screening programs across Canada. However, the Canadian Partnership Against Cancer reports do not allow for timely monitoring due to variable reporting intervals. The variability of reporting makes it difficult to determine required quality improvement activity on some key performance indicators.

The abnormal call rate for Saskatchewan's Screening Program for Breast Cancer is stable and in the optimal range.[313] It is important to ensure current practices continue to maintain the optimal range. As well, it is important to adopt practices recommended by Canadian Partnership Against Cancer's abnormal call rate framework.

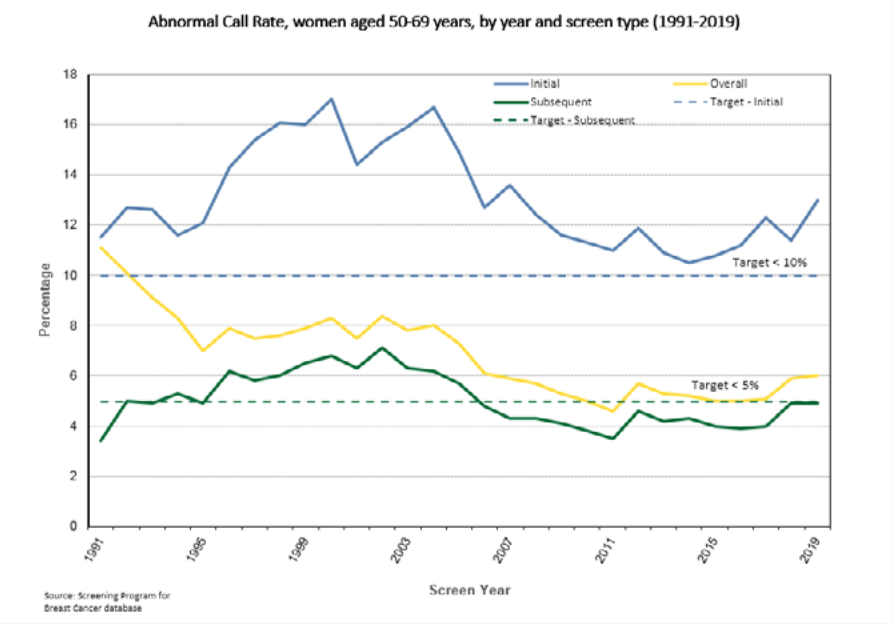


Figure 7. Abnormal call rate for Saskatchewan woman, aged 50-69 years

Figure seven represents Saskatchewan's Abnormal Call Rate, women aged 50-69 years, by year and screen type (1991-2019).

4.4.2 Mammogram Reading Volumes

The interpretation of mammograms by radiologists is a complex process that must continually be practiced to maintain skills. There is evidence that a higher minimum interpretative volume leads to better results.[276]

Two Canadian studies[276] examined the relationship between radiologist screening program reading volumes and interpretation results. The main result of these studies revealed the breast cancer detection rate ratio was greater at one point two eight (1.28) for interpreting 4,000 or more screenings per year, compared with those performing fewer than 2,000. The average positive predictive value for individual radiologists increased as reading volume rose up to 2,000 mammograms per year.[276]

An American study[276] reviewed the radiologist's performance for the screening mammography interpretive volume. It found increasing the minimum volume from 1,000 to 1,500 while adding a minimal requirement for diagnostic interpretation could reduce the number of false positive work-ups without hindering cancer detection.

In 2019, the Canadian Association of Radiologists Mammography Accreditation Program (CAR-MAP)[80,83] recommended a change in the minimum annual reading volume from 480 to 1,000. The change is based on evidence suggesting read volumes of less than 1,000 per year do not allow for an adequate review of radiologist performance. British Columbia worked with CAR to modify the 1,000 minimum read for radiologists who read only diagnostic mammography. In this situation, there is still a minimum read, although not 1,000, and the radiologist is required to submit quality indicator information for ongoing accreditation. Many countries require

2,000 to 5,000 reads. Increasing the number of reads in Canada could positively affect outcomes.[276]

"Emerging research shows that improved performance appears to be related more to the combination of both screening and diagnostic mammography study interpretation than to the interpretive volume alone".[127]

Current State in Saskatchewan

Saskatchewan's Screening Program for Breast Cancer is CAR-MAP accredited for the required four quality areas. The contracted community radiologists read all Screening Program for Breast Cancer screening images and meet the required reading volumes of 2,000.

Radiologists interpreting diagnostic mammograms at the mid-sized hospitals may not be able to meet the CAR-MAP read requirement of 1,000 minimum reads. (See Appendix E).

Screening Program for Breast Cancer radiologists report a better learning experience is the result of interpretation of screening and diagnostic mammography and the performing of biopsies on the same case.

4.4.3 Peer Learning and Mentorship

Though peer learning and education are common practice within a screening program, it can be clinic specific and varies within and across jurisdictions. Peer learning and mentorship involve peer radiologists working together on a regular basis to review screens and provide performance feedback on strengths and challenges and thereby identify areas for program optimization. Informal and formal education provides knowledge and tools to help radiologists improve in specific areas.[276] The Canadian Association of Radiologists booklet *The CAR Guide To Peer Review Systems*[86] is a good resource. Quality assurance practices are an opportune time to share information and learn through the review of cases. Peer learning, mentorship and a feedback loop is also important for the technologists performing mammograms.

One of the learning opportunities in a mammography quality assurance practice is called mini-quality assurance. This is where the radiologist reviews each of their abnormal cases with the follow-up tests.

Current State in Saskatchewan

In Saskatchewan, a formalized peer learning and mentorship provincial program is not in place. However, a variety of performance feedback practices occur. The frequency and consistency of these practices varies. (See Appendix F). Examples are:

- multi-disciplinary team meetings
- rounds
- second and third reads
- quality assurance nights
- one-on-one meetings

There are imaging subspecialties for neurology, abdominal, breast and others. Radiologists have access and can refer difficult cases to the subspecialists for a second opinion.

In rural Saskatchewan, radiologists are not required to be trained in a breast fellowship as they are expected to function as generalists, interpreting other modalities. Many rural radiologists have completed additional mammography courses to enhance their skills. There is no formalized structure for the breast imaging subspecialty.

The current approach to peer review and quality assurance evenings creates some barriers for those single radiologist practices in mid-sized hospitals.

Locum radiologists do not practice mini-quality assurance, as they may no longer be at the original mid-sized hospital when the abnormal case follow up test results are available.

Technologists in mid-sized hospitals report that they would benefit from site visits to assist them with image quality and positioning issues. Historically, the Screening Program for Breast Cancer provided site visits to work one-on-one with the technologist on proper positioning and image quality. Due to human resource staffing, this practice discontinued. The Screening Program for Breast Cancer also hosted annual continuing education conferences. This practice changed to align with other health care professionals being responsible to maintain their own education credits, rather than an organization.

4.4.4 Double Reading and Artificial Intelligence

4.4.4.1 Double Reading

Double reading is the process of two readers interpreting a given mammogram. Double reading of mammograms is standard practice in Europe but is not in Canada and the United States.

Screening practices at Cambridge Breast Unit, United Kingdom, include independent double reading in alignment with defined national standards for training, caseloads, and performance. Arbitration takes place for cases where there is discrepancy in the first two readers' opinions.

Other approaches to the application of double reading includes: [276]

- Applied only to those cases considered for recall.
- One Canadian clinic transitioned to conducting double reading of normal scans only. The clinic employs an external radiologist to do monthly double reads on approximately five percent of normal cases, checking for missed cancers. Final recommendations for discordant cases happen at monthly quality assurance meetings.
- When the first reader requests a second read. When a difference in opinion occurs between the first and second reader, a single third reader is used for arbitration.

Abnormal call rates may decrease from the use of double reading with consensus or arbitration. "It is important to clearly define the objectives of a double reading program based on performance indicators evaluated and areas identified for improvement":[276]

- "A program designed to double read an abnormal screen with arbitration is intended to increase specificity and decrease abnormal call rate".[276]
- "Double reads of normal screens will impact sensitivity and increase abnormal call rate".[276]

Manitoba discontinued the practice of double reading except for during the orientation of new radiologists.

Current State in Saskatchewan

The Screening Program for Breast Cancer practices double reading through an independent blind read by the senior mammography technologists. In both Saskatoon community radiology clinics, the practice is for two radiologists to perform an independent double read which are not a common practice in mid-sized hospitals.

4.4.4.2 Artificial Intelligence Technologies

At this time, there are identified problems using artificial intelligence to interpret mammograms. Artificial intelligence does very well at interpreting a data set it is trained on. However, it does not do well when

introducing a different dataset that it has not been trained on. While there are still problems with using AI to interpret mammograms, it is anticipated that with time, artificial intelligence technologies will improve and enhance health care. Artificial intelligence has shown promise for clinical application in image-intensive fields including radiology.

It is important to consider challenges and opportunities for the practice of double reading given the increasing use of artificial intelligence and how this may play a role in the future of the mammography services. Artificial intelligence has a great deal of potential to act as a second read.[201]

Current State in Saskatchewan

The Screening Program for Breast Cancer uses an artificial intelligence software, iCAD, for some images. This includes images completed in Regina and Saskatoon, but excludes images completed on the mobile bus and mid-sized hospitals, in addition to this some radiologists do not use iCAD when reading screening. Radiologists have expressed concern regarding this inconsistent practice.

Saskatchewan's Screening Program for Breast Cancer mammography mobile bus.

4.4.5 Provincial Quality Assurance Committee

Nova Scotia[268] is the only province where screening and diagnostic services are under the umbrella of the provincial breast-screening program in a single database. There are two health authorities: Nova Scotia Health Authority and IWK Health Centre. When the province restructured to the two health authorities, a provincial Diagnostic Imaging program was developed to oversee and standardize the province. A provincial quality assurance program was under development. However, this is not finalized as the Nova Scotia Health Authority is undergoing another restructure and it is unclear if work on the provincial quality assurance committee will continue.

In Nova Scotia, there is a provincial Breast Imaging Service Advisory committee developed at the time of the original restructure with the goal being a standardized and equitable service for the province. This committee serves as the technical, medical, and scientific expert advisory group to inform, support, and enable standardized, integrated coordinated, innovative, efficient, and client-centered breast imaging services throughout the Nova Scotia Health Authority and IWK Health Centre. This committee works to establish and maintain standards of practice that support the provision of safe, high quality, appropriate, accurate, and

sustainable Breast Imaging services throughout Nova Scotia. The Nova Scotia Breast Screening Program sits on this committee.

In Alberta, 85 percent of screening occurs in the community, organized under the Alberta Society of Radiologists.[11] The provincial Quality Assurance Committee is currently working out the specifics to obtain legal protection. Until this is worked out, the committee is mainly quality improvement, rather than a true quality assurance, where program quality discussion and decisions take place. The committee meets three to four times per year. Terms of Reference for the Quality Assurance Committee are under review.

Committee membership includes provincial mammography leads from both urban and rural sites and the screening program. Alberta Society of Radiologists represent the community radiologists for screening committees. Screening related issues are the main topic. Diagnostic mammography related discussions are included in meetings but only in relation to screening.

The leads investigate outlying quality measure targets and work with the radiologist to determine the issue specifics and develop an action plan. Actions are taken and the results reported back to the provincial Quality Assurance Committee. The committee reviews the actions and outcome and determines if the follow-up has taken place or if further action is required.

Current State in Saskatchewan

Saskatchewan currently does not have a provincial quality assurance committee for mammography.

4.4.6 Systems and Standards in Saskatchewan

4.4.6.1 Radiology Information System and Picture Archiving and Communication System

Saskatchewan uses a provincial Radiology Information System (RIS) and Picture Archiving and Communication System (PACS), that is coordinated through eHealth.[169] RIS is for reporting and PACS is for image storage. RIS pushes the report to two portals - eHR Viewer[170] for healthcare provider and MySaskHealthRecord[171] for patients. The advantages of a provincial system are to view reports and images from across the province, reduce repeat scans and a system to facilitate the collection of quality data.

In Saskatchewan, there are varying practices for RIS and PACS. As of April 2020, all community radiology practices upload their mammogram images to RIS and PACS. The Screening Program for Breast Cancer does not upload the report to RIS and therefore it is not available on eHR Viewer[170] and MySaskHealthRecord. [171] The screening mammogram report is considered a non-reportable in the system. The paper mammogram report is scanned into PACS as an image.

4.4.6.2 Mammography Requisitions and Reports

In Saskatchewan, there is variation in the mammogram requisitions. Greater than 80 percent of family physicians use an electronic health record, either TELUS Med Access EMR Inc. or QHR Technologist Inc.[322] There are still paper requisitions utilized.

In Saskatchewan, there is variation in reporting mammograms, screening and diagnostic. The goal is for reports to be in accordance with *CAR Standards for Communication of Diagnostic Imaging Findings*[81] and *Breast Imaging Reporting Data Systems* (BI-RADS®).[19]

4.4.6.3 Reporting Breast Density

In Saskatchewan, the reporting of breast density varies. This may include a percentage rating, such as 0-25

percent, 25-50 percent, 50-75 percent and 75-100 percent, or A/B/C/D, or nomenclature is used. The nomenclature may include words such as (A) fatty breasts, (B) scattered densities (C) heterogeneously dense, and (D) extremely dense. The Screening Program for Breast Cancer reports breast density as under 75 percent and over 75 percent. Reporting as a percentage is no longer a BI-RADS®[19] standard.

Interpretation of breast density is subjective and can be difficult to determine between the categories, such as if it is 74 percent versus 76 percent. Softtware is available to standardize the dense breast reporting and is currently not used.

In Saskatchewan, there is variation whether a woman and her healthcare provider are notified of her breast density. The Screening Program for Breast Cancer sends a letter to clients if they have breast density over 75 percent. Women with breast density under 75 percent are not notified. Women receiving a diagnostic mammogram may not be notified of their density.

4.4.7 Quality Assurance Accountability

In Alberta, the Alberta Society of Radiologists[11] owns the majority of the screening data. According to the agreed upon schedule, Alberta Society of Radiologists sends the raw data to the Alberta Breast Screening Program. The program prepares the screening reports and distributes a report to the screening radiologists, CPAC and others as appropriate. Alberta Breast Screening Program reports only data for clients who start in the screening program.

In Nova Scotia, screening and diagnostic are under the umbrella of the provincial breast screening program in a single database. The Nova Scotia Breast Screening Program[270] distributes quality indicator reports. While Nova Scotia Breast Screening Program has access to all provincial mammography services data, they report only on screening performance indicators.

Current State in Saskatchewan

Saskatchewan currently does not have a provincial organization accountable for quality assurance in mammography.

Considerations

In the delivery of mammography services section, the jurisdiction for the delivery of screening and diagnostic mammography is the Saskatchewan Health Authority (SHA). As an external partner, SCA will be responsible for the monitoring and auditing of quality activities designed to ensure mammography services continually meet quality criteria. Taking improvement action as required would be the responsibility of the SHA.

Figure eight represents the future state for quality assurance for Breast Pathway Phase 1.

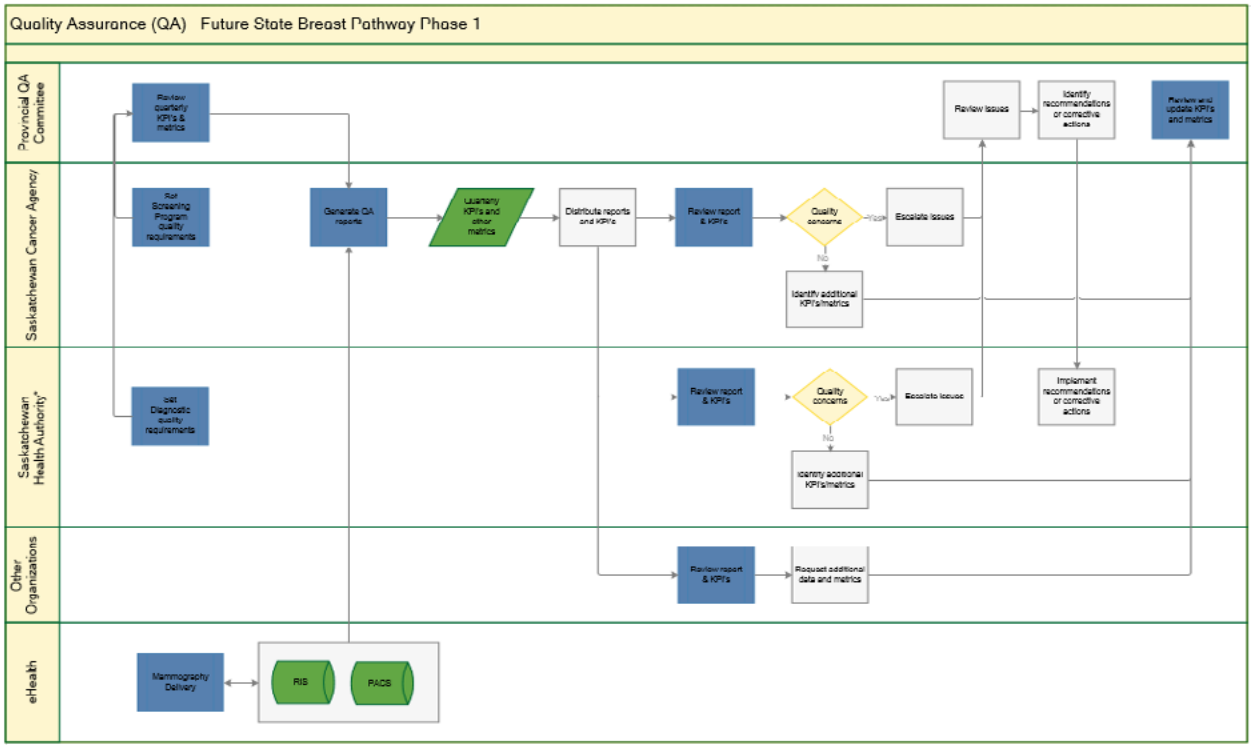


Figure 8. Future State – Quality Assurance for Breast Pathway Phase 1 Continuum

*SHA includes all facilities who offer mammography services, including mid-sized hospitals & agreements with community providers.

Recommendations

Upon reviewing the above information and analysis, this section recommends the following:

- Establish the accountability for mammography quality assurance.
- Create a key performance measurement plan that includes an annual performance indicator report for radiologists across mammogram services.
- Determine a plan to implement the Canadian Partnership Against Cancer's abnormal call rate framework.
- Distribute the mammography interpretation to approved radiologists to meet Canadian Association of Radiologists Mammography Accreditation Program and Saskatchewan Cancer Agency requirements.
- Implement a peer-learning program for radiologists and mammogram technologists.
- Determine the criteria required for more than one (1) read of a mammogram image.
- Develop a provincial mammography quality assurance committee.

- Leverage the provincial information technology systems.
- Standardize the reporting of breast density.
- Develop standard work for continuous quality improvement within mammography services.

4.5 Delivery of Mammography Services in Saskatchewan

Saskatchewan's delivery of mammography services is currently divided between the Saskatchewan Cancer Agency, the Saskatchewan Health Authority, and community radiologists. Under the current model, the Saskatchewan Cancer Agency's responsibility is limited to providing screening mammography and the Saskatchewan Health Authority is primarily responsible for diagnostic mammography. Healthcare providers do refer clients to community radiologists or Saskatchewan Health Authority locations for screening mammography.

The delivery of mammography services includes:

- jurisdiction for mammography services
- interpretation of radiology images
- upgrading mammography to tomosynthesis
- telemammography

4.5.1 Mammography Delivery

The mammography delivery analysis aligns with primary objectives, guiding principles and assumptions agreed to by the Steering Committee. (See Appendix B). When considering these, there are potential benefits to changing Saskatchewan's delivery model. For example, moving towards a singular responsible body for the delivery of services could provide the following benefits:

- women experience consistent streamlined care with fewer gaps in service and hand-offs
- comprehensive quality assurance program established and implemented across the continuum
- cost-effective services with pooled resources, equipment procurement and maintenance
- established implemented standard processes

Background

Across Canada, there are various program models for the administration and delivery of breast mammography services. Each province has developed their program to meet client and service needs. The Canadian Partnership Against Cancer publishes annual environmental scans, that includes each province's administration for breast screening.[98] The 2018 environmental scan was reviewed when considering the vision for Saskatchewan.

In British Columbia, the Cancer Agency,[37,38] administers the breast screening program. Mammograms are delivered throughout the province by contracted services via a distributed model.

Nova Scotia is the only province where screening and diagnostic are captured under the umbrella of the provincial breast screening program in a single database. Screening and diagnostic images are integrated. This is cost-effective and decreases the wait time for asymptomatic clients.[268] Mammography services are offered through a distributed model.

Current State in Saskatchewan

The current model for mammography services is distributed. The Saskatchewan Cancer Agency provides screening in Saskatoon and Regina along with a number of contracted Saskatchewan Health Authority services within mid-sized hospitals. A blended model of Saskatchewan Cancer Agency and Saskatchewan Health Authority

mammography technologists provide the images that are interpreted and reported by contracted radiologists. The Saskatchewan Health Authority and community radiologists offer diagnostic mammography. The Saskatchewan Health Authority also provides assessment and interventional radiology services, which comprises of biopsy and other breast health services. (See Appendix G).

Considerations

The following four delivery options were presented to the Breast Pathway Steering Committee on September 5, 2019 for consideration, and are listed here for reference.

1. Saskatchewan Cancer Agency has jurisdiction for breast health in Regina and Saskatoon. The mobile is administered by SCA with contract mammography technologists. SHA mid-sized hospitals and community is status quo.

2. Saskatchewan Health Authority has jurisdiction for breast health in Regina and Saskatoon. Saskatchewan Cancer Agency does the booking through a centralized booking model.

3. Collaborative partnership model with administrator of breast health in Regina and Saskatoon occurring at Saskatchewan Cancer Agency, Saskatchewan Health Authority and community. The mobile is administered by Saskatchewan Cancer Agency with contract mammography technologists. Saskatchewan Health Authority mid-sized hospitals require further discussion.

4. Collaborative partnership model with administrator of breast health in Regina and Saskatoon occurring at Saskatchewan Health Authority and community. The mobile is administered by Saskatchewan Cancer Agency with contract mammography technologists. Saskatchewan Health Authority mid-sized hospitals and community is status quo for some centre and further discussion for others.

The Breast Pathway Steering Committee requested further analysis. Analysis including clarifying the four options, aligning with primary objectives, guiding principles and assumptions (see Appendix B) and responsibilities of the organizations. The Saskatchewan Health Authority is responsible for the delivery of high quality and timely health care for the entire province. The Saskatchewan Cancer Agency is responsible for planning, organizing, delivering and evaluating cancer care and related health services throughout the province. After review, the four options were condensed to three.

4.5.1.1 Option One: Saskatchewan Health Authority

Option one is the jurisdiction for Saskatchewan's mammography services to be Saskatchewan Health Authority. Community radiology services would remain important partners and Saskatchewan Health Authority will coordinate services.

The key challenges and barriers with this model are:

- The Saskatchewan Cancer Agency's mandate is to ensure quality in screening and therefore a provincial quality assurance program will need to be developed to determine how this could be administered.
- Changing the current delivery of the mammography exam at Saskatchewan Cancer Agency's will impact the staff.
- Saskatchewan Health Authority staff will be impacted as there may not be the capacity for delivery of screening mammography that is currently taking place at Saskatchewan Cancer Agency.
- Radiologists in mid-sized hospitals currently do not meet the required mammography reading of 1,000 images for accreditation as set by the Canadian Association of Radiologists Mammography Accreditation Program (CAR-MAP).[83] A plan to facilitate the radiologist achieving accreditation will be required.

- Mid-sized hospital radiologist's workload will be impacted by the requirement to meet the CAR-MAP[83] reading requirement.
- Community radiology services are anticipated to expand.
- Processes and standard work for the operation of the mammography mobile bus are required.
- There is need to explore potential options for diagnostic services on the bus.
- There will be cost implications to provide the necessary infrastructure, equipment, and technology that is required.

4.5.1.2 Option Two: Saskatchewan Cancer Agency

Option two is the jurisdiction for Saskatchewan's mammography services to be Saskatchewan Cancer Agency. Community radiology services are important partners where services will be coordinated by Saskatchewan Cancer Agency.

The key challenges and barriers with this model are:

- Regina Screening Program for Breast Cancer is experiencing a mammography technologist shortage leading to an extended wait time. The shortage started in 2018 and has become critical in 2020.
- Screening Program mammography technologists do not have the option to work to their full scope of practice, as mammography is the only modality. Mammography technology jobs are part-time. This impacts job satisfaction, recruitment and retention.
- Community radiology services will likely be expanded.
- Mid-sized hospital radiologist's workload will be impacted by the requirement to meet the CAR-MAP reading requirement.
- There is need to explore potential options for diagnostic services on the bus.
- There will be significant cost implications to provide the necessary infrastructure, equipment, and technology that is required.

4.5.1.3 Option Three: Hybrid of Saskatchewan Health Authority and Saskatchewan Cancer Agency

Option three is the jurisdiction for Saskatchewan's mammography services to be a hybrid of Saskatchewan Health Authority and Saskatchewan Cancer Agency. Community radiology services would remain important partners and their services will be coordinated by the partnership.

The key challenges and barriers with this model are:

- There may be multiple hand-offs for the client between Saskatchewan Cancer Agency, family physician, community radiologists and Saskatchewan Health Authority. Hand-offs can lead to increased wait time and possible errors.
- Split accountability impacts the ability to standardize and streamline processes resulting in a different service of care between clients.
- Strong communication and collaboration between the partners will be key for the establishment and implementation of a robust quality assurance program.
- Regina Screening Program is experiencing a mammography technologist shortage leading to an extended wait time. The shortage started in 2018 and has become critical in 2020.
- Technologists do not have the option to work to their full scope of practice within Saskatchewan Cancer Agency, as mammography is the only modality. As well, mammography technology jobs are part-time. This impacts job satisfaction, recruitment and retention.

4.5.1.4 Analysis Outcome of the Three Options

The analysis for the delivery of mammography services (see Appendix I) included comparisons with:

- Guiding principles established during the Visioning and Design workshops and agreed to with the Steering Committee. (See Appendix B).
- The client perspective section. (See section 3).
- Benefits and challenges for delivery of mammography in Saskatchewan Health Authority and Saskatchewan Cancer Agency. (See Appendix H).

Figures nine – eleven demonstrate the analysis for the three options:

- figure nine is the analysis that if the Saskatchewan Health Authority had jurisdiction for the delivery of mammography services, 83 percent of the guiding principles are met.
- figure ten is the analysis that if the Saskatchewan Cancer Agency had jurisdiction for the delivery of mammography services, 67 percent of the guiding principles are met.
- figure eleven is the analysis if a hybrid model for jurisdiction for the delivery of mammography services was chosen, 25 percent of the guiding principles are met.

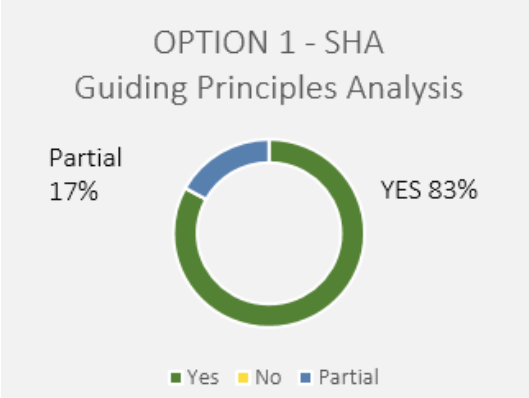


Figure 9. Saskatchewan Health Authority meets 83% of guiding principles

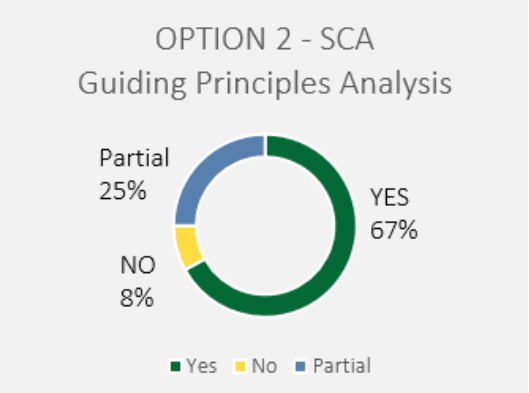


Figure 10. Saskatchewan Cancer Agency meets 67% of guiding principles

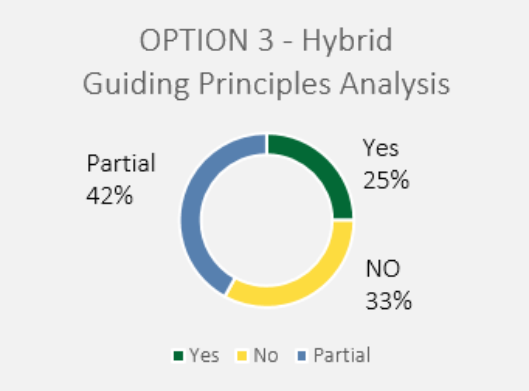


Figure 11. A hybrid model meets 25% of guiding principles

Figure twelve represents the future state for the delivery of mammography for Breast Pathway Phase 1.

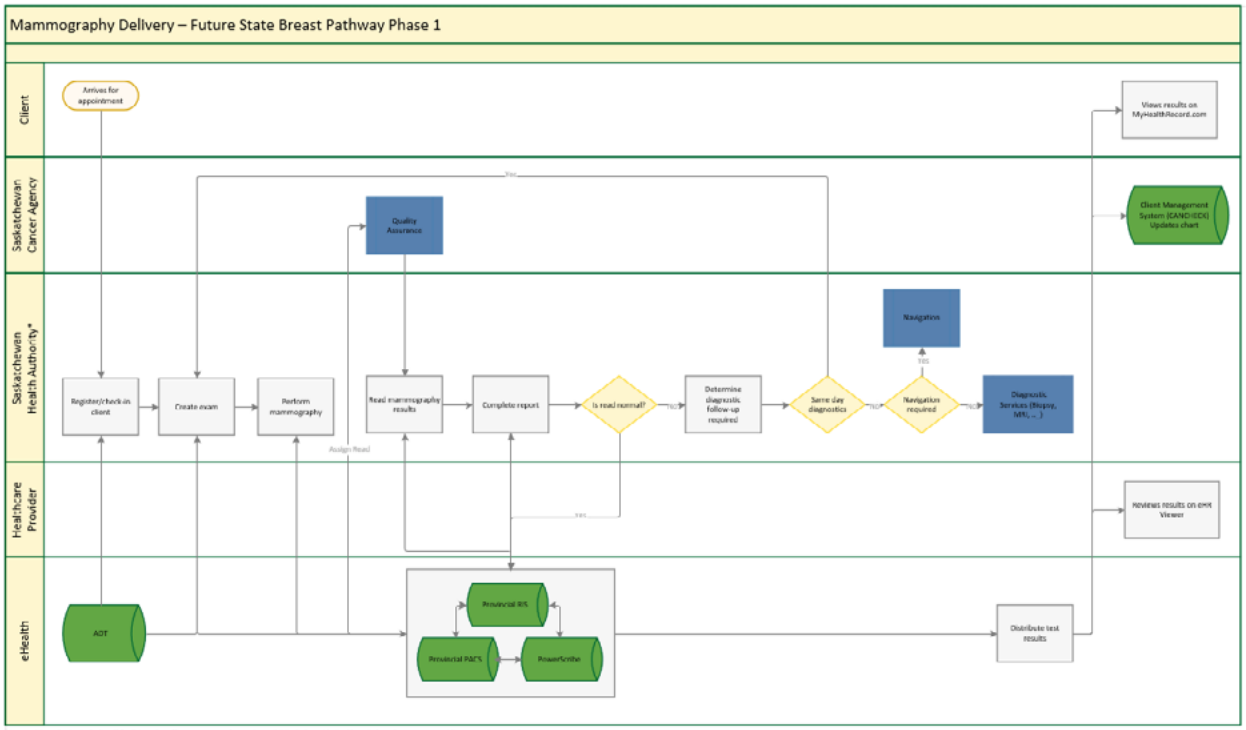


Figure 12. Future State – Mammography Delivery for Breast Pathway Phase 1 Continuum

*SHA includes all facilities who offer mammography services, including mid-sized hospitals & agreements with community providers.

Recommendations

Upon reviewing the above information and analysis, this section recommends the following:

- Deliver Saskatchewan's mammography services through one accountable jurisdiction, that is the Saskatchewan Health Authority.
- Implement a standard process for mammography delivery.
- Leverage the provincial information technology systems.
- Maintain the Saskatchewan Cancer Agency's jurisdiction over promotion, education and quality assurance of screening mammography.

4.5.2 Distributing Breast Screening Mammography Reads

In 2019, the Canadian Association of Radiologists Mammography Accreditation Program (CAR-MAP)[80,83] recommended a change in the minimum annual reading volume from 480 to 1,000. The change is based on evidence suggesting read volumes of less than 1,000 per year do not allow for an adequate review of the radiologist performance. The breast pathway aims to establish a minimum of 1,000 per radiologist reads annually for diagnostic and maintain 2,000 per radiologists annually for screening. In order to accomplish this, the approach of distributing the reads has been put forth for consideration.

Current State in Saskatchewan

Breast screening is provided by the Saskatchewan Cancer Agency clinics and mobile bus, the Saskatchewan Health Authority mid-sized hospitals, and community radiology centres. Women due for screening are encouraged to book their mammogram through the Screening Program for Breast Cancer.[318] However, the healthcare provider may refer the client to a community radiology centre.

All Saskatchewan Cancer Agency and Saskatchewan Health Authority screening mammogram images are read at the Regina or Saskatoon Screening Program for Breast Cancer clinics. Contracted radiologists reading the mammogram must physically attend the clinic to complete the read. Comments are handwritten on paper reports, that are then transcribed into the software, Integrated Screening Information System (ISIS). The completed report is scanned and saved as an image in the provincial Picture Achieving and Communication System (PACS).[173] The necessity to be in the clinic inhibits the distribution of reads beyond Regina, or Saskatoon, based radiologists.

It is a goal for all mammogram reports to be uploaded to the provincial Radiology Information System (RIS)[169]. ISIS does connect to RIS to create a visit for the exam order; however, the completed report is available as an image in PACS.

Considerations

Benefits to fully use provincial RIS for mammography reporting include:

- Ability to distribute the reads.
- Mammogram reporting can be done from anywhere with access to provincial RIS, eliminating the need to be physically present in the SCA office.
- Completed reports will be in provincial RIS, therefore:
  - Available to the healthcare provider in the eHR Viewer,[170] the secure website for healthcare providers to access client information.
  - Available to the client in MySasKHealthRecord,[171] the secure website that contains one's personal health information.
- Automated report distribution.
- Ability to implement a common report template with built in reportable fields such as breast density rating, normal or abnormal, Breast Imaging – Reporting and Data System (BI-RADS®)[19] score, and designate as screening or diagnostic mammogram.
- Utilizing PACS workflow would allow assignment and restriction of reads to a group or individual.
- Ability to monitor volumes to ensure radiologists can meet minimum number of reads for CAR-MAP.[83]

ISIS already communicates with RIS and much of the technical work is done. Two changes required are configuration and template design. The larger effort will likely be the change management required. This solution requires the radiologists to log into provincial RIS and use PowerScribe360, [169] the real-time radiology software, for dictation. For the current pool of contracted radiologists, there will be a wide range of comfort level depending on the experience and current practice of each resource. For SHA radiologists the learning curve will be minimal as they currently use provincial RIS and PowerScribe 360 for other diagnostic imaging reporting.

SCA could simply be a recipient in the final report distribution and attach it to the chart. If desired, the report could be transcribed into ISIS. Although this seems inefficient, it might make sense until such time that ISIS is replaced. Also, provincial RIS does not have the functionality to include an image such as appears on the ISIS report so there would be some interpretation required to complete this section.

Recommendations

Upon reviewing the above information and analysis, this section recommends the following:

- Leverage the provincial information technology systems.

4.5.3 Tomosynthesis

Digital breast tomosynthesis, often-referred to as three-dimensional (3D) mammography, is an advanced form of breast imaging created by digital reconstruction of multiple mammographic images into overlapping slices. Synthetic views are two-dimensional (2D) projection images reconstructed from the information acquired during data acquisition."[80]

Background

The Canadian Agency for Drugs and Technologies in Health published five reports regarding tomosynthesis.[69,71,73,74,77] Overall results are that tomosynthesis improves cancer detection rates, can reduce the need to recall women for additional tests and improved detection for people with extremely dense breasts. A budget impact analysis found tomosynthesis to be cost saving due to lower recall rates and the reduced treatment costs that result from early cancer detection.

In 2018, the Canadian Task Force on Preventative Health Care (Task Force) updated the guidelines on screening for breast cancer in women ages 40-74 who are not at increased risk. The task force indicated there is a lack of evidence on clinical outcomes of screening by tomosynthesis.[113] It is noted that the task force only considers evidence from randomized controlled trials and does not include any retrospective or observational studies as evidence.

The Canadian Association of Radiology Mammography Accreditation Program (CAR-MAP)[80,83] does not have an accreditation protocol specific to tomosynthesis. In February 2019, CAR issued a statement regarding the Canadian Task Force on Preventative Health Care guidelines. "The Task Force recommendation against using tomosynthesis on average risk women, cited in the guidelines as a 'strong recommendation, no evidence' ignores the very large body of evidence on tomosynthesis that has been summarized in 2015 by the Canadian Agency for Drugs and Technologies in Health and discussed in the CAR Breast Imaging and Intervention Guideline 2016 update. The evidence on tomosynthesis demonstrates not only an increase in the cancer detection rate but also a decrease in the false positive mammogram recall rate. The issue of false positive mammograms was cited by the Task Force guidelines as one of the harms of screening, yet the ability of tomosynthesis to reduce the rate of false positive examinations, was inexplicably discounted."[85]

In 2016, the Tomosynthesis Mammographic Imaging Screening Trial[254] (T-MIST) started through the National Community Oncology Research Program and National Clinical Trials Network. TMIST is a randomized breast screening trial that will help researchers learn about the best ways to find breast cancer in women who have no symptoms.[258] T-MIST compares standard digital mammography (2D) and tomosynthesis mammography (3D). The trial includes asymptomatic women ages 40 and over and results will be available in 2023.

Within Canada, tomosynthesis is used for diagnostic and screening. Some examples are:

- In 2009, The Rose Ages Breast Health Centre, The Ottawa Hospital,[356] began using tomosynthesis clinically for diagnostic assessment.
- In 2015, some Alberta community radiologists adopted tomosynthesis as the standard of care for both screening and diagnostic exams. Currently 85 percent of mammography occurs in community radiology with tomosynthesis. Dr. Shelia Appavoo, a radiologist at MIC Medical Imaging in Edmonton, Alberta, quoted "From the audit of our first full year of using it, we've had at least a 50 percent increase in our cancer detection rates."[282]

- In 2018, Queen Elizabeth Health Complex, Montreal, started using tomosynthesis for all breast exams.[299]
- In 2019, The Foundation for the Guelph General Hospital fundraised to replace current mammography equipment with tomosynthesis to be used in screening and diagnostic.[355]
- British Columbia is currently using tomosynthesis for research purposes.[98]

The American Medical Resource Institute states there is less pain and discomfort as the client's breast is not compressed as firmly.[23] Star Imaging and Research Centre indicates 3D is a faster scan that minimizes pain.[348] Siemens Healthineers indicate clients notice a big difference with breast compression and comfort level.[24,338]

Dense breast tissue is an independent risk factor for cancer. A mammogram is 90-100 percent effective in fatty breasts and only 50 percent effective in the highest density. The addition of tomosynthesis to digital mammography for women with heterogeneously dense breasts provided the largest gain.[302]

Current State in Saskatchewan

Mammography services are available throughout Saskatchewan. (See Appendix G). Currently, tomosynthesis makes up approximately 25 percent of all mammography.

Staff at Saskatoon Screening Program for Breast Cancer report increasing calls regarding tomosynthesis. From December 1-31, 2019, 0.42 percent of telephone calls discussed tomosynthesis. Reasons women stated they would attend community radiology were a belief it is a better test, a friend recommended, or a healthcare provider recommended. Two comments were regarding dense breasts. Statistically, there has not been a decrease in the number of women due to the availability of tomosynthesis. Comparing the first six months for the years 2015 through 2019, the number of mammograms increased from 4,332 to 4,853.

Considerations

- From November 1-December 13, 2019, a radiologist referred 2.77 percent of clients attending the Screening Program for Breast Cancer Saskatoon clinic for tomosynthesis. This number may be low due to the fact radiologists are aware tomosynthesis is the standard at diagnostic radiology centres and no longer write this as a recommendation.
- A client with an abnormal screening mammogram requires further investigation. This may include a diagnostic mammogram and or an ultrasound, or a biopsy, if suspicion of cancer. A screening tomosynthesis exam can reduce false positive referrals for diagnostic mammograms, as it may clarity the difference between tissue overlap and a true mass with the need to refer for additional diagnostic mammography views.
- The Canadian Association of Radiology Mammography Accreditation Program[80,83] requires submission of a dense breast image to pass accreditation. Some mid-sized hospitals reported once a client with dense breasts receives tomosynthesis, they do not always return to screening. This affects the ability to choose dense breasts images to submit for accreditation purposes.
- A quality assurance practice includes comparing previous images to current images. This comparison assists the radiologist in determining if the mammogram is normal, or there is a change requiring follow-up. Tomosynthesis images to 2D mammogram images cannot be compared, as the current Screening Program for Breast Cancer workstations do not display 3D images. From November 1-December 13, 2019, 17.22 percent of Saskatoon Breast Screening individual's last mammogram was tomosynthesis. With these clients, comparison occurred to previous non-tomosynthesis images.
- Tomosynthesis machines are more expensive. However, digital mammography equipment has decreased in price since the original purchase prices. The first digital mammogram machine was purchased in 2004 in Saskatchewan.

    - Within Saskatchewan, all current mammography equipment will be end-of-life by 2022 and will require replacement.
    - Fundraising is occurring in Moose Jaw, North Battleford, Swift Current and Yorkton to replace current equipment with a tomosynthesis capable mammogram machine.
    - A provincial Request for Proposal for new mammography equipment will leverage bulk purchasing.
- Reading tomosynthesis image sets can at least double the time for interpretation as compared to 2D mammography.[52,80,227]
    - Saskatchewan community radiologist indicate that interpretation takes more time with the number of images to scroll through. A radiologist reported diagnostic tomosynthesis has slowed workflow and there is an increase in further testing, that includes spot compression views and ultrasound. Another radiologist estimates it takes at least twice the time to review tomosynthesis compared to 2D mammography.
    - Researchers from Massachusetts General Hospital showed that mean interpretation time was 2.8 minutes for combined tomosynthesis and mammography studies and 1.9 minutes for mammography, a 47 percent increase in time.[158]
- Training requirements
    - Radiologists attend an eight-hour workshop that is available on-line or in-person outside Saskatchewan.
    - Mammography technologists require additional training, that the vendor includes at the time of installation.
- Data storage requirements are larger
    - Current images are stored on eHealth's Picture Archiving and Communication Systems (PACS)[173] for a cost of $3.15 per study, that includes the images, reports and associated documentation. Size is not a costing factor in image acquisitions.
    - The current PACS version, 4.4.541.5, does not handle tomosynthesis datasets well, as the images load very slowly and do not scroll well. PACS is being upgraded to version 4.4.553.30 in 2020.[172]
    - eHealth Services indicated there will be coordination with the current vendor, Phillips, to ensure the network infrastructure can handle the load. There may be an additional cost for the bandwidth on the network depending on volume.
    - A community radiology group reported it was approximately $35,000 for upgraded servers and bandwidth for the larger data storage requirements.
- Currently there is one diagnostic fee code for mammography in Saskatchewan's Physician Payment Schedule:[194]
    - Screening mammograms are an uninsured service. Per screen fees are paid to radiologists through service agreements.
    - Saskatchewan Radiologists have not applied for the addition of a tomosynthesis code in the Physician Payment Schedule. The process timeline is 8-12 months for a new fee code to be implemented.[324]
    - Alberta's Physician Payment Schedule includes a screen code, diagnostic code and a tomosynthesis code.[6]

Recommendations

Upon reviewing the above information and analysis, this section recommends the following:

- Upgrade provincial mammography to tomosynthesis within two to three years.

4.5.4 Telemammography

Teleradiology is the electronic transfer of radiographic images from one locality to another. An image is acquired in one location and transmitted to another location to be viewed and interpreted by a radiologist at a later point in time.[50] Telemammography is the electronic transfer of mammographic images from one locality to another. It is real-time, off-site interpretation of digital mammograms through networks between the site where the mammogram is taken, and a centre where mammograms are interpreted.[50]

The primary purpose of telemammography is to improve access to mammography for underserved populations and thereby increase the rate of early breast cancer detection. There are several advantages of this process including the ability for radiologists to cover multiple sites, better consultation with the client or between physicians, less time to diagnosis and consequently reduced period of anxiety. The real-time evaluation of mammogram images allows women from rural areas to obtain their results before they need to travel back to their homes, particularly those living in areas that have more limited communication capabilities.[50]

Background

The Canadian Agency of Drugs and Technologies in Health completed the *Rapid Response Report: Summary of Abstracts Telemammography for Breast Cancer Diagnosis: Clinical Utility, Cost-Effectiveness, and Guidelines.*[70] There was no relevant literature regarding telemammography for breast cancer diagnosis. An informal scan reported that telemammography and teleradiology are being used in the Territories, Thompson, Manitoba and northern Ontario.[51]

The Territories, Thompson, Manitoba and northern Ontario meet requirements for Canadian Association of Radiologists Mammography Accreditation Program (CAR-MAP)[80, 83] accreditation. CAR-MAP states "Screening mammography may be performed in non-traditional settings where a radiologist may not be in attendance. This includes digital telemammography. Where practical, the radiologist supervising the facility, or an appropriately qualified delegate, should be available for consultation and should visit the facility at least monthly to observe the performance of mammograms and assure that safe operating procedures are followed."[80] The same qualifications apply to a radiologist interpreting diagnostic mammography. In 2008, CAR published standards for teleradiology, that includes "digital mammography is evolving rapidly but at this time primary reading is not performed on PACS systems. This standard will be updated as tele-mammography technology matures."[82]

The American College of Radiology[20] indicates, "The interpreting physician does not need to be present at the facility to monitor the screening mammogram when the client is imaged. Diagnostic mammography may be performed without the interpreting physician on site (diagnostic telemammography). However, because diagnostic evaluation often includes real-time correlation of mammographic, sonographic, and clinical findings, this practice is not optimal.

1. Diagnostic telemammography should be used only in circumstances of limited client access, in order to facilitate client care.
2. If performed, the responsible physician should be immediately available to review images and provide direction throughout the examination." [20]

There are global organizations offering telemammography. [82,146,150,160,182,343] Examples are Australia,[182] India[343] and United States.[160] Teleradiology is a growth technology growing approximately fifteen percent annually against an increase of only two percent in the radiologist population.[160]

In 2018, the Australian Department of Health completed a literature review on emerging technologies in breast cancer screening. It found the use of telemammography to be at least moderately widespread, and a range of benefits, including the ability to provide services to remote areas, and better utilization of radiologists' time. The review found no significant difference in screening outcomes between traditional mammography and telemammography technologies.[50]

Current State in Saskatchewan

Saskatchewan has a large geographical area with sparsely populated rural and remote. Screening mammography is provided by the Saskatchewan Cancer Agency in Saskatoon, Regina and a mobile bus, along with a number of contracted Saskatchewan Health Authority services within mid-sized hospitals. The Saskatchewan Health Authority and community radiologists offer diagnostic mammography.

Teleradiology is used in diagnostic imaging throughout Saskatchewan with the Radiology Information System (RIS) and Picture Archiving Communication System (PACS). This may occur when a small community does not have a radiologist on-site. An example is an x-ray from Shaunavon is interpreted in Swift Current. As well, there are some physician offices and other diagnostic facilities offering imaging, that are interpreted off-site. Radiologists can interpret images in their office, hospital or at home, providing there is a workstation and access to PowerScribe360[169]. Several modalities, except diagnostic mammography, are being interpreted via Teleradiology. Teleradiology is also used for interpretation of screening mammography completed on the mobile bus and the mid-sized hospitals.

The College of Physicians and Surgeons of Saskatchewan Regulatory Bylaw 25.1[150] provides the requirements for the operation of diagnostic imaging facilities. The bylaw states that mammography centres must have Canadian Association of Radiologists (CAR) or American College of Radiologists (ACR) accreditation, or be accredited by a body approved by the Advisory Committee on Medical Imaging (ACMI)[146]. It clarifies CAR guidelines to indicate mammographers shall meet the CAR standards for mammography or have received special approval from the ACMI. The objectives of ACMI are:

- Establish and administer a comprehensive quality assurance program for diagnostic imaging services.
- Study and advise upon the best possible, safe and required medical imaging services.
- Serve as a resource to the Ministry of Health and Saskatchewan Health Authority on medical imaging issues.

As of February 2020, the ACMI does not support telemammography.

Considerations

Saskatchewan is facing recruitment issues in many rural areas for generalist radiologists. There is a danger of losing mammography service locally if telemammography is not a consideration. Currently there are no standards for telemammography in Saskatchewan. Standards and processes to be developed include unavailability of radiologist due to vacation, vacancy or other reasons. The process of double reads will also need addressed.

Recommendations

Upon reviewing the above information and analysis, this section recommends the following:

- Develop standards for telemammography, screening and diagnostic, in Saskatchewan.

4.6 Navigation

Across Canada, navigation is recognized as a key component of an integrated cancer care system to address the specific needs and gaps of target populations, improve delivery of client-centered care, facilitate timely access to care services and helps clients to make informed decisions.[104] Navigation programs improve results and reduce disparities by eliminating barriers to obtaining quality care. Client navigation provides for the right service at the right time for the right client, with efficiency and little duplication of effort.

Gaps exist in the breast pathway regarding the availability of navigation services after an abnormal breast imaging result. Access is dependent on whether they are a client of the Screening Program for Breast Cancer, if their healthcare provider has signed a medial directive, the location of the diagnostic imaging facility and geographic location. These gaps can lead to delays in diagnosis and treatment. Delays are also created by the inability of the community radiologists to arrange all further testing required to complete the diagnostic circle.

The navigation analysis aligns with the breast pathway primary objectives, guiding principles and assumptions. (See Appendix B). One primary objective is to enhance access to navigation services using modern communication tools such as texts, online chats, emails and access to breast cancer information.

In the client perspective section, determinants were identified as impacting the experience. Clients spoke to a desire for coordinated and seamless care throughout their journey, timely results with minimal waits to decrease their anxiety, the importance of communication, and the importance of education.

Background

Client navigation is defined as a "proactive, intentional process of collaborating with a client and their family to provide guidance as they negotiate the maze of treatments, services and potential barriers throughout the cancer journey."[104] There are many benefits to a navigation program.[281]

The diagnosis and treatment of cancer may be confusing, intimidating, and overwhelming for clients/patients and their families. Individuals seeking care can get lost as they move among different healthcare providers, that can have a serious effect on clinical outcomes. Clients report: [25,89,104,284]

- Going through breast cancer treatment is often like trying to find their way through a maze.[89]
- The stress and anxiety from the moment they discover a suspicious symptom or receive an abnormal screening result to the time they receive a confirmed diagnosis is often the most difficult part of their cancer journey.[96]
- Their care is fragmented and confusing.
- They may not fully comprehend the importance of prompt evaluation and treatment of their disease.[104]
- Their burden is not limited to the direct physical effects of the disease; they have to deal with a wide range of emotional, psychological, social and practical challenges throughout their journey.[104]

The Canadian Partnership Against Cancer report *Living With Cancer*[103] indicates that women want to be empowered with tailored, understandable information about their cancer and treatment options. Women want support services that focus on the physical, emotional and practical concerns that they, and their families, face. [103]

The Breast Cancer Screening Pathway map[107] illustrates Canadian organized breast screening programs, including how women experience the screening process. This map illustrates steps and points of communication that a client may experience through to follow-up for a cancer diagnosis. [107]

Breast cancer disparities impact breast cancer outcomes among specific population groups. These groups may include, but are not limited to, those characterized by race, ethnicity, religion, nationality, socioeconomic status, age, sexual orientation, geography, or disability. Care barriers that may lead to disparities in outcomes fall into a number of categories: [25,26,204,278,353]

- Financial and economic barriers related to ability to pay for costs related to receiving care.
- Language and cultural differences.
- Problems understanding the medical information communicated and getting lost in the complexity of the health care system.
- Bias based on culture, race, age and sexual orientation.
- Fear, distrust and emotional barriers.

Navigation is a potential strategy to improve outcomes and reduce cancer-related disparities by eliminating barriers to obtaining quality cancer care. Navigation provides for the right service at the right time for the right client, with great efficiency and little duplication of effort.[25]

4.6.1 Navigation History

Dr. Harold Freeman developed the first navigator program in 1990 in partnership with American Cancer Society. It focused on women who faced more barriers being screened, diagnosed and treated and had poor cancer outcomes. Peer navigators, women from the same culture or community, or cancer survivors, received training and provided support to organize the care, overcome logistical barriers, and help the client feel empowered to take an active role in their care.[25,186,204] Navigation has been an accepted part of breast cancer accreditation programs run by the American College of Surgeons since 2008.[281]

Freeman believes there should be an interconnection between the lay navigator and the professionally trained navigator and they should work together to move the client through the treatment of cancer. At certain points, required actions are relatively simple and can be done by a lay navigator, and as cancer treatment becomes more complex in terms of social or clinical services, a clinically trained navigator should step in. [25,186,204] This is cost-effective and provides for staff to work within their scope. Freeman explains a key concept is to keep the full continuum of care in mind. If the client has an abnormal finding, it needs to be resolved through to diagnosis. If the client has cancer, it has to resolve with the treatment of cancer. Freeman observed that navigation programs in the United States are taking on parts of the navigation process and not necessarily connecting to the next action required for the client. [25,186,204]

With navigators, Freeman found outcomes improved. At Harlem Hospital alone, the five-year survival rate jumped from 39 percent to 70 percent. A Boston navigation program demonstrated a 12 percent improvement in mammography screening rates, a 15 percent improvement in timely follow-up rates after an abnormal screening test, and a 50 percent reduction in missed appointments. [25,186,353]

4.6.2 Navigation Modes and Scope

There is no single best method of cancer-related navigation and they vary in terms of the personnel and services provided. The core intentions and outcomes are to facilitate and enhance the delivery of high quality, client-centered care and to improve the journey.[104,204]

The navigator's role can focus on specific tumor groups, populations, geographical areas, phases along the cancer care trajectory and others. Roles of navigators include to: [25,89,186]

- Help the client navigate the system by connecting them with resources and support systems.
- Facilitate interaction and communication with healthcare providers.
- Streamline appointments, paperwork, track interventions and outcomes.
- Help clients arrive at scheduled appointments prepared.
- Help empower client's and decrease fear and anxiety.
- Help clients identify and use appropriate social services.
- Engage in outreach and education strategies to increase breast health awareness in their community, depending upon population size and complexity.[89]

There are many different types of client navigators. Most common are nurses, social workers, and peer or lay health advocates from within the community.

Modes of navigation may include:[29,89,104,108,226,278,353]

4.6.2.1 Professional Navigation

- A health care professional with oncology expertise and experience provides care directly to clients, providing such critical functions as assessment, implementation and evaluation of clinical and supportive care needs throughout the cancer journey.
- Facilitates a coordinated approach, provides emotional and psychological support, engages in in caring and therapeutic communication and relationships, and enables education and information sharing.

4.6.2.2 Peer or Lay Navigation

- Peer navigators usually have had a cancer experience as a survivor or caregiver. Lay navigators may not have had direct experience with cancer.
- Trained and generally work as volunteers, although they can be paid.
- Focus on providing information to clients and families and can facilitate access to services and resources.
- Provide a client-centered approach where the priorities and concerns of clients and families guide interactions.

4.6.2.3 Online Navigation

- Client and/or family members find the information and services they need, often within virtual navigation tools and online resources. This can include navigation tools such as Choose My Tree.[54] Virtual navigation is recognized as an important component of navigation overall.
- Personal health portals enhance the ability to self-navigate, improve engagement, self-management of care, and improve the experience by providing easy access to credible cancer information. High quality e-health application is supported as a relevant, timely and important resource for clients and families.
- Web-based tools that include features such as a repository of clinical trials, and monitoring, record keeping and communication devices designed to help manage their cancer experience.
- Virtual navigation in health care supports clients via internet resources to manage their illness demands.[350] Canadian Cancer Society offers online support.[90]

4.6.2.4 System-based Navigation

- Redesign of cancer care procedures and pathways to decrease delays and increase client-centered efficiency. An Ontario panel examined “Are we looking at the idea of health system navigators because our delivery system is disorganized and unintegrated or would a more integrated system of care eliminate the need for navigators in the first place?[281]

Not all clients need navigation, but it is important that they are aware that it is available and accessible. Some individuals and families may find that different modes are best suited to their needs at different stages of their experience.

The Canadian Association of Nurses in Oncology’s position is that oncology nurses best fit the professional navigation role. “Oncology nurses are required to have an evidence-informed understanding of the physiological impacts of treatment and diagnosis, the psychosocial impacts of the illness, and an understanding of cancer care services across the cancer trajectory. These attributes, along with the competencies of oncology nursing more generally, the definition of navigation, and the shared goal of client-centered care, position oncology nurses as well suited to the navigator role”.[79]

Navigation can occur at any point, providing assistance for a defined episode of care. It can target a defined set of services to complete a specific cancer care goal, with a defined end point. It focuses on identifying and resolving barriers to receiving care, and aims to reduce delays in accessing services throughout the continuum of cancer care.[104]

Guidelines suggest:

- The Canadian Partnership Against Cancer "Patient Reported Outcome" initiative hopes to lead the shift to providing client-centered care during each stage of the journey to ensure that clients and families receive coordinated care.[106]
- The Oncology Nursing Society believes that navigation services should begin with prevention and screening activities and facilitate care transitions through diagnosis, treatment, survivorship, and end-of-life care.[274]

Across Canada, navigation is recognized as a key component of an integrated system of cancer care designed to address the specific needs and gaps of target populations, a means to improve delivery of client-centered care through coordination and continuity of care, facilitate timely access to care services, information and guidance, and help to make informed decisions. Canadian programs initially focused less on underserved populations and more on women living with cancer in general. More recent programs have taken a culturally targeted approach.[104]

In Canada, Nova Scotia was one of the first jurisdictions to introduce a navigation program into its cancer care system. The program was first implemented in 2001. An evaluation report confirmed there was significant benefit for cancer clients and their families in dealing with the emotional turmoil, informational needs and logistical challenges associated with having cancer. The programs also contributed to overall improvements in the cancer care system itself related to integration, coordination and continuity of care.[271] Unlike other programs in Canada, Nova Scotia's screening program does not deliver any care services. They are in charge of coordinating the care and movement of clients throughout the screening and diagnostic process as necessary. A centralized booking system and a centralized IT platform help to support the one Nova Scotia Breast Screening Program nurse navigator to focus on client needs from screening, diagnosis and all the way to treatment. [268,271,281,]

Navigation initiatives have been implemented in all provinces and one territory, and services continue to expand: [79,89,103,278,281]

- Most programs span the trajectory from diagnosis through treatment to survivorship, some programs target only the diagnostic phase.
- The majority of professional roles are assumed by oncology nurses, but in some programs professional navigators are social workers. A combined team model also exists.
- Most navigation programs focus on newly diagnosed cancers defined by tumor site.
- Numerous programs target high-needs clients or address gaps in accessibility and care for clients in rural and remote communities. Some provinces have navigators who help address women's language and cultural needs:
    - Cancer Care Ontario has an Indigenous Patient Navigator Program that provides support and advocacy for First Nations, Métis and Inuit women. [104,124,281]
    - Toronto-based program provides navigation services for the Chinese Canadian community.[281]
    - British Columbia Cancer Agency has a Chinese Peer Navigator Program providing the Chinese-speaking population with conversation and support in finding resources or services, as well as, for First Nations communities. [104,281]
- In New Brunswick, pediatric oncology nurse navigators help children and teens and their families navigate health care and community support systems from time of diagnosis to recovery.[104]
- In Quebec, Pivot Nurses in Oncology are integrated in health care teams as a resource for clients and their families from the moment of diagnosis and along the entire care continuum. [104,281]

- In Alberta, there are three models including 1) generalist from diagnosis to end of life care, 2) Indigenous navigator and 3) breast cancer from suspicion to first surgical consult. [104,281]
- In Newfoundland and Labrador, Cancer Patient Navigation members are culturally sensitive and highly trained nurses available at point of suspicion.[281]
- At CancerCare Manitoba, as part of its IN SIXTY initiative,[341] implemented a professional navigation model. Navigation starts at point of high suspicion of cancer, or positive pathology and stops at first cancer centre appointment. Most clients are referred by a health care provider, however clients in a rural setting can self-refer. [116,118,222,341]

Current State in Saskatchewan

In Saskatchewan, there is no defined navigation pathway for a client across the breast pathway. The opportunity for navigation support after an abnormal breast imaging result or a cancer diagnosis varies. Access is dependent on whether the clients attends the Screening Program for Breast Cancer, if her healthcare provider has signed a medial directive, the location of the diagnostic imaging facility and r geographic location. The gaps in navigation service can lead to delays in diagnosis and treatment.

Radiologists do not refer directly to the Breast Health Centre or Breast Assessment Centre because they are not the primary healthcare provider. Their role is to ensure the healthcare provider is aware of the concerning imaging and will recommend the referral for further testing. Delays can be created by these handoffs. Other physician specialists, such as surgeons and oncologists, order medical imaging tests in order to diagnose or treat cancer.

There are a number of professional navigator roles in the province. In addition to the navigators discussed in the sections below the roles include, but are not limited to, screening focused navigation, the Prostate Pathway in Saskatchewan Health Authority, Gynecological Oncology and the New Patient Navigators at Saskatchewan Cancer Agency. The majority require registered nurses. The New Patient Navigators at Saskatchewan Cancer Agency are Social Workers.

4.6.2.5 Saskatchewan Cancer Agency

In October 2006, Saskatchewan's Screening Program for Breast Cancer implemented the navigation program as a pilot project. The navigators are registered nurses. The purpose of the program was to assist in reducing wait times and the anxiety levels by providing timely seamless access, guidance and support to women who require follow-up tests and care.[138] Healthcare providers' sign a medial directive that authorizes the navigator to provide follow-up care after an abnormal screening mammogram. The healthcare provider has three options: no, yes, or case-by-case. Once authorized, the navigator:

- Informs the client of their screening result and next steps.
- Facilitates appropriate and timely follow-up diagnostic tests requested by the radiologists.
- Answers client concerns and provides emotional support and contacts for support groups.
- Help the client understand the process and addresses problems encountered.
- Provides educational information.

Navigation is based on the recommendations of the screening radiologist. Currently, the navigator cannot arrange tests recommended from a diagnostic radiologist. This can result in delay.

The navigation ends when the diagnostic imaging results are given to the client by their healthcare provider for BI-RADS®1, 2 and 3.[19] For BIRADS® 4 and 5, the navigation file is closed as per standard work:

- Once the Breast Health Centre has received referral from healthcare provider.
- For the Breast Assessment Centre and mid-sized hospitals (Swift Current, Moose Jaw, Yorkton) the file is closed after receiving biopsy, radiology and pathology report and the healthcare provider has referred the client to a surgeon for the clients with BIRADS 6, that means a diagnosis of cancer.

When a healthcare provider does not authorize the navigator to proceed with follow-up, the healthcare provider will be responsible to contact the client to discuss results and arrange for any follow-up tests. The navigator keeps the clients file open and reminds the healthcare provider if required.

In 2012, the navigation program was evaluated to determine effectiveness and if the original objectives were achieved. Highlights of the evaluation include the following:[138]

- Participation rate
  - Since program implementation in October 2006, the volume of women with abnormal screens navigated increased. 92 percent of women were navigated during the first two (2) years and 99 percent of women were navigated during the last two years.
- Medical directive status
  - For the first two years, the physician participation rate was 68.1 percent and later it was 88.4 percent. The number of physicians opting for navigation of clients on a case-by-case basis has declined, indicating a shift to physicians agreeing for their clients navigated by the program.
- Median wait times
  - Before the program existed, the wait time between abnormal mammogram and subsequent follow-up testing was 29 days. This wait time decreased during the initial implementation period to 11 days and subsequently increased gradually to 21 days in 2011.

4.6.2.6 Saskatchewan Health Authority

The Saskatchewan Health Authority operates two assessment centres. This includes Breast Assessment Centre, Regina and Breast Health Centre, Saskatoon.

4.6.2.6.1 Breast Assessment Centre, Regina[320]

At the Breast Assessment Centre, Regina, radiologists often complete further diagnostic testing such as mammogram, ultrasound and a biopsy in the same appointment. The radiologist informs the healthcare provider of the testing, but does not require a referral.

Radiologists performing mammography at Prairie Sky Medical Imaging, a community radiology service, refers the client back to their healthcare provider who is responsible for arranging further follow-up testing. This may create delay in diagnosis. There is no process to check if the client has been referred.

A gap in support and service was identified for women who had their biopsies done at the Breast Assessment Centre in Regina. There is a time delay between receiving a diagnosis of breast cancer to the appointment time with a surgeon. This is a highly stressful time in a women's breast cancer trajectory. Currently support and communication for the client is with their healthcare provider, as this centre does not provide navigation services. A pilot project started in 2018 to provide navigation support, however, the project is on hold as of January 2020.

4.6.2.6.2 Centre of Care Breast Health Centre, Saskatoon[321]

The Irene and Leslie Dubé Centre of Care Breast Health Centre, Saskatoon serves clients in central and northern Saskatchewan. Diagnostic mammograms are done prior to attending the centre. The referral must be done by the healthcare provider. When a biopsy is done at this centre, they are immediately connected with a surgeon. The only exception is when the client was referred by a surgeon outside of this centre. The nurse navigator is a registered nurse who meets with all clients diagnosed with breast cancer to provide education and support, pre-operative teaching and other resources as required through the surgical process.

Considerations

During the research for this section, the following were identified in examining the navigation process and determining the jurisdiction for delivery:

- A clear, defined, and communicated provincial navigation model for breast pathway is not available in Saskatchewan.
- The term navigator is not well defined.
- Canadian Partnership Against Cancer Strategy, a 10 year roadmap, calls for cancer system partners to collect patient-reported outcomes and experience measures to provide more comprehensive client-centered care that affect quality of life of clients and their caregivers.[96] Metrics tools are available to facilitate metric selection.[204]
- Outcomes of navigation are influenced by the type of navigation model chosen.
- There is no one-size-fits-all template for navigation programs. These services can be designed to fit with a program's specific resources, community needs, and strategic objectives.
- Navigation is an effective role to support women advancing through breast cancer screening into further diagnostic evaluation and even into breast cancer treatment.
- Navigators focus on making some diagnostic appointments for the clients. Navigators could have a more active role in client support and education following diagnostic testing results.
- Navigator time is spent making calls to healthcare provider and surgeons to ensure clients have been informed of their diagnostic results and follow-up arrangements have been made.
- Multiple handoffs along the pathway can lead to delayed diagnosis and treatment.
- It is unrealistic to expect any one provider to meet clients' needs, or that there will be a standard set of care needs for all cancer clients. Scope and focus of the cancer navigator role should be defined by the organizations and clients served.
- Navigation provincial forms and toolkits are not currently available for the breast pathway.
- Navigator positions and skillset should be determined by the model created.

The vision for delivery of mammography services recommends jurisdiction should be under the Saskatchewan Health Authority (SHA). In this vision, the SHA will assume all mammography services and with that will be the accountable for the breast pathway up to the client referral to oncology.

Figure thirteen represents the future state for navigation for Breast Pathway Phase 1.

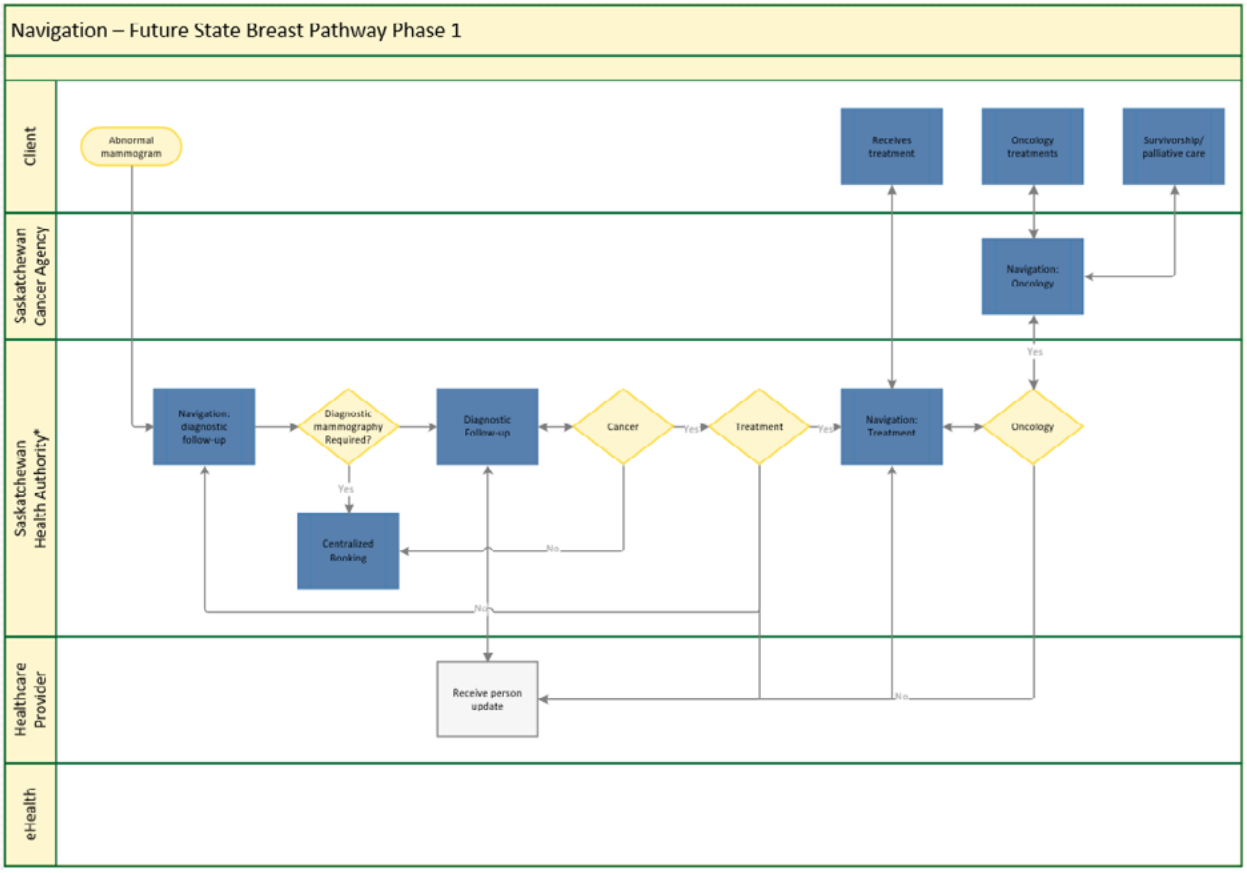


Figure 13. Future State – Navigation for Breast Pathway Phase 1

*SHA includes all facilities who offer mammography services, including mid-sized hospitals & agreements with community providers.

Recommendations

Upon reviewing the above information and analysis, this section recommends the following:

- Develop a provincial navigation program to provide access to all women across the continuum in the breast pathway.
- Sanction radiologists to arrange further testing required to complete the diagnostic circle.
- Enhance communication and information to increase access to, and awareness of navigation services.
- Develop the provincial navigation services under the jurisdiction of Saskatoon Health Authority from time of abnormal screening result to client referral to the Saskatchewan Cancer Agency.

4.7 Diagnostic Follow-up

Approximately 10 percent of women will require additional tests after a mammogram. After an abnormal screening mammogram, diagnostic assessment may include clinical history, physical examination, diagnostic mammogram, ultrasound, magnetic resonance imaging and or a biopsy at the discretion of the radiologist. Biopsy will be investigated in subsequent phases of the breast pathway.

The College of Physicians and Surgeons of Saskatchewan maintains an Advisory Committee on Medical Imaging[146] mandated, by its contract with the Ministry of Health, to develop methods and protocols for the assessment of the quality of medical imaging services. The Canadian Association of Radiologists has published *Practice Guidelines and Technical Standards for Breast Imaging and Intervention*.[80]

Background

Two medical imaging tools used for investigation of breast abnormalities are ultrasound (US) and Magnetic Resonance Imaging (MRI). Ultrasound is a medical imaging scan that uses high-frequency sound waves to capture live images from inside the body. MRI is a medical imaging tool that uses magnetic field and radio waves to produce detailed images of the body's internal structures.

Breast Ultrasound is used for the following indications:

- Investigation of mammographic abnormalities, particularly masses
- Investigation of palpable abnormalities, skin changes.
- Investigation of nipple discharge.
- Investigation of focal and persistent, noncyclical breast pain and tenderness.
- Evaluation of breast implants.
- Treatment planning for post-operative brachytherapy.
- Screening for high risk clients who cannot undergo MRI screening.
- Guidance for intervention.
- Follow-up of probably benign sonographic lesions.

Reporting for sonographic finding should be in accordance with Canadian Association of Radiologists (CAR) *Standard for Communication of Diagnostic Imaging Findings*.[81] Retention of sonographic images should be consistent with the policies for retention of mammograms and in compliance with federal and provincial regulations.

Ultrasound equipment and procedures should be systemically monitored and evaluated as part of the overall quality improvement program of the facility.

Radiologists involved in the performance, supervision and interpretation of breast ultrasound must have a Fellowship or Certification in Diagnostic Radiology with the Royal College of Physicians and Surgeons of Canada.[80] Equivalent foreign radiologist qualification are also acceptable if the radiologist is certified by a recognized body and holds a valid provincial license. As new imaging modalities and interventional techniques are developed, additional training, under supervision and with proper documentation, should be obtained before radiologists interpret or perform such examination or procedures independently. Such additional training must meet with pertinent provincial and regional regulations. Continuing professional development must meet the Maintenance of Certification Program requirements of the Royal College of Physicians and Surgeons of Canada.[80]

Breast MRI is used for the following indications:

- Investigation of nipple discharge
- Breast Implants – To determine rupture or other complications.
- Problem solving – in the case of equivocal diagnostic mammogram or US.
- High Risk Screening – women with over 20-25 percent risk (BRCA 1, 2 gene).
- Neo-adjuvant chemotherapy – to assess response.
- To determine the site of primary carcinoma.
- Perioperative evaluation – to assess for residual disease.
- Pre-operative staging – to assess extent of the disease.
- Intervention – to guide an MRI interventional procedure such as biopsy.

Radiologists involved in the performance, supervision and interpretation of breast MRI must have a Fellowship or Certification in Diagnostic Radiology with the Royal College of Physicians and Surgeons of Canada.[80] The

interpreting radiologist should practice and possess knowledge of imaging and diagnosis of breast disease. Breast MRI should only be practiced in a facility with the capacity for mammography, ultrasound, and breast intervention, including MRI-guided biopsy. The results of biopsies initiated based on MRI findings require radiologic-pathologic correlation regardless of where the biopsy is performed. A breast MRI accreditation program is not currently available in Canada.

The Canadian Association of Radiologists[80] endorses the standard of MRI radiologist qualification, as developed by the American College of Radiologists. Qualifications include:

- Supervise, interpret and report on ≥150 breast MRI examinations in the last 36 months or interpret and report ≥100 breast MRI examinations in the last 36 months in a supervised situation
- 15 hours of Continuing Medical Education in MRI.

Reporting for MRI findings should be in accordance with the *Canadian Association of Radiologists Standard for Communication of Diagnostic Findings*[81] and should include:

- All pertinent observations.
- Areas of clinical or radiologic concern.
- Level of suspicion based on imaging findings.
- Specific recommendations for client management.
- Documentation and correlation with pre-existing breast imaging studies or procedures.
- BI-RADS®[19] classification.

A quality control program with written procedures and logs shall be maintained at the MRI site.[81]

Current State in Saskatchewan

Saskatchewan's College of Physicians and Surgeons maintains an Advisory Committee on Medical Imaging [146] that has been mandated by its contract with the Ministry of Health to develop methods and protocols for the assessment of the quality of medical imaging services. As part of its mandate, Standards of Practice for Medical Imaging in the areas of general ultrasound and MRI were developed.[146] In order to assess compliance with the standards, a process is established with which to audit imaging physicians that includes audits of Radiologists among other specialties. Saskatchewan radiologists adopt and follow the Canadian Association of Radiologists *Practice Guidelines and Technical Standards for Breast Imaging and Intervention.*[80]

Recommendations

Upon reviewing the above information and analysis, this section recommends the following:

- Continue to follow the best-practices from the Canadian Association of Radiologists Practice Guidelines and Technical Standards for Breast Imaging and Intervention.
- Continue to follow standards for the College of Physicians and Surgeons of Saskatchewan Advisory Committee on Medical Imaging.

5 Governance

The Breast Pathway Phase 1 Project governance consists of a Leadership Team and a Steering Committee. (See Appendix A). The Leadership Team is comprised of representatives from Saskatchewan Cancer Agency (SCA), Saskatchewan Health Authority (SHA), and Ministry of Health. The Leadership Team plays the primary role with regards to project governance providing the following:

- Decisions and direction on project activities, issues and risk mitigation.
- Reviewing and approving any changes to the project scope and timelines.
- Approval and acceptance of project deliverables.
- Project resources as required.

The Steering Committee is comprised of representatives from patients, SCA, SHA, Ministry of Health, eHealth, community radiology, and Saskatchewan Medical Association. The project leverages the Steering Committee for direction, feedback and advice. The Steering Committee met in July 2019, September 2019, January 2020, April 2020 and September 2020.

The Breast Pathway Phase 1 Vision Report received endorsement from the three organizations exective leadership team on the following dates: SCA on September 29, 2020, Ministry of Health on March 24, 2021, and SHA on July 13, 2021. Endorsements were delayed due to the Covid-19 pandemic. A strategic plan was developed to incorporate multiple projects across multiple years to incrementally move towards and accomplish the primary objectives. The plan requires close partnerships with SCA, SHA, eHealth and the Ministry of Health.

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Appendix A: Breast Pathway Project Participants

The Breast Pathway Project would like to gratefully acknowledge the following groups and individuals involved with the breast pathway vision:

- Sponsors: Dr. Paul Babyn and Kevin Wilson
- Breast Pathway Leadership Team:
  - Dr. Paul Babyn, Kevin Wilson, Bryan Witt, Dr. Chong Lim, Karen Efthimiou, Ingrid Kirby, Dave Morhart
- Breast Pathway Steering Committee:
  - Brenda Jameson, Bryan Witt, Dave Morhart, Dr. Andrea Gourgaris, Dr. Anita Dhir, Dr. Carolyn Flegg, Dr. Chong Lim, Dr. Geeta Achyuthan, Dr. Greg Kraushaar, Dr. Ivar Mendez, Dr. Paul Babyn, Karen Efthimiou, Kevin Wilson, Paul Maindonald, Riaz Alvi, Terri Hansen Gardner
- Breast Pathway Project Team:
  - Barbara Flowers, Brenda Foster, Christa Bergquist, Darcy Guy, Gopinath Narasimhan, Karen Efthimiou, Leah Palmer, Linda Weir, Louise Mallett, Patti Shirkey, Wanda Fiessel
- Breast Pathway Vision Workshop Participants:
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- Breast Pathway Design Workshop Participants:
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- Mammography Medical Imaging Departments:
  - Battlefords Union Hospital, Breast Assessment Centre, Breast Health Centre, Cypress Regional Hospital, Dr. F. H. Wigmore Regional Hospital, Lloydminister Hospital, Royal University Medical Imaging, Screening Program for Breast Cancer, Victoria Hospital, Yorkton Regional Health Centre
- Community Radiology – Associated Radiologists, Prairie Skies Medical Imaging, Saskatoon Medical Imaging
- Content experts: Dave Ambroz, Kim Belhumeur, Tera Maquire, Susan Cherland and Tristan Bilash

Appendix B: Objectives, Guiding Principles and Assumptions

Primary Objectives of the Breast Pathway Project

- Expand awareness of services and reinforce the benefits of early detection through the use of modern strategies and channels for public education.
- Ensure health care professionals are informed of and support early detection services.
- Quality medical services are available for all women across the province.
- Define patient access requirements and provide mechanisms to address access challenges such as geographic location, socioeconomic status, and/or diversity.
- Increase number of women utilizing the services in the Breast Care Pathway.
- Ensure statistics/reporting include participation for all the screening and diagnostic services.
- Up-to-date patient data is available across the pathway ensuring no women are missed and all women receive the best care possible.
- Key performance indicators are monitored and evaluated to support continuous improvement.
- Enhance access to navigation services using modern communication tools. For example, texts, online chats, email.

Guiding Principles for the Breast Pathway Project

- Client-centered philosophy; focus on client's needs.
- Minimal travel time for women to obtain a screening mammogram.
- Minimal wait time for services.
- Coordinate and integrate breast cancer care across the continuum.
- Maximize patient accessibility and minimize duplication of services.
- Commitment to quality of services, evaluation and continuous improvement.
- Provider-developed, evidence based care, one standard of care regardless of where clients/patients are tested/treated.
- Quality medical services are available for all women across the province.
- Decisions are evidence based.
- Continuity in the flow of crucial health information across the system.
- Organizational structure that promotes coordination across settings and levels of care.
- Align service funding to ensure equitable funding distribution for different services.

Assumptions for the Breast Pathway Project

- Quality is ensured. A comprehensive Quality Assurance program will be developed and implemented.
- All facilities are CAR-MAP accredited for the equipment, radiologists and technologists.
- Radiologists meet the minimum CAR-MAP requirement of reading 1,000 mammograms.
- Radiologists reading screening meet SCA minimum requirement for reading (2,000 as of 2020).
- Inherent risks will occur with each model including human resource and space challenges. Risks will be mitigated once the model has been selected.
- The model chosen will be provincial.
- All legislative acts are followed – Cancer Agency Act, Provincial Health Authority Act
- All images will be stored on PACS. Provincial PACS and RIS will be used.
- All mammogram reports in the screening target age are sent to Saskatchewan Cancer Agency.

Appendix C: Saskatchewan Screening Mammogram Eligibility Questions

Saskatchewan's Screening Program for Breast Cancer staff ask the following eligibility questions when a client calls to book a mammogram:

- Breast implants
  □ Yes □ No
- Breast cancer
  □ Yes, (clients with previous breast cancer >5 years are eligible)
  □ No
- Lump in breast
  □ Yes □ No □ Dr is aware
- Discharge from breast
  □ Yes □ No □ Dr is aware
- First Time Mammogram
  □ Yes □ No
- Last Mammogram. Was it through the Screening Program for Breast Cancer
  □ Yes □ No
- Last Mammogram Date _____
- Last Mammogram Location _____ □ Out of Province/Country Location

Prior to client attending the appointment, staff look for previous images.

- Prior Film Status
  □ Report Only □ To Be Located □ Located □ Destroyed □ Unable to Locate

Staff ask the following questions when client is registering for a screening mammogram:

- Family history of breast, ovarian or prostate cancer
- Had breast surgery or any injuries that have caused scaring
- Hormone therapy
- Menstruation
- History of cancer

Appendix D: Saskatchewan Breast Cancer Cases

Data extracted from Saskatchewan Cancer Agency's Cancer Registry, IR19019 June 10, 2019.[129]

	First Breast case counts of Saskatchewan residents from 1980-2017 by age					*Multiple Breast cases counts of Saskatchewan residents from 1980-2017 by age*			
Age	1980 - 1989	1990 - 1999	2000 - 2009	2010 - 2017		1980 - 1989	1990 - 1999	2000 - 2009	2010 - 2017
20-24	2	2	4	4		2	2	4	4
25-29	24	14	19	24		25	14	19	24
30-34	83	100	61	70		87	104	66	72
35-39	174	207	148	144		180	222	157	145
40-44	253	353	402	257		273	376	426	269
45-49	353	485	630	468		370	510	687	509
50-54	401	594	789	702		426	645	857	766
55-59	494	651	814	732		510	691	902	805
60-64	605	703	802	765		634	761	896	869
65-69	587	826	711	808		621	905	815	925
70-74	548	789	746	683		589	882	873	813
75-79	441	676	607	500		468	750	716	602
80-84	269	474	518	379		283	534	609	466
85-89	174	284	346	295		180	305	393	347
90-94	64	99	163	131		69	106	185	154
95-100	20	21	29	27		20	24	29	31

Appendix E: Saskatchewan Radiology Read Volume

The following table is the read volume for radiologists in Saskatchewan April 1, 2017 – March 31, 2018.

Radiologists 1-9 read screening mammograms.

Radiologists 10-31 read diagnostic mammograms in mid-sized hospitals.

This does not include the number of diagnostic mammograms completed in community radiology practices.

Data Source:

- 1-9 from Integrated Screening Information System at the Saskatchewan Cancer Agency
- 10-33 from Medical Imaging mid-sized hospital Managers in Saskatchewan Health Authority

Saskatchewan Radiologists Read Volume for April 1, 2017 - March 31, 2018

Radiologist	Mammography Read Volume
1	6,795
2	6,262
3	3,908
4	3,670
5	3,177
6	2,926
7	2,489
8	2,130
9	2,043
10	702
11	632
12	470
13	435
14	405
15	176
16	156
17	149
18	133
19	118
20	107
21	97
22	77
23	76
24	76
25	76
26	72
27	70
28	69
29	67
30	52
31	51
32	28
33	24

Appendix F: Saskatchewan Performance Feedback Mechanisms

2020	# 0f Radiologists reading screening	# of Radiologists reading diagnostic	CAR-MAP Accredited for on-site radiologists	QA Meetings, Rounds
Mobile (SCA)	*	–	–	–
Regina – Screen (SCA)	*	–	Yes	Yes
Saskatoon – Screen (SCA)	**	–	Yes	Yes
Lloydminister – HOS (SHA)	**	Locum	No	No
Moose Jaw – HOS (SHA)	*	3	Yes	Yes ±
North Battleford – HOS (SHA)	**	Locum	No	No
Prince Albert (PA) – HOS (SHA)	**	3 PA AR	–	Yes, with Saskatoon AR
Prince Albert - AR		3 PA AR	Yes]=[-p09oi8u-765jikolp;[	Yes, with Saskatoon AR
Swift Current – HOS (SHA)	*	***2	Yes	No
Yorkton – HOS (SHA)	**	1	Yes	No
Regina – Prairie Skies	–	5	Yes	Yes
Saskatoon – AR	–	10	Yes	Yes
Saskatoon – SMI	–	9	Yes	Yes
Regina – BAC (SHA)	–	*4	Yes	Yes ±
Saskatoon – BHC (SHA)	–	** 6	–	Yes ±

* 6 radiologists from Prairie Skies Medical Imaging and Carma Lim Medical Professional Corporation

** 6 radiologists from Associated Radiology, Saskatoon

*** 2 Radiologists; only one reads due to volume; both meet requirements for CAR-MAP accreditation

± Rounds, multi-disciplinary team meetings or both.

Abbreviations	
AR	Associated Radiologists
BAC	Breast Assessment Centre
BHC	Breast Health Centre
HOS	Hospital
PA	Prince Albert
SCA	Saskatchewan Cancer Agency
SHA	Saskatchewan Health Authority
SMI	Saskatoon Medical Imaging

Appendix G: Saskatchewan Mammography Services

2017/18	# Of Radiologists reading screening	# of Radiologists reading diagnostic	CAR-MAP accredited for on-site radiologists	Screening Mammogram	Diagnostic Mammogram	Ultrasound	U/S guided biopsy	Stereotactic biopsy	Wire localization	Surgery	# of surgeons	Pathologist	MRI
Mobile (SCA)	*	-	-	8,973	-	-	-	-	-	-	-	-	-
Regina – Screen (SCA)	*	-	√	10,732	-	-	-	-	-	-	-	-	-
Saskatoon – Screen (SCA)	**	-	√	8,684	-	-	-	-	-	-	-	-	-
Lloydminister – HOS (SHA)	**	Locum	-	323	1,030	√	35	-	3	37	3	Off-site	√
Moose Jaw – HOS (SHA)	*	3	√	2,064	1,423	√	37	-	16	43	3	On-site	√
North Battleford – HOS (SHA)	**	Locum	-	1,372	803	√	2	-	0	2	2	On-site	-
Prince Albert (PA) – HOS (SHA)	**	3 PA AR	-	2,082	3	√	0	-	0	18	7	On-site	-
Prince Albert - AR		3 PA AR	√	-	3,190 Tomo	√		-				-	-
Swift Current – HOS (SHA)	*	***2	√	1,468	628	√	7	-	0	0	0	Off-site	-
Yorkton – HOS (SHA)	**	1	√	2,357	710	√	47	-	15	34	3	Off-site	-
Regina - RAR	-	5	√	-	6,248	2,470	-	-	-	-	-	-	√
Saskatoon – AR and Saskatoon -SMI	-	10 9	√	-	13,418 Tomo	7,283	-	-	-	-	-	-	-
Regina – BAC (SHA)	-	*4	√	-	2,463 Tomo	1,684	596	116	√	√		√	RGH
Saskatoon – BHC (SHA)	-	** 6	-	-	59 Tomo	√	√	√	√	√		√	City HOS
Totals****		33		38,055	30,082								

* 6 radiologists from Prairie Skies Medical Imaging and Carma Lim Medical Professional Corporation

** 6 radiologists from Associated Radiology, Saskatoon

*** 2 Radiologists; only 1 reads due to volume; both meet requirements for CAR-MAP accreditation

**** The total number of diagnostic mammograms is a combination of 3,544 unilateral diagnostic mammograms and 26,538 bilateral diagnostic mammograms

Notes:

- In Lloydminster, several clients obtain screening mammograms at Guardian Radiology in Lloydminster, Alberta or Edmonton. Guidelines are:
  - Age 50-74 – no health care referral needed. Saskatchewan patients require a referral from a healthcare provider
  - Age 40-49 - healthcare provider referral needed for initial visit. Subsequent annual visits do not require
    a referral
  - Age >75 - healthcare provider referral needed for initial visit. Subsequent annual visits do not require
    a referral

  Diagnostic mammograms are completed at Lloydminster hospital for Saskatchewan and Alberta clients.
- In North Battleford, there is a large population who see a healthcare provider to obtain a requisition creating a backlog for diagnostic mammograms. Women >75 tend to go to family physician for a requisition.
- Prince Albert offered diagnostic mammograms until 2010 when radiology staffing changed to locums. Now three (3) radiologists from Associated Radiologists rotate through the medical imaging department. The radiologists do not provide diagnostic mammography or breast intervention. Clients attend Breast Health Centre in Saskatoon for biopsies.
- A component of CAR-MAP Accreditation is image quality. Prince Albert Screening Program reported there is difficulty submitting a dense breast image for their accreditation because once the client is identified as dense breasts, they attend Associated Radiologists and do not return to screening.

Data sources:

- Screens - Screening Program for Breast Cancer
- Mid-sized hospitals – Medical Imaging Managers
- Diagnostic Mammograms - Medical Services Branch, Ministry of Health

Appendix H: Benefits and Challenges to Determine Jurisdiction in Saskatchewan

A fishbone diagram provides focus for the evaluation of jurisdiction for Saskatchewan's mammography services. Fishbone themes provided categories to determine benefits and challenges for which organization is better suited to deliver mammography services. The fishbone themes are: client/patient access, human resources, quality, equipment and infrastructure, reporting and finance. In the Mammography Delivery section, there was three (3) options explored. This analysis is for jurisdiction being either the Saskatchewan Health Authority or the Saskatchewan Cancer Agency.

Option One: Saskatchewan Health Authority

The jurisdiction for mammography services is through the Saskatchewan Health Authority (SHA). Community radiology services are important partners and their services will be coordinated by SHA.

Benefits	Challenges
Client/Patient Access • Aligns with the vision of SHA to create a health care system that enables healthcare providers to ensure every patient, client and resident can expect, and receives, high quality and timely care regardless of where they live • The amalgamation of the health regions to one Saskatchewan Health Authority has the opportunity to streamline the care for the client • The majority of women view mammogram as one test, rather than a screening and a diagnostic. With services in one organization, this would streamline what type of mammogram client was receiving • Breast health services including mammograms, ultrasound and biopsy located in one facility wherever possible • As services are in one organization, wait time is able to be managed with pooled resources • Navigation is throughout breast pathway for all women. • 1-800 number exists for screening. Scope could expand to include diagnostic and interventional radiology • Clients are able to attend an organization that provides full range of services – medical imaging, surgeons, genetics • Breast health services are provided similarly throughout the province in Regina, Saskatoon and mid-sized hospitals through SHA • Leverage the work completed by the Health Quality Council in 2006 to improve wait times for breast cancer care in Saskatchewan	Client/Patient Access • If services are increased at the Breast Health Centre or Breast Assessment Centre, parking is a challenge and there is a charge • Currently services are in the hospital. Healthy clients prefer services outside a hospital

Benefits	Challenges
Human Resources • Aligns with Executive Leadership Team focusing on providing local management and support services across the province and ensuring the organization leverages the strengths of the women as its greatest asset: the right people with the right skills in the right positions • Breast radiologists services coordinated through one organization • Recruitment advantage for breast imaging trained radiologists. • Ability to develop breast Imaging sub-specialty • Pooled resources for mammography techs which will address shortages • Mammography techs have increased opportunity to work to their full scope of practice	Human Resources • SCA epidemiologist workload will increase as performance indicators will be provided to all radiologists reading mammograms • This would impact community radiologist practices who are a valuable partner
Quality • Provincial QA program for mammography will be developed • With screening, diagnostic and interventional radiology, the same radiologist may be involved in the women's pathway. This will benefit the patient	Quality • Number of radiologists involved in the pathway will increase. This has the potential to decrease quality, as each Radiologist is reading less
Equipment and Infrastructure • Ability to amalgamate equipment into one facility and use to full potential	Equipment and Infrastructure • Current mammogram machines are end of life between 2008 and 2012 • Currently space is not available in Regina/ Saskatoon hospital to include screening, diagnostic and interventional radiology
Reporting • Standardized reporting for dense breasts which is A/B/C/D and or word descriptors for mammography. • Reports will be transcribed with PowerScribe; all Radiologists trained • Ability to standardize Radiology reporting for mammography • Reports will be available electronically, as reportable in PACS	Reporting
Finance • May be cost savings when aligning staff	Finance • There would be a loss of the administration fee as contract between SHA and SCA for mammography techs will be ended. • New infrastructure required. • Staffing costs to provide the increased services

Option Two: Saskatchewan Cancer Agency

The jurisdiction for mammography services is through Saskatchewan Cancer Agency (SCA). Community radiology services are important partners and their services will be coordinated by SHA.

Benefits	Challenges
Client/Patient Access • Breast health services including mammograms, ultrasound and biopsy located in one facility wherever possible. • Women able to have majority of testing done outside hospital in Regina and Saskatoon • Navigation is throughout the breast pathway for all women. • 1-800 number for all breast health services. As the 1-800 exists for screening, the scope could expand to include diagnostic and interventional radiology	Client/Patient Access • SCA would not be able to provide biopsy at the Regina and Saskatoon locations. Clients attend SHA for all diagnostic services outside mammography • SCA is not involved in the delivery of other medical imaging • Clients will not be able to access the entire breast pathway within one organization. • Wait time issues may continue if staffing issues in SCA continues
Human Resources • Breast Radiologists services coordinated in one organization • Recruitment advantage for Breast Imaging trained Radiologists • With one organization, Radiologists can provide real time remote review if client requires additional images when the client attends on the mobile bus, or consult for radiologists working in mid-sized hospitals • Ability to develop Radiology Breast Imaging sub-specialty • Pooled resources for mammography techs which will address shortages	Human Resources • SCA is not involved in the delivery of other medical imaging. • Radiologists in mid-sized hospitals interpret all medical imaging and mammography is only a portion – potential workload impact • Currently there is a recruitment issue at Regina Breast Screening for mammography technologists • Mammography Techs do not have opportunity to work in other modalities as no other medical imaging in SCA • Mammography Techs report increased repetitive strain when working within one modality. • Graduating MRT's may not have a desire to limit career to mammography • Some staff work at both SCA and SHA. These staff will be impacted • Mammography Techs in SHA may not wish to work at the Agency, compounding recruitment difficulties • Hours of work for Agency is 7.77 and hours of work for SHA is 8 hours • Breast Imaging sub-specialty will be outside SHA Medical Imaging department • If providing all breast health services, it would impact community radiologist practices who are a valuable partner

Benefits	Challenges
Quality • As all mammogram reports are available, participation rate would automatically reflect a true number • Developing a provincial QA program would be facilitated • A factor to high quality program is the limited number of Radiologists reading • With screening, diagnostic and interventional radiology, the same Radiologist may be involved in the women's pathway. With involvement in each of the steps, this will improve the Radiologists mammography interpretation skills	Quality • There are Radiologists from SHA mid-sized hospitals who would read <1,000 mammograms
IT Systems and Data • All reports would be available	IT Systems and Data • SCA has different software than mid-sized hospitals. • Currently, screening mammograms are considered non-reportable in PACS • Current workstations to read screening do not have the ability to read ultrasounds • Tomosynthesis images are unable to be read on current workstations. (5 megapixel required) • All reports are not available on one system to provide client's holistic view of medical history and images • Radiologist who read for SCA use iCAD, this is not used in mid-sized hospitals (inconsistent practice)
Equipment and Infrastructure • Currently space available for 1 more machine in Regina, as 2 equipment rooms designed; only 1 occupied with equipment • Pooling of equipment resources in one organization is a benefit as less service agreements and better utilization of equipment	Equipment and Infrastructure • Currently space is not available to expand to accommodate all services for breast health • Operating outside the provincial Medical Imaging stream
Reporting	Reporting • Dense breast reporting is not the standard way – it will require change • PowerScribe is not available in Breast Screening • 85% of family physicians use an EMR. Screening reports are sent via mail. It is labor intensive for physicians to scan the report into the chart. • Screening mammogram reports are not available via eHR Viewer

Benefits	Challenges
Financial • Staffing contracts will be decreased as pooled resources • Mammography Techs would be in one organization and could be rotated through the mobile bus. This decreases travel cost as currently the Saskatoon Mammography Techs travel south with the bus • Mammography Techs would be SCA staff and therefore no administration cost for contracted staff • With all breast health services in one organization, it would decrease cost provincially as mammograms would be billed as screening or diagnostic	Financial • Breast Screening is a non-insured program through Medical Services Branch (MSB). If all services delivered at SCA, compensation for radiologists may be affected, which may cause recruitment issues

Appendix I: Saskatchewan Mammography Delivery Jurisdiction Analysis

The analysis for the organization who has mammography delivery jurisdiction included the Breast Pathway guiding principles (see Appendix A), benefits and challenges with delivery of mammography in Saskatchewan Health Authority or Saskatchewan Cancer (see Appendix H), and patient perspectives (see section 4).

Option One: SHA	Option Two: SCA	Option Three: Hybrid	Guiding Principles
Partially met	Partially met	Partially met	Client-centered approach; focus on client's needs.
Partially met	Partially met	Partially met	Minimal travel time for women to obtain a screening mammogram.
Met	Partially met - historical staffing issues (SCA)	Partially met - historical staffing issues (SCA)	Minimal wait time for services.
Met	Met	Partially met - more coordination required and potential gap	Coordinate and integrate breast cancer care across the system.
Met	Met	Not met - Duplication of services	Maximize patient accessibility and minimize duplication of services.
Met	Met	Met - continuous improvement across organizations more difficult	Commitment to quality of services, evaluation and continuous improvement.
Met	Met	Not met - two different organizations	Provider-developed, evidence based care, one standard of care regardless of where clients/patients are tested and treated.
Met	Met	Met	Quality medical services are available for all women across the province.
Met	Met	Met	Decisions are evidence based.
Met	Met	Not met - Information flow concerns with two organizations	Continuity in the flow of crucial health information across the system.
Met	Not met - barriers with SCA providing interventional radiology	Not met - barriers with SCA providing interventional radiology	Organizational structure that promotes coordination across the system and levels of care.
Met Efficiencies gained through combined service agreements and provincial equipment procurement and maintenance	Met Efficiencies gained through combined service agreements and provincial equipment maintenance	Not met	Align service funding to ensure equitable funding distribution for different services.

Appendix J: Breast Pathway Recommendations and Deliverables

Overall recommendations for Breast Pathway Project

1. Transition the delivery of screening mammography from the Saskatchewan Cancer Agency to the Saskatchewan Health Authority.
2. Improve the delivery of screening and diagnostic mammography by standardizing consistent processes and technology tools across Saskatchewan.
3. Centralize the booking of mammography appointments to effectively and manage test delivery using a consistent process.
4. Update the breast cancer screening program to serve a wider range of women.
5. Implement standard measures for quality and processes to support continuous improvement.
6. Update educational and promotional programs to reflect changes and increase the participation of breast cancer screening.

High-level Recommendations and Deliverables

Education and Promotion

1. Develop an engagement plan regarding screening that includes education, promotion, and communication to inform women about screening
    - Enhance and distribute educational resources for the public and healthcare providers
        - Revise and distribute screening guidelines for the target population
        - Offer culturally specific patient resources that are easy to understand, and offered in languages reflective of the diverse Saskatchewan population
        - Include information specific to underserved populations including First Nations, Métis and Inuit
        - Address the different needs of women in terms of disabilities including cognitive, physical and hearing impairment
        - Include balanced information to aid informed decision regarding participation
        - Distribute education and promotion information for the public and health care professionals though multiple mediums such as websites, emails, hard copies and social media
        - Provide accurate and up-to-date information from trusted references including prevention, early detection, treatments, follow-up care, and supportive practices for women diagnosed with breast cancer
        - Partner with healthcare providers to determine education requirements including current education materials
        - Provide tools for healthcare provider to illustrate the process of screening outlining the pathway from screening criteria, to appropriate screening procedures, to frequency for repeating screening, to follow-up recommendations for abnormal screening results
        - Provide guidance for the healthcare provider on how to address sensitive situations, such as when at-risk patients refuse screening due to cultural sensitivities or a prior traumatic experience
    - Enhance promotion of breast screening services
        - Partner with healthcare providers to determine support required to promote the screening program
        - Implement multi-media sources for promoting breast screening such as social media.
        - Develop messaging that will encourage appropriate participation such as dispelling myths, illustrate benefits and harms of screening, reduce harms and anxieties
        - Engage high-risk groups and those with low screening participation
        - Consider developing an interactive tool that will highlight potential cancer risks and will suggest screening procedures and prevention strategies

- Review the current Saskatchewan Cancer Agency website for readability and interactive capabilities
- Collaborate with healthcare providers and Saskatchewan Health Authority for expanding the website to include: 1) a cancer screening self-education tool, 2) dynamic educational materials such as videos and visuals to explain screening and diagnostic procedures and 3) public content in languages reflective of Saskatchewan's diverse population
- Collaborate with key stakeholders to cross-reference websites to ensure consistent messaging

- Enhance communication and patient experience
  - Inform women of the next steps in the screening process, including timely communication of results and how to follow-up with questions and concerns
  - Conduct regular client surveys to help assess the patient experience and satisfaction
  - Define processes on how results of client surveys will be used to improve the service

Client Referral

2. Create a standard referral process for provincial mammography
   - Develop a referral process for standardized provincial mammography
   - Create staff booking resources to include standard questions to capture any requirements for additional support during a mammogram
   - Schedule clients with special needs for additional time at mammogram appointment
   - Develop resources to assist healthcare providers to request the appropriate test
   - Schedule women in the target population who meet the criteria for a screening mammogram whether self-referred or with a healthcare provider referral
   - Define provincial elevated and high risk for breast cancer criteria
3. Expand the ages for breast screening to include women ages 40-49
   - Plan the financial impact of expanding the age to include women ages 40-49
   - Determine and execute a strategy to provide education to healthcare providers
   - Determine and execute a strategy to provide education to the public, including a media campaign
   - Update all references for screening mammography to reflect the change for age eligibility
   - Update printed material and electronic media
4. Leverage the provincial information technology systems
   - Configure Saskatchewan Cancer Agency information technology system to accept women ages 40-49
   - Configure Saskatchewan Cancer Agency information technology system to not send invitation letters to women ages 40-49
   - Implement a software package to invite and remind clients they are due for a mammogram using appropriate methods and include women in the 40-49 age group, with lobular carcinoma in situ (LCIS), with breast implants and those who had breast cancer >5 years ago
   - Develop a web interface with self-referral functionality for online booking
   - Configure breast screening software to provide breast density category
   - Implement breast density tools to assist with standardization of reporting, such as supplemental software or artificial intelligence
   - Configure the current information technology systems to provide all mammography reports and follow-up reports for breast health to the Screening Program
   - Update the website information for cultural competence and inclusivity
   - Establish processes to collect and analyze inequality data

5. Enhance education and promotion of the awareness of breast screening
    - Enhance promotion of, and access to breast screening services for targeted populations identified as having below-average participation rates
    - Develop and implement breast cancer awareness education and promotion resources for healthcare providers, incorporating cultural competency as a core value
    - Develop and implement public breast cancer awareness education and promotion resources
    - Update all documents for cultural competence and knowledge
6. Develop and implement best practices resources
    - Develop a breast risk stratification program for Saskatchewan
    - Develop a policy for LGBTQIA2S+ clients
    - Develop a process for clients with the incapacity to provide consent
    - Develop and implement strategies to improve participants' experience
    - Establish supports for women who require them to participate in the screening program
    - Update and create all documents with focus on cultural awareness and inclusivity

Centralized Booking

7. Administer a standard centralized mammography booking process for all mammography appointments within the province through one accountable jurisdiction, which is Saskatchewan Health Authority
    - Create a standard centralized booking process for all mammography appointments to support an equitable patient experience
    - Develop work processes and standards for mammography booking process
    - Determine and develop metrics in centralized booking system which includes wait time, quality, and performance measures
    - Create standard mammography flow map for centralized booking
    - Create decision support tools for the ordering and booking of mammography
    - Create standard provincial mammography referral forms and templates
    - Create provincial referral processes to leverage the new centralized booking process
8. Leverage the provincial information technology systems
    - Implement electronic referral submission capability for healthcare providers
    - Adopt and use provincial Radiology Information System and Picture Archiving Communication System at all mammography services locations
    - Develop an online booking tool for clients to book screening mammograms
    - Implement an information technology system that electronically sends out invitations and recalls to clients
    - Implement an information technology system that electronically sends a reminder message of an upcoming appointment

Quality Assurance

9. Establish the accountability for mammography quality assurance
    - Develop and implement the plan for Saskatchewan Health Authority to be accountable for continuous quality improvement within mammography services
    - Develop and implement the plan for Saskatchewan Cancer Agency to be accountable for monitoring, auditing and reporting of quality performance indicators
    - Create and implement a process to approve radiologists who will read screening mammograms
    - Create an on-boarding plan for radiologists approved to read screening mammograms
    - Develop and implement the quality assurance criteria for the radiologist involved in mammography
    - Expand radiologists responsibilities to include screening and diagnostic mammography
10. Create a key performance measurement plan that includes an annual performance indicator report for radiologists across mammogram services
    - Develop and implement a key performance measurement plan
        - Design and build quality measurement reports determining audience and frequency of distribution
        - Design an annual performance indicator report for all radiologists reading mammography
        - Determine quality measures to include in the annual radiologist report card
        - Determine quality measures to distribute on a quarterly basis to radiologists
        - Upload all community radiologists reports and images into provincial RIS and PACS
        - Develop and implement a process for the SCA to receive copies of all breast health services reports within the target age group
        - Develop and implement a process for all non-SCA mammography services to be entered into the SCA database
11. Determine a plan to implement the Canadian Partnership Against Cancer's abnormal call rate framework
    - Implement the CPAC framework for the abnormal call rate
        - Create a working group to implement the Canadian Partnership Against Cancer framework for abnormal call rate
    - Consider increasing the reading volume of screening mammograms to greater than2,000 per radiologist
12. Distribute the mammography interpretation to approved radiologists to meet Canadian Association of Radiologists Mammography Accreditation Program (CAR-MAP) and Saskatchewan Cancer Agency (SCA) requirements
    - Develop and implement a plan for radiologists to meet CAR-MAP and SCA requirements for number of reads
        - Accredit equipment, technologists and radiologists through CAR-MAP for all facilities providing mammography services
        - Accredit all locum radiologists reading mammography through CAR-MAP for all facilities providing mammography services
        - Determine the number of radiologists who will read screening mammograms
        - Review each radiologist mammography read numbers on a quarterly basis
        - Configure Radiology Information System to include screening mammography to be a reportable function
        - Develop a PowerScribe template for a screening mammogram report in RIS
        - Deploy PowerScribe in the Screening Program

- Update existing contracts with radiologists
- Sign new contracts with radiologists reading screening mammograms
- Determine the volume of screening mammograms per radiologists
- Determine a plan to distribute the number of reads per month to radiologists who require more mammogram reads to meet CAR-MAP 1,000 reads

13. Implement a peer-learning program for radiologists and mammogram technologists
    - Implement a mammography peer learning program
        - Develop a mammography peer learning program for radiologists
        - Determine and implement a process for locum radiologists to review an abnormal call with the follow-up tests
        - Implement peer learning for the mammogram technologists
        - Arrange yearly site visits with mid-sized hospitals including to review mammography positioning
        - Determine a Human Resource plan to ensure capacity in the system to facilitate peer learning
14. Determine the criteria required for more than one read of a mammogram image
    - Develop and implement a double read protocol in Saskatchewan for mammogram images
        - o Determine and implement the protocol for double reads
        - Determine the reimbursement for double reads
    - Investigate how artificial intelligence may play a role in future mammography services
        - Investigate the utilization of artificial intelligence
    - Determine the standard for usage of the artificial intelligence software, iCAD, for screening mammograms
        - Investigate the utilization of iCAD provincially
        - Investigate the cost for provincial licensing for iCAD
        - Determine if iCAD can be discontinued and funds redirected
15. Develop a provincial mammography quality assurance committee
    - Create a provincial mammography quality assurance committee
        - Write the terms of reference for a provincial quality assurance committee
        - Determine membership for committee, ensuring patient representation, radiologists mammogram technologists, director and manager
        - Select two patient representatives as members for the quality assurance committee
16. Leverage the provincial information technology systems
    - Leverage the technology of the provincial radiology information technology systems
        - Configure workflow in Picture Archiving Communication System (PACS) to assign the radiologist read
        - Upload the Screening Program for Breast Cancer mammogram reports to Radiology Information System (RIS)
        - Upload all community radiologists mammogram reports to RIS and images to PACS (accomplished as of April 2020)
        - Launch the Mammography Module on provincial PACS
        - Develop a process for the Saskatchewan Cancer Agency (SCA) to receive copies of all breast health services reports within the target age group
        - Develop a process for all non-SCA mammography services to be entered into the SCA database
        - Standardize the mammogram requisition ordered by healthcare providers

- Standardize the radiologist's mammogram report, including 1) incorporate BI-RADS into the mammogram report and 2) incorporate agreed upon breast density into mammogram report
- Investigate the cost of breast density software
- Request a budget increase for breast density software licensing
- Advocate for fundraising organizations to include funding for breast density software with new mammogram machines

17. Standardize the reporting of breast density
    - Standardize breast density reporting
        - Determine the language of breast density, whether, numerical, alphabetical or nomenclature
        - Update all mammogram reports with agreed upon breast density language
        - Develop and implement a process for the breast density to be included with each screening mammogram letter for the client
        - Develop and implement a process for the breast density to be included with each screening mammogram letter for the healthcare provider
        - Develop and implement a process for the breast density to be included in the reports uploaded to eHR Viewer and MySaskHealthRecord
18. Develop standard work for continuous quality improvement within mammography services
    - Develop and implement standard work for quality improvement within mammography services
        - Develop continuous quality improvement working groups at each site offering mammography
        - Determine a list of criteria to deliver screening mammography in a facility
        - Determine a list of criteria to deliver mammography assessment services in a facility

Mammography Delivery

19. Deliver Saskatchewan's mammography services through one accountable jurisdiction which is the Saskatchewan Health Authority (SHA)
    - Transition the delivery of screening mammography from SCA to SHA
    - Coordinate the delivery of screening mammography between SHA and community radiology
    - Determine an HR plan for radiology services, including a breast imaging subspecialty
    - Determine the location for mammography services, including equipment and staffing
20. Maintain the Saskatchewan Cancer Agency's jurisdiction over promotion, education and quality assurance of screening mammography
    - Review current promotional activities for breast screening
    - Enhance promotion of breast screening services
    - Review education for breast screening
    - Enhance and distribute educational resources for the public and healthcare providers
    - Develop and implement the plan for Saskatchewan Cancer Agency to be accountable for monitoring, auditing and reporting of quality performance indicators
21. Implement a standard process for mammography delivery
    - Develop a clinical pathway for clients/patients to receive mammography services
    - Deploy the mammography service future state high level work flow
    - Educate radiologists utilizing PowerScribe 360 to transcribe screening mammography

22. Leverage the provincial information technology systems
    - Fully use the functionality of Radiology Information System and Picture Archiving Communication System (RIS/PACS)
    - Develop process for mammogram reports to be downloaded into electronic health records
    - Develop a screening tab for healthcare providers in the electronic health record
    - Develop a screening tab for patients in MySaskHealthRecord
    - Configure RIS to include screening mammography to be a reportable function
    - Ensure screening mammogram reports are uploaded to provincial RIS to be distributed to MySaskHealthRecord and eHR Viewer
    - Deploy PowerScribe360 in the Screening Program for Breast Cancer
    - Develop a RIS analytic report to ensure all screening mammograms are read
    - Develop a process for clients to receive reminders for mammogram appointments through text or email message
    - Create a template for screening mammograms in PowerScribe
23. Upgrade provincial mammography to tomosynthesis within two to three years of approval of the Breast Pathway Project Phase 1 Vision Report
    - Determine how to display tomosynthesis images on current mammogram workstations
    - Determine a process for women currently obtaining tomosynthesis to receive screening mammograms
    - Replace current end-of-life mammography machines with machines that are tomosynthesis capable
    - Determine the fee code for physicians by exploring a new fee item for tomosynthesis in the Physician Payment Schedule with the Saskatchewan Medical Association
    - Secure capital-funding to upgrade the mammogram machines to tomosynthesis for the 2022/2023 budget cycle
    - Upgrade mammography machines to tomosynthesis in 2022/2023
    - Investigate the storage requirements for tomosynthesis images to be stored on PACS
    - Secure capital-funding for additional PACS storage requirements
    - Expand the network infrastructure to support tomosynthesis images
24. Develop standards for telemammography, screening and diagnostic, in Saskatchewan
    - Determine HR plan within SCA for radiologists in mid-sized hospitals
    - Advocate for Advisory Committee on Medical Imaging to update standards for telemammography

Navigation

25. Develop a provincial navigation program to provide access to all clients across the continuum in the breast pathway
    - Develop a professional navigation framework, considering a multi-team approach
    - Define program goals, objectives, and timeframes
    - Implement a smaller navigation program with defined boundaries and objectives to use as benchmarks for success and then expand
    - Establish navigation to address the biggest gaps
    - Develop a professional patient navigator role description to fit the model
    - Develop skills and training modules for the navigation program

- Expand the current role of the screening client navigator to a more active role in client support and education
- Capture metrics to evaluate the program and client outcomes to facilitate quality improvement
- Eliminate the case-by-case option for navigation
- Develop a plan to discuss navigation with healthcare providers who don't authorize navigation
- Develop standardized forms, such as an intake form to guide the navigator with client communication and data collection
- Develop the provincial navigation services under the jurisdiction of Saskatoon Health authority from time of abnormal screening result to client referral to the Saskatchewan Cancer Agency

26. Sanction radiologists to arrange all further testing required to complete the mammography diagnostic circle
    - Develop the process for radiologists to arrange further breast health testing to complete the diagnostic circle
    - Develop a breast clinical pathway
    - Develop education modules for radiologists requiring support to talk with the patient regarding next steps
27. Enhance communication and information to increase access to navigation services
    - Develop education modules for the navigation program to assist and strengthen the support and utilization of the role of healthcare providers and their clients
    - Develop a marketing plan for the navigation program
    - Update current navigation brochures
    - Develop navigation tools and establish resources, such as referral follow-up, patient care profiles, triage assessment tools, data logs, navigation process charts, cancer journey toolkits

Diagnostic Follow-up

28. Continue to follow the best-practices from the Canadian Association of Radiologists Practice Guidelines and Technical Standards for Breast Imaging and Intervention
29. Continue to follow standards for the College of Physicians and Surgeons of Saskatchewan Advisory Committee on Medical Imaging

Appendix K: Abbreviations

2D	Two dimensional
3D	Three dimensional
ACMI	Advisory Committee on Medical Imaging
ACR	Abnormal Call Rate
BC	British Columbia
BC Cancer Agency	British Columbia Cancer Agency
BI-RADS	Breast Imaging – Reporting and Data System
CADTH	Canadian Agency on Drugs and Technology in Health
CAMRT	Canadian Association of Medical Radiation Technologists
CAR	Canadian Association of Radiologists
CAR-MAP	Canadian Association of Radiologists Mammography Accreditation Program
CNP	Client Navigation Program
CPAC	Canadian Partnership Against Cancer
CT	Computed Tomography
Canadian Task Force on Preventative Health	Task Force
eHS	eHealth Saskatchewan
ISIS	Integrated Screening Information System
LCIS	Lobular carcinoma in situ
LGBTQ2S+	Lesbian, Gay, Bisexual, Transgender, Queer or Questioning and Two-Spirit
MAP	Mammography Accreditation Program
MI	Medical Imaging
MRI	Magnetic Resonance Imaging
MSHR	MySaskHealthRecord
PACS	Picture Archiving and Communication System
PHRS	Personal Health Registration System
QA	Quality Assurance
QAC	Quality Assurance Committee
RIS	Radiology Information System
SCA	Saskatchewan Cancer Agency
SHA	Saskatchewan Health Authority
SPBC	Screening Program for Breast Cancer
T-MIST	Tomosynthesis Mammographic Imaging Screening Trial
US	Ultrasound