



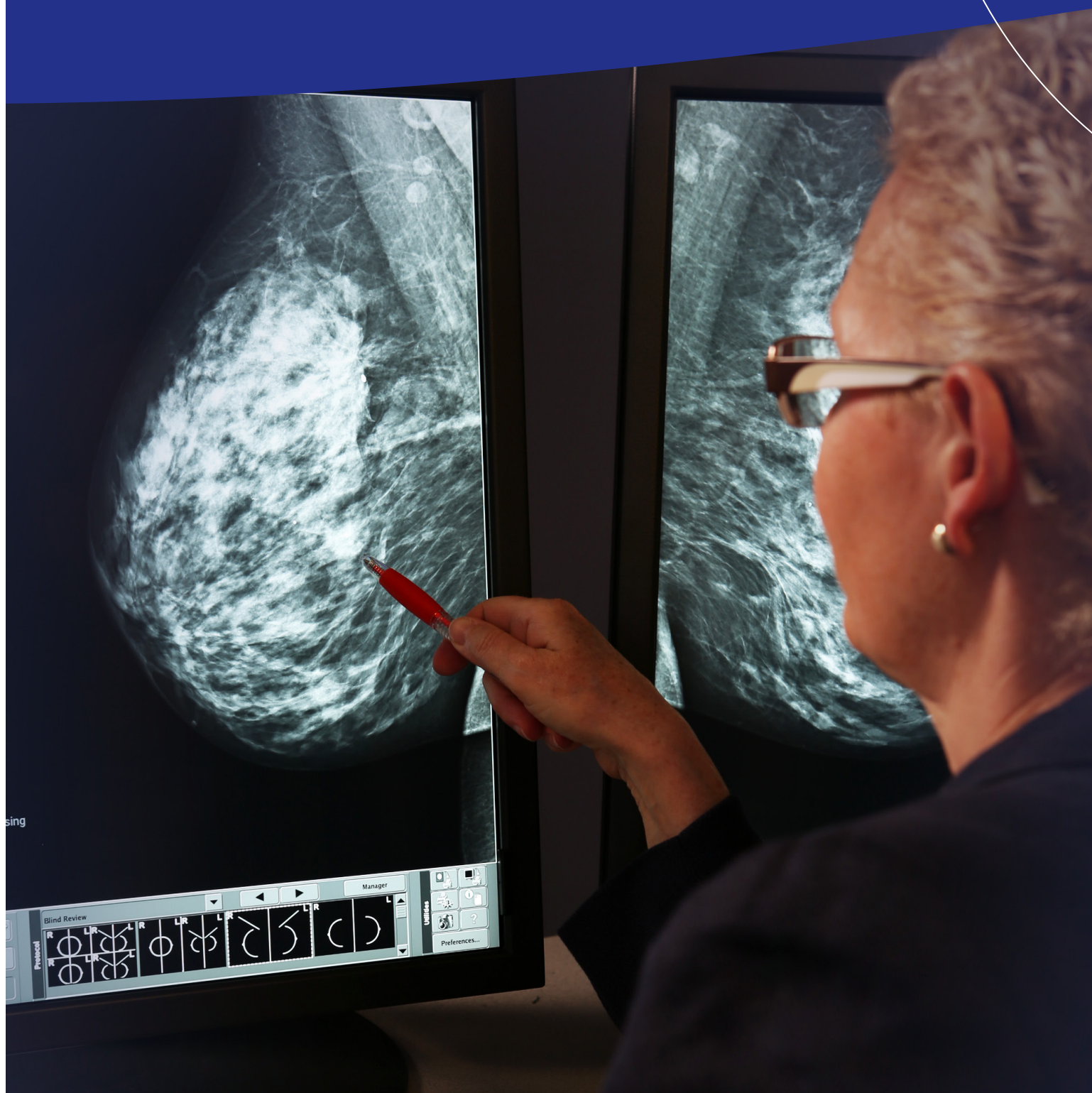
BC Cancer Agency

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Screening Mammography Program

# Screening Mammography Program 2014 Annual Report





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## 1.0 Message



### Message from the Medical Director

With the introduction of an updated Breast Screening Policy, 2014 proved to be a busy year for the Screening Mammography Program. The updated policy, as a result of an exhaustive review of British Columbia's breast screening guidelines by the Screening Guidelines Review Committee in 2012, launched province-wide on February 4th to considerable media attention.

The updated policy places an increased emphasis on informed decision making. A full suite of materials was made available at launch, and has since expanded to include the multi-channel media campaign "Take Care of the Girls", as well as an online decision aid; both aimed at raising awareness of the importance of regular screening among target populations.

We look forward to further enhancing our support offerings as well as our services in the coming year. Over 65 per cent of our screening mammography machines in the province are now digital, with the remainder of analog machines slated to be upgraded over the next three to four years.

It has been a pleasure working with so many of you over the past year. I am impressed by the dedication of our team and certainly appreciate the emphasis everyone places on patient care. This is an exciting and challenging time for the Screening Mammography Program; I look forward to experiencing it with you.

– Christine Wilson MD



### Message from the Screening Operations Director

2014 was a productive year for the Screening Mammography Program. A number of new initiatives were introduced, including an updated Breast Screening Policy this past February, and I am pleased to share these developments and their results with you in this Annual Report.

At the Screening Mammography Program, the wants and needs of the women we serve are always prevalent in our decision making. I think you will find this reflected in the projects we have undertaken, as they are not only geared towards improving and increasing access, but also to enhancing our understanding of how to best serve our audience, as we move forward in ever changing times.

I am enthused about the progress we have made over the last year. Thank you to everyone involved with our work; from community partners to volunteers to, most importantly, the women we serve. We could not achieve our goals without your support- together we will continue to make a difference.

– *Janette Sam*



## 2.0 Executive Summary

The BC Cancer Agency is proud of the achievements of the Screening Mammography Program. The population based breast cancer screening program was the first of its kind in Canada and is in its 26th year of operation. Since the inception of the program in 1988 to the end of 2013, the program has provided over 4,831,639 screening mammograms and detected 20,992 (breast) cancers.

We are happy to provide this 26th annual report. While the technology has changed significantly over the last 26 years our commitment has remained the same – to provide a quality service for the women of BC.

The Screening Mammography Program has a participation target of 70% of eligible 50-69 year old women to have a screen every two years. The number of women 50-69 eligible for a screening mammogram grows each year as the population ages and this cohort increases in size. While the number of screens performed in this age group increased in 2013 compared with 2012, the overall participation dropped by 1% to 52% and is now at its lowest rate since 2005 (calculated as the number of eligible women screened divided by total number of eligible women in the province).

This past year has seen some significant gains in both ethnic participation and diagnostic intervals. For the first time participation rates by select ethnic groups exceed overall participation rates across the province at 54% on average compared with 52% overall (Table 3). This is as a result of continued outreach by the mobile service and support of our various community partners such as our volunteers around the province, the Canadian Cancer Society and Canadian Breast Cancer Foundation.

The node negative rate for those women who had breast cancer detected was 78%, which exceeds the national target of 70% (Table 12). Screening helps find cancers when they are smaller, leading to more treatment options for women.



*Dr. Andy Coldman  
Vice President of Population Oncology  
BC Cancer Agency*

On a personal note, we wish Dr. Andy Coldman a fond farewell as he retires from his position with the BC Cancer Agency. Dr. Andy Coldman, Vice President of Population Oncology at the BC Cancer Agency, has contributed significantly to the Screening Mammography Program locally as well as contributed to the framework and benchmark discussions internationally over the years. He was a longtime member of the Canadian Breast Cancer Screening Network, as well as being the Chair of the Quality Determinants Working Group.

Andy is widely published in the peer reviewed literature on breast cancer and screening among others. In particular, his work on radiology reading volumes, outcomes and interpretive performance are often cited. In addition, Andy et al have at least one more publication pending: Pan-Canadian Study of Mammography Screening and Mortality from Breast Cancer, which will appear in the Journal of the National Cancer Institute.

We thank Andy for all of his contributions over the years and wish him a wonderful retirement.



### 3.0 Screening Policy Review and Update

#### Screening Recommendations for Women in British Columbia

Breast cancer is the most frequently diagnosed cancer in British Columbian women, and it is important that all women be aware that while there is no way to prevent breast cancer, early detection is critical. Mammograms help find cancer in its earliest stages – when there are more treatment options available and a better chance of treating the cancer successfully.

While the efficacy of mammograms is quite easily understood and appreciated, the issue of contention remains the age at which to start routine screening and the appropriate interval between screenings.

As part of BC's Provincial Breast Health Strategy, the BC Cancer Agency (BCCA) launched a review of BC's breast screening policy to ensure that provincial screening recommendations are up-to-date with current evidence-based research findings. Recommendations encompassed the use of mammography, MRI, breast self-examination, and clinical breast examination to screen for breast cancer among women at average risk of developing the disease, and women at a higher than average risk (defined as those with a first degree relative with in situ or invasive breast cancer).

These recommendations were approved by the BC Ministry of Health, and became British Columbia's new Screening Policy, effective Feb 4, 2014

The evidence is clear – women aged 50 to 74 should be screened every two years as this age group stands to benefit the most from routine screening.

Based on available evidence, a “one-size-fits-all” approach to breast cancer screening does not make sense for women aged 40-49 years or 75+. This is why we are encouraging these women to make an informed decision to be tested by speaking with their healthcare provider about their personal risk, and becoming aware of the benefits and limitations of screening mammography. We have developed an online Decision Tool available at [screeningbc.ca](http://screeningbc.ca) to support women and their healthcare providers in understanding how their individual profile may affect their screening outcomes.

BC has developed new guidelines for women with a family history of breast cancer in a first degree relative (mother, sister, or daughter). These guidelines are critical as these women are two times more likely to develop breast cancer<sup>1</sup>. Offering annual screening for women with a family history is a step towards tailoring a screening schedule on the basis of personal risk.

<sup>1</sup> Pharoah PD, Day NE, Duffy S, Easton DF, Ponder BA. Family history and the risk of breast cancer: a systematic review and meta-analysis. *Int J Cancer*. 1997 May 29;71(5):800–809.

## Breast Screening

Risk	Age	Policy
Average risk	Ages 40-49	<p>Health care providers are encouraged to discuss the benefits and limitations of screening mammography with asymptomatic women in this age group.</p> <p>If screening mammography is chosen, it is available every two years. The patient will be recalled by the program at the recommended interval.</p> <p>A health care provider's referral is not required, but is recommended.</p>
	Ages 50-74	<p>Routine screening mammograms are recommended every 2 years for asymptomatic women at average risk of developing breast cancer. Patient will be recalled at the recommended interval.</p>
	Ages 75+	<p>Health care providers are encouraged to discuss the benefits and limitations of screening mammography with asymptomatic women in this age group.</p> <p>Health care providers should discuss stopping screening when there are comorbidities associated with a limited life expectancy or physical limitations for mammography that prevent proper positioning.</p> <p>If screening mammography is chosen, it is available every two to three years. The patient will not be recalled by the Screening Mammography Program of BC.</p> <p>A health care provider's referral is not required.</p>
Higher than average risk	Ages 40-74 with a first degree relative with breast cancer	<p>Routine screening mammograms are recommended every year. The patient will be recalled by the program at the recommended interval.</p> <p>A health care provider's referral is not required, but is recommended.</p>
High risk	With a known BRCA1 or BRCA2 mutation or prior chest wall radiation or strong family history of breast cancer	<p>Age 40-74: please refer to recommendation for "Higher than average risk" women.</p> <p>Under age 40: The Screening Mammography Program accepts women at high risk of developing breast cancer with a health care provider's referral, provided they do not have breast implants or an indication for a diagnostic mammogram. Please discuss patient with a screening program radiologist before referral.</p>

Procedure	Policy Recommendation
<b>Self Breast Exam (SBE)</b>	<p>Routine self-breast examinations (when used as the only method to screen for breast cancer) are not recommended for asymptomatic women at average risk of developing breast cancer</p> <p>Women should still be familiar with their breast texture and appearance and bring any concerns to their healthcare provider.</p>
<b>Clinical Breast Exam (CBE)</b>	<p>There is insufficient evidence to either support or refute routine clinical breast exams (in the absence of symptoms) alone or in conjunction with mammography. The patient and her health care provider should discuss the benefits and limitations of this procedure to determine what is best for the patient.</p> <p>This excludes women with prior breast cancer history.</p>
<b>Magnetic Resonance Imaging (MRI)</b>	<p>Routine screening with breast MRI of women at average risk of developing breast cancer is not recommended.</p> <p>Exceptions are higher than average risk groups include: BRCA1 and/or BRCA2 carriers, first degree family relatives of BRCA1 and/or BRCA2 not tested, and prior Hodgkin's disease (or other lymphoproliferative diseases) at a young age (between the ages of 10-30 years old) treated with chest radiation.</p>

## 4.0 About the Screening Mammography Program

Regular breast cancer screening is an important part of a women's health routine. Here in BC we have some of the best survival outcomes in Canada for those women who do get breast cancer. This success is largely due to improved cancer treatments and participation in breast cancer screening.

Going for a regular mammogram is a key component of early detection – regular breast cancer screening can find cancer when it is small, which means:

- There is a better chance of treating the cancer successfully.
- It is less likely to spread.
- There may be more treatment options.

A woman's risk of breast cancer increases as she ages; 80% of breast cancers in BC are found in women 50 years and older. The BC Cancer Agency is committed to finding breast cancers early through breast cancer screening by its population based screened program - the Screening Mammography Program (SMP). SMP utilizes standard two-view bilateral mammography (x-ray of the breast) for breast cancer screening. Women ages 40-74 may self-refer to the program; however it is recommended that by age 50 women have a screening mammogram every two years. Women are not eligible for a screening mammogram in BC if they have/had breast cancer, breast implants, or if they currently have breast symptoms requiring a diagnostic investigation. These women must speak with their primary care provider and be referred for a diagnostic mammogram.

### Centres and Mobile Services

There are 37 fixed centres across the province, and three mobile vans that visit over 120 smaller BC communities, including many First Nations communities. Mobile schedules are posted on the SMP website ([www.screeningbc.ca](http://www.screeningbc.ca)) and are sent to local health professionals.

### The Screening Process

The Screening Process is illustrated in Figure 4.1 at the end of this section. The process consists of four stages:

1. Identify and invite the target population for screening.
2. Conduct the screening examination.
3. Investigate any abnormalities identified on screening.
4. Issue a screening reminder at the appropriate interval.

### FAST TRACK – Facilitated Referral to Diagnostic Imaging

On average approximately 7% of women who attend for screening will require additional diagnostic testing. Recognizing the importance of timely follow up, the Fast Track Referral System was established in 1999. The Fast Track system, modeled after a process developed in Nanaimo, facilitates referral for women who require further testing.

#### Fast Track Overview

- At the time of screening, women are informed that if further tests are required, they will be called directly by a diagnostic facility to book their appointment.
- If further testing is required i.e. additional mammographic views or breast ultrasound, the woman is booked at the Fast Track diagnostic clinic closest to the screening site, usually at the same location.
- The SMP images and results are transferred to the diagnostic office prior to the appointment.
- SMP notifies the woman's health care provider where their patient has been referred for additional testing.
- The diagnostic facility makes every effort to provide an appointment within one week of receiving the referral.

Standardization of the Fast Track referral system ensures that all women benefit from the shortened time between an initial abnormal screening result and the first appointment for diagnostic assessment.

### Program Evaluation

Data is collected and analyzed on an ongoing basis to monitor the program's effectiveness and to identify areas for improvement. SMP evaluation indicators, quality standards and systems are based on national and international guidelines and recommendations, including the 3rd edition of the Report from the Evaluation Indicators *Working Group: Guidelines for Monitoring Breast Cancer Screening Program Performance*, published in February 2013<sup>2</sup>.

Results of this analysis are presented in the "PROGRAM RESULTS" section of this report (Section 8). Age-specific breast cancer incidence and mortality rates are provided by the BC Cancer Registry.

<sup>2</sup> Canadian Partnership against Cancer. Report from the Evaluation Indicators Working Group: Guidelines for Monitoring Breast Cancer Screening Program Performance (3rd edition). Toronto: Canadian Partnership Against Cancer; February, 2013

### Quality Assurance

A team of Medical Physicists, Provincial Professional Practice Leader for Mammography Technologists, and a Quality Management Coordinator are dedicated to quality assurance at all SMP centres. This team supports imaging quality assurance and provides professional direction in equipment selection, acceptance testing, troubleshooting, quality control testing and accreditation at screening centres around the province. The Program also supports continuing education for radiologists and technologists.

The screening mammography workforce is comprised of certified technologists from across BC who are trained and experienced in breast imaging. The Provincial Professional Practice Leader for Mammography Technologists has developed various initiatives to support the professional development of our dedicated technologists, including:

- Certificate in Breast Imaging scholarship program, in partnership with the Canadian Breast Cancer Foundation;
- Educational Webinars;
- A Quarterly Technologist Newsletter;
- An educational event at the bi-annual SMP Forum with continuing medical education (CME) credits that is also open to BCIT students;
- SMP Mammography Teaching Sets for Technologists for CME credits;
- Mammography and Patient Care In-Service presentations (CME credits) at the centres.

Quality assurance and monitoring is a critical component of an organized screening program. Standards and systems in the SMP are developed based on guidelines and recommendations from the Canadian Association of Radiologists (CAR), Public Health Agency of Canada (PHAC), the Canadian Association of Medical Radiation Technologists (CAMRT), the BCCA Physics Support Group, and the scientific literature.

**Accreditation:** Accreditation is the certification of competence in an area of expertise. CAR Mammography Accreditation is mandatory for all SMP Centres. Centres participate in accreditation renewals every three years and are required to have an annual update. The team provides support and guidance for centres as they pursue accreditation. Accredited sites display a certificate for all women attending the service to see.

**Image Quality Assurance:** The SMP Quality Assurance Support Group provides leadership and technical support to centres for their quality control practices. All centres undergo regular annual equipment testing. SMP quality control practices are standardized and monitored regularly with support to the centres through site visits, manuals, and



training. The team also provides technical support for centres as they transition from analog to digital mammography.

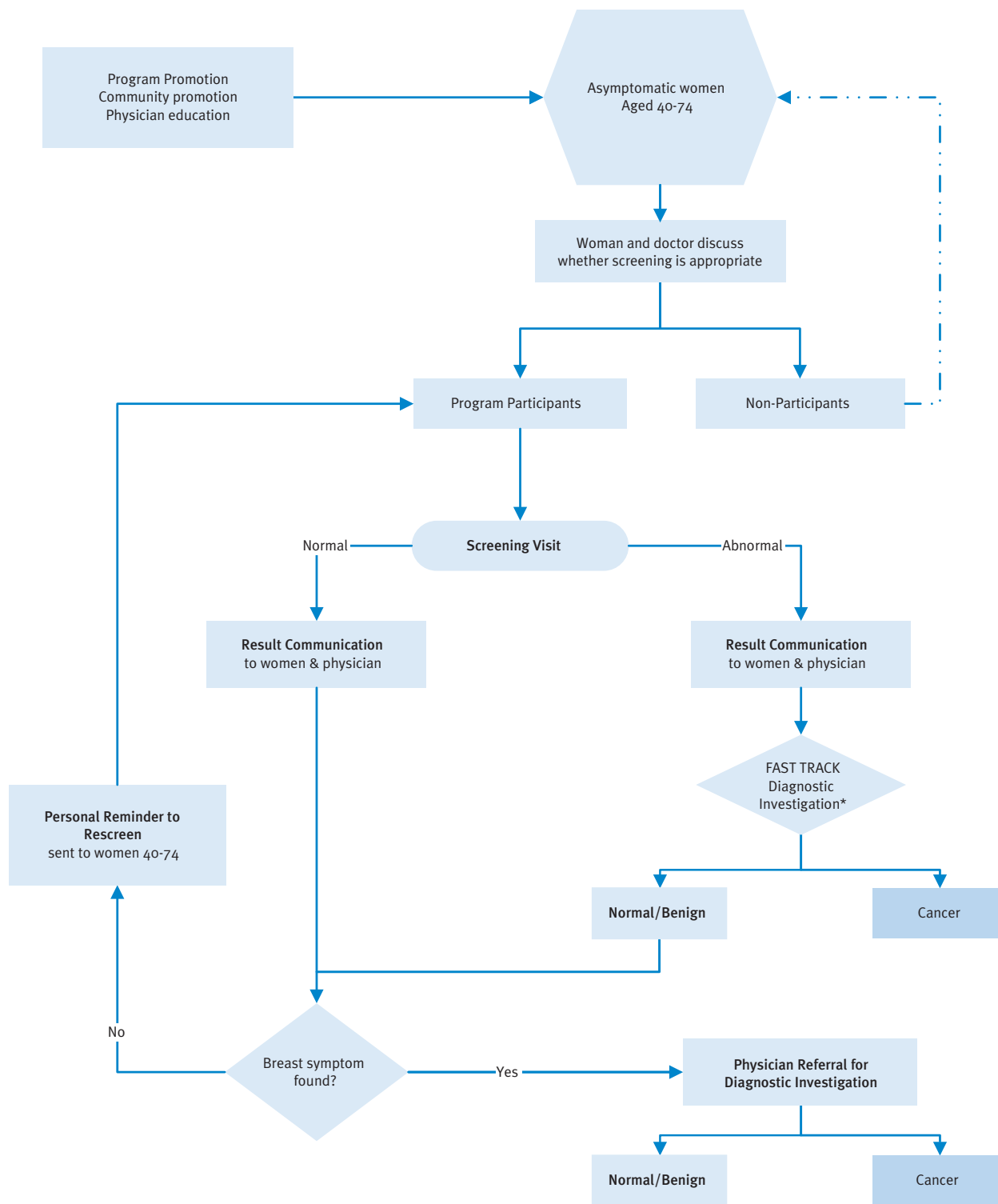
Based upon best practices, SMP has developed and implemented a comprehensive, harmonized quality control program specific for digital mammography equipment, as well as digital mammography-specific phantoms and a web based 'mQc' program. Technologists are trained to perform these quality control tests through site visit demonstrations. Access to the QC website allows technologists and physicists to review test results on site or remotely. SMP continues to work with other provinces to champion standardization of quality control programs for digital mammography.

### Regular Promotion and Education Activities

Ongoing promotion activities include:

- Production of new promotional tools, such as brochures, posters, marketing giveaways, bookmarks and postcards that effectively 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 "@screeningbc" Twitter account that promotes relevant information about cancer screening including upcoming mobile visits in communities around the province.
- A website ([www.screeningbc.ca](http://www.screeningbc.ca)) to support informed decision making about screening.
- Regular presence at health fairs and events throughout the province by the BC Cancer Agency's Prevention group.

### FIGURE 4.1: SMP SCREENING PROCESS OVERVIEW



\* SMPBC obtains diagnostic investigation information from sources such as Medical Services Plan, surgeons, hospitals and BC Cancer Registry on women who consent to follow up.

## 5.0 2013/14 Program Initiatives and Activities

### Program Initiatives

SMP regularly develops initiatives related to quality assurance, promotion and retention, and program expansion. This past year some of the initiatives and activities included:

#### Ask an Expert campaign - October 2013

The annual “Ask an Expert” campaign, run by the Canadian Breast Cancer Foundation (CBCF), connected women to breast cancer experts during a month long event in October 2013 that coincided with breast cancer awareness month.

Leading up to “Ask an Expert”, Screening Mammography Program centres took part promoting the event with poster placement at fixed and mobile locations as well as question card distribution to patients.

Dr. Christine Wilson served as the Screening Mammography Program representative for the event; participating in a CTV Morning Live interview, a live Facebook chat segment, and a final live event during which participating experts took part in a Q&A moderated by CTV and the Vancouver Sun.

#### Take Care of the Girls campaign - February 2014

The “Take Care of the Girls” campaign encouraged women age 50 and over to have a screening mammogram every two years. The campaign featured three breast cancer survivors who had their cancer detected through a screening mammogram. Each woman was asked to invite female friends and family between the ages of 50-69 to a lingerie shop under the guise of a special promotional party hosted by former Global TV personality Deb Hope. During these parties, it was revealed to guests that the true intention was to create a TV commercial to help convince them, and the viewers at home, of the importance of screening mammograms.

Creative for this campaign was tested with a small sample of 27 BC women between the ages of 50-69. The intent of the informal survey was to ensure clear messaging and understanding of both the TV and radio spots. The testing also ensured that the spots were perceived as positive and that no negative connotations were taken from viewing/listening to them.

Campaign results were very positive. Over 74 per cent of respondents stated that their initial reaction was positive after watching the commercial and listening



to the radio spot. The results also showed that the messaging was clear and well articulated. The main message was “if you are a woman age 50 or over, have a mammogram every two years”. All respondents were able to state this after viewing/listening. There were some minor variations of opinion on tone of voice of the radio, but overall, respondents felt the ads were an effective way to relay the importance of regular mammograms for women age 50 and over. Online, “Take Care of the Girls” generated 52,844 page views to its landing page and a combined 44,715 views for the 2 minute and 30 second spots hosted on YouTube.

### Online Decision Aid

The online decision aid was introduced in July 2014 as a tool to support asymptomatic women in making an informed decision to screen for breast cancer using screening mammography.

The tool requires women to complete a short, online form by answering questions about age, previous screening history, family history, previous benign biopsies and personal cancer history. Upon submitting the form, a personalized report is generated. Based on BC data, this report shows the likelihood of experiencing the following screening outcomes at the next screen:

- A breast cancer detected at screening;
- A false positive mammogram; and
- A false positive biopsy (when a biopsy is done and the results are normal).

In addition to the personalized report, the decision aid provides women with information tailored to support informed patient decision making, including:

- The benefits and limitations of screening mammography;
- Comparative BC statistics for women in the same age group;
- Print functionality for those who wish to print and discuss results with their health care provider; and;
- Links to additional breast cancer screening information.

The decision aid can be found at <http://decisionaid.screeningbc.ca> or by visiting the SMP website at [www.screeningbc.ca/breast](http://www.screeningbc.ca/breast).

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**Breast Cancer Screening Decision Aid**

**Is Screening right for you?**

Answer the following questions to determine what the probable results from your screening will be.

1. How old are you?
2. When was your last screening mammogram?
3. Do you have a first degree relative (mother, sister, or daughter) with breast cancer?
4. Have you had a breast biopsy that was determined to be benign (not cancer)?
5. Have you ever been diagnosed with breast cancer?
6. Have you ever received an abnormal result (false positive) from a screening mammogram?

**SUBMIT ANSWERS**

### Breast screening policy materials development (including focus testing with GPs and eligible women)

The catalogue of materials offered by the Screening Mammography Program was updated and expanded in 2014 to coincide with the launch of the updated Breast Screening Policy in February. New materials developed included a refreshed patient brochure, a physician protocols fact sheet, the “Next Steps” postcard, reminder letters and the online decision aid.

To ensure a match between what we intended to convey with the intended audience’s comprehension of our key messages, the materials were tested with primary care providers, key stakeholders and eligible women prior to launch. The primary objectives of these tests were to obtain reactions to these materials in terms of language, length, content and usefulness, receive input into the proposed design and format of these new materials, and identify the information needs of primary care providers with respect to the new policy.

Additionally, participants were asked for general feedback on the following aspects of the materials: usefulness, content, appeal, readability, presentation, involvement in care or increasing, credibility, and cultural appropriateness. Once testing was complete, materials were then modified prior to launch, if feedback deemed change necessary.

Information was conducted in multiple setting types; including one-on-one interviews, test scenarios, surveys and focus groups.



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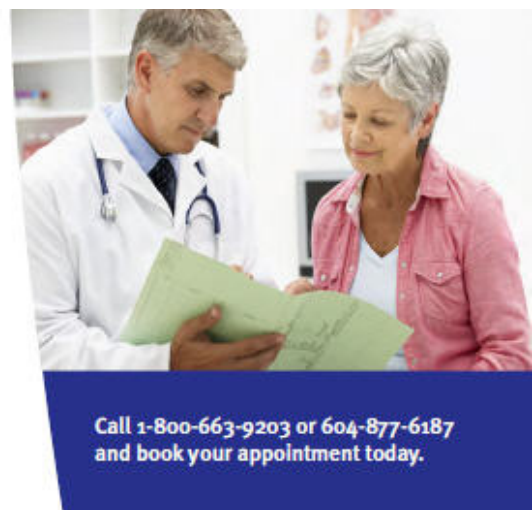
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### Make an informed decision about screening mammography

Women ages 50-74, without a family history of breast cancer, should have a mammogram every **two years**. A doctor’s referral is not needed. Research has shown that a mammogram every two years is effective for reducing breast cancer deaths.

For those with one first degree relative (mother, sister, or daughter) with breast cancer, a screening mammogram is recommended **every year**. While age is the biggest risk factor for breast cancer, having a family history increases your risk further.

Consider the benefits and limitations of screening mammography.  
Learn more at [www.screeningbc.ca/breast](http://www.screeningbc.ca/breast)



**Call 1-800-663-9203 or 604-877-6187  
and book your appointment today.**





*This information is important. Please have it translated if you cannot read it.*

此信息很重要, 如果您不明白, 请找人翻译。

這些資料很重要, 如果看不懂, 請找人翻譯。

ਇਹ ਜ਼ਰੂਰੀ ਜਾਣਕਾਰੀ ਹੈ। ਜੇ ਤੁਸੀਂ ਇਸ ਨੂੰ ਪੜ੍ਹ ਨਹੀਂ ਸਕਦੇ ਤਾਂ ਕਰਿਪਾ ਕਰਕੇ ਕਸਿ ਤੋਂ ਇਸ ਦਾ ਉਲਥਾ ਕਰਵਾਉ।

Dear

It's time to book your mammogram. To make your appointment, please call one of the screening centres listed below. A doctor's referral is not needed.

I would also like to inform you of recent updates to British Columbia's Breast Screening Policy. This policy reflects the latest evidence and our commitment to reducing breast cancer deaths by finding cancer at an early stage – when there are more treatment options and better outcomes.

Key things to know for your age group (50-74 year olds) are:

- Women **without** a family history should be screened every two years.
- Women **with** a 1st degree relative (mother, sister or daughter) with breast cancer should be screened every year.

The risk of breast cancer increases as you age. Over 80 per cent of new breast cancers diagnosed each year are in women age 50 or older. Women with a family history of breast cancer have a higher risk than women of the same age who do not have a family history.

The enclosed information card provides more information on screening mammograms for your age group. I encourage you to read the card and speak with your doctor if you have any questions. You can also visit the Screening Mammography Program's website at [www.screeningbc.ca/breast](http://www.screeningbc.ca/breast).

Sincerely,

Dr. Christine Wilson MD FRCPC  
Medical Director, Screening Mammography Program  
BC Cancer Agency



Dr. Christine Wilson, Medical Director,  
Screening Mammography Program,  
BC Cancer Agency

Visit <a href="http://www.screeningbc.ca/breast">www.screeningbc.ca/breast</a> for locations. Please have your BC Services Card/CareCard and doctor's name available when you call to book your appointment.			
MOBILE SERVICE AREAS (CALL CENTRAL BOOKING: 1-800-663-9203)			OTHER LOCATIONS
• Interior/Kootenays • Vancouver Island	• Northern BC • Sea to Sky Corridor	• Lower Mainland • Haida Gwaii	
<b>VANCOUVER</b>			
BC Women's Health Centre	604-775-0022		Abbotsford 604-851-4750
Mount St. Joseph Hospital	604-877-8388		Burnaby 604-436-0691
5752 Victoria Drive	604-321-6770		Comox 250-890-3020
505 - 750 West Broadway	604-879-8700		Coquitlam 604-927-2130
			Delta 604-877-6187
			Kamloops 250-828-4916
			Kelowna 250-861-7560
			Langley 604-514-6044
			Nanaimo 250-716-5904
			North Vancouver 604-903-3860
			Penticton 250-770-7573
			Prince George 250-565-6816
			Richmond 604-244-5505
			Surrey 604-582-4592
			Vernon 250-549-5451
			White Rock 604-535-4512
<b>VICTORIA</b>			
Fort Street	250-952-4232		
Victoria General Hospital	250-727-4338		
			For all other locations please contact central booking: 1-800-663-9203 Central booking hours: Monday to Friday, 8:00am-5:30pm and Saturday, 8:00am-4:00pm.



### Primary Care Advisory Committee

Established by the BC Cancer Agency's Screening Programs, the Primary Care Advisory Committee provides guidance on the development and implementation of communication, engagement and educational strategy to support primary care providers in the implementation of cancer screening guidelines and recommendations that have already been developed.

Membership in this committee is diverse, with representation from numerous health care organizations and primary care providers to ensure multiple perspectives are included in future advisement and project planning.

The Advisory Committee reconvenes 2 to 3 times a year, or as required, with members expected to offer a 2-year term of service with the possibility of extension. The Screening Mammography Program is currently represented by Dr. Christine Wilson, Medical Director and Janette Sam, Operations Director.

### A Randomized Study of Screening Mammography Return Rates in Overdue Women; Standard SMPBC Reminders Versus Reminder Letters Signed by Women's Family Physicians

Designed to determine if screening mammography return rates of overdue women can be positively influenced by physician-signed reminder letters, this study invited all family physicians in BC to participate. Of this group, 822 physicians were recruited.

To facilitate this research, consenting physicians were asked to sign study letters, which encouraged screening mammography, for all overdue women in their practices. 5638 randomized, eligible women overdue by 30-48 months were contacted from their last screening mammogram through this project.

253 of the 5638 women were excluded because they had a screening mammogram between the physician recruitment and the letter mail-out. Postcards were sent to 2689 women and a Postcard and Letter to 2696 women. Within 6 months, 600 women (22.3%) in the Postcard arm returned, while 894 women (33.2%) in the Postcard and Letter arm returned (odds ratio 1.7,  $p < 0.0001$ ). The maximum difference between the screening mammography return rates was observed at 4 months. Return rates were significantly related to screening history, age, and time overdue.

In conclusion, it was determined that a signed family physician reminder letter is a simple and effective intervention to improve screening mammography return rates in overdue women.

### Client Satisfaction Surveys

Each year SMP performs a client satisfaction survey to ask women their feedback about the program and their screening visit experience. The survey consists of 1000 surveys sent each month to women randomly selected from across the province that have attended the program.

2013 Summary of SMP Client Satisfaction Survey Results:

- The total number of surveys sent – 12,007
- Total number of surveys returned – 4,682 (38.99% return rate)

The results are compiled and both program wide and centre specific results are shared with the centres twice a year. Any centre specific comments provided by those surveyed are also forwarded to the centres for review.

Appointment Scheduling	95.16% had NO trouble getting through on the phone to book an appointment
Centre Locations	97.67% found the location of the centres GOOD/EXCELLENT overall
Appointment check in	96.91% rated the staff GOOD/EXCELLENT at being courteous, helpful and caring
Mammography Experience overall	98.03% rated the technologists GOOD/EXCELLENT at being courteous, helpful and caring
Mammography Experience – Procedure explanation	80.41% felt the procedure was explained to their satisfaction
Mammography compression	95.42% felt the compression was either somewhat uncomfortable or tolerable
Results letters	98.13% felt their NORMAL results letter was easy to understand

## 6.0 Professional Development and Academic Activities

Screening program representatives and scientists authored 4 publications in radiologic literature, and delivered 16 lectures and presentations to mammography screening peers.

The SMP plans and participates in professional and academic activities throughout the year. SMP Educational Webinars have resulted in good participation from radiologists and technologists across the province.

In 2013, SMP hosted the following webinars:

- Presentations on Screening Mammography – Breast Screen South Australia Digital Mammography System Wide Review, Mammographic screening for breast cancer: Early Detection or Overdiagnosis? Guest Speaker: Dr. Warwick Lee State Radiologist, BreastScreen NSW Adjunct Associate Professor, Discipline Medical Radiation Sciences, The University of Sydney, Australia
- Ask an Expert Overview Webinar – Speakers: Cheri van Patten, RD, Dr. Christine Wilson, Dr. Stephen Chia, Dr. Nagarajan Kannan
- Advanced Applications in Breast Imaging – Guest Speaker: Kathleen Schindler MRT, CBI, BMD Women's Healthcare Product Specialist



## 7.0 Partnerships and Collaborations

### Canadian Breast Cancer Foundation

The BC Cancer Agency was proud to partner with Canadian Breast Cancer Foundation on multiple projects in 2013/14 including the *Ask the Expert* series and with Global to produce the *Take Care of the Girls* campaign.

### Canadian Partnership Against Cancer /Canadian Breast Cancer Screening Network

SMP participates as a member of the Canadian Partnership Against Cancer, Canadian Breast Cancer Screening Network. This national committee's purpose is to review, discuss and take action on inter-provincial matters of mutual interest or concern that are related to breast cancer screening.

National activities include representation by BCCA staff on the following committees and working groups:

- Canadian Breast Cancer Screening Network
  - Dr. Christine Wilson, Medical Director, Screening Mammography Program
  - Ms. Janette Sam, Operations Director, Screening Mammography Program
- Monitoring and Evaluation Working Group
  - Ms. Janette Sam, Operations Director, Screening Mammography Program
- Canadian Partnership Against Cancer Organized Breast Cancer Screening Programs Report on Program Performance Working Group
  - Ms. Janette Sam, Operations Director, Screening Mammography Program
- Presentation to the Senate: “Standing Committee on Social Affairs, Science and Technology on background information regarding Bill C-314 -The Breast Density Awareness Act”. Ottawa, ON. May 23rd, 2013.
  - Dr. Christine Wilson, Medical Director, Screening Mammography Program

### Canadian Cancer Society

The BC Cancer Agency is grateful for the ongoing support of the Canadian Cancer Society and its Sirf Dus Initiative - a project aimed at increasing awareness of early detection and screening for breast cancer in the South Asian community.

## 8.0 Program Results

This section provides outcomes for various indicators including coverage, participation, follow-up, quality of screening, detection, and disease extent at diagnosis. The indicators used are adapted from the Canadian Partnership Against Cancer Guidelines for Monitoring Breast Cancer Screening Program Performance<sup>3</sup>.

In section 8.8, the SMP performance measures are presented against the national targets set for Canadian breast cancer screening programs.

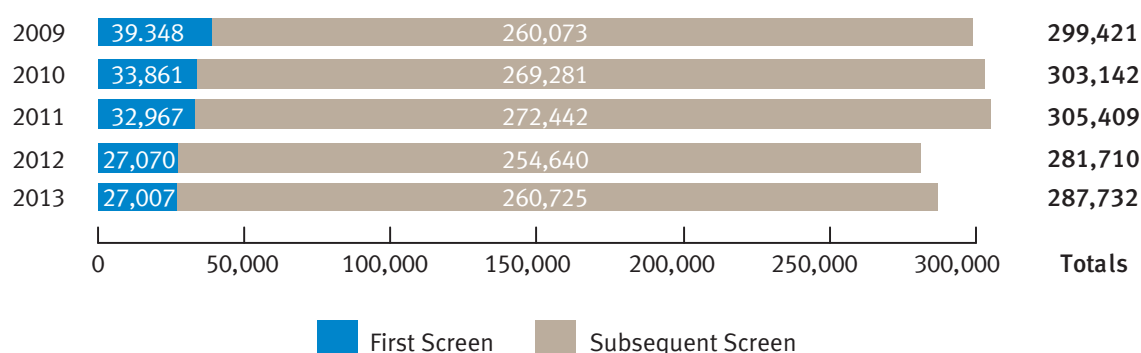
### 8.1 Recruitment and Re-screening

#### Screening Volume

The SMP provided 287,732 examinations in 2013. During this period 27,007 (9.6%) of those examinations were provided to first time attendees.

Figure 8.1 shows that the total number of exams provided by SMP in 2013 increased by 2.1% compared to 2012. The number of first time attendees remained stable, while the number of returning participants increased slightly by 2.3% over the previous year.

FIGURE 8.1: SMP ANNUAL SCREENING VOLUME YEARS: 2009 – 2013



NOTE: SMP data extraction date: August 13, 2013

<sup>3</sup> [www.cancerview.ca/idc/groups/public/documents/webcontent/guideline\\_monitoring\\_breast.pdf](http://www.cancerview.ca/idc/groups/public/documents/webcontent/guideline_monitoring_breast.pdf)

### SMP Volume by Health Service Delivery Area (HSDA) 2013

The age distribution of all exams and first exams performed in 2013 by Health Services Delivery Areas (HSDA) are displayed in Table 8.1. The majority of exams are performed for women between ages 50 to 69 in all HSDAs. Most of the first time attendees were under 50 years of age; however, there are regional variations ranging from 47% in East Kootenay to an average of 70% of first time attendees being under 50 years of age across most of the Lower Mainland.

**TABLE 8.1: SMP VOLUME BY HEALTH SERVICE DELIVERY AREA (HSDA): 2013**

HSDA	Total Exams	Age Distribution of All Exams			First Exams		Age Distribution of First Exams		
		<50	50-69	70+	n	% Total	<50	50-69	70+
East Kootenay	4,260	21%	64%	15%	432	10%	47%	50%	3%
Kootenay Boundary	4,493	19%	65%	16%	363	8%	51%	48%	1%
Okanagan	24,776	22%	59%	18%	1,917	8%	54%	42%	3%
Thompson Cariboo	14,656	24%	61%	15%	1,102	8%	64%	33%	3%
Fraser East	16,846	29%	57%	14%	1,724	10%	65%	33%	3%
Fraser North	38,552	36%	54%	10%	3,946	10%	72%	26%	2%
Fraser South	46,062	34%	55%	12%	4,884	11%	68%	30%	2%
Richmond	14,708	34%	56%	10%	1,388	9%	69%	28%	2%
Vancouver	38,856	35%	54%	11%	4,075	10%	71%	27%	2%
North Shore / Coast Garibaldi	19,056	30%	57%	13%	1,709	9%	65%	32%	2%
South Vancouver Island	23,870	24%	61%	15%	1,810	8%	60%	37%	3%
Central Vancouver Island	17,576	19%	63%	18%	1,333	8%	52%	44%	4%
North Vancouver Island	8,205	20%	64%	16%	690	8%	51%	47%	2%
Northwest	3,559	29%	60%	11%	336	9%	68%	30%	2%
Northern Interior	8,441	30%	60%	10%	758	9%	64%	35%	1%
Northeast	2,368	28%	61%	11%	261	11%	59%	40%	1%
<b>Program</b>	<b>287,732</b>	<b>29%</b>	<b>57%</b>	<b>13%</b>	<b>27,007</b>	<b>9%</b>	<b>65%</b>	<b>33%</b>	<b>2%</b>

NOTE: SMP data extraction date: August 13, 2014



## Screening Participation

**Participation rate is the percentage of British Columbian screen-eligible women, aged 50 to 69 who completed at least one SMP screening mammogram in a 30 month period.**

The biennial screening participation rates are shown by HSDA for each age group in Table 8.2. In the 30 month period between July 1, 2011 and December 31, 2013, 541,233 women ages 40 and over participated in the SMP. The highest overall participation rates were seen in the 50 to 59, and 60 to 69 age groups, with a combined participation rate of 52%. Northeast had the lowest participation rate at 37%, while Richmond had the highest at 58%. Compared with 2012, the participation fell slightly in the 40-49 and 50-59 age groups, and increased slightly in the 70-79 age group. Participation remained the same for 60-69 year olds at 55%.

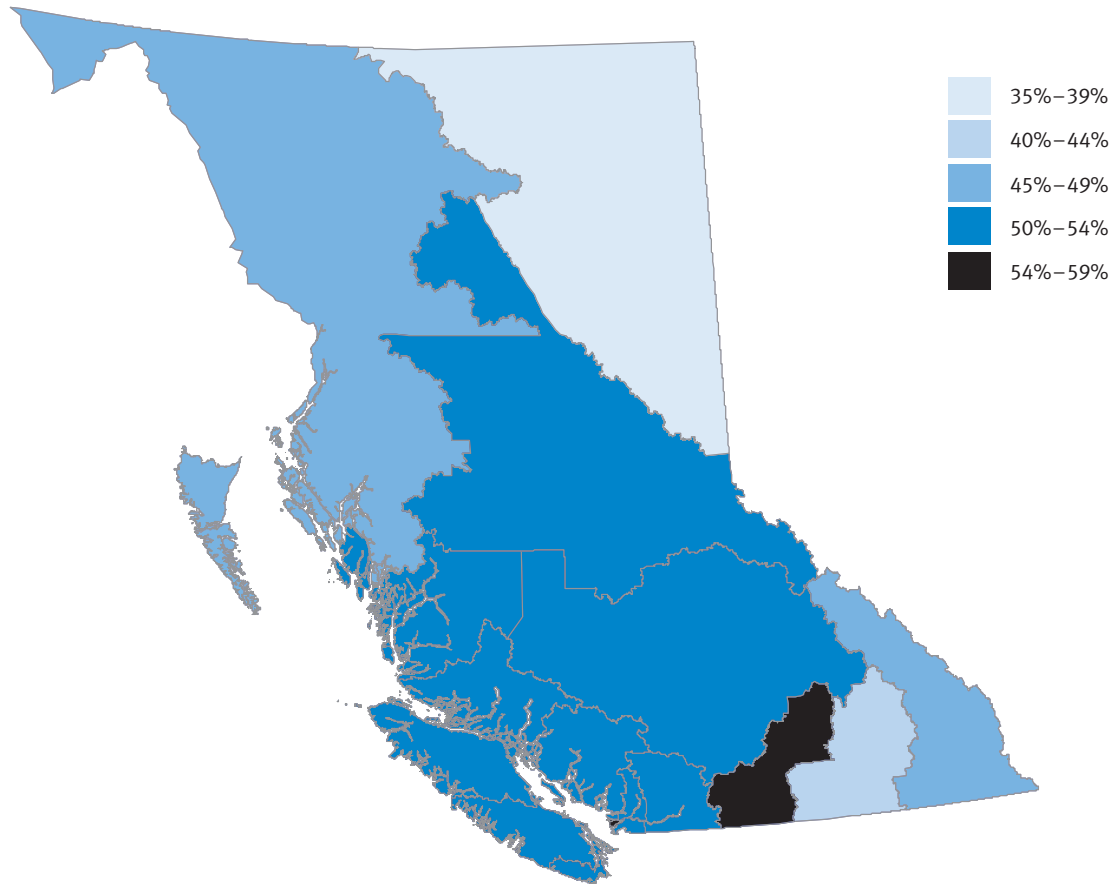
**TABLE 8.2: REGIONAL 30-MONTH PARTICIPATION RATES BY 10-YEAR AGE GROUPS ENDING DECEMBER 31, 2013 INCLUSIVE**

HSDA	10-Year Age Groups					Ages 50-69
	40-49	50-59	60-69	70-79	80-89	
East Kootenay	34%	44%	50%	41%	2%	47%
Kootenay Boundary	30%	42%	46%	40%	2%	44%
Okanagan	42%	51%	58%	50%	3%	55%
Thompson Cariboo Shuswap	40%	48%	53%	46%	2%	50%
Fraser East	41%	47%	53%	46%	2%	50%
Fraser North	46%	51%	54%	44%	3%	52%
Fraser South	46%	51%	53%	44%	2%	52%
Richmond	49%	56%	59%	46%	2%	58%
Vancouver	42%	51%	55%	42%	2%	52%
North Shore/Coast Garibaldi	42%	49%	54%	46%	2%	51%
South Vancouver Island	39%	49%	55%	47%	2%	52%
Central Vancouver Island	37%	49%	57%	50%	3%	53%
North Vancouver Island	36%	47%	57%	47%	1%	52%
Northwest	34%	44%	48%	40%	1%	46%
Northern Interior	41%	51%	54%	43%	2%	53%
Northeast	23%	35%	39%	35%	1%	37%
<b>British Columbia</b>	<b>42%</b>	<b>50%</b>	<b>55%</b>	<b>46%</b>	<b>2%</b>	<b>52%</b>

### NOTES:

1. Based on the weighted average of 2011, 2012 and 2013 female population estimates
2. Population data source: P.E.O.P.L.E. 2013 population projection (Sept 2013), BC Stats, Ministry of Technology, Innovation and Citizens' Services, Government of the Province of British Columbia.
3. Postal code translation file: TMF201406 (June 2014).
4. Population and postal code data acquired through BC Stats, Ministry of Technology, Innovation and Citizens' Services, Government of the Province of British Columbia
5. SMP data extraction date: August 13, 2014.

**FIGURE 8.2: BIENNIAL SCREENING PARTICIPATION BY WOMEN AGES 50 TO 69 OVER 30 MONTH PERIOD BETWEEN JULY 1, 2011 AND DECEMBER 31, 2013**



**NOTES:**

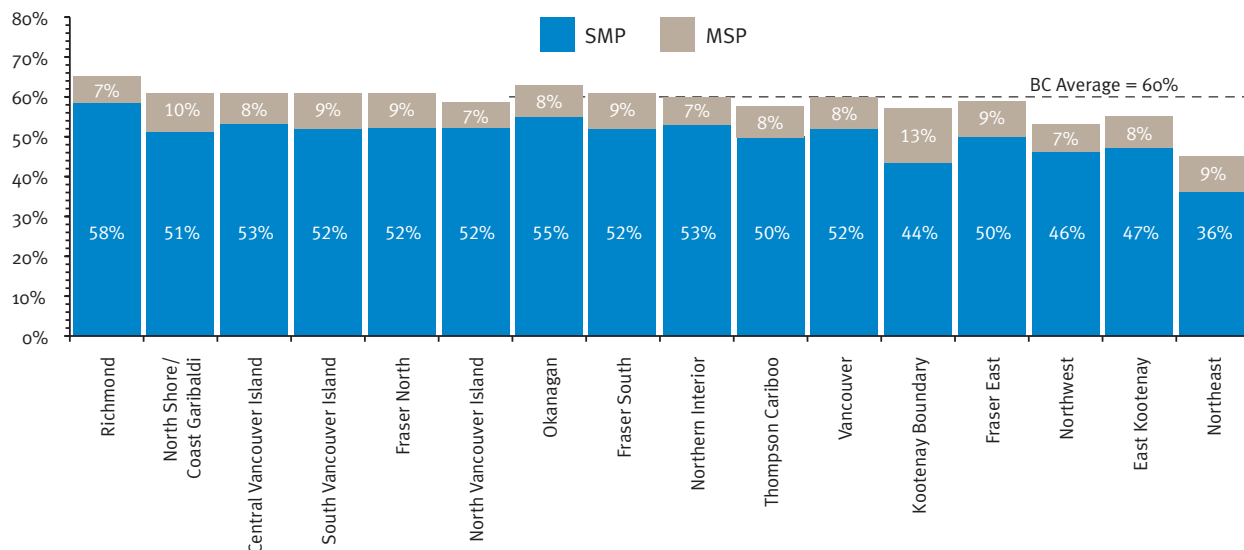
1. Based on the weighted average of 2011, 2012 and 2013 female population estimates
2. Population data source: P.E.O.P.L.E. 2013 population projection (Sept 2013), BC Stats, Ministry of Technology, Innovation and Citizens' Services, Government of the Province of British Columbia.
3. Postal code translation file: TMF201406 (June 2014).
4. Population and postal code data acquired through BC Stats, Ministry of Technology, Innovation and Citizens' Services, Government of the Province of British Columbia
5. SMP data extraction date: August 13, 2014

Bilateral mammography may be used for both screening and diagnostic purposes. A proportion of the bilateral mammography services paid through the Medical Services Plan (MSP) are directly related to screening. Data on bilateral mammography utilization were obtained from the MSP.

Figure 8.3 shows the proportion of women receiving bilateral mammography services through the either SMP or MSP over a 30 month period. Some women may have had bilateral mammograms through both SMP and MSP. Thus, the proportions presented here may be slightly higher than the actual figures due to this possible duplication. In HSDA with long established SMP services, the proportion of women using the MSP funded bilateral mammography has stabilized to 8%–10%.

During the 30-month reporting period, 60% of BC women ages 50 to 69 received bilateral mammography services through either the screening program or MSP, which is a 2% decrease from 62% reported in 2012. The percentage of women ages 50 to 69 receiving bilateral mammography ranged from 45% to 65% across the province, with Northeast (45%) and Northwest (53%) having the lowest percentages. Overall, the SMP provided 86% of the bilateral mammography services for this age group.

**FIGURE 8.3: BILATERAL MAMMOGRAPHY UTILIZATION BY WOMEN AGES 50 TO 69 IN BC  
BETWEEN JULY 1, 2011 AND DECEMBER 31, 2013 INCLUSIVE**



**NOTES:**

1. MSP data includes only MSP Fee-For-Service item 8611 on female patients only; all out of province claims are excluded
2. MSP data contains payment date to June 30, 2014 for services provided between July 1, 2011 and December 31, 2013.
3. SMP data includes single and multiple screens per woman provided between July 1, 2011 and December 31, 2013.
4. 2011 to 2013 Projected Population Data Source: P.E.O.P.L.E. 2013 (Sept 2013), BC Stats, Ministry of Technology, Innovation and Citizens' Services, Government of the Province of British Columbia.
5. SMP data extraction date: August 13, 2014

Participation rates of women ages 50 to 69 by selected ethnic groups are shown in Table 8.3. The percentage of each ethnic group in the population was computed this year based on National Household Survey Custom Profile, 2011 (original data source) data (previous years used 2006 Census, Statistics Canada data). The ethnic population size for each HSDA was estimated based on this ethnic population percentage and the P.E.O.P.L.E. 2013 population projections. The use of single ethnic response data may represent an under-estimation of the ethnic population size, especially the East/South East Asian population in the Fraser North, Richmond, and Vancouver HSDAs. The SMP data on ethnic origin was collected at the time of SMP registration on approximately 80% of attendee's ages 50 to 69 screened between July 1, 2011 and December 31, 2013. 17.5% of attendees did not specify their ethnicity and were excluded from this analysis.

**TABLE 8.3: REGIONAL PARTICIPATION RATES OF WOMEN AGES 50 TO 69 BY SELECTED ETHNIC GROUPS BETWEEN JULY 1, 2011 AND DECEMBER 31, 2013 INCLUSIVE**

HSDA	First Nations		East/South-East Asians		South Asians	
	Population %	Participation Rate	Population %	Participation Rate	Population %	Participation Rate
East Kootenay	0.9%	99.9%	0.5%	97.4%	0.5%	40.2%
Kootenay Boundary	0.4%	99.9%	0.9%	58.2%	0.0%	99.9%
Okanagan	0.9%	70.5%	1.4%	48.0%	1.0%	65.2%
Thompson Cariboo Shuswap	3.8%	51.0%	1.1%	79.7%	0.9%	53.1%
Fraser East	1.5%	48.5%	2.2%	74.2%	8.7%	52.7%
Fraser North	0.5%	52.6%	24.8%	53.8%	4.4%	58.4%
Fraser South	0.4%	68.1%	10.3%	57.9%	14.7%	46.1%
Richmond	0.1%	99.9%	51.2%	58.2%	5.8%	59.3%
Vancouver	0.9%	43.4%	40.5%	49.6%	4.2%	64.9%
North Shore/Coast Garibaldi	1.8%	47.0%	6.9%	53.2%	1.5%	80.6%
South Vancouver Island	0.8%	52.8%	4.2%	45.7%	1.1%	68.6%
Central Vancouver Island	2.0%	43.3%	1.7%	54.7%	0.9%	50.5%
North Vancouver Island	2.2%	53.3%	1.1%	62.7%	0.0%	99.9%
Northwest	15.5%	49.7%	2.6%	25.3%	0.7%	99.9%
Northern Interior	3.8%	69.3%	1.7%	39.5%	1.4%	65.5%
Northeast	3.9%	58.4%	1.3%	7.3%	0.5%	38.7%
<b>British Columbia</b>	<b>1.5%</b>	<b>54.7%</b>	<b>13.4%</b>	<b>53.5%</b>	<b>4.5%</b>	<b>53.8%</b>

**PARTICIPATION RATE:**

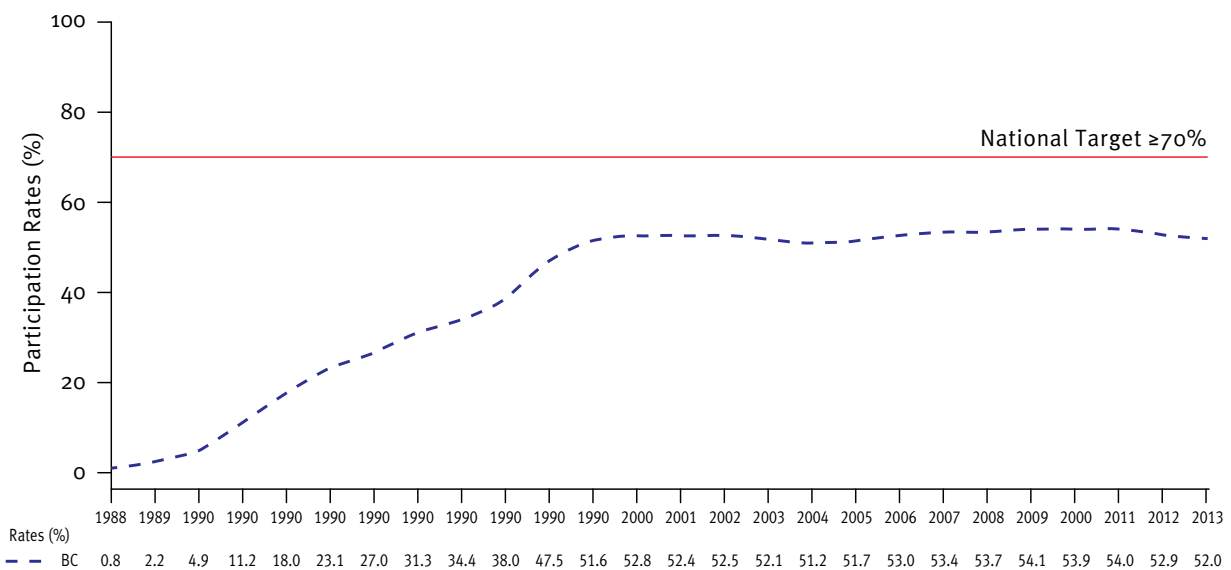
1. Population data sources: P.E.O.P.L.E. 2013 population projection (Sept 2013), BC STATS, Ministry of Technology, Innovation and Citizens' Services, Government of British Columbia, and Statistics Canada, National Household Survey Custom Profile, 2011 (original data source).
2. Postal code translation file: TMF201406 (June 2014).
3. Women attended the SMP at least once between July 1, 2011 and December 31, 2013 inclusive
4. East/South-East Asians include Chinese, Japanese, Korean, Filipino, Burmese, Cambodian, Laotian, Thai, Vietnamese, Indonesian, Malay, and other Asians.
5. South Asians include Bangladeshi, Bengali, East Indian, Gujarati, Pakistani, Punjabi, Sinhalese, Sri Lankan, Tamil.
6. SMP data extraction date: August 13, 2014.

**POPULATION PERCENTAGE:**

1. Original data source - Statistics Canada, National Household Survey Custom Profile, 2011
2. East/South-East Asians include Chinese, Filipino, Burmese, Cambodian, Hmong, Khmer, Laotian, Thai, Vietnamese, Indonesian, Japanese, Korean, Malaysian, Singaporean, Mongolian, Taiwanese, Tibetan, Asian n.o.s. and East/Southeast Asian n.i.e
3. South Asians include Bangladeshi, Bengali, East Indian, Goan, Gujarati, Kashmiri, Nepali, Pakistani, Punjabi, Sinhalese, Sri Lankan, Tamil, and South Asian n.i.e.

Participation in SMP by select ethnic groups has increased over the last three consecutive years, and is now higher than the overall provincial rate. Participation by First Nations women has increased by 7% overall (from 47.7% to 54.7%), East/South East Asians has increased by .1% overall (from 53.4% to 53.5%) and South Asians has increased by 3.6% overall (from 50.2% to 53.8%). These increases are as a result of outreach and mobile visits to select ethnic communities and targeted promotion activities by community partners such as the successful Canadian Cancer Society Sirf Dus campaign. Table 8.3 indicates that there are regional variations (the rate comparison over last year may vary slightly due to the change in the data source from last year). This information will help inform future promotional activities.

**FIGURE 8.4 – SMP PARTICIPATION RATES (%) FOR WOMEN 50 TO 69 BY CALENDAR YEAR: 1988–2013**



By 2000 there were 36 fixed and mobile mammography centres enabling all BC women to have reasonable access to screening services. The percentage of women in the target population increased each year until 2000 and has remained steady since then, ranging between 51-54%. This participation rate does not include women screened outside of the program.

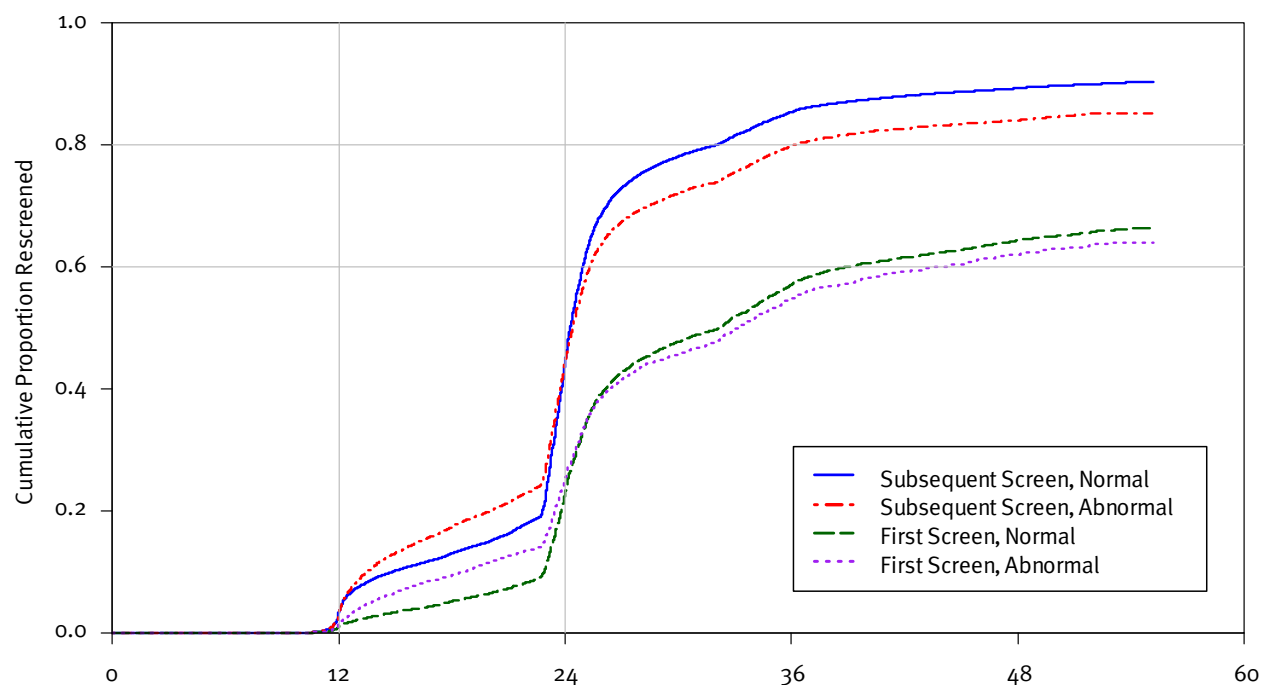
### Screening Return Rates

**Retention rate is the percentage of screen eligible women age 50 – 69 who had a subsequent SMP screening mammogram within 30 months of their previous program mammogram.**

Regular attendance for screening is important in order to benefit from a reduction in breast cancer mortality. The SMP sends recall reminders to women when they are due for their next screening interval. A second letter is sent if there is no appointment scheduled within four to six weeks of the first letter. This two-letter reminder system is repeated again the following year if there is no response.

Figure 8.5 and Table 8.4 show return rates for women ages 50 to 69 who attended SMP between 2010 and 2012. About 3-5% more women with a previous abnormal result at their last visit self-selected to return early (by 18 months) than those with normal results. But by 24 months, when SMP recall mailing is active, women with normal results are more likely to respond to the recall letters. First time women attendees have a much lower rate of return than those who have had two or more visits already. Compared to 2009-2011 the 30 month retention rate dropped 2% for women with previous normal results and dropped 2% for women with previous abnormal results. SMP has developed support material for the technologists to share with women at their first appointment to encourage them to return when they are recalled for future screening.

**FIGURE 8.5: RETURN RATES FOR WOMEN AGE 50-69 BY FIRST/SUBSEQUENT SCREENS AND SCREEN RESULT: 2010–2012**



NOTE: SMP data extraction date July 9, 2013



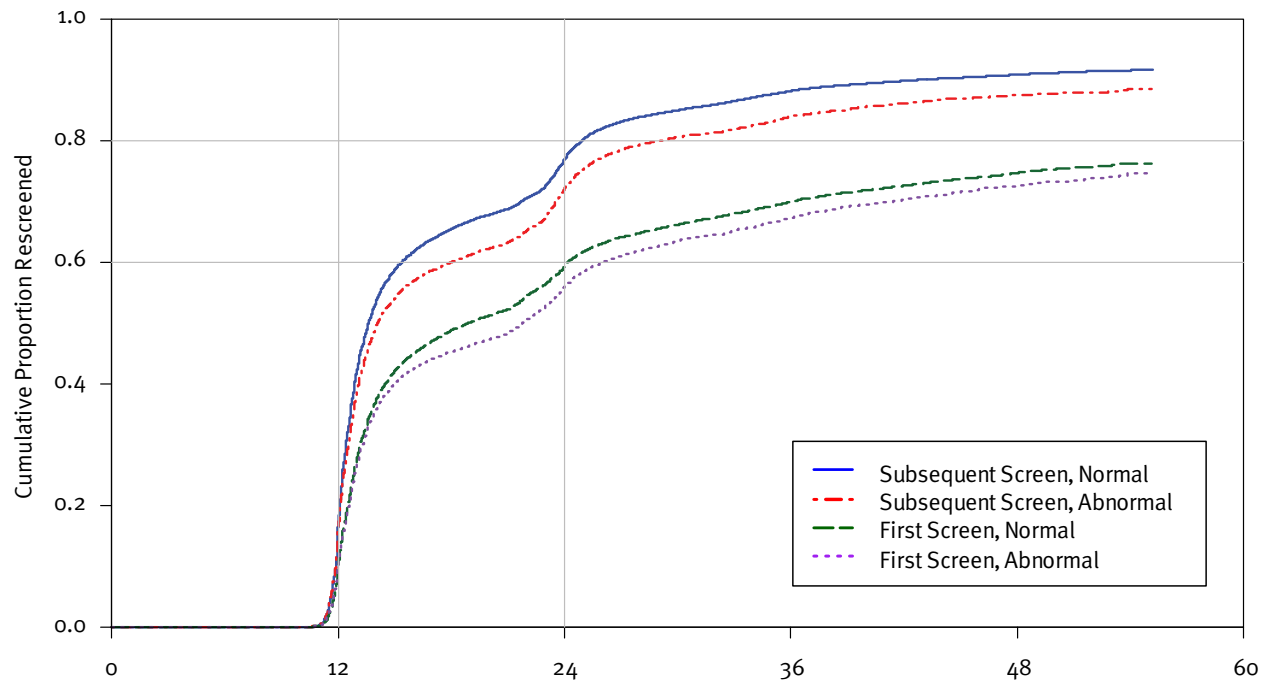
TABLE 8.4: RETURN RATES FOR WOMEN AGE 50 TO 69: 2010 – 2012

	First Screen		Subsequent Screen		Overall	
	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal
<b>Total Number to be Re-screened</b>	23,496	4,601	430,105	26,310	453,601	30,911
<b>Returned by 18 months</b>	5%	9%	13%	17%	13%	16%
24 months	23%	25%	44%	44%	43%	41%
30 months	48%	46%	78%	72%	77%	68%
36 months	57%	55%	85%	80%	84%	76%

NOTE: SMP data extraction date: August 13, 2014

Figure 8.6 shows a graph of return rates for women ages 40 to 49 who attended SMP between 2010 and 2012. Women in this cohort were recalled in accordance to the annual recall screening policy active at the time. Women with normal screen results at the last visit were more likely to return than those who had abnormal screen results. Just as observed for women ages 50-69, first time women ages 40-49 also have a much lower rate of return than those who had two or more visits already.

FIGURE 8.6: RETURN RATES FOR WOMEN AGE 40-49 BY FIRST/SUBSEQUENT SCREENS AND SCREEN RESULT: 2010-2012



NOTE: SMP data extraction date July 9, 2013

## 8.2 2013 Screening Results

Table 8.5 summarizes the outcome indicators for screening exams provided in 2013 by 10-year age groups. Of the 287,732 screening mammograms performed, 21,309 (7.4%) had an abnormal result. There were 1,385 breast cancers reported in 2013 as of August 13, 2014 (4.8 per 1,000 exams). The 2013 overall cancer detection rate increased over 2012, from 4.5 to 4.8 cancers detected per 1000 women screened. The proportion of cancers detected on first screens increased significantly for women 50-59 and 80+ compared to 2012 (5.2% and 6.6% respectively).

**TABLE 8.5: SMP OUTCOME INDICATORS BY 10-YEAR AGE GROUP: 2013**

Outcome Indicators	Age at Exam						All
	<40	40-49	50-59	60-69	70-79	80+	
<b>Number of Exams</b>	218	84,365	89,555	75,732	36,848	1,014	287,732
% on first screens	89.4%	20.6%	6.8%	3.6%	1.6%	2.9%	9.4%
<b>Number of Cancers</b>	---	186	372	494	318	15	1,385
% on first screens	---	34.4%	15.9%	6.3%	3.8%	13.3%	12.1%
<b>Abnormal Call Rate</b>	12.4%	8.9%	7.3%	6.4%	6.2%	7.6%	7.4%
on first screens	12.8%	15.9%	18.0%	17.3%	18.0%	24.1%	16.6%
on subsequent screens	8.7%	7.1%	6.5%	6.0%	6.0%	7.1%	6.5%
<b>Overall Cancer Detection Rate (per 1,000)</b>	---	2.2	4.2	6.5	8.6	14.8	4.8
on first screens	---	3.7	9.7	11.4	19.9	69.0	6.2
on subsequent screens	---	1.8	3.8	6.3	8.4	13.2	4.7
<b>DCIS Detection Rate (per 1,000)</b>	---	0.6	1.0	1.2	1.5	2.0	1.0
on first screens	---	0.9	2.0	3.3	3.3	---	1.4
on subsequent screens	---	0.5	0.9	1.2	1.5	2.0	1.0
<b>Positive Predictive Value of Screening Mammography</b>	---	2.5%	5.7%	10.2%	14.1%	19.5%	6.5%
on first screens	---	2.3%	5.4%	6.6%	11.2%	28.6%	3.8%
on subsequent screens	---	2.6%	5.8%	10.6%	14.2%	18.6%	7.3%
<b>Core Biopsy Yield Ratio</b>	---	16.9%	31.3%	46.7%	56.7%	86.7%	35.4%
on first screens	---	12.1%	24.1%	28.3%	31.3%	100.0%	18.3%
on subsequent screens	---	21.0%	33.1%	48.7%	58.4%	84.6%	40.4%
<b>Open Biopsy Yield Ratio</b>	---	12.3%	19.0%	33.1%	41.0%	50.0%	23.4%
on first screens	---	10.0%	14.9%	35.7%	33.3%	---	14.4%
on subsequent screens	---	14.4%	20.1%	32.9%	41.7%	50.0%	26.3%

**NOTES:**

1. See glossary in the Appendix for definitions of terms.
2. Overall Cancer Rate includes ductal carcinoma in situ (DCIS)
3. An additional 116 abnormal screens had incomplete or lost to follow-up. Information from these screens is excluded from all entries in the table other than exam counts and abnormal call rates.
4. The final number of cancers is still to be determined.
5. SMP data extraction date: August 13, 2014.

### Abnormal Call Rate

**Abnormal call rate is the percentage of women who were referred for further testing because of an abnormal screening mammogram result.**

The overall, first and subsequent screen abnormal call rates moved in a positive direction, decreasing for 2013 compared to 2012 (from 7.5 to 7.4%). The abnormal call rate is lower on subsequent screens than on first screens. The overall abnormal call rate decreases as women age, from 8.9% for ages 40 to 49 to 6.2% for ages 70 to 79.

### Cancer Detection Rate

**Cancer Detection rate is the number of women with a screen detected cancer per 1,000 women who had a screening mammogram. Cancer detection rates may be presented as invasive cancer detection rates, in-situ cancer detection rates and overall cancer detection rates.**

### Positive Predictive Value

**Positive Predictive Value (PPV) is the percentage of women with an abnormal mammogram result who were diagnosed with breast cancer (DCIS or invasive) after completion of diagnostic work-up.**

Cancer detection rates, ductal carcinoma in-situ (DCIS) detection rates, positive predictive values, core biopsy yield ratios, and open biopsy yield ratios increase with age between 40-49 and 70-79. Compared to last year, the overall and DCIS cancer detection rates, positive predictive values, and core biopsy ratio increased for overall, first, and subsequent screens. The overall core biopsy yield rate increased slightly by 2% compared with the rate in 2012 (35.4% in 2013 compared with 33.4% in 2012).

Diagnostic procedure information is available to date on 21,193 (99%) of the screening mammograms with abnormal findings. Table 8.6 shows the proportion of women receiving specific diagnostic procedures as part of the work-up on their screen-detected abnormalities.

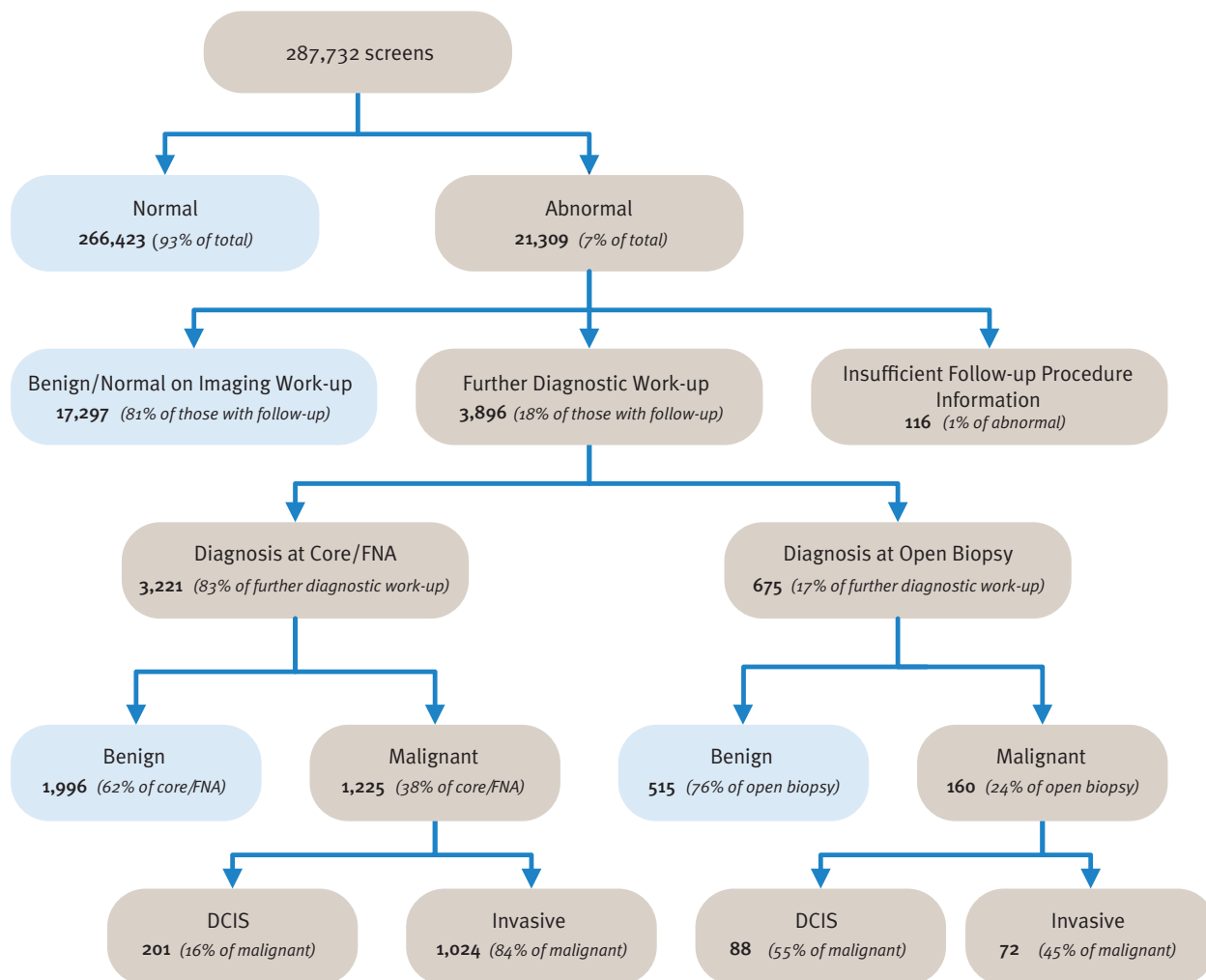
Overall, 16% and 3% of women with abnormal screening mammograms had core biopsy and open biopsy, respectively. The number of core biopsies performed increased by 1% (from 15% to 16%) compared to the previous year.

**TABLE 8.6: DIAGNOSTIC PROCEDURES RECEIVED BY SMP PARTICIPANTS WITH “ABNORMAL” SCREENING MAMMOGRAMS: 2013**

Procedure	Age at Exam						All
	<40	40-49	50-59	60-69	70-79	80+	
Diagnostic Mammogram	85%	92%	93%	93%	93%	91%	93%
Ultrasound	59%	68%	67%	67%	67%	77%	67%
Fine Needle Aspiration	0%	1%	2%	2%	2%	3%	2%
Core Biopsy	19%	12%	16%	19%	22%	19%	16%
Surgical Biopsy	0%	3%	3%	3%	3%	5%	3%
with Localization	0%	2%	3%	3%	3%	5%	3%
Number of cases with diagnostic assessment information available	27	7,473	6,524	4,835	2,257	77	21,193

NOTE: SMP data extraction date: August 13, 2014.

FIGURE 8.7: SCREENING OUTCOME SUMMARY (2013)



### 8.3 2012 Cancer Detection

Histologic features of breast cancers detected by the SMP in 2012 are summarized by 10-year age groups in Table 8.7. Histologic features of breast cancer cases were obtained from the pathology reviews, if available. Otherwise, they were obtained from the original diagnostic reports. Invasive tumour size was determined from the best available source: (1) pathological, (2) radiological, or (3) clinical.

Overall, 21% of cancers detected were in situ. Of the invasive cancers detected, 62% were  $\leq 15$  mm, 78% did not have invasion of the regional lymph nodes (2% increase compared with last 76% year), and 26% were grade 3 (i.e. poorly differentiated) tumours. Of the grade 3 tumours, 42% were smaller than 15 mm (42% compared with 46% last year).

These overall outcome indicators met the international targets<sup>4</sup> recommended for screening programs.

TABLE 8.7: HISTOLOGIC FEATURES OF BREAST CANCERS DETECTED BY SMP: 2012

Histological Features	Age at Exam								Age 40-79	
	40-49		50-59		60-69		70-79			
Number of Cancers	189		329		447		289		1,254	
in situ	61	32%	69	21%	77	17%	53	18%	260	21%
invasive	128	68%	260	79%	370	83%	236	82%	994	79%
Invasive Cancers Tumour Size										
≤5 mm	8	7%	29	11%	32	9%	18	8%	87	9%
6-10 mm	22	18%	54	21%	103	28%	75	32%	254	26%
11-15 mm	38	32%	68	26%	104	28%	60	26%	270	28%
16-20 mm	22	18%	42	16%	56	15%	32	14%	152	16%
>20 mm	29	24%	64	25%	74	20%	48	21%	215	22%
unknown size	(9)		(3)		(1)		(3)		(16)	
Invasive Cancers with tumour ≤ 15 mm										
	68	57%	151	59%	239	65%	153	66%	611	62%
Node Involvement in Invasive Cancers										
no	85	75%	180	75%	280	79%	171	78%	716	78%
yes	28	25%	59	25%	73	21%	47	22%	207	22%
no nodes sampled / unknown	(15)		(21)		(17)		(18)		(71)	
Histologic Grade of Invasive Cancers										
1 - well differentiated	24	20%	70	28%	98	27%	73	32%	265	27%
2 - moderately differentiated	54	45%	107	42%	179	50%	109	47%	449	47%
3 - poorly differentiated	41	34%	77	30%	84	23%	48	21%	250	26%
unknown grade	(9)		(6)		(9)		(6)		(30)	
Grade 3 tumour ≤ 15 mm	17	41%	27	35%	38	45%	22	46%	104	42%

NOTES:

1. Targets<sup>1</sup> : >50% invasive tumours  $\leq 15$ mm, >70% with negative nodes, >30% grade 3 tumours  $\leq 15$ mm.
2. SMP data extraction date: August 13, 2014.

<sup>4</sup> Tabår L, Fagerberg G, Duffy SW, Day NE, Gad A, Grøntoft O. Update of the Swedish two-country program of mammographic screening for breast cancer. Radiol Clin North Am. 1992 Jan;30(1):187-210

## 8.4 Outcome Indicators by Calendar Year: 2009–2013

Table 8.8 shows the outcome indicators for screening exams provided over five years. Abnormal call rates, cancer detection rates, and positive predictive values have remained stable over the five year period. Core biopsy yield ratios have settled around 35% in the last five years. Open biopsy yield ratios, on the other hand, have been declining steadily. In 2012, 23.4% of the open biopsies performed found breast cancer.

Regular record linkage with the British Columbia Cancer Registry enables the SMP to determine the number of non-screen detected (interval) cancers in the SMP participants. Sensitivity (i.e. probability of finding women with breast cancer) and specificity (i.e. probability of a negative mammography in women without breast cancer) by calendar year are shown in Table 8. The SMP conducts formal reviews, both blinded and retrospective, of ~ 50% of interval cancers in SMP participants.

Comparison of prevalence rate at first screen with the historical incidence rate prior to the onset of screening practice provides another measure of program performance. The expected age-specific incidence rates in the absence of screening were derived from the 1982 breast cancer incidence data reported for British Columbia. Since screening may be obtained outside of the SMP, prevalent screens have been restricted to those women with no previous outside mammogram within 24 months of their first SMP encounter.



TABLE 8.8: SMP OUTCOME INDICATORS BY CALENDAR YEAR BETWEEN 2009 AND 2013 INCLUSIVE

Outcome Indicators	Calendar Year					5-Year Cumulative
	2009	2010	2011	2012	2013	
<b>Number of Exams</b>	299,421	303,142	305,409	281,710	287,732	1,477,414
% on first screens	13.1%	11.2%	10.8%	9.6%	9.4%	10.8%
<b>Number of Cancers</b>	1,293	1,288	1,477	1,270	1,385	6,713
% on first screens	15.6%	13.6%	13.7%	11.1%	12.1%	13.2%
<b>Abnormal Call Rate</b>	7.3%	7.3%	7.8%	7.5%	7.4%	7.4%
on first screens	15.3%	15.6%	16.8%	16.0%	16.6%	16.0%
on subsequent screens	6.0%	6.2%	6.7%	6.5%	6.5%	6.4%
<b>Overall Cancer Detection Rate (per 1,000)</b>	4.3	4.3	4.8	4.5	4.8	4.5
on first screens	5.1	5.2	6.2	5.2	6.2	5.6
on subsequent screens	4.2	4.1	4.7	4.4	4.7	4.4
<b>DCIS Detection Rate (per 1,000)</b>	1.0	0.9	1.0	0.9	1.0	1.0
on first screens	1.2	1.3	1.6	1.0	1.4	1.3
on subsequent screens	0.9	0.8	0.9	0.9	1.0	0.9
<b>Positive Predictive Value of Screening Mammography</b>	6.0%	5.9%	6.2%	6.1%	6.5%	6.1%
on first screens	3.4%	3.4%	3.7%	3.3%	3.8%	3.5%
on subsequent screens	7.0%	6.7%	7.0%	6.8%	7.3%	6.9%
<b>Core Biopsy Yield Ratio</b>	36.0%	35.1%	35.0%	33.5%	35.4%	34.9%
on first screens	20.3%	18.3%	17.9%	15.9%	18.3%	18.1%
on subsequent screens	42.1%	40.9%	40.8%	38.6%	40.4%	40.5%
<b>Open Biopsy Yield Ratio</b>	30.3%	29.2%	26.1%	24.0%	23.4%	27.0%
on first screens	19.4%	19.6%	18.0%	15.9%	14.4%	17.8%
on subsequent screens	33.9%	32.0%	28.8%	26.2%	26.3%	29.9%
<b>Interval Cancer Rate (per 1,000)</b>						
0-12 months	0.65	0.70	0.57	0.62	---	---
after first screens	0.46	0.53	0.24	0.70	---	---
after subsequent screens	0.68	0.72	0.61	0.61	---	---
13-24 months	0.64	0.76	0.68	---	---	---
<b>Sensitivity (i.e. 1 – false negative rate)</b>	86.8%	85.8%	89.5%	---	---	---
<b>Specificity (i.e. 1 – false positive rate)</b>	93.2%	93.2%	92.7%	93.0%	---	---
<b>Prevalence to Expected Incidence Ratio for Age 50-79 (target: &gt;3.0)</b>	5.00	4.40	6.20	4.60	5.20	5.20

## NOTES:

1. See glossary in the Appendix for definitions of terms.
2. Overall Cancer Rate includes ductal carcinoma in situ (DCIS)
3. The final number of cancers in 2013 is still to be determined.
4. Number of cancers and related rates do not include data for women whose follow-up is incomplete.
5. SMP data extraction date: August 13, 2014.

1 Day NE, Williams DRR, Khaw KT. Breast Cancer Screening Programmes: The Development of a Monitoring and Evaluation System. Br J Cancer 1989; 59:954-958

## 8.5 Outcome Indicators by 10-Year Age Groups: 2009 – 2013 Cumulative

Table 8.9 shows the outcome indicators for screening exams provided in a five-year period by 10-year age groups. From 2009 to 2013, the SMP provided 1,477,414 screening mammography examinations, and detected 6,713 breast cancers. About 85% of the cancers detected during this five year period were in women 50 years of age or older. The screen-to-cancer ratio ranges from 120:1 for women in their 70's to 460:1 for women in their 40's.

Although the risk of breast cancer increases with age, the abnormal call rates were higher in the younger age groups. The abnormal-to-cancer ratio ranges from 7:1 for women in their 70's to 41:1 for women in their 40's. The cancer detection rate and positive predictive value increases as for women as they get older.

TABLE 8.9: SMP OUTCOME INDICATORS BY 10-YEAR AGE GROUPS BETWEEN 2009 AND 2013 INCLUSIVE

Outcome Indicators	Age at Exam					All
	40-49	50-59	60-69	70-79	80+	
<b>Number of Exams</b>	475,160	456,276	363,458	175,242	5,918	1,477,414
% on first screens	22.1%	7.8%	4.0%	2.1%	4.3%	10.8%
<b>Number of Cancers</b>	1,034	1,831	2,312	1,456	80	6,713
% on first screens	33.3%	15.3%	7.9%	5.0%	11.3%	13.2%
<b>Abnormal Call Rate</b>	9.0%	7.2%	6.4%	6.1%	6.6%	7.4%
on first screens	15.5%	17.3%	16.6%	16.3%	13.3%	16.0%
on subsequent screens	7.1%	6.4%	5.9%	5.9%	6.3%	6.4%
<b>Overall Cancer Detection Rate (per 1,000)</b>	2.2	4.0	6.4	8.3	13.5	4.5
on first screens	3.3	7.9	12.6	20.0	35.4	5.6
on subsequent screens	1.9	3.7	6.1	8.1	12.5	4.4
<b>DCIS Detection Rate (per 1,000)</b>	0.7	0.9	1.2	1.5	1.5	1.0
on first screens	0.9	1.6	2.7	4.1	0.0	1.3
on subsequent screens	0.6	0.8	1.1	1.4	1.6	0.9
<b>Positive Predictive Value of Screening Mammography</b>	2.4%	5.6%	10.1%	13.8%	20.5%	6.1%
on first screens	2.1%	4.6%	7.7%	12.5%	27.3%	3.5%
on subsequent screens	2.6%	5.8%	10.4%	13.8%	19.9%	6.9%
<b>Core Biopsy Yield Ratio</b>	17.3%	31.7%	47.5%	56.5%	75.5%	34.9%
on first screens	12.0%	21.5%	33.0%	44.7%	70.0%	18.1%
on subsequent screens	22.0%	34.6%	49.4%	57.2%	76.2%	40.5%
<b>Open Biopsy Yield Ratio</b>	15.5%	23.5%	36.5%	45.1%	52.9%	27.0%
on first screens	12.9%	19.1%	32.4%	40.0%	100.0%	17.8%
on subsequent screens	17.5%	24.7%	36.9%	45.5%	46.7%	29.9%
<b>Interval Cancer Rate (per 1,000)</b>						
0-12 months	0.54	0.47	0.67	0.62	0.34	0.56
after first screens	0.37	0.48	0.83	0.82	<0.01	0.44
after subsequent screens	0.58	0.47	0.67	0.62	0.35	0.57
13-24 months	<0.01	0.58	0.78	0.80	1.01	0.47
<b>Sensitivity (i.e. 1 - false negative rate)</b>	80.2%	89.4%	90.4%	93.0%	97.6%	89.0%
<b>Specificity (i.e. 1 - false positive rate)</b>	91.3%	93.2%	94.3%	94.8%	94.7%	93.0%

## NOTES:

1. See glossary in the Appendix for definitions of terms.
2. Overall Cancer Rate includes ductal carcinoma in situ (DCIS)
3. The final number of cancers in 2013 is still to be determined.
4. Number of cancers and related rates do not include data for women whose follow-up is incomplete.
5. The "All" column includes women less than 40 years of age.
6. SMP data extraction date: August 13, 2014.

## 8.6 Outcome Indicators by HSDA: 2009–2013 Cumulative

Outcome indicators for 2009 to 2013 are summarized by HSDA in Table 10. North and South Vancouver Island regions have the lowest abnormal call rate (5%), while Fraser East has the highest (11%).

Northern Interior and Northeast have the lowest cancer detection rate (3.9 per 1,000), and Central Vancouver Island has the highest (5.4 per 1,000).

Fraser East and East Kootenay have the lowest positive predictive value (4%), and Kootenay Boundary and Central Vancouver Island have the highest (9%). All of the HSDAs meet the international targets<sup>5</sup> recommended for screening programs for invasive tumour detection size (target > 50%); eight out of the sixteen HSDAs meet the international target recommended for percentage of cases with negative nodes (target > 70%).

**TABLE 8.10: SMP OUTCOME INDICATORS BY HEALTH SERVICE DELIVERY AREA (HSDA) BETWEEN 2009 AND 2013 INCLUSIVE**

HSDA	% Called Abnormal	Cancer Detection Rate (per 1000)	PPV	In-Situ : Invasive (number)	% Invasive ≤15 mm	% Invasive with -ve nodes
East Kootenay	10%	4.2	4%	15 : 82	67%	74%
Kootenay Boundary	6%	4.9	9%	26 : 86	60%	71%
Okanagan	6%	4.6	8%	91 : 508	60%	76%
Thompson Cariboo	7%	5.2	8%	75 : 324	56%	70%
Fraser East	11%	5.1	4%	86 : 333	55%	69%
Fraser North	7%	4.3	6%	219 : 641	62%	69%
Fraser South	9%	4.5	5%	226 : 780	62%	71%
Richmond	6%	4.0	6%	85 : 210	60%	67%
Vancouver	8%	4.4	5%	224 : 627	64%	67%
North Shore / Coast Garibaldi	7%	4.8	7%	105 : 377	63%	71%
South Vancouver Island	5%	4.3	8%	80 : 471	54%	69%
Central Vancouver Island	6%	5.4	9%	81 : 439	65%	75%
North Vancouver Island	5%	4.4	8%	33 : 152	67%	76%
Northwest	6%	4.6	7%	22 : 66	56%	65%
Northern Interior	7%	3.9	6%	37 : 136	59%	63%
Northeast	8%	3.9	5%	7 : 39	67%	62%
<b>Program</b>	<b>7%</b>	<b>4.5</b>	<b>6%</b>	<b>1421 : 5292</b>	<b>61%</b>	<b>70%</b>

**NOTES:**

1. See glossary in the Appendix for definitions of terms.
2. Targets<sup>1</sup>: >50% invasive tumours ≤15mm, >70% with negative nodes
3. SMP data extraction date: August 13, 2014.

5 Tabår L, Fagerberg G, Duffy, SW, Day NE, Gad A, Grøntoft O. Update of the Swedish Two-country Program of Mammographic Screening for Breast Cancer. Radiol Clin North Am 1992; 30(1): 187-210

## 8.7 Cancer Characteristics by Age: Cumulative up to and including 2012

From the start of the program in July 1988 to December 2012, 19,616 women were found to have breast cancer through screening-initiated work-up. Histologic features of breast cancers detected by the SMP cumulative up to and including 2012 are summarized by 10-year age groups in Table 8.11. Internationally recommended targets have been achieved. Overall, invasive cancers found in women ages 40 to 49 tend to be larger and more likely to have node involvement than cancers found in older women.

**TABLE 8.11: HISTOLOGIC FEATURES OF BREAST CANCERS DETECTED BY SMP CUMULATIVE UP TO AND INCLUDING 2012**

Histological Features	Age at Exam										Age 40+	
	40-49		50-59		60-69		70-79		80+			
Number of Cancers	3,269		5,554		6,142		4,339		312		19,616	
in situ	1,038	32%	1,384	25%	1,260	21%	763	18%	33	11%	4,478	23%
invasive	2,231	68%	4,170	75%	4,882	79%	3,576	82%	279	89%	15,138	77%
Invasive Cancers Tumour Size												
≤5 mm	218	10%	388	9%	423	9%	259	7%	25	9%	1,313	9%
6-10 mm	433	20%	999	24%	1,323	27%	1,098	31%	74	27%	3,927	26%
11-15 mm	608	28%	1,147	28%	1,464	30%	1,065	30%	79	29%	4,363	29%
16-20 mm	335	15%	688	17%	723	15%	531	15%	48	17%	2,325	16%
>20 mm	591	27%	896	22%	908	19%	581	16%	50	18%	3,026	20%
unknown size	(46)		(52)		(41)		(42)		(3)		(184)	
Invasive Cancers with tumour ≤ 15 mm												
	1,259	58%	2,534	62%	3,210	66%	2,422	69%	178	64%	9,603	64%
Node Involvement in Invasive Cancers												
no	1,409	70%	2,840	73%	3,505	78%	2,516	80%	159	81%	10,429	76%
yes	614	30%	1,031	27%	1,009	22%	611	20%	38	19%	3,303	24%
no nodes sampled / unknown	(208)		(299)		(368)		(449)		(82)		(1406)	
Histologic Grade of Invasive Cancers												
1 - well differentiated	544	26%	1,235	32%	1,486	33%	1,204	37%	98	39%	4,567	33%
2 - moderately differentiated	887	43%	1,606	42%	2,031	45%	1,456	44%	105	42%	6,085	43%
3 - poorly differentiated	633	31%	1,015	26%	1,021	22%	618	19%	50	20%	3,337	24%
unknown grade	(167)		(314)		(344)		(298)		(26)		(1149)	
Grade 3 tumour ≤ 15 mm	267	42%	466	46%	535	52%	311	50%	22	44%	1,601	48%

**NOTES:**

1. Targets<sup>1</sup>: >50% invasive tumours ≤15mm, >70% with negative nodes, >30% grade 3 tumours ≤15mm.
2. SMP data extraction date: August 13, 2014.

## 8.8 Comparison with Canadian Standards

The Canadian Breast Cancer Screening Initiative (CBCSI) was launched in 1992. Under this initiative, Health Canada (now Public Health Agency of Canada) facilitated a federal/provincial/territorial network that enabled collaboration in the implementation and evaluation of breast cancer screening programs in Canada. In 2012 the CBCSI component transferred to the Canadian Partnership Against Cancer (CPAC).

The Canadian Breast Cancer Screening Database (CBCSD) was first established in 1993. All provincial and territorial programs in Canada contribute data to the CBCSD. The first evaluation report on Organized Breast Cancer Screening Programs in Canada was published in 1999, and prompted the creation of the Evaluation Indicators Working Group to begin the task of defining performance measures for Canadian breast cancer screening programs. Biennial evaluation reports are now produced regularly from the CBCSD by CPAC.

In this section, the SMP performance measures are presented against the targets set for Canadian breast cancer screening programs<sup>6</sup>. This document defined a set of performance measures that were developed on the basis of recognized population screening principles, evidence from randomized controlled trials, demonstration projects, and observational studies.

SMP achieves national targets in invasive cancer detection rates, positive predictive values, invasive tumour sizes, and node negative rates. Improvements are needed to: increase participation and retention rates; and to reduce abnormal call rates, diagnostic intervals, and benign to malignant open biopsy ratio.

- The participation rate decreased 2% compared to 2012 (53% plus 9% MSP to 52% plus 8% MSP).
- Compared with 2012 the retention rate decreased by 5% for first screens and 2% for subsequent screens.
- The positive predictive value for first screens improved from 4.5 to 5.8% and now meets the established target.

Comparison of SMP Performance with Canadian Breast Screening Standards for Ages 50 to 69 is summarized in Table 8.12.

<sup>6</sup> Report from the Evaluation Indicators Working Group: Guidelines for Monitoring Breast Screening Program Performance third Edition. Health Canada 2013

**TABLE 8.12: COMPARISON OF SMP PERFORMANCE WITH CANADIAN BREAST SCREENING STANDARDS FOR AGES 50 TO 69 YEARS**

Performance Measure	National Target <sup>7</sup>	SMP
<b>Participation Rate (1)</b>	≥70% of the eligible population	52% (plus 8% MSP)
<b>Retention Rate (2)</b>		
Initial Rescreen	≥75% initial re-screen within 30 months	47%
Subsequent Rescreen	≥90% subsequent re-screen within 30 months	78%
<b>Abnormal Call Rate (3)</b>		
First Screens	<10% first screens	17.8%
Subsequent Screens	<5% re-screens	6.3%
<b>Invasive Cancer Detection Rate (per 1000) (3)</b>		
First Screens	>5.0 per 1,000 first screens	7.8 per 1000
Subsequent Screens	>3.0 per 1,000 re-screens	3.9 per 1000
<b>In Situ Cancer Detection Rate (3)</b>		
First Screens	Surveillance and Monitoring only	2.4 per 1000
Subsequent Screens	Surveillance and Monitoring only	1.0 per 1000
<b>Diagnostic Interval (3)</b>		
no tissue biopsy performed	≥90% within 5 weeks if no tissue biopsy performed	81.3%
tissue biopsy performed	≥90% within 7 weeks if tissue biopsy performed	63.6%
<b>Positive Predictive Value (3)</b>		
First Screens	≥5% first screen	5.8%
Subsequent Screens	≥6% re-screens	7.9%
<b>Benign Core Biopsy Rate (per 1000) (3)</b>		
First Screens	Surveillance and Monitoring only	26.4 per 1000
Subsequent Screens	Surveillance and Monitoring only	6.3 per 1000
<b>Benign to Malignant Core Biopsy Ratio (3)</b>		
First Screens	Surveillance and Monitoring only	2.9 : 1
Subsequent Screens	Surveillance and Monitoring only	1.4 : 1
<b>Benign Open Biopsy Rate (per 1000) (3)</b>		
First Screens	Surveillance and Monitoring only	5.6 per 1000
Subsequent Screens	Surveillance and Monitoring only	1.6 per 1000
<b>Benign to Malignant Open Biopsy Ratio (3)</b>		
First Screens	≤1:1	4.1 : 1
Subsequent Screens	≤1:1	2.8 : 1
<b>Invasive Tumour size ≤10 mm (4)</b>	>25%	35%
<b>Invasive Tumour size ≤15 mm (4)</b>	>50%	62%
<b>Node Negative Rate in Cases of Invasive Cancer (4)</b>	>70%	78%

NOTES:

- Screen years: (1) = July 1, 2011 - December 31, 2013, (2) = 2010-2012, (3) = 2013, (4) = 2012
- Population data source: P.E.O.P.L.E. 2013 population projection (Sept 2013), BC Stats, Ministry of Technology, Innovation and Citizens' Services, Government of the Province of British Columbia.
- SMP data extraction date: August 13, 2014.

<sup>7</sup> Report from the Evaluation Indicators Working Group: Guidelines for Monitoring Breast Screening Program Performance third Edition. Health Canada 2013



## 8.9 Cost Analysis

The BC Cancer Agency Screening mammography Program is funded by the provincial Ministry of Health through the Provincial Health Services Authority (PHSA). The SMP contracts with regional health authorities and private community imaging clinics to provide screening mammography services, including mobile services, throughout the province.

Overall program administration and coordination is provided by the SMP Central Office, including: promotion, a provincial toll-free call centre, mobile service coordination and staff travel, result mail-out to women and physicians, invitation and recall reminder system, follow-up tracking, quality management, program evaluation, and research support.

Costing analysis by fiscal year is summarized in Table 8.13

Financial reports for PHSA and BCCA are available at the PHSA website:  
[www.phsa.ca/AboutPHSA/PHSA\\_Budget\\_Financials/default.htm](http://www.phsa.ca/AboutPHSA/PHSA_Budget_Financials/default.htm)

**TABLE 8.13: COST COMPARISON BY FISCAL YEAR**

Indicator	2009–2010	2010–2011	2011–2012	2012–2013	2013–2014
<b>Total Cost</b>	\$20,311,839	\$21,450,188	\$21,716,688	\$21,633,483	\$21,936,860
<b>Total cost per screen</b>	\$70.56	\$72.34	\$74.76	\$75.63	\$79.51
Central Services	\$14.95	\$13.89	\$16.83	\$17.05	\$19.62
Screen Provision Costs	\$41.10	\$43.88	\$43.29	\$43.87	\$45.11
Professional Reading Fees	\$14.50	\$14.57	\$14.64	\$14.71	\$14.78
<b>Cost per cancer detected</b>	\$15,434.15	\$15,798.52	\$16,606.31	\$16,853.82	Not Available

**NOTES:**

1. Program Expenses are audited through PHSA Finance annually.
2. Screen Provision Costs includes, but are not limited to, staffing costs, equipment maintenance related costs, and mobile operation costs.
3. The professional reading fee was \$14.78 per screen effective April 1, 2014.
4. Number of cancers detected in 2013-14 is not available yet, and thus the cost per cancer detected is not computed.
5. Cost per cancer detected is based upon screens with complete follow-up.
6. The cost per screen is exclusive of salary and benefit increases to public screening centres which, commencing in fiscal 2006, have gone directly to the Health Authority.
7. SMP data extraction date: August 13, 2014.

## Appendix 1 — Cancer Screening Program Overview

### Definition of Screening

Screening is a prevention strategy. Primary cancer prevention strategy involves changes of behaviour or habits that reduce a risk, for example, stopping smoking, fat reduction in the diet, etc. Screening for cancer is a secondary prevention strategy. Secondary cancer prevention strategy targets disease in process<sup>8</sup>. A secondary prevention can reduce cancer morbidity and mortality by: diagnosing invasive disease at an earlier, more favourable prognostic stage; and, detecting precursor lesions associated with some cancers that once eliminated, prevent progression to invasive disease. Screening is “the application of various tests to apparently healthy individuals to sort out those who probably have risk factors or are in the early stages of specified conditions.”<sup>9</sup>

### Limitations of Screening

The decision to screen an at-risk population for pre-clinical signs of cancer is based on well-established criteria related to cancer and the screening tests that we used to identify individuals who may have occult disease.<sup>10,11,12</sup>

The overall objective of a screening program is to reduce morbidity and mortality from cancer. The goal of screening is to “apply a relatively simple, inexpensive test to a large number of persons in order to classify them as likely or unlikely to have the cancer”. The emphasis on likelihood underscores the limits of what should be expected from screening (i.e., screening tests are not diagnostic tests).

<sup>8</sup> US Preventive Services Task Force: Guide to Clinical Preventive Services, Ed 2. Baltimore, Williams & Wilkins, 1996

<sup>9</sup> Morrison A: Screening in Chronic Disease. New York, Oxford Press, 1992

<sup>10</sup> Cole P, Morrison AS: Basic issues in cancer screening. In Miller AB (ed); Screening in Cancer. Geneva, International Union Against Cancer, 1978, P7

<sup>11</sup> Miller AB; Fundamentals of Screening. In Screening for Cancer. Orlando, Academic Press, 1985, P3

<sup>12</sup> Wilson JMG, Junger G; Principles and Practice of Screening for Disease. Geneva, World Health Organization, 196

A person with an abnormal screening test does not have a definitive diagnosis until additional, more sophisticated diagnostic tests are completed. The emphasis on likelihood also is important because screening tests are inherently limited in their accuracy, which varies by test, cancer site, and individual characteristics. Although most of screening interpretations are accurate, it is inevitable that some individuals are identified as possibly having cancer when they do not (false-positive screen), and screening tests may fail to identify some individuals who do have the disease (false-negative screen).

The comparative evaluation of accuracy versus misinterpretation cannot be considered in absolute terms, but rather should be evaluated in terms of the relative consequences of one or the other kind of error.

### Organized Population Screening Program

To reduce morbidity and mortality from cancer in a population by screening, there must be coordinated and effective strategies to ensure acceptance and utilization of the established screening test. Since screening is targeted at asymptomatic women, the fine balance between maximizing benefits and minimizing undesirable effects must be maintained.

An organized approach to screening ensures that the target population has access to the screening service and that it accepts and uses the services offered. This is achieved by including the following six program components:

1. Health Promotion
2. Professional Development/Education
3. Recruitment & Retention
4. Screening Test & Reporting
5. Follow-up

## Appendix 2 — 2012 SMP Screening Services

In 2013 SMP provided screening mammography to women ages 40 to 79. The recall frequency shown below was used to calculate the program results for the period of January 1, 2013 – December 31, 2013.

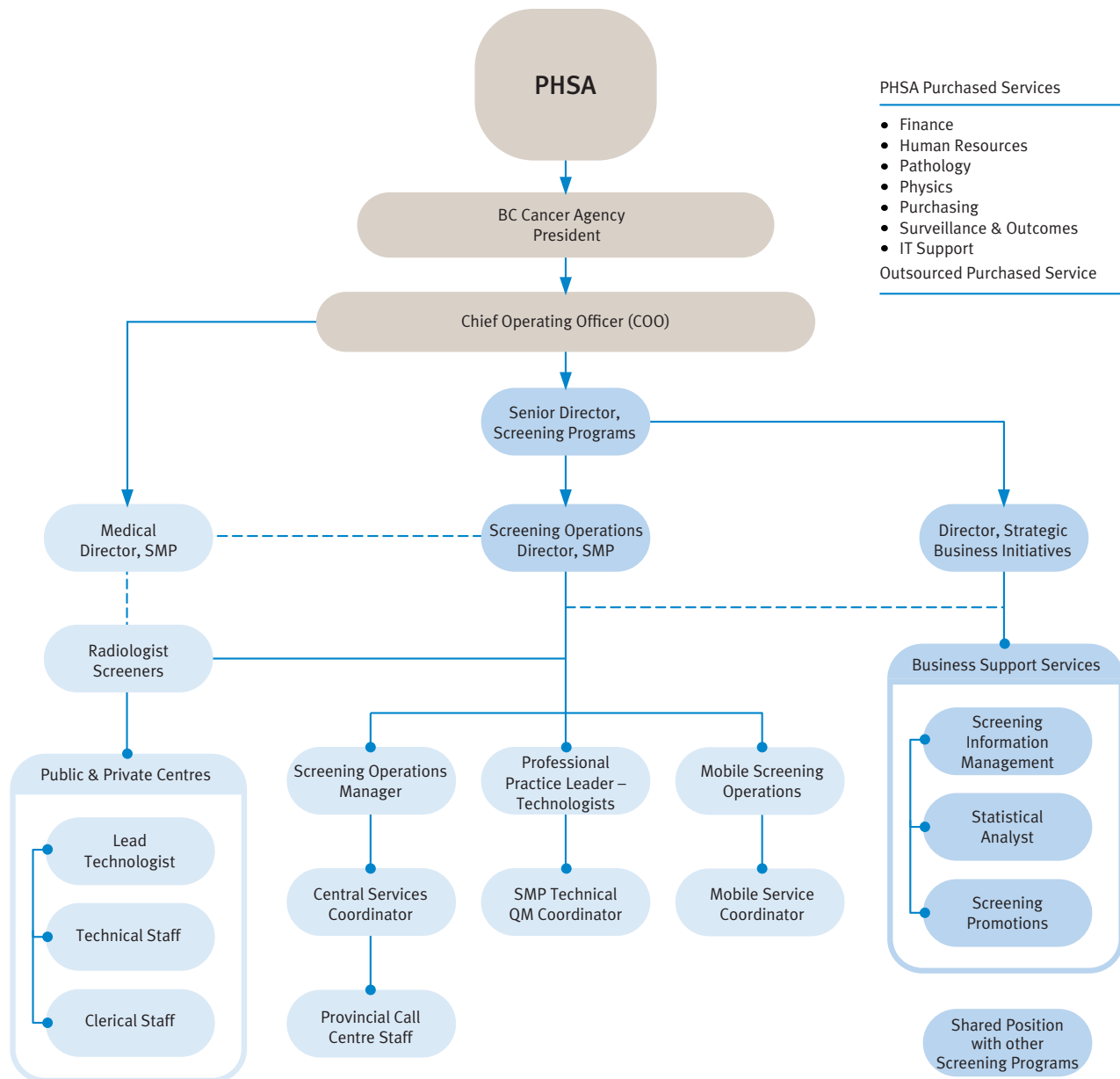
Age	Recall Frequency
<40	Will accept with primary health care provider referral
40-49	Reminders* for 12-month and 24-month anniversary
50-79	Reminders* for 24-month and 36-month anniversary to age 79
80+	Will accept with primary health care provider referral

### Eligibility Criteria

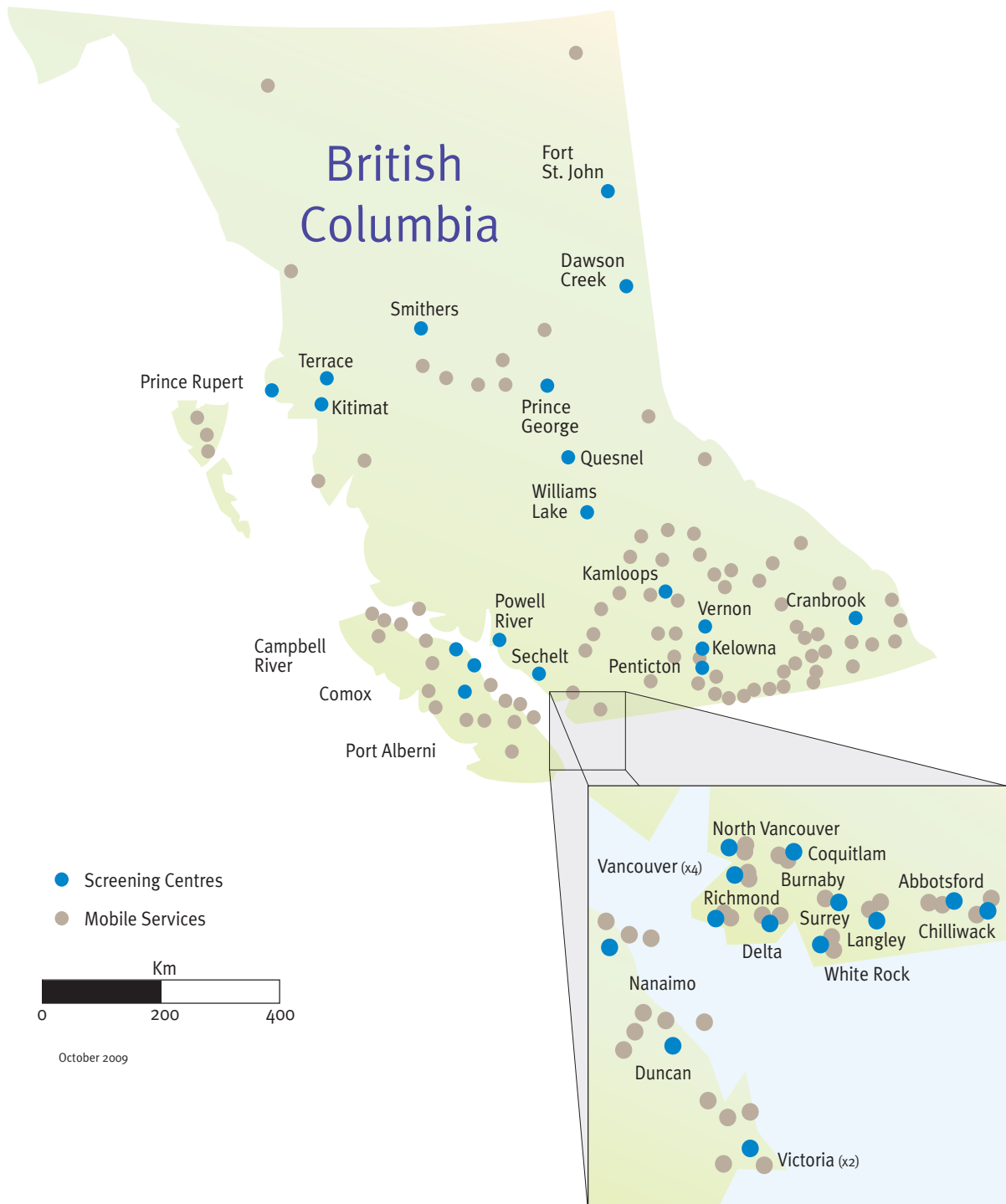
- Have no breast changes\*.
- Have not had a mammogram within 12 months.
- Have not had breast cancer.
- Do not have breast implants.
- Are not pregnant or breast feeding.
- Can provide the name of a primary care provider to receive the results.

\*If there is a new lump, thickening or discharge, we recommend seeing a doctor immediately, even if the last mammogram was normal.

## Appendix 3 — SMP/BCCA Organization Chart



## Appendix 4 — Map of Screening Centres



## Appendix 5 — Screening Centre Contact Information

Abbotsford	604-851-4750	Prince George	250-565-6816
Burnaby	604-436-0691	Prince Rupert	1-800-663-9203
Campbell River	1-800-663-9203	Quesnel	1-800-663-9203
Chilliwack	1-800-663-9203	Smithers	1-800-663-9203
Comox	250-890-3020	Sechelt	1-800-663-9203
Coquitlam	604-927-2130	Richmond	604-244-5505
Cranbrook	250-417-3585	Surrey – JPOCSC	604-582-4592
Dawson Creek	1-800-663-9203	Terrace	1-800-663-9203
Delta	604-946-1121	Vernon	250-549-5451
Duncan	1-800-663-9203	White Rock	604-535-4512
Fort St. John	1-800-663-9203	Williams Lake	1-800-663-9203
Kamloops	250-828-4916		
Kelowna	250-861-7560	Vancouver	
Kitimat	1-800-663-9203	BC Women's Health Centre	604-775-0022
Langley	604-514-6044	Mount St. Joseph Hospital	604-877-8388
Nanaimo	250-716-5904	5752 Victoria Drive	604-321-6770
IK and NLM Mobile	1-800-663-9203	#505-750 West Broadway	604-879-8700
North Vancouver	604-903-3860		
Penticton	250-770-7573	Victoria	
Port Alberni	1-800-663-9203	#230–1900 Richmond Ave	250-952-4232
Powell River	1-800-663-9203	Victoria General Hospital	250-727-4338
Provincial Screening Call Centre: 1-800-663-9203			



### Mobile Screening Service Delivery Areas

Agassiz	Dawson Creek	Kimberley	Pemberton	Skidegate
Alert Bay	Dease Lake	Ladysmith	Pender Island	Slocan
Alexis Creek	Delta	Lake Cowichan	Pitt Meadows	Sooke
Anaheim Lake	Elkford	Lillooet	Port Alice	Sorrento
Armstrong	Enderby	Logan Lake	Port Clements	Southside
Ashcroft	Fernie	Lumby	Port Coquitlam	Sparwood
Balfour	Fort Nelson	Lytton	Port Hardy	Squamish
Barriere	Fort Rupert	Mackenzie	Port McNeill	Stewart
Beaver Valley	Fort St. James	Maple Ridge	Princeton	Summerland
Bella Bella	Fort St. John	Masset	Qualicum Beach	Surrey
Bella Coola	Fountain	McBride	Queen Charlotte City	Tatla Lake
Blind Bay	Fraser Lake	Merritt	Queensborough	Tofino
Burnaby	Gabriola	Midway	Radium Hot Springs	Trail
Burns Lake	Golden	Mill Bay	Revelstoke	Tumbler Ridge
Castlegar	Gold River	Mission	Richmond	Ucluelet
Chase	Grand Forks	Mount Currie	Rock Creek	Valemount
Chemainus	Granisle	Nakusp	Rossland	Vancouver
Chetwynd	Greenwood	Nelson	Saanichton	Vanderhoof
Chilliwack	Hazelton	New Denver	Salmo	Westbank
Christina Lake	Hope	New Westminster	Salmon Arm	Whistler
Clearwater	Houston	North Vancouver	Saltspring Island	Williams Lake
Clinton	Hudson's Hope	Oliver	Sayward	Windermere
Coquitlam	Invermere	Osoyoos	Scotch Creek	Winfield
Crawford Bay	Kaslo	Parksville	Seabird Island	100 Mile House
Creston	Keremeos	Peachland	Sicamous	

Lower Mainland locations change from time to time.

Latest visits include: Alouette Correctional Centre, BC Biomedical Lab, BCIT Campus, Ballard Auto, Buchanan Lodge, Chilliwack City Hall, Coast Mountain Bus Company, Creation Technologies, Downtown Eastside Women's Health Centre, ICBC North Vancouver, ICBC Surrey, Indo-Canadian Senior Centre, Maple Ridge City Hall, New Vista Society, North Vancouver City Hall, Overwaitea Head Office, Pacific Blue Cross, Richmond City Hall, Surrey Primary Care Centre, SFU Campus, Surrey Tax Centre, Telus, Translink, Vancouver Primary Care Centre/Native Health, Vancouver Tax Centre, West Vancouver City Hall, Work Safe BC (Richmond)

## First Nations Communities

Chehalis First Nation	Agassiz	Nadleh Whut'en First Nation	Fraser Lake
Seabird First Nation	Agassiz	Stella'ten First Nation	Fraser Lake
Esketemc First Nations	Alakli Lake	Laxgalts First Nation	Greenville
Boston Bar First Nation	Boston Bar	Kispiox First Nation	Hazelton
tsartlip First Nation	Brentwood Bay	Gingolx Indian Band	Kincolith
Lake Babine Nation	Burns Lake	Gitanyow First Nation	Kitwanga
Bonaparte Indian Band	Cache Creek	Lower Nicola Indian Band	Merritt
Canim Lake Indian Band	Camin Lake	Upper Nicola Indian Band	Merritt
Cambell River First Nation	Campbell River	Nanoose First Nation	Nanoose Bay
Penelakut Tribe	Chemainus	Gitlakdamix First Nation	New Aiyansh
Stz'uminus First Nation	Chemainus	Esketemc First Nations	North Vancouver
Sto:lo First Nation	Chilliwack	Squamish First Nation	North Vancouver
Quatsion First Nation	Coal Harbour	Tseshah First Nation	Port Alberni
Soowhalie First Nation	Cultus Lake	Gwa'Sala-Nakwaxda'xw	Port Hardy
Lyackson First Nation	Duncan	T'sou-ke Nation	Sooke
Splatsin First Nation	Enderby	Kitselas First Nation	Terrace
Prophet River First Nation	Fort Nelson	Ahousaht First Nation	Tofino
Nak'azdli First Nation	Fort St. James	Tla-o-qui-aht First Nation	Tofino
Tlaz'ten First Nation	Fort St. James	Saik'uz First Nation	Vanderhoof

## Appendix 6 — Educational Materials Order Form



**BC Cancer Agency**

CARE + RESEARCH

*An agency of the Provincial Health Services Authority*

## Order Form

Cancer Screening Promotion and Resource Materials

Cancer screening promotion and resource materials are available free of charge for use in your office/clinic.

To order materials, please complete this form and email to [screening@bccancer.bc.ca](mailto:screening@bccancer.bc.ca) or fax to 604-660-3645.

### Screening Mammography Program of BC

Item	Quantity Requested
SMP Tear-Off Pad (50 sheets)	(max. 20)
SMP Program Brochure – “Is Screening Mammography Right for You?”	(max. 50)
SMP Physician Protocol Fact Sheet	(max. 5)
Fridge Magnet - “Pass it On”	(max. 50)
Poster - “Why Mammograms Work” (8.5” by 11”)	(max. 10)

### Cervical Cancer Screening Program

Item	Quantity Requested
CCSP Program Brochure – “Is Cervical Screening Right for You?” (English)	(max. 50)
CCSP Program Brochure – “Is Cervical Screening Right for You?” (Punjabi)	(max. 50)
CCSP Program Brochure – “Is Cervical Screening Right for You?” (Traditional Chinese)	(max. 50)
CCSP Program Brochure – “Is Cervical Screening Right for You?” (Simplified Chinese)	(max. 50)
CCSP Program Brochure – “Abnormal Pap Test” (English)	(max. 50)
CCSP Program Brochure – “Abnormal Pap Test” (Punjabi)	(max. 50)
CCSP Program Brochure – “Abnormal Pap Test” (Traditional Chinese)	(max. 50)
CCSP Program Brochure – “Abnormal Pap Test” (Simplified Chinese)	(max. 50)
CCSP Tear-Off Pad (50 sheets) – “After Your Pap Test”	(max. 3)
Poster – “You Can Get A Pap Test in the Time it Takes to...” (8.5” by 11”)	(max. 10)
Postcard – “You Can Get A Pap Test in the Time it Takes to...” (8.5” by 11”)	(max. 50)

### Colon Screening Program

Item	Quantity Requested
CSP Program Brochure – “Is Colon Screening Right for You?” (English)	(max. 50)
CSP Program Brochure – “Is Colon Screening Right for You?” (Punjabi)	(max. 50)
CSP Program Brochure – “Is Colon Screening Right for You?” (Traditional Chinese)	(max. 50)
CSP Program Brochure – “Is Colon Screening Right for You?” (Simplified Chinese)	(max. 50)
CSP Program Brochure – “What is a Colonoscopy?” (English)	(max. 50)
CSP Program Brochure – “What is a Colonoscopy?” (Punjabi)	(max. 50)
CSP Program Brochure – “What is a Colonoscopy?” (Traditional Chinese)	(max. 50)
CSP Program Brochure – “What is a Colonoscopy?” (Simplified Chinese)	(max. 50)
Colonoscopist Reference	(max. 5)
Colonoscopy Referral Pad (50 sheets)	(max. 5)
Colonoscopy Reporting Form	(max. 200)
Colonoscopy Specimen Table Example	(max. 5)
CSP Program Fact Sheet	(max. 5)
Patient Assessment Process	(max. 5)
Patient Coordinator Bowel Preparation Decision Algorithm	(max. 5)
Polyp Info Sheet	(max. 5)

### Contact Information

Name		Organization	
Phone Number		Email	
Delivery Address			

Email to [screening@bccancer.bc.ca](mailto:screening@bccancer.bc.ca) or Fax to 604-660-3645

## Appendix 7 – Glossary

- **Abnormal Call Rate:** Proportion of screening mammography examinations determined to require further diagnostic assessment (i.e. called “abnormal”).

$$\text{Abnormal Call Rate} = \frac{\text{Number of exams called abnormal}}{\text{Total number of exams}} \times 100\%$$

- **Benign Core Biopsy Rate:** Proportion of cases with complete follow-up that resulted in a benign core biopsy for diagnostic purposes, where each core biopsy represents a case.
- **Benign Open Biopsy Rate:** Proportion of cases with complete follow-up that resulted in a benign open biopsy for diagnostic purposes, where each open biopsy represents a case.
- **Benign to Malignant Core Biopsy Ratio**

$$\text{Benign to Malignant Core Biopsy Ratio} = \frac{B_b}{M_b} : 1$$

$B_b$  Number of benign cases detected by core biopsy, where each core biopsy performed represents a case.

$M_b$  Number of malignant cancers cases detected by core biopsy, where each core biopsy represents a case.

- **Benign to Malignant Open Biopsy Ratio**

$$\text{Benign to Malignant Open Biopsy Ratio} = \frac{B_b}{M_b} : 1$$

$B_b$  Number of benign cases detected by core biopsy, where each open biopsy performed represents a case.

$M_b$  Number of malignant cancers cases detected by core biopsy, where each open biopsy represents a case.

- **Core Biopsy Yield Ratio:** Proportion of cases with core biopsy that resulted in a diagnosis of breast cancer, where each core biopsy performed represents a case.

$$\text{Core Biopsy Yield Ratio} = \frac{M_b}{B_b + M_b} \times 100\%$$

$B_b$  Number of diagnostic core biopsies without breast cancer diagnosis.

$M_b$  Number of diagnostic core biopsies with breast cancer diagnosis.

- **DCIS (or In Situ Cancer) Detection Rate:** Number of ductal carcinoma in situ (DCIS) cases detected per 1,000 screens with complete follow-up.
- **Invasive Cancer Detection Rate:** Number of invasive cancer cases detected per 1,000 screens with complete follow-up.
- **Interval Cancer Rate:** Number of women being diagnosed with post-screen breast cancer at a breast location which was called normal at previous screen within the specified period of time per 1,000 screens.
- **Node Negative Rate in Cases of Invasive Cancer:** Proportion of invasive cancers in which the cancer has not invaded the lymph nodes.
- **Open Biopsy Yield Ratio:** Proportion of cases with open biopsy that resulted in a diagnosis of breast cancer, where each open biopsy performed represents a case.

$$\text{Open Biopsy Yield Ratio} = \frac{M_b}{B_b + M_b} \times 100\%$$

$B_b$  Number of diagnostic open biopsies without breast cancer diagnosis.

$M_b$  Number of diagnostic open biopsies with breast cancer diagnosis.

- **Overall Cancer Detection Rate:** Number of cancer cases detected per 1,000 screens with complete follow-up.
- **Participation Rate:** The percentage of women who have a screening mammogram within 30 months as a proportion of the eligible population. The eligible population is estimated by the weighted average of the three-year population from forecast.
- **Positive Predictive Value (PPV) of Screening Mammography:** Proportion of “abnormal” cases found to have breast cancer after diagnostic workup.

$$\text{PPV} = \frac{\text{Number of screen - detected cancers}}{\text{Number of "abnormal" cases with complete follow - up}}$$

- **Prevalence to Expected Incidence Ratio:** Comparison between incidence rates at first (prevalent) screen with historical incidence rate prior to onset of screening practice. Prevalent screens have been restricted to those women with no previous outside mammogram within 24 months of their first program screens. The 1982 incidence rates by five-year age group obtained from the BC Cancer Registry were chosen as the comparison reference.

$$P : I \text{ Ratio} = \frac{\sum_i C a_i}{\sum_i N_i R_i}$$

Where  $N_i$  is the number of prevalent screens for age group  $i$ ,  $C a_i$  is the number of cancers detected in prevalent screens for age group  $i$  and  $R_i$  is the expected incidence rate for age group  $i$ . Prevalence to expected incidence ratio for ages 50 to 79 would be calculated by summing over age groups 50 to 54, 55 to 59, 60 to 64, 65 to 69, 70 to 74, and 75 to 79 in the numerator and denominator.

- **Retention Rate:** The estimated percentage of women returned for rescreen within 30 months of their previous screen. This rate is estimated using Kaplan-Meier method.
- **Return (Compliance) Rate:** The estimated percentage of women without history of breast cancer diagnosis returned for rescreen within a certain period of time. This rate is estimated using Kaplan-Meier method.
- **Sensitivity:** Probability of interpreting screening mammograms of breast cancer cases as “abnormal”. It measures how well screening mammography determines the presence of breast cancer.

$$\text{Sensitivity} = \frac{TP}{TP + FN}$$

TP Number of screen-detected breast cancer cases.

FN Number of breast cancer cases called “normal” and diagnosed within 12 months post screen.

- **Specificity:** Probability of interpreting screening mammograms of cases with no evidence of breast cancer as “normal”. It measures how well screening mammography determines the absence of breast cancer.

$$\text{Specificity} = \frac{TN}{TN + FP}$$

TN Number of cases with “normal” screening mammograms that remained without evidence of breast cancer before the next screening visit, or within 12 months after the last screening visit.

FP Number of cases with no evidence of breast cancer but whose screening mammograms were called “abnormal”.

## Appendix 8 — Acknowledgements

The SMP would like to thank its partners who have supported and contributed to the Program over the years. The success of the Program depends on an integrated system of:

- Community health professionals promoting the benefits of screening.
- Dedicated and highly trained staff to perform and interpret the screening mammograms.
- Primary care providers and medical specialists to provide diagnostic follow-up and treatment.
- 
- Community facilities providing space and personnel to support mammography.

We would like to thank the following organizations for their ongoing support (alphabetical):

- BC Cancer Foundation
- BC Radiological Society
- BC Women's Health Centre
- BC/Yukon Women's Cancer Alliance
- Canadian Breast Cancer Foundation
- Canadian Cancer Society
- College of Physicians and Surgeons
- Doctors of BC
- Divisions of Family Practice
- University of British Columbia
- Women's Health Bureau



## Appendix 9 — Committees

### *Alphabetical Listing*

#### **Academic Committee**

Christine Wilson (Co-Chair)  
 Scott Tyldesley (Co-Chair)  
 Janette Sam  
 Nancy Aldoff  
 Chris Baliski  
 Nadine Caron  
 Kathy Ceballos  
 Stephen Chia  
 Andy Coldman  
 Jaco Fourie  
 Paula Gordon  
 Malcolm Hayes  
 Lisa Kan  
 Anky Lai  
 Heather MacNaughton  
 Alan Nichol  
 Ivo Olivotto  
 Rob Olson  
 Rasika Rajapakshe  
 Larry St. Germain  
 Elaine Wai  
 Linda Warren  
 Ryan Woods

#### **Quality Management Committee**

Ms. Nancy Aldoff  
 Ms. Carla Brown-John  
 Dr. Stephen Chia  
 Dr. Nick Foster  
 Ms. Ritinder Harry  
 Dr. Malcolm Hayes  
 Ms. Lisa Kan  
 Ms. Sheila MacMahon  
 Ms. Janette Sam  
 Mr. Larry St. Germain  
 Dr. Linda Warren  
 Dr. Christine Wilson – Chair

#### **Screener's Advisory Committee**

Dr. Ken Bentley  
 Dr. Michael Clare  
 Dr. Eleanor Clark  
 Dr. Nancy Graham  
 Dr. Dennis Janzen  
 Dr. Rob Johnson  
 Ms. Lisa Kan  
 Dr. Tahir Khalid  
 Dr. Nicola Lapinsky  
 Dr. Brent Lee  
 Dr. Richard Lee

Dr. Patrick Llewellyn  
 Dr. Heather MacNaughton  
 Dr. John Matheson  
 Dr. Peter McNicholas  
 Dr. David McKeown  
 Dr. Julie Nichol  
 Dr. David O'Keeffe  
 Dr. Rasika Rajapakshe  
 Ms. Janette Sam  
 Dr. Greg Shand  
 Dr. Stuart Silver  
 Dr. Catherine Staples  
 Dr. Phil Switzer  
 Dr. Lynette Thurber  
 Dr. Tim Wall  
 Dr. Linda Warren  
 Dr. Christine Wilson – Chair

#### **Quality Assurance Support Group**

Ms. Nancy Aldoff  
 Ms. Sheila MacMahon  
 Ms. Moira Pearson  
 Dr. Rasika Rajapakshe  
 Mr. Derek Wells  
 Ms. Teresa Wight  
 Dr. Joseph Yang

#### **Screening Guidelines Review Committee**

Stephen Chia, Medical Oncologist & Chair Breast Cancer Tumour Group – BC Cancer Agency, Review Committee Co-Chair  
 Brian Schmidt, retired Senior VP - PHSA & past Interim President – BC Cancer Agency, Review Committee Co-Chair  
 Christine Wilson, Medical Director – SMPBC, Chair, Clinical Pathway Team – Provincial Breast Health Strategy  
 Andy Coldman, Vice President, Population Oncology – BC Cancer Agency  
 Jan Christilaw, President, BC Women's, Project Sponsor & Co-Chair – Steering Committee Provincial Breast Health Strategy  
 Paula Gordon, Medical Director – BCW, Co-Chair, Workforce Team – Provincial Breast Health Strategy  
 Lawrence Turner, Surgeon – FHA  
 Elaine Wai, Radiation Oncologist – BC Cancer Agency, Victoria  
 Sylvia Robinson, Public Health – Ministry of Health  
 Kelly Barnard, Deputy Medical Health Officer – Ministry of Health

## Appendix 10 — Radiologist Screeners

### Abbotsford

Dr. Tahir Khalid\*  
Dr. Marion J. Kreml  
Dr. Caroline Pon

### Burnaby & Richmond

Dr. Bill Collins  
Dr. Nancy Graham  
Dr. Henry Huey  
Dr. Marty Jenkins  
Dr. Vee Lail  
Dr. Elizabeth Tanton\*  
Dr. Lynette Thurber\*

### Comox

Dr. Grant Larsen  
Dr. David McKeown\*

### Coquitlam

Dr. Debra Chang  
Dr. Jennifer Dolden  
Dr. Brad Halkier  
Dr. Maria Kidney  
Dr. Heather MacNaughton\*  
Dr. Anita McEachern  
Dr. Robert Van Wiltenburg

### Cranbrook

Dr. Daryn Maisonneuve  
Dr. Julie Nicol\*

### Interior/Kootenay

Dr. Dorothy Harrison  
Dr. Colin Mar  
Dr. Christine Wilson\*  
Dr. Charlotte Yong-Hing

### Kamloops

Dr. Michael Clare\*  
Dr. Donal Downey

### Kelowna

Dr. Michael Partrick  
Dr. Catherine Staples  
Dr. Timothy Wall\*

### Langley

Dr. Ron Campbell\*  
Dr. John Matheson

### Nanaimo/Islands & Coastal Mobile

Dr. David Coupland  
Dr. Rob Johnson\*  
Dr. Zenobia Kotwall  
Dr. David O'Keeffe\*  
Dr. Paul Trepanier

### North Vancouver

Dr. Sven Aippersbach  
Dr. Barry Irish  
Dr. Patrick Llewellyn\*  
Dr. Catherine Phillips

### Penticton

Dr. Peter McNicolas\*  
Dr. Stacey Piche

### Prince George

Dr. Larry Breckon  
Dr. Alasdair Leighton  
Dr. Greg Shand\*

### Sechelt

Dr. Daniel Dolden  
Dr. Patrick Llewellyn\*

### Surrey & JPOSC

Dr. Don Coish  
Dr. Guy Eriksen  
Dr. Fin Hodge  
Dr. Dennis Janzen\*  
Dr. Amir Neyestani  
Dr. John Sisler  
Dr. L. Earl Tregobov

### Vancouver –

#### BC Women's Health Centre

Dr. Paula Gordon  
Dr. Patricia Hassell  
Dr. Linda Warren\*

### Vancouver –

#### Mount St. Joseph Hospital

Dr. Richard Lee\*

### Vancouver – Victoria Drive

Dr. Connie Siu  
Dr. Phil Switzer\*

### Vancouver –

#### #505–750 West Broadway

Dr. Miriam Buckley  
Dr. Nicola Lapinsky\*  
Dr. Linda Warren

### Vernon

Dr. Ken Bentley\*  
Dr. Ian Marsh  
Dr. Glenn Scheske

### Victoria General Hospital/

#### Victoria Richmond Ave

Dr. Richard Eddy  
Dr. George Hodgins  
Dr. Robert Koopmans  
Dr. Brent Lee\*  
Dr. Delmer Pengelly  
Dr. Nicola Proctor  
Dr. Stuart Silver\*  
Dr. Rick Smith  
Dr. Paul Sobkin  
Dr. John Wrinch

### White Rock

Dr. Eleanor Clark\*  
Dr. Joanne Coppola  
Dr. Jeffrey Hagel

### Alphabetical Listing

\* Indicates Chief Screener

## Appendix 11 – Publications & Presentations

### Publications

#### **Andy Coldman**

Coldman, A., Phillips, N. (2013). Incidence of breast cancer and estimate of overdiagnosis after the initiation of a population-based mammography screening program. *CMAJ*. 185(10). E492-E498. doi:10.1503/cmaj.121791

Coldman, A.J., Phillips, N., Wilson, C., & Sam, J. (2013). Information for Physicians Discussing Breast Cancer Screening with Patients. *BC Medical Journal*, 55(9). 420-428.

Weisstock, C., Rajapakshe, R., Bitgood, C., McAvoy, S., Gordon, P. B., Coldman, A., Parker, B. A., & Wilson, C. M. (2013). Assessing the Breast Cancer Risk Distribution for Women Undergoing Screening in British Columbia. *Cancer Prevention Research*. doi:10.1158/1940-6207.CAPR-13-0027.

#### **Rasika Rajapakshe**

Weisstock, C., Rajapakshe, R., Bitgood, C., McAvoy, S., Gordon, P. B., Coldman, A., Parker, B. A., & Wilson, C. M. (2013). Assessing the Breast Cancer Risk Distribution for Women Undergoing Screening in British Columbia. *Cancer Prevention Research*. doi:10.1158/1940-6207.CAPR-13-0027.

#### **Janette Sam**

Coldman, A.J., Phillips, N., Wilson, C., & Sam, J. (2013). Information for Physicians Discussing Breast Cancer Screening with Patients. *BC Medical Journal*, 55(9). 420-428.

#### **Christine Wilson**

Weisstock, C., Rajapakshe, R., Bitgood, C., McAvoy, S., Gordon, P. B., Coldman, A., Parker, B. A., & Wilson, C. M. (2013). Assessing the Breast Cancer Risk Distribution for Women Undergoing Screening in British Columbia. *Cancer Prevention Research*. doi:10.1158/1940-6207.CAPR-13-0027.

Pataky, R., Armstrong, L., Chia, S., Coldman, A. J., Kim-Sing, C., McGillivray, B., Scott, J., Wilson, C. M., & Peacock, S. (2013). Cost-effectiveness of MRI for Breast Cancer Screening in BRCA1/2 Mutation Carriers. *BMC Cancer*. doi: 10.1186/1471-2407-13-339.

Coldman, A.J., Phillips, N., Wilson, C., & Sam, J. (2013). Information for Physicians Discussing Breast Cancer Screening with Patients. *BC Medical Journal*, 55(9). 420-428.

## Presentations and Lectures

### ***Nancy Aldoff***

Aldoff, N. (2013, February). The Importance of Screening Mammography for First Nation Women, *Squamish Nation Women's Evening*. Lecture conducted from Squamish Nation Community Centre, North Vancouver, BC.

Aldoff, N. (2013, June). Patient Care – How it Affects Your Centre's Retention Rate In-service, *SMP #04*, Victoria, BC.

### ***Rasika Rajapakshe***

Araujo, C., Vandenberg, C., Rajapakshe, R., Yang, J., Wight, T., Sam, J., Aldoff, N., & Wilson, C. (2013). "Estimating Diagnostic Reference Levels for Mean Glandular Dose within the Screening Mammography Program of British Columbia (SMPBC)". Canadian Association of Radiation Oncology and Canadian Organization of Medical Physicists. *Joint Scientific Meeting*.

Vandenberg, C., Araujo, C., Rajapakshe, R., Baliski, C., Ellard, S., Reed M., Fyles, G., & Tyldesley, S. (2013). "Mapping of Breast Cancer Care Paths in British Columbia for a Breast Cancer Micro-Simulation Model", *Canadian Centre for Applied Research in Cancer Control*, Vancouver, BC.

Hoegg, T., Esterby, S., Gill, P., Araujo, C., & Rajapakshe, R. (2013). "Breast Cancer in British Columbia - Identification of high-risk women based on breast cancer risk modelling". *Statistical Society of Canada Annual Meeting*.

### ***Janette Sam***

Sam, J. (2013, October) Screening Mammography Program Projects and Initiatives – 2013. *Canadian Breast Cancer Screening Network Meeting*, Vancouver, BC.

**Christine Wilson**

Wilson, C. M. (2013, February). GPO Training – Screening Guidelines Review. *Family Practice Oncology Network*. Lecture conducted from BC Cancer Research Centre, Vancouver, BC.

Wilson, C. M. (2013, March). Breast Cancer Screening Workshop. *48th Annual Postgraduate Review in Family Practice*. Lecture conducted from Vancouver Marriott Pinnacle Downtown, Vancouver, BC.

Wilson, C. M. (2013, May). Bill C-314 – The Breast Density Awareness Act Background Information. *Senate Standing Committee on Social Affairs, Science and Technology*, Ottawa, ON.

Wilson, C. M. (2013, May). Breast Screening Update. Speaker *CME on the Run*. Lecture conducted from Vancouver General Hospital, Vancouver, BC.

Wilson, C. M. (2013, June). Breast Screening Update. *Primary Care Advisory Committee*. Lecture

conducted from BC Cancer Agency Vancouver Centre, Vancouver, BC.

Wilson, C. M. (2013, September). GPO Training – Screening Guidelines Review. *Family Practice Oncology Network*. Lecture conducted from Fairmont Medical Building, Vancouver, BC.

Wilson, C. M. (2013, September). Panel discussion. *CBCF Ask an Expert event*. Lecture conducted from BC Cancer Research Centre, Vancouver, BC.

**Linda Warren**

Warren, L. (2013, April). CAD. *SBI 11th Post Graduate Course*. Lecture conducted from Los Angeles, CA.

Warren, L. (2013, November). What is Current in CAD? *BCRS Annual Meeting*. Lecture conducted from Vancouver, BC.

Warren, L. (2013, November - December). RSNA On-The-Air. *99th Scientific Assembly and Annual Meeting*. Chicago, IL.

Warren, L. (2013, November - December). Techniques for International Sonography and Thermal Ablation. *99th Scientific Assembly and Annual Meeting*. Chicago, IL

## Appendix 12 — SMP / BCCA Contact Information

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**BC Cancer Agency**

CARE + RESEARCH

*An agency of the Provincial Health Services Authority*

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### **Abbotsford Centre**

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### **Centre for the North**

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Prince George, BC V2N 7E9

250.645. 7300 or toll-free 1.855.775.7300

### **Fraser Valley Centre**

13750 96th Avenue

Surrey, BC V3V 1Z2

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### **Sindi Ahluwalia Hawkins Centre for the Southern Interior**

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### **Vancouver Centre**

600 West 10th Avenue

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