



**BC Cancer Agency**

CARE + RESEARCH

*An agency of the Provincial Health Services Authority*

**Screening Mammography Program**

# Screening Mammography Program 2013 Annual Report



Revised January 2013



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## 1.0 Message



### Message from the Medical Director

2013 proved to be an interesting and challenging year for the Screening Mammography Program. Last year, British Columbia's breast screening guidelines were reviewed by the Screening Guidelines Review Committee co-chaired by Dr. Stephen Chia and Mr. Brian Schmidt. The committee was comprised of members from the Breast Tumour group and the Provincial Breast Health Strategy, as well as representatives of the Ministry of Health (Please see Appendix 9 for a complete list of the committee members).

Much of this past year was spent revising and preparing materials to present to the women of British Columbia and their primary care practitioners to help clarify screening guidelines and promote screening mammography as a form of secondary prevention for the eligible population.

We look forward to presenting these guidelines and various materials such as decision aids to the staff and screeners within the program in the near future. We are also preparing a multi-channel media campaign for the New Year to raise awareness regarding the importance of regular screening.

We have much work to do in this challenging time with limited resources and the renewed criticism of screening mammography from various sources. I know we are up to the challenge.

– Christine Wilson MD



### Message from the Operations Director

It has been another busy year at the Screening Mammography Program. From the very beginning, the program has strived and planned to ensure that everyone in the province who would like to access the program is able to. This year the mobile program continued to improve access for the underserved and rural populations. The number of First Nations communities the mobile visited nearly doubled in 2012/13.

A goal of the BC Cancer Agency is to provide consistent, high quality information for the general population and health care providers. We have refreshed our website and many of our materials to align with the other screening programs and to provide a single point of entry for those looking for cancer screening information ([www.screeningbc.ca](http://www.screeningbc.ca))

We are grateful for the continued support of our community partners, fellow health care providers and organizations, as well as the women we serve.

– *Janette Sam*



## 2.0 Executive Summary



*Dr. Ivo Olivotto with, from L to R, Dr. Linda Warren, Ms. Sheila King, Ms. Lisa Kan and Ms. Janette Sam*

### Saying Farewell to Dr. Ivo Olivotto

After a long and noteworthy career with BC Cancer Agency, Dr. Ivo Olivotto, Vice President Radiation Therapy and Functional Imaging, has concluded his time at the Agency to take another role in Calgary, Alberta.

Dr. Olivotto's contributions were numerous during his tenure with the Agency. Much of his clinical and research career has been devoted to improving care for patients with breast cancer. From 1991-1998 he was the Chair of the Breast Tumor Group. During his time as chair, he founded the Breast Cancer Outcomes Unit (which has supported >80 fellow, resident and student projects, and over 140 peer-reviewed publications); partnered with the Canadian Cancer Society to launch the Breast Cancer Information Project (1994-1999); collaborated with Judy Caldwell and others to start the Canadian Breast Cancer Foundation (CBCF) BC/Yukon Chapter (Ivo was the initial Head of the CBCF Medical Advisory Committee); and published a book in 1995 with Karen Gelmon, Urve Kuusk, Charmaine Kim-Sing, Cheri van Patten and others for women newly diagnosed with breast cancer (in its 5th edition with >75,000 copies sold).

From 1996 to 2000 Dr. Olivotto was the Medical Leader of the Screening Mammography Program. During this time, he was asked to lead a Health Canada workgroup to establish evidence and consensus-based standards for the diagnostic process after an abnormal breast screen. Those standards are still used today as a quality metric for organized breast screening programs across Canada.

We gratefully acknowledge Dr. Olivotto for his leadership and contributions to the Screening Mammography Program and wish him well in his future endeavors.

### Celebrating 25 Years of Breast Screening in BC

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 celebrating 25 years of operation in 2013. Since the inception of the program in 1988 to the end of 2012, the program has provided over 4,543,907 screening mammograms and detected 19,607 (breast) cancers.

We are happy to provide this 25th annual report. While the technology has changed significantly over the last 25 years our commitment has remained the same – to provide a quality service for the women of BC.

This past year has seen some significant gains in both participation and diagnostic intervals. For the first time participation rates by select ethnic groups are on par with participation rates across the province at 52% on average (Table 7.3). This is as a result of continued outreach by the mobile service and support of various community groups such as the many volunteers around the province, the Canadian Cancer Society and Canadian Breast Cancer Foundation.

Another important indicator, the Diagnostic Interval, also saw significant improvement in 2012. The time from an abnormal screen to definitive diagnosis with tissue biopsy improved 9.2% compared to 2011 (Table 7.7). This is as a result of significant effort from the various health authorities to ensure that women who require a tissue biopsy are seen in a timely fashion.

The number of first-time attendees for 50-69 year olds in 2012 increased in most Health Service Delivery Areas compared to 2011; 2% increase from last year (Table 7.1), however the number of women returning within a 24 month period dropped slightly compared to the previous year (Table 7.4). A campaign is planned for 2014 to inform women of the value of returning regularly for breast cancer screening.

### 3.0 Program Overview

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 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 women'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 the Screening Mammography Program (SMP) – its population-based screening program. SMP utilizes standard two-view bilateral mammography (x-ray of the breast) for breast cancer screening.

Women ages 40-79 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 38 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 3.1 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 films 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 .

Results of this analysis are presented in the "PROGRAM RESULTS" section of this report (Section 7). Age-specific breast cancer incidence and mortality rates are provided by the BC Cancer Registry.

### Commitment to Quality

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

The screening mammography workforce is comprised of 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 technologists, including:

- Certificate in Breast Imaging scholarship program, in partnership with the Canadian Breast Cancer Foundation;
- A Technologist Newsletter;
- An educational event at the bi-annual SMP Forum with continuing medical education (CME) credits that is 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 centers 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 surveys. Quality control practices are standardized and monitored regularly. The team provides technical support for centers as they transition from analog to digital mammography.

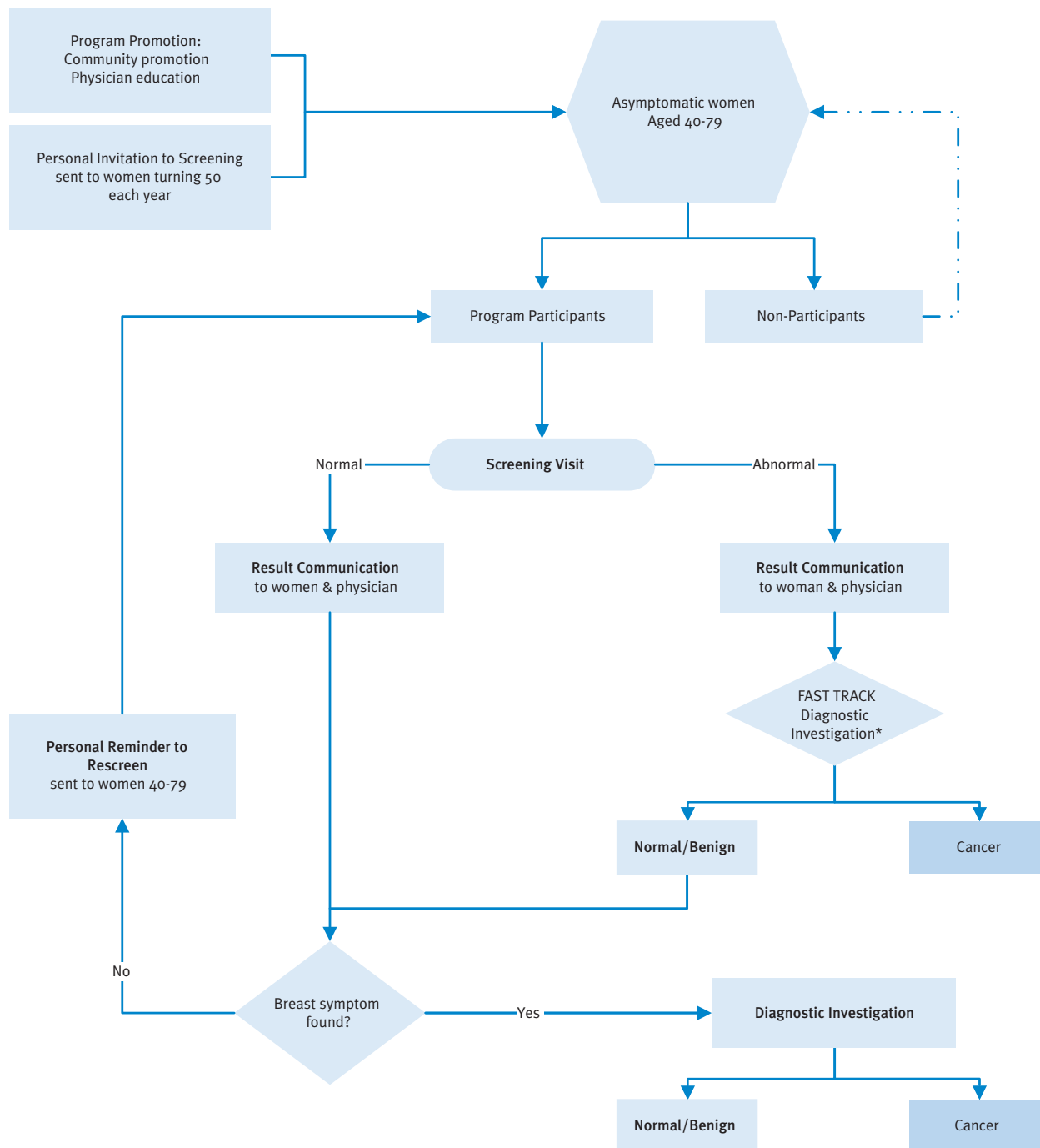
Based upon best practices, SMP has developed and implemented a comprehensive, harmonized quality control program specific for digital mammography equipment, as well as digital mammography-specific phantoms and a web based 'mQc' program. SMP continues to work with other provinces to champion standardization 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 3.1: 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.

## 4.0 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:

#### Primary Care Advisory Committee for Cancer Screening Implementation

The BC Cancer Agency's (BCCA) screening programs are establishing a Primary Care Advisory Committee to provide guidance on the development and implementation of strategies to communicate cancer screening guidelines, and to support primary care practices with information and tools for patient discussions and guideline adoption. An independent provincial guidelines development/review process involving multi-disciplinary experts is responsible for recommending cancer screening guidelines for the province of British Columbia. This is a separate process from the mandate of this Advisory Committee.

The Advisory Committee's mandate is based on a large scale BC-wide family physician cancer screening needs assessment conducted in 2009/2010 and the following principles:

1. An overall congruent strategy is needed to sustain long term engagement with primary care providers;
2. Primary care providers will inform the engagement and educational strategies;
3. Information needs to be concise, perceived as high value and immediately relevant to clinical practice;
4. Evidence informed recommendations and strategies should be promoted where possible.

The Advisory Committee will function with a quality improvement approach to ensure input is responsive and adaptable to the primary care landscape.

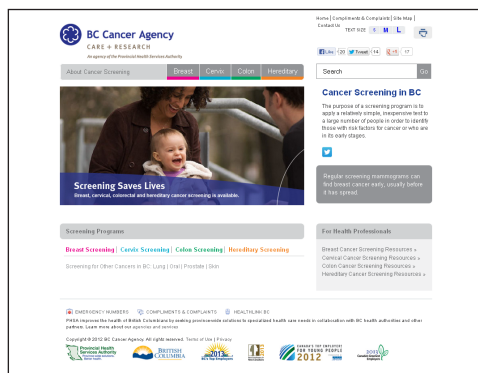
### Canadian Cancer Society Sirf Dus Project

In 2012, the Canadian Cancer Society (CCS) launched a community-based screening campaign aimed at increasing awareness about early detection and screening for breast cancer in the South Asian community. The project goals are to increase breast cancer screening rates in the South Asian community in the Fraser Valley; and to empower the South Asian community to spread knowledge about breast cancer prevention and screening.

The Punjabi name of the initiative, Sirf Dus, translates to both Only Ten and Only Tell, and asks South Asian women to:

- Take 10 minutes to talk about the importance of the mammography exam and early detection
- Take 10 minutes to go for mammography screening
- Tell 10 friends about the importance of mammography screening

SMP is a member of the project advisory committee, and supports CCS Sirf Dus events by providing mobile mammography services on site and a dedicated Punjabi phone line at the call center. In March 2013, 51 South Asian women attended a mobile visit at the Indo Canadian Seniors Centre in Surrey. This community-based approach has helped to reach thousands of participants. This year, they will continue their work in the community through the Sirf Dus committee of local volunteers interested in making a difference.



Pictured: BC Cancer Agency Screening Website

### Refreshed Screening Website

In April 2013, the BC Cancer Agency launched a new cancer screening website featuring an updated look, easier navigation and current information on all four of BC's organized screening programs – breast, cervical, colon and hereditary cancers.

The [www.screeningbc.ca](http://www.screeningbc.ca) website was developed in response to feedback obtained from both health care providers and the public. With the new one-stop shop website, patients can now access all cancer screening related information, including screening eligibility, screening procedures, and clinic locations. The website also hosts a health care professionals section dedicated to keep primary care providers updated about current screening recommendations and to provide easy access to resources to assist with discussions about cancer screening with patients. Resources range from patient support and physician information materials, to guidelines and forms, as well as evidence-based research and publications.

### New Recall Reminder Materials

In 2012, SMP piloted an overdue recall program where a postcard was mailed to women who were significantly overdue to return to SMP. Three postcards were designed for this group – all three addressed common misconceptions about mammography and personal risk. Testing showed that all three of the cards were considered informative and well designed.

In February 2013, SMP replaced all reminder cards with the new postcards.

### Vancouver Island Mobile First Nations Tour

In the spring of 2013, the BC Cancer Agency Screening Mammography Program of BC visited eleven First Nation communities over two weeks.

A total of four technologists (two each week) were warmly received in each community. They reported that women they visited said, “By the program visiting us, we see how valuable this is”.

60 per cent of participants were first-timers (never had a mammogram before). The tour demonstrated the importance of coming to First Nation communities and how this influences women to attend for screening.

Every participant that had a mammogram received a bright, beautiful postcard to take with them indicating important facts about mammograms and their nearest screening mammography centre to attend for future screening.



*Pictured: SMP postcard used during Vancouver Island Mobile First Nations Tour, Spring 2013*

### SMP Provincial Breast Dose Survey

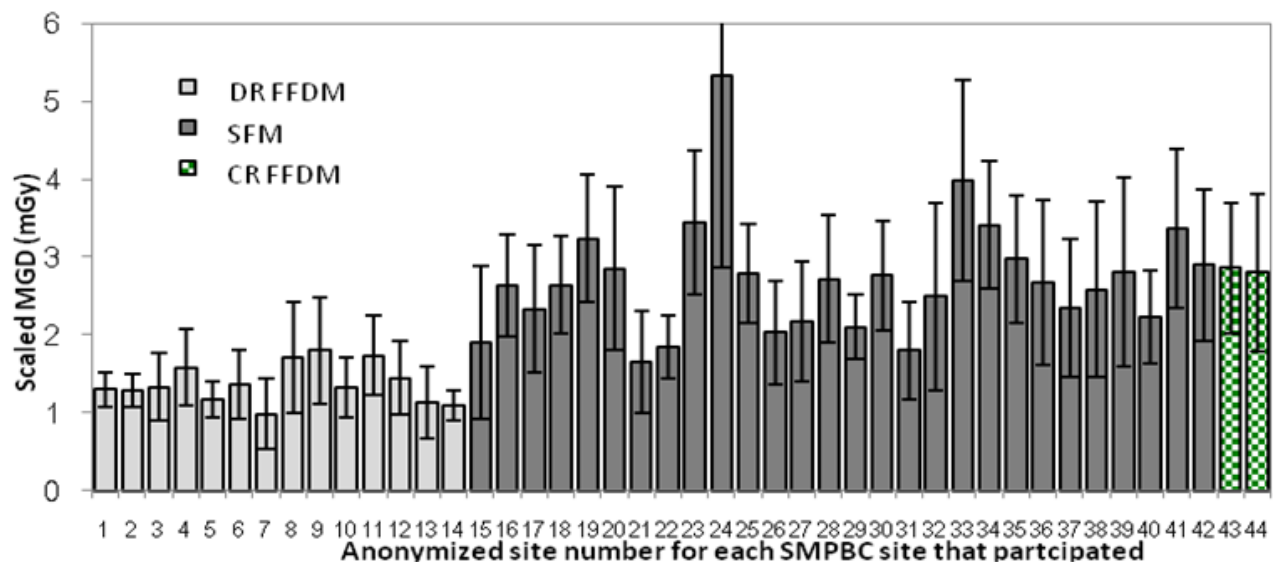
All SMP centres participated in a study in 2012 to determine radiation doses delivered during mammography examinations and compare the mean glandular dose (MGD) for full field digital mammography and screen-film mammography. Mean Glandular Dose focuses on the dose delivered to glandular tissue where breast cancer occurs. Technique factors (Anode/Filter, kVp, and mAs), breast density and compressed breast thickness were collected for each mammography screen as they contribute to dose.

During the study, data was collected and analyzed for 50 patients from each centre in the program (14 digital radiography units, 2 computed radiography units, and 29 analog (film/screen) units). Results were analyzed and a comparison of the difference in MGD between analog versus digital radiography units evaluated.



All results indicated that breast dose is well within acceptable standards set by Health Canada and the FDA with the average MGD by full field digital mammography being 60% of the average dose of the screen-film units and CR units. Therefore, digital mammography continues to be choice for standard equipment replacement when equipment is due for replacement in SMP.

The results of this research were accepted to be presented as a poster at the CARO COMP 2013 Joint Scientific Meeting in Montreal, QC September 18 – 21, 2013.



*Pictured: Average MGD for each SMP centre; values have been scaled to reflect the average Compressed Breast Thickness of 56 mm. Unit types include Digital (striped), Screen/Film (shaded), and Computed Radiography (checkered).*

### Client Satisfaction Surveys

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

2012 Summary of SMP Client Satisfaction Survey Results:

The total number of surveys sent – 11,999

Total number of surveys returned – 4,277 (36% return rate)

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

## 5.0 Professional Development and Academic Activities

Screening program representatives and scientists authored 6 publications in radiologic literature, and delivered 30 lectures and presentations to mammography screening peers (Appendix 11).

The SMP plans and participates in professional and academic activities throughout the year including a scientific forum hosted by the program.

### Screening Mammography Program Scientific Forum

The SMP scientific forum was held October 26-27, 2012. The 2012 program included updates on the Provincial Breast Health Strategy, a 2011 program outcomes review, an image case study review, and a mammography technologist break out session.

In addition, a Friday evening event occurred for technologists that included recognition, awards, announcements, and lectures about “Get Ready for the Future: Digital QC in the Cloud”, “SMP Provincial Breast Dose Survey results” and an update by the Canadian Breast Cancer Foundation.

Out-of-town faculty included:

- Dr. Edward Sickles, MD. Professor Emeritus, Department of Radiology, University of California at San Francisco School of Medicine; Former Chief, Breast Imaging Section, University of California at San Francisco Medical Center, San Francisco, CA, USA
- Ms. Katherine Steigerwald, Quality Assurance Coordinator, Canadian Association of Radiologists Mammography Accreditation Program
- Ms. Kathleen Schindler, MRT, CBI, BMD, Women’s Healthcare Product Specialist

Local presenters included:

- Dr. Christine Wilson, Medical Director, BC Cancer Agency Screening Mammography Program
- Ms. Lynn Pelletier, Project Director, Provincial Breast Health Strategy
- Ms. Janette Sam, Operations Director, BC Cancer Agency Screening Mammography Program
- Dr. Stephen Chia, Oncologist, BC Cancer Agency
- Dr. Rasika Rajapakshe, Senior Physicist, BC Cancer Agency
- Dr. Scott Tyldesley, Oncologist, BC Cancer Agency
- Dr. Paula Gordon, Medical Imaging Director, BC Women’s Hospital

- Ms. Nancy Aldoff, Professional Practice Leader, BC Cancer Agency Screening Mammography Program
- Ms. Teresa Wight, Quality Coordinator, BC Cancer Agency Screening Mammography Program
- Ms. Elaine Webb, Senior Director, Canadian Breast Cancer Foundation - BC/Yukon Region
- Mr. Stephen Smithbower, Screening program project student, BC Cancer Agency Screening Mammography Program

## 6.0 Partnerships and Collaborations

### PHAC/Canadian Breast Cancer Screening Initiative

SMP participates as a member of the Public Health Agency of Canada, Canadian Breast Cancer Screening Initiative. 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 Initiative

- Dr. Christine Wilson, Medical Director, Screening Mammography Program
- Ms. Janette Sam, Operations Director, Screening Mammography Program

Report from the Evaluation Indicators Working Group (3rd Edition), Canadian Partnership Against Cancer; February, 2013

- Dr. Andrew Coldman, Vice President, Population Oncology, BC Cancer Agency
- Ms Christina Chu, Biostatistical Analyst, Cancer Surveillance & Outcomes, Population Oncology, BC Cancer Agency\*

Organized Breast Cancer Screening Programs in Canada – Report on Program Performance in 2007 and 2008, Canadian Partnership Against Cancer; February, 2013

- Ms Christina Chu, Biostatistical Analyst, Cancer Surveillance & Outcomes, Population Oncology, BC Cancer Agency\*

Quality Determinants of Breast Cancer Screening with Mammography in Canada, Canadian Partnership Against Cancer; February, 2013

- Dr. Andrew Coldman (Chair), Vice President, Population Oncology, BC Cancer Agency
- Ms. Janette Sam, Operations Director, Screening Mammography Program (reviewer)

## 7.0 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 . In section 7.8, the SMP performance measures are presented against the national targets set for Canadian breast cancer screening programs.

### 7.1 Recruitment and Re-screening

The SMP provided 281,715 examinations in 2012. During this period 27,073 (9.6%) of those examinations were provided to first time attendees.

Figure 7.1 shows that the total number of exams provided by SMP in 2012 decreased by 7.8% compared to 2011. The number of first time attendees decreased 12%, while the number of returning participants decreased 6.5% over the previous year.

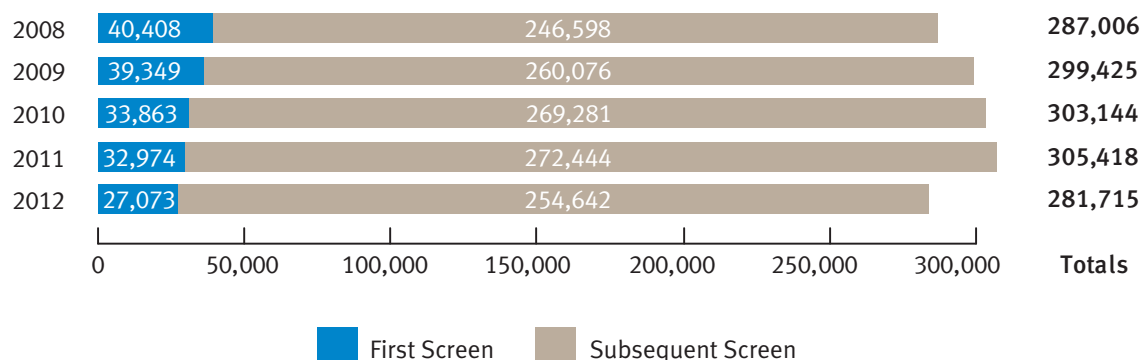
In November, 2011 the Canadian Task Force on Preventive Health Care (CTFPHC) updated their recommendations for breast cancer screening:

#### Mammography

- For women aged 40-49, routine screening not recommended (Weak recommendation; moderate quality evidence)
- For women aged 50-69, routine screening every 2 to 3 years (Weak recommendation; moderate quality evidence)
- For women aged 70-74, routine screening every 2 to 3 years (Weak recommendation; low quality evidence)

The CTFPHC recommendations differ from eligibility guidelines for screening in BC for women aged 40-49. A corresponding drop in attendance by women 40-49 in 2012 is noted after the CTFPHC guidelines announcement in the fall of 2011. In 2012 there were 9,418 fewer 40-49 year old women and 12,034 fewer 50-69 year old women than in 2011.

FIGURE 7.1: SMP ANNUAL SCREENING VOLUME YEARS: 2008 – 2012



#### NOTES:

1. SMP data extraction date: July 9, 2013

The age distribution of all exams and first exams performed in 2012 by Health Services Delivery Areas (HSDA) are displayed in Table 7.1. 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 46% in East Kootenay to over 70% of first time attendees being under 50 years of age across most of the Lower Mainland.

64% of BC women ages 50 to 69 received bilateral mammography services. The percentage of women ages 50 to 69 receiving bilateral mammography ranged from 54% to 75% across the province, with Northeast (54%) and East Kootenay (58%) having the lowest percentages. Overall, the SMP provided 85% of the bilateral mammography services for this age group.

**TABLE 7.1: SMP VOLUME BY HEALTH SERVICE DELIVERY AREA (HSDA) IN 2012**

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	4,586	25%	61%	14%	553	12%	46%	49%	5%
Kootenay Boundary	4,311	23%	61%	16%	383	9%	54%	43%	3%
Okanagan	23,758	25%	58%	17%	1,857	8%	56%	40%	3%
Thompson Cariboo	14,033	26%	59%	15%	1,011	7%	64%	34%	3%
Fraser East	14,579	32%	54%	14%	1,564	11%	64%	34%	2%
Fraser North	40,223	39%	51%	10%	4,245	11%	74%	24%	2%
Fraser South	43,249	38%	52%	10%	4,711	11%	70%	28%	2%
Richmond	14,704	36%	54%	10%	1,435	10%	74%	24%	2%
Vancouver	37,353	38%	51%	11%	3,914	10%	73%	25%	2%
North Shore / Coast Garibaldi	19,436	32%	55%	13%	1,787	9%	66%	31%	3%
South Vancouver Island	23,508	27%	58%	15%	1,922	8%	65%	32%	3%
Central Vancouver Island	18,563	22%	61%	17%	1,509	8%	53%	44%	3%
North Vancouver Island	7,825	24%	62%	14%	604	8%	52%	45%	3%
Northwest	3,760	31%	59%	10%	378	10%	63%	34%	3%
Northern Interior	8,591	33%	57%	10%	778	9%	70%	29%	1%
Northeast	1,872	31%	59%	10%	174	9%	64%	34%	2%
<b>Program</b>	<b>281,715</b>	<b>32%</b>	<b>55%</b>	<b>13%</b>	<b>27,073</b>	<b>10%</b>	<b>67%</b>	<b>31%</b>	<b>2%</b>

NOTES:

1. SMP data extraction date July 9, 2013.

## 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 7.2. In the 30 month period between July 1, 2010 and December 31, 2012, 544,091 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 53%. Northeast had the lowest participation rate at 37%, while Richmond had the highest at 64%. Compared with 2011, 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 7.2: BILATERAL MAMMOGRAPHY UTILIZATION BY WOMEN AGES 50 TO 69 IN BC**

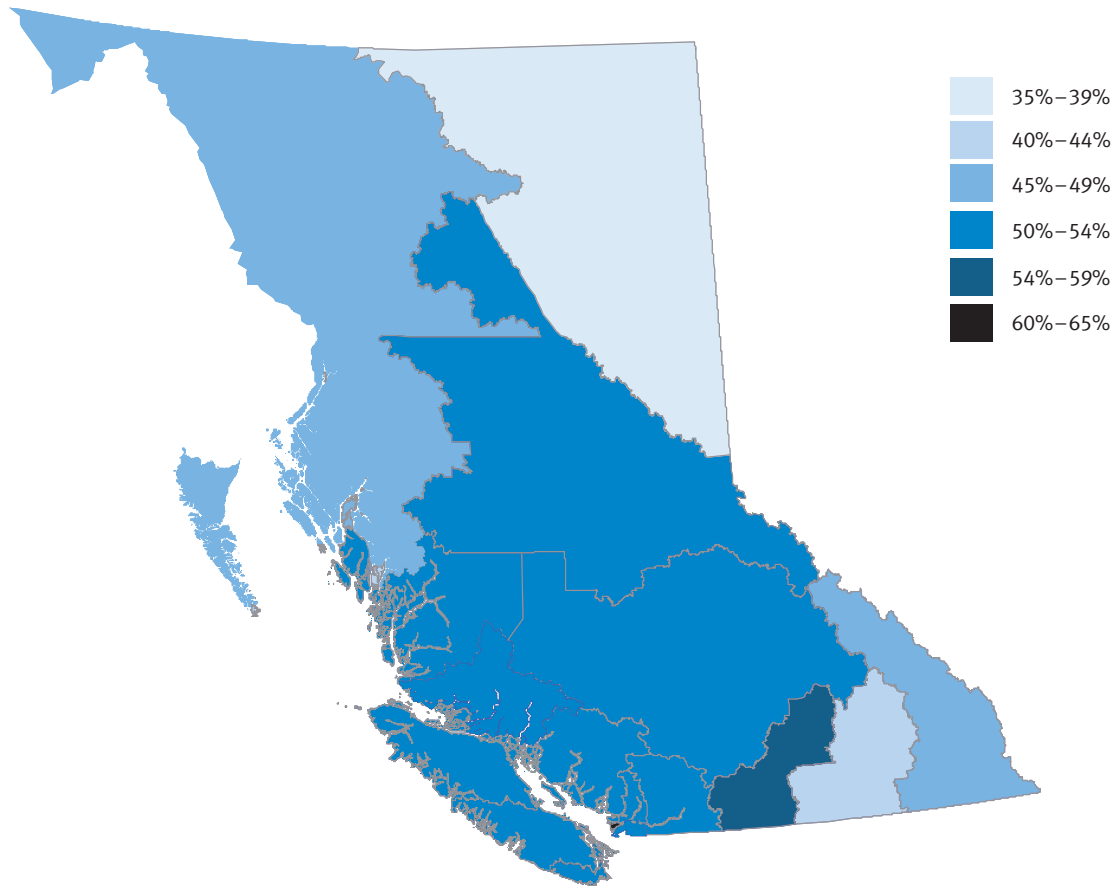
HSDA	10-Year Age Groups					Ages
	40-49	50-59	60-69	70-79	80-89	50-69
East Kootenay	35%	45%	51%	44%	2%	48%
Kootenay Boundary	31%	41%	47%	43%	3%	44%
Okanagan	42%	51%	58%	54%	4%	55%
Thompson Cariboo Shuswap	40%	50%	54%	48%	2%	52%
Fraser East	39%	49%	55%	47%	2%	51%
Fraser North	48%	52%	56%	48%	3%	53%
Fraser South	51%	56%	50%	32%	2%	53%
Richmond	49%	62%	67%	48%	3%	64%
Vancouver	44%	49%	55%	46%	2%	51%
North Shore/Coast Garibaldi	44%	49%	56%	52%	3%	52%
South Vancouver Island	40%	49%	56%	52%	3%	52%
Central Vancouver Island	38%	50%	59%	53%	3%	54%
North Vancouver Island	37%	50%	58%	50%	2%	53%
Northwest	37%	46%	48%	41%	1%	47%
Northern Interior	44%	52%	55%	45%	2%	53%
Northeast	25%	37%	37%	34%	1%	37%
<b>British Columbia</b>	<b>44%</b>	<b>51%</b>	<b>55%</b>	<b>46%</b>	<b>3%</b>	<b>53%</b>

### NOTES:

1. SMP data extraction date July 9, 2013.
2. Population data source: P.E.O.P.L.E. 2012 population projection (Sept 2012), BC Stats, Ministry of Technology, Innovation and Citizens' Services, Government of the Province of British Columbia.
3. Postal code translation file: TMF201306 (June 2013).
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: July 9, 2013.



**FIGURE 7.2: BIENNIAL SCREENING PARTICIPATION BY WOMEN AGES 50 TO 69 OVER 30 MONTH PERIOD  
BETWEEN JULY 1, 2010 AND DECEMBER 31, 2012**



**NOTES:**

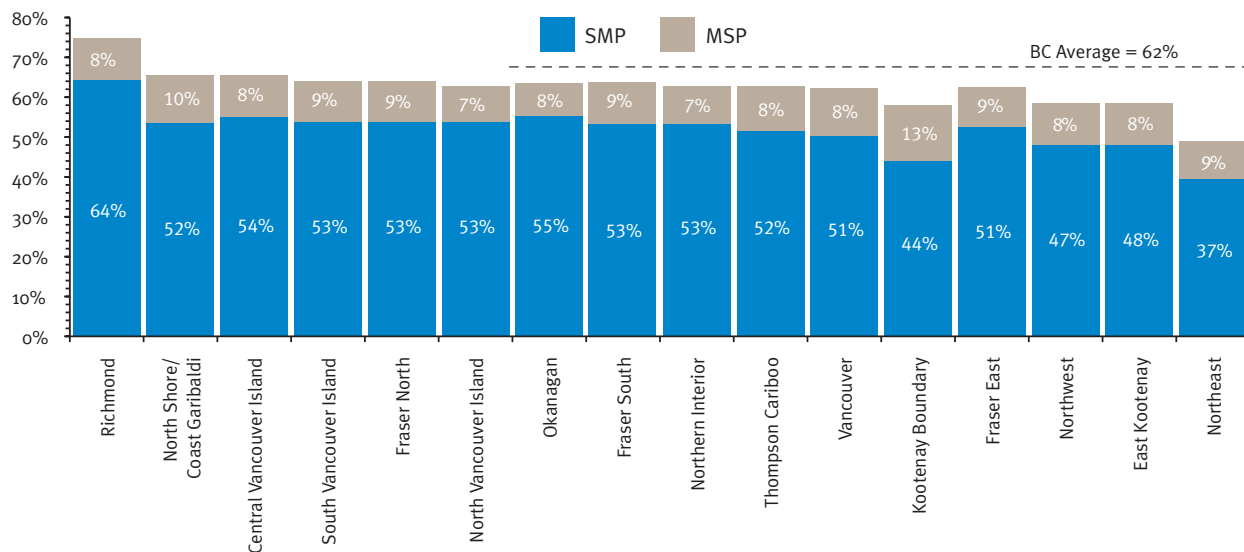
1. Based on the weighted average of 2010, 2011 and 2012 female population estimates
2. Population data source: P.E.O.P.L.E. 2012 population projection (Sept 2012), BC Stats, Ministry of Technology, Innovation and Citizens' Services, Government of the Province of British Columbia.
3. Postal code translation file: TMF201306 (June 2013).
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: July 9, 2013.

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 7.3 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%.

62% of BC women ages 50 to 69 received bilateral mammography services. The percentage of women ages 50 to 69 receiving bilateral mammography ranged from 54% to 75% across the province, with Northeast (46%) and Northwest (55%) having the lowest percentages. Overall, the SMP provided 86% of the bilateral mammography services for this age group.

**FIGURE 7.3: BILATERAL MAMMOGRAPHY UTILIZATION BY WOMEN AGES 50 TO 69 IN BC BETWEEN JULY 1, 2010 AND DECEMBER 31, 2012 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 July 15, 2013 for services provided between July 1, 2010 and December 31, 2012.
3. SMP data includes single and multiple screens per woman provided between July 1, 2010 and December 31, 2012.
4. 2010 to 2012 Projected Population Data Source: P.E.O.P.L.E. 2012 (Sept 2012), BC Stats, Ministry of Technology, Innovation and Citizens' Services, Gov't of the Province of BC.
5. SMP data extraction date: July 9, 2013

Participation rates of women ages 50 to 69 by selected ethnic groups are shown in Table III. 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. 2012 population projections. Changing the data source to the National Household Survey data may change the participate rates reported this year over last. 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, 2010 and December 31, 2012. 20% of attendees did not specify their ethnicity and were excluded from this analysis.

Participation in SMP by select ethnic groups has increased over the last two consecutive years, closing the gap with the general population. Participation by First Nations women has increased by 4 % overall, East/South East Asians has decreased by 1.5 % overall and South Asians has increased by 2 % overall. Table III 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 promotional activities.

**TABLE 7.3: REGIONAL PARTICIPATION RATES OF WOMEN AGES 50-69 BY SELECTED ETHNIC GROUPS  
BETWEEN JULY 1, 2010 AND DECEMBER 31, 2012 INCLUSIVE**

HSDA	First Nations		East/South-East Asians		South Asians	
	Population %	Participation Rate	Population %	Participation Rate	Population %	Participation Rate
East Kootenay	0.9%	91.9%	0.5%	98.7%	0.5%	35.0%
Kootenay Boundary	0.4%	99.9%	0.9%	57.2%	0.0%	99.9%
Okanagan	0.9%	63.9%	1.4%	45.1%	1.0%	60.6%
Thompson Cariboo Shuswap	3.8%	50.4%	1.1%	75.1%	0.9%	61.9%
Fraser East	1.5%	43.8%	2.2%	71.2%	8.7%	50.6%
Fraser North	0.5%	48.5%	24.8%	51.9%	4.4%	56.1%
Fraser South	0.4%	68.0%	10.3%	53.4%	14.7%	45.6%
Richmond	0.1%	99.9%	51.2%	62.2%	5.8%	64.6%
Vancouver	0.9%	42.8%	40.5%	47.3%	4.2%	60.8%
North Shore/Coast Garibaldi	1.8%	43.4%	6.9%	51.7%	1.5%	82.5%
South Vancouver Island	0.8%	42.2%	4.2%	36.6%	1.1%	56.5%
Central Vancouver Island	2.0%	38.8%	1.7%	51.9%	0.9%	60.0%
North Vancouver Island	2.2%	99.9%	1.1%	99.9%	0.0%	99.9%
Northwest	15.5%	50.0%	2.6%	23.2%	0.7%	99.9%
Northern Interior	3.8%	64.8%	1.7%	37.7%	1.4%	62.9%
Northeast	3.9%	52.2%	1.3%	7.5%	0.5%	42.5%
<b>British Columbia</b>	<b>1.5%</b>	<b>52.1%</b>	<b>13.4%</b>	<b>51.7%</b>	<b>4.5%</b>	<b>52.3%</b>

**PARTICIPATION RATE:**

1. Population data sources: P.E.O.P.L.E. 2012 population projection (Sept 2012), 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: TMF201306 (June 2013).
3. Women attended the SMP at least once between July 1, 2010 and December 31, 2012 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: July 9, 2013

**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

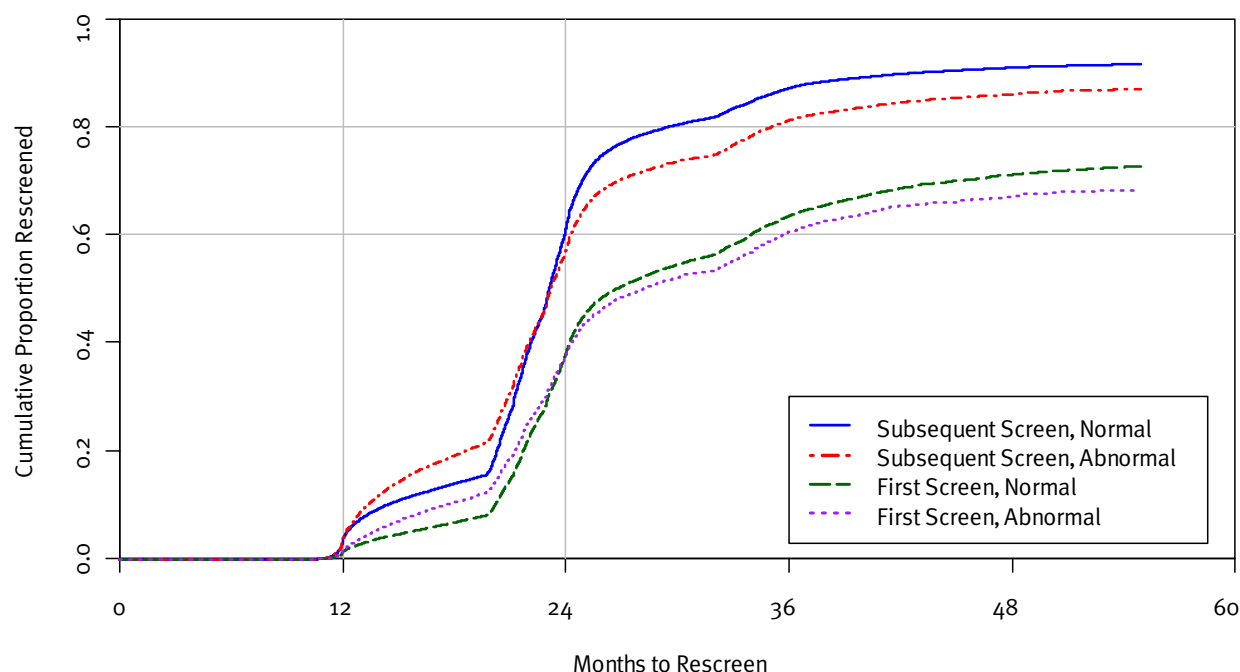
### Screening Return Rates

**Retention rate is the percentage of screen eligible women age 50 – 67 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 7.4 and Table 7.4 show return rates for women ages 50 to 69 who attended SMP between 2009 and 2011. 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 had two or more visits already. SMP has developed support material for the technologists to share with women at their first appointment to encourage them to return when they recalled for future screening.

FIGURE 7.4: RETURN RATES FOR WOMEN AGE 50-69 BY FIRST/SUBSEQUENT SCREENS AND SCREEN RESULT: 2009-2011



NOTES:

1. SMP data extraction date: July 9, 2013.

TABLE 7.4: RETURN RATE FOR WOMEN AGE 50-69: 2009 - 2011

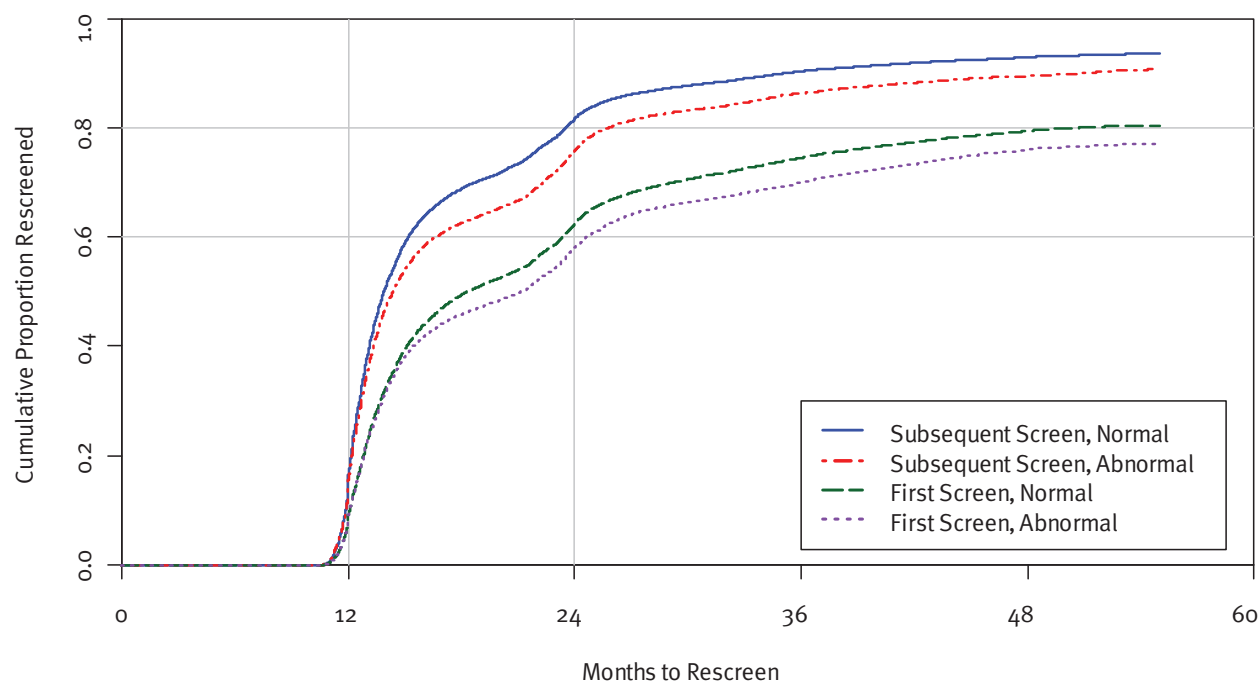
	First Screen		Subsequent Screen		Overall	
	Normal	Abnormal	Normal	Abnormal	Normal	Abnormal
<b>Total Number to be Re-screened</b>	27,345	5,208	435,789	25,824	463,134	31,032
<b>Returned by 18 months</b>	6%	10%	13%	18%	13%	17%
24 months	32%	33%	55%	52%	54%	49%
30 months	52%	50%	81%	74%	79%	70%
36 months	61%	59%	87%	81%	85%	77%

## NOTES:

1. SMP data extraction date: July 9, 2013.

Figure 7.5 shows a graph of return rates for women ages 40 to 49 who attended SMP between 2008 and 2010. Women in this cohort were recalled in accordance to the screening policy active at the time of the recall. 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 7.5: RETURN RATES FOR WOMEN AGE 40-49 BY FIRST/SUBSEQUENT SCREENS AND SCREEN RESULT: 2009-2011



## NOTES:

1. SMP data extraction date: July 9, 2013.

## 7.2 Screening Results

Table 7.5 summarizes the outcome indicators for screening exams provided in 2012 by 10-year age groups. Of the 281,715 screening mammograms performed, 21,000 (7.5%) had an abnormal result and 1,264 breast cancers were reported as of July 9, 2013 (4.5 per 1,000 exams).

**TABLE 7.5: SMP OUTCOME INDICATORS BY 10-YEAR AGE GROUP**

Outcome Indicators	Age at Exam						All
	<40	40-49	50-59	60-69	70-79	80+	
<b>Number of Exams</b>	201	91,061	83,630	71,209	34,685	929	281,715
% on first screens	90.0%	19.7%	6.9%	3.6%	1.8%	3.2%	9.6%
<b>Number of Cancers</b>	---	189	327	444	289	15	1,264
% on first screens	---	31.2%	10.7%	6.3%	6.2%	6.7%	11.2%
<b>Abnormal Call Rate</b>	15.9%	8.8%	7.3%	6.5%	6.4%	7.4%	7.5%
on first screens	17.1%	15.3%	17.3%	17.1%	20.8%	16.7%	16.0%
on subsequent screens	5.0%	7.1%	6.5%	6.1%	6.2%	7.1%	6.5%
<b>Overall Cancer Detection Rate (per 1,000)</b>	---	2.1	3.9	6.2	8.3	16.1	4.5
on first screens	---	3.3	6.1	11.0	29.6	33.3	5.2
on subsequent screens	---	1.8	3.8	6.1	8.0	15.6	4.4
<b>DCIS Detection Rate (per 1,000)</b>	---	0.7	0.8	1.1	1.5	---	0.9
on first screens	---	0.9	0.9	0.8	4.9	---	1.0
on subsequent screens	---	0.6	0.8	1.1	1.5	---	0.9
<b>Positive Predictive Value of Screening Mammography</b>	---	2.4%	5.4%	9.7%	13.0%	21.7%	6.1%
on first screens	---	2.2%	3.5%	6.5%	14.6%	20.0%	3.3%
on subsequent screens	---	2.5%	5.8%	10.0%	13.0%	21.9%	6.8%
<b>Core Biopsy Yield Ratio</b>	---	17.0%	29.1%	43.7%	54.5%	68.2%	33.4%
on first screens	---	11.3%	14.5%	29.0%	45.5%	100.0%	15.9%
on subsequent screens	---	21.6%	32.6%	45.4%	55.2%	66.7%	38.4%
<b>Open Biopsy Yield Ratio</b>	---	14.4%	23.0%	27.3%	42.5%	---	24.0%
on first screens	---	14.8%	18.9%	5.6%	37.5%	---	16.0%
on subsequent screens	---	14.2%	23.9%	29.6%	43.0%	---	26.2%

**NOTES:**

1. See glossary in the Appendix for definitions of terms.
2. Overall Cancer Rate includes ductal carcinoma in situ (DCIS)
3. An additional 148 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: July 9, 2013

### 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 decreased for 2012 compared to 2011 (from 7.8 to 7.5%). The abnormal call rate is lower on subsequent screens than on first screens. The overall abnormal call rate decreases from 9.4% for ages 40 to 49 to 5.6% 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 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. The overall open biopsy yield rate decreased slightly by 1.7% compared with the rate in 2011 (decreased 1.7% on first screens and 2.1% on subsequent screens).

Diagnostic procedure information is available to date on 20,852 (99%) of the screening mammograms with abnormal findings. Table 7.6 shows the proportion of women receiving specific diagnostic procedures as part of the work-up on their screen-detected abnormalities.

Overall, 15% and 3% of women with abnormal screening mammograms had core biopsy and open biopsy, respectively. The number of fine needle aspirations decreased by 1% (from 3% to 2%) compared to the previous year. The number of surgical (open) biopsies decreased by 1% (from 4% to 3%) compared to the previous year.

**TABLE 7.6: DIAGNOSTIC PROCEDURES RECEIVED BY SMP PARTICIPANTS WITH “ABNORMAL” SCREENING MAMMOGRAMS**

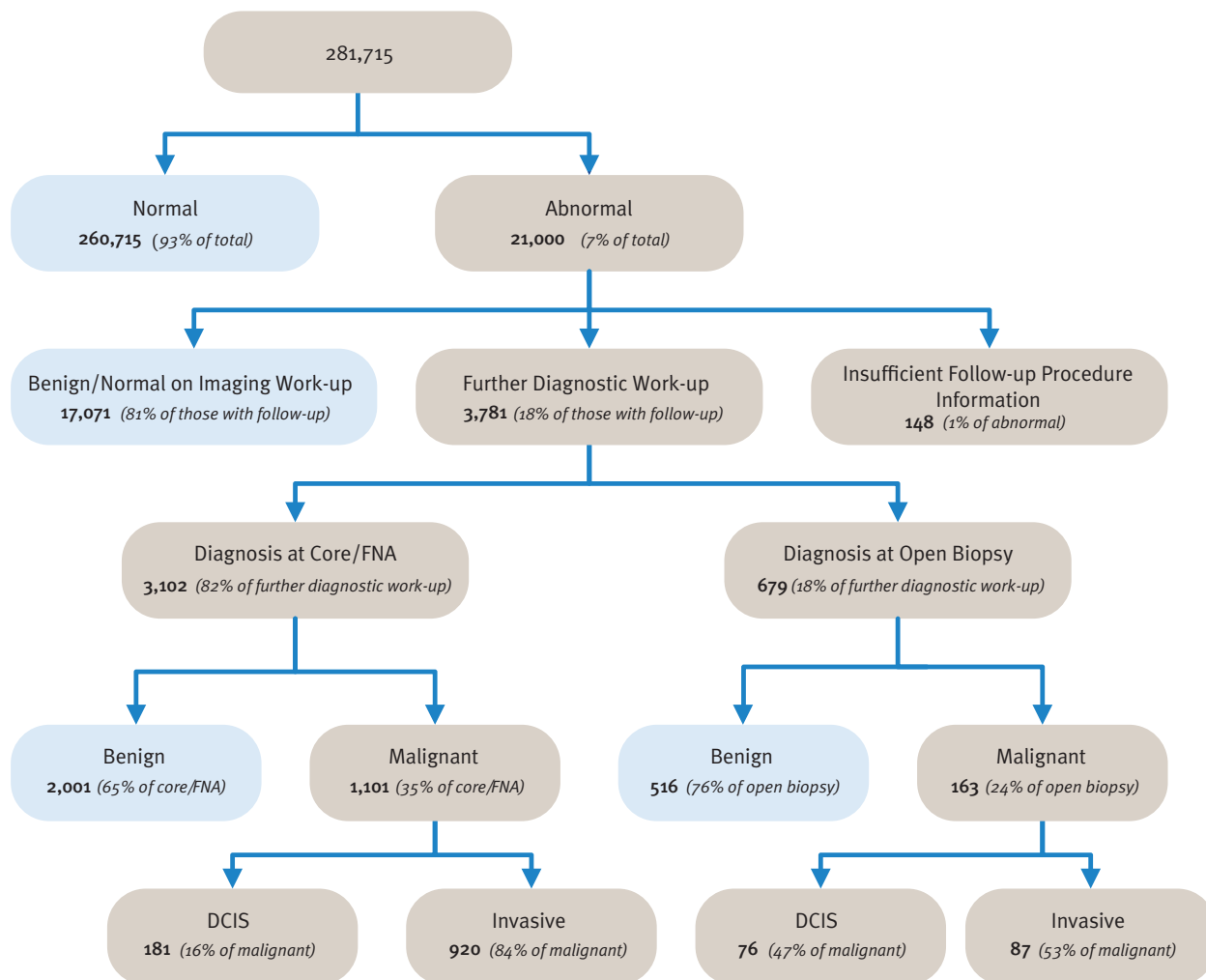
Procedure	Age at Exam						All
	<40	40-49	50-59	60-69	70-79	80+	
Diagnostic Mammogram	88%	90%	91%	92%	90%	90%	91%
Ultrasound	63%	69%	68%	68%	68%	64%	68%
Fine Needle Aspiration	0%	2%	2%	2%	2%	4%	2%
Core Biopsy	19%	12%	15%	19%	21%	32%	15%
Surgical Biopsy	0%	3%	3%	4%	3%	1%	3%
with Localization	0%	2%	3%	3%	3%	1%	3%
Number of cases with diagnostic assessment information available	32	7,916	6,019	4,601	2,215	69	20,852

#### NOTES:

1. SMP data extraction date: July 9, 2013.



FIGURE 7.6: SCREENING OUTCOME SUMMARY (2012)



### 7.3 2011 Cancer Detection

Histologic features of breast cancers detected by the SMP in 2011 are summarized by 10-year age groups in Table VII. 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, 76% have not had invasion of the regional lymph nodes, and 28% were grade 3 (i.e. poorly differentiated) tumours. Of the grade 3 tumours, 46% were smaller than 15 mm.

These overall outcome indicators met the international targets recommended for screening programs.

**TABLE 7.7: HISTOLOGIC FEATURES OF BREAST CANCERS DETECTED BY SMP YEAR: 2011**

Histological Features	Age at Exam								Age 40-79	
	40-49		50-59		60-69		70-79			
Number of Cancers	233		394		503		331		1,461	
in situ	71	30%	89	23%	92	18%	51	15%	303	21%
invasive	162	70%	305	77%	411	82%	280	85%	1,158	79%
Invasive Cancers Tumour Size										
≤5 mm	13	8%	19	6%	38	9%	18	6%	88	8%
6-10 mm	29	18%	73	24%	117	29%	84	30%	303	26%
11-15 mm	38	24%	89	29%	110	27%	79	28%	316	28%
16-20 mm	26	17%	46	15%	65	16%	44	16%	181	16%
>20 mm	51	32%	75	25%	77	19%	53	19%	256	22%
unknown size	(5)		(3)		(4)		(2)		(14)	
Invasive Cancers with tumour ≤ 15 mm										
	80	51%	181	60%	265	65%	181	65%	707	62%
Node Involvement in Invasive Cancers										
no	95	66%	209	73%	307	79%	212	79%	823	76%
yes	48	34%	78	27%	83	21%	57	21%	266	24%
no nodes sampled / unknown	(19)		(18)		(21)		(11)		(69)	
Histologic Grade of Invasive Cancers										
1 - well differentiated	33	21%	75	25%	132	33%	86	31%	326	29%
2 - moderately differentiated	71	46%	130	44%	170	43%	117	42%	488	43%
3 - poorly differentiated	50	32%	93	31%	96	24%	74	27%	313	28%
unknown grade	(8)		(7)		(13)		(3)		(31)	
Grade 3 tumour ≤ 15 mm	15	30%	40	43%	54	56%	34	46%	143	46%

**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: July 9, 2013.

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

## 7.4 Outcome Indicators by Calendar Year: 2008–2012

Table VIII 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 four years. Open biopsy yield ratios, on the other hand, have been declining steadily. In 2012, 24% 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 VIII. 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.

A Swedish two-county study showed a prevalence to expected incidence ratio of 3.09 for ages 50 to 59, and 4.59 for ages 60 to 69<sup>1</sup>, and had recommended the target of >3.0 for organized screening programs<sup>2</sup>. The annual prevalence to expected incidence ratios for ages 50 to 79 has consistently been above 3.0 from 1995 onwards.

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1 Tabär 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: 187-209

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2 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

TABLE 7.8: SMP OUTCOME INDICATORS BY CALENDAR YEAR BETWEEN 2008 AND 2012 INCLUSIVE

Outcome Indicators	Calendar Year					5-Year Cumulative
	2008	2009	2010	2011	2012	
<b>Number of Exams</b>	287,006	299,425	303,144	305,418	281,715	1,476,708
% on first screens	14.1%	13.1%	11.2%	10.8%	9.6%	11.8%
<b>Number of Cancers</b>	1,248	1,293	1,288	1,474	1,264	6,567
% on first screens	17.2%	15.6%	13.6%	13.8%	11.2%	14.3%
<b>Abnormal Call Rate</b>	7.4%	7.3%	7.3%	7.8%	7.5%	7.4%
on first screens	15.4%	15.3%	15.6%	16.8%	16.0%	15.8%
on subsequent screens	6.1%	6.0%	6.2%	6.7%	6.5%	6.3%
<b>Overall Cancer Detection Rate (per 1,000)</b>	4.4	4.3	4.3	4.8	4.5	4.4
on first screens	5.3	5.1	5.2	6.2	5.2	5.4
on subsequent screens	4.2	4.2	4.1	4.7	4.4	4.3
<b>DCIS Detection Rate (per 1,000)</b>	1.1	1.0	0.9	1.0	0.9	1.0
on first screens	1.6	1.2	1.3	1.6	1.0	1.4
on subsequent screens	1.0	0.9	0.8	0.9	0.9	0.9
<b>Positive Predictive Value of Screening Mammography</b>	5.9%	6.0%	5.9%	6.2%	6.1%	6.0%
on first screens	3.5%	3.4%	3.4%	3.7%	3.3%	3.5%
on subsequent screens	6.9%	7.0%	6.7%	7.0%	6.8%	6.9%
<b>Core Biopsy Yield Ratio</b>	35.1%	36.0%	35.1%	35.0%	33.4%	34.8%
on first screens	18.7%	20.3%	18.3%	17.9%	15.9%	18.2%
on subsequent screens	42.4%	42.1%	40.9%	40.8%	38.4%	40.7%
<b>Open Biopsy Yield Ratio</b>	32.4%	30.3%	29.2%	25.9%	24.0%	28.9%
on first screens	22.6%	19.4%	19.6%	18.0%	16.0%	19.6%
on subsequent screens	36.0%	33.9%	32.0%	28.5%	26.2%	31.9%
<b>Interval Cancer Rate (per 1,000)</b>						
0-12 months	0.63	0.65	0.71	0.59	---	---
after first screens	0.74	0.46	0.53	0.24	---	---
after subsequent screens	0.62	0.68	0.73	0.64	---	---
13-24 months	0.87	0.64	0.76	---	---	---
<b>Sensitivity (i.e. 1 - false negative rate)</b>	87.3%	86.8%	85.8%	---	---	---
<b>Specificity (i.e. 1 - false positive rate)</b>	93.1%	93.2%	93.2%	92.7%	---	---
<b>Prevalence to Expected Incidence Ratio for Age 50-79 (target: 3.0)</b>	4.60	5.00	4.40	6.20	4.60	5.00

## 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 2012 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: July 9, 2013.

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

## 7.5 Outcome Indicators by 10-Year Age Groups: 2008 – 2012

Table 7.9 shows the outcome indicators for screening exams provided in a five-year period by 10-year age groups. From 2008 to 2012, the SMP provided 1,476,708 screening mammography examinations, and detected 6,567 breast cancers. About 84% 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 119:1 for women in their 70's to 461:1 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 42:1 for women in their 40's. The cancer detection rate and positive predictive value increases as for women as they get older.

TABLE 7.9: SMP OUTCOME INDICATORS BY 10-YEAR AGE GROUPS BETWEEN 2008 AND 2012 INCLUSIVE

Outcome Indicators	Age at Exam					All
	40-49	50-59	60-69	70-79	80+	
Number of Exams	489,040	458,437	352,344	169,180	6,230	1,476,708
% first screens	23.5%	8.3%	4.3%	2.5%	4.9%	11.8%
Number of Cancers	1,060	1,804	2,201	1,425	76	6,567
% on first screens	35.4%	15.4%	8.9%	5.5%	11.8%	14.3%
Abnormal Call Rate	9.0%	7.2%	6.3%	6.0%	6.1%	7.4%
on first screens	15.3%	17.0%	16.2%	15.2%	10.8%	15.8%
on subsequent screens	7.1%	6.3%	5.8%	5.8%	5.8%	6.3%
Overall Cancer Detection Rate (per 1,000)	2.2	3.9	6.2	8.4	12.2	4.4
on first screens	3.3	7.3	12.9	18.8	29.6	5.4
on subsequent screens	1.8	3.6	5.9	8.2	11.3	4.3
DCIS Detection Rate (per 1,000)	0.7	0.9	1.3	1.5	1.1	1.0
on first screens	1.1	1.6	2.6	3.4	0.0	1.4
on subsequent screens	0.6	0.8	1.2	1.4	1.2	0.9
Positive Predictive Value of Screening Mammography	2.4%	5.5%	10.0%	14.1%	20.2%	6.0%
on first screens	2.1%	4.4%	8.1%	12.6%	28.1%	3.5%
on subsequent screens	2.6%	5.8%	10.3%	14.2%	19.4%	6.9%
Core Biopsy Yield Ratio	17.1%	31.9%	48.1%	57.5%	73.0%	34.8%
on first screens	12.0%	20.5%	36.0%	49.2%	60.0%	18.2%
on subsequent screens	21.9%	35.3%	49.8%	58.1%	74.7%	40.7%
Open Biopsy Yield Ratio	17.4%	25.1%	38.8%	47.8%	61.1%	28.9%
on first screens	15.9%	19.2%	32.3%	44.4%	100.0%	19.6%
on subsequent screens	18.6%	26.8%	39.7%	48.0%	53.3%	31.9%
Interval Cancer Rate (per 1,000)						
0-12 months	0.54	0.55	0.71	0.67	0.48	0.60
after first screens	0.41	0.61	0.92	0.96	0.01	0.51
after subsequent screens	0.58	0.54	0.70	0.66	0.51	0.61
13-24 months	<0.01	0.68	0.94	0.95	0.80	0.55
Sensitivity (i.e. 1 - false negative rate)	80.1%	87.8%	89.8%	92.7%	96.2%	88.2%
Specificity (i.e. 1 - false positive rate)	91.2%	93.2%	94.3%	94.8%	95.1%	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 2012 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: July 9, 2013.

## 7.6 Outcome Indicators by HSDA: 2008 – 2012 Cumulative

Outcome indicators for 2008 to 2012 are summarized by HSDA in Table 7.10. The Kootenay Boundary, Okanagan, North and South Vancouver Island regions have the lowest abnormal call rate (5%), while Fraser East has the highest (11%). North Vancouver Island has the lowest cancer detection rate (3.7 per 1,000), and Thomson Cariboo has the highest (5.3 per 1,000).

Fraser East has the lowest positive predictive value (4%), and Kootenay Boundary has the highest (10%). All of the HSDAs meet the international targets recommended for screening programs for invasive tumour detection size; seven out of the sixteen HSDAs meet the international target recommended for percentage of cases with negative nodes.

**TABLE 7.10: SMP OUTCOME INDICATORS BY HEALTH SERVICE DELIVERY AREA (HSDA) BETWEEN 2008 AND 2012 INCLUSIVE**

HSDA	% Called Abnormal	Cancer Detection Rate (per 1000)	PPV	In-Situ : Invasive (number)	% Invasive ≤15 mm	% Invasive with -ve nodes
East Kootenay	9%	4.4	5%	15 : 83	59%	73%
Kootenay Boundary	5%	5.2	10%	32 : 86	60%	69%
Okanagan	5%	4.4	8%	88 : 494	61%	77%
Thompson Cariboo	7%	5.3	8%	87 : 325	57%	70%
Fraser East	11%	5.1	4%	84 : 317	54%	69%
Fraser North	8%	4.1	5%	203 : 604	61%	70%
Fraser South	9%	4.4	5%	223 : 753	63%	71%
Richmond	7%	4.1	6%	87 : 211	62%	66%
Vancouver	8%	4.2	5%	225 : 601	65%	67%
North Shore / Coast Garibaldi	7%	4.7	7%	116 : 366	63%	70%
South Vancouver Island	5%	4.2	8%	90 : 456	54%	69%
Central Vancouver Island	6%	5.0	8%	82 : 413	66%	75%
North Vancouver Island	5%	3.7	7%	29 : 126	67%	75%
Northwest	6%	4.8	7%	26 : 68	53%	65%
Northern Interior	7%	4.2	6%	39 : 146	59%	62%
Northeast	7%	4.4	6%	7 : 47	66%	57%
Program	7%	4.4	6%	1442 : 5125	61%	70%

**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: July 9, 2013.

1 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: 187-210



## 7.7 Cancer Characteristics by Age: Cumulative up to and including 2011

From the start of the program in July 1988 to December 2011, 18,343 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 2011 are summarized by 10-year age groups in Table 7.11. 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 7.11: HISTOLOGIC FEATURES OF BREAST CANCERS DETECTED BY SMP CUMULATIVE UP TO AND INCLUDING 2011**

Histological Features	Age at Exam										Age 40+	
	40-49		50-59		60-69		70-79		80+			
Number of Cancers	3,080		5,225		5,692		4,050		296		18,343	
in situ	977	32%	1,315	25%	1,181	21%	710	18%	32	11%	4,215	23%
invasive	2,103	68%	3,910	75%	4,511	79%	3,340	82%	264	89%	14,128	77%
Invasive Cancers Tumour Size												
≤5 mm	210	10%	359	9%	391	9%	241	7%	25	10%	1,226	9%
6-10 mm	411	20%	945	24%	1,220	27%	1,023	31%	71	27%	3,670	26%
11-15 mm	570	28%	1,079	28%	1,360	30%	1,005	30%	75	29%	4,089	29%
16-20 mm	313	15%	646	17%	666	15%	499	15%	47	18%	2,171	16%
≥20 mm	562	27%	832	22%	834	19%	533	16%	43	16%	2,804	20%
unknown size	(37)		(49)		(40)		(39)		(3)		(168)	
Invasive Cancers with tumour ≤ 15 mm												
	1,191	58%	2,383	62%	2,971	66%	2,269	69%	171	66%	8,985	64%
Node Involvement in Invasive Cancers												
no	1,324	69%	2,660	73%	3,225	78%	2,345	81%	146	80%	9,700	76%
yes	586	31%	972	27%	936	22%	564	19%	36	20%	3,094	24%
no nodes sampled / unknown	(193)		(278)		(350)		(431)		(82)		(1334)	
Histologic Grade of Invasive Cancers												
1 - well differentiated	520	27%	1,165	32%	1,388	33%	1,131	37%	91	38%	4,295	33%
2 - moderately differentiated	833	43%	1,499	42%	1,852	44%	1,347	44%	102	43%	5,633	43%
3 - poorly differentiated	592	30%	938	26%	937	22%	570	19%	45	19%	3,082	24%
unknown grade	(158)		(308)		(334)		(292)		(26)		(1118)	
Grade 3 tumour ≤ 15 mm	249	42%	439	47%	497	53%	288	51%	21	47%	1,494	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: July 9, 2013.

## 7.8 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. 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 1% compared to 2011 (54% plus 10% MSP to 53% plus 9% MSP).
- The diagnostic interval for no tissue biopsy improved 1.5% compared to 2011 (79.6% to 81.1%).
- The diagnostic interval for tissue biopsy improved 9.2% compared to 2011 (55.6% to 64.8%)

Comparison of SMP Performance with Canadian Breast Screening Standards for Ages 50 to 69 is summarized in Table 7.12.

<sup>1</sup> Report from the Evaluation Indicators Working Group: Guidelines for Monitoring Breast Screening Program Performance Second Edition. Health Canada 2007

**TABLE 7.12: COMPARISON OF SMP PERFORMANCE WITH  
CANADIAN BREAST SCREENING STANDARDS FOR 50-69 YEARS OLD**

Performance Measure	National Target <sup>1</sup>	SMP
<b>Participation Rate (1)</b>	≥70% of the eligible population	53% (plus 9% MSP)
<b>Retention Rate (2)</b>		
Initial Rescreen	≥75% initial re-screen within 30 months	52%
Subsequent Rescreen	≥90% subsequent re-screen within 30 months	80%
<b>Abnormal Call Rate (3)</b>		
First Screens	<10% first screens	17.3%
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	6.8 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	0.8 per 1000
Subsequent Screens	Surveillance and Monitoring only	0.9 per 1000
<b>Diagnostic Interval (3)</b>		
no tissue biopsy performed	≥90% within 5 weeks if no tissue biopsy performed	81.1%
tissue biopsy performed	≥90% within 7 weeks if tissue biopsy performed	64.8%
<b>Positive Predictive Value (3)</b>		
First Screens	≥5% first screen	4.5%
Subsequent Screens	≥6% re-screens	7.7%
<b>Benign Core Biopsy Rate (per 1000) (3)</b>		
First Screens	Surveillance and Monitoring only	27.2 per 1000
Subsequent Screens	Surveillance and Monitoring only	6.6 per 1000
<b>Benign to Malignant Core Biopsy Ratio (3)</b>		
First Screens	Surveillance and Monitoring only	4.2 : 1
Subsequent Screens	Surveillance and Monitoring only	1.6 : 1
<b>Benign Open Biopsy Rate (per 1000) (3)</b>		
First Screens	Surveillance and Monitoring only	5.7 per 1000
Subsequent Screens	Surveillance and Monitoring only	1.7 per 1000
<b>Benign to Malignant Open Biopsy Ratio (3)</b>		
First Screens	≤1:1	5.9 : 1
Subsequent Screens	≤1:1	2.7 : 1
<b>Invasive Tumour size ≤10 mm (4)</b>	>25%	35%
<b>Invasive Tumour size ≤15 mm (4)</b>	>50%	63%
<b>Node Negative Rate in Cases of Invasive Cancer (4)</b>	>70%	76%

NOTES:

1. Screen years: (1) = July 1, 2010 - December 31, 2012, (2) = 2009-2011, (3) = 2012, (4) = 2011
2. Population data source: P.E.O.P.L.E. 2012 population projection (Sept 2012), BC Stats, Ministry of Technology, Innovation and Citizens' Services, Government of the Province of British Columbia.
3. SMP data extraction date: July 9, 2013

1 Report from the Evaluation Indicators Working Group: Guidelines for Monitoring Breast Screening Program Performance Second Edition. Health Canada 2007

## 7.9 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 7.13

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 7.13: COST COMPARISON BY FISCAL YEAR**

Indicator	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013
<b>Total Cost</b>	\$18,219,310	\$20,311,839	\$21,450,188	\$21,716,688	\$21,633,483
<b>Total cost per screen</b>	\$69.79	\$70.56	\$72.34	\$74.76	\$75.63
Central Services	\$13.88	\$14.95	\$13.89	\$16.83	\$17.05
Screen Provision Costs	\$39.84	\$39.85	\$42.40	\$41.67	\$42.36
Professional Reading Fees	\$14.08	\$14.50	\$14.57	\$14.64	\$14.71
Capital Allocation	\$1.99	\$1.25	\$1.48	\$1.62	\$1.51
<b>Cost per cancer detected</b>	\$14,171.00	\$15,700.90	\$16,608.43	\$15,148.01	Not Available

**NOTES:**

1. Number of cancers detected in 2012-13 is not available yet, and thus the cost per cancer detected is not computed.
2. Program Expenses are audited through PHSA Finance annually.
3. Screen Provision Costs includes the cost of tube replacement.
4. Capital allocation includes 1) capital differential allocated to privately administered centres in their annual operating budget and 2) amortization of equipment purchased through BCCA/PHSA. Capital allocation does not include capital expenditures capitalized and amortized through host hospitals.
5. The professional reading fee was \$14.71 per screen effective April 1, 2013.
6. Cost per cancer detected is based upon screens with complete follow-up.
7. The cost per screen is exclusive of salary and benefit increases to public screening centers which, commencing in fiscal 2006, have gone directly to the Health Authority.
8. The cost per screen is exclusive of extraordinary one time costs to: (a) establish a fund to support cancer screening promotion and community outreach projects at BC Cancer Agency and (b) to support CIC digital conversion.
9. SMP data extraction date: July 9, 2013.

## 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>1</sup>. A secondary prevention can reduce cancer morbidity and mortality by diagnosing invasive disease at an earlier, more favourable prognostic stage, and by 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>2</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>3 4 5</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>1</sup> US Preventive Services Task Force: Guide to Clinical Preventive Services, Ed 2. Baltimore, Williams & Wilkins, 1996

<sup>2</sup> Morrison A: Screening in Chronic Disease. New York, Oxford Press, 1992

<sup>3</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>4</sup> Miller AB; Fundamentals of Screening. In Screening for Cancer. Orlando, Academic Press, 1985, p3

<sup>5</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 error 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
6. Evaluation/Research Partnerships

The success of screening is a shared responsibility of the team of individuals working together to develop goals, set standards, monitor progress, and continue improvement in each of the six components.

## Appendix 2 — 2012 SMP Screening Services

In 2012 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, 2011 – December 31, 2012.

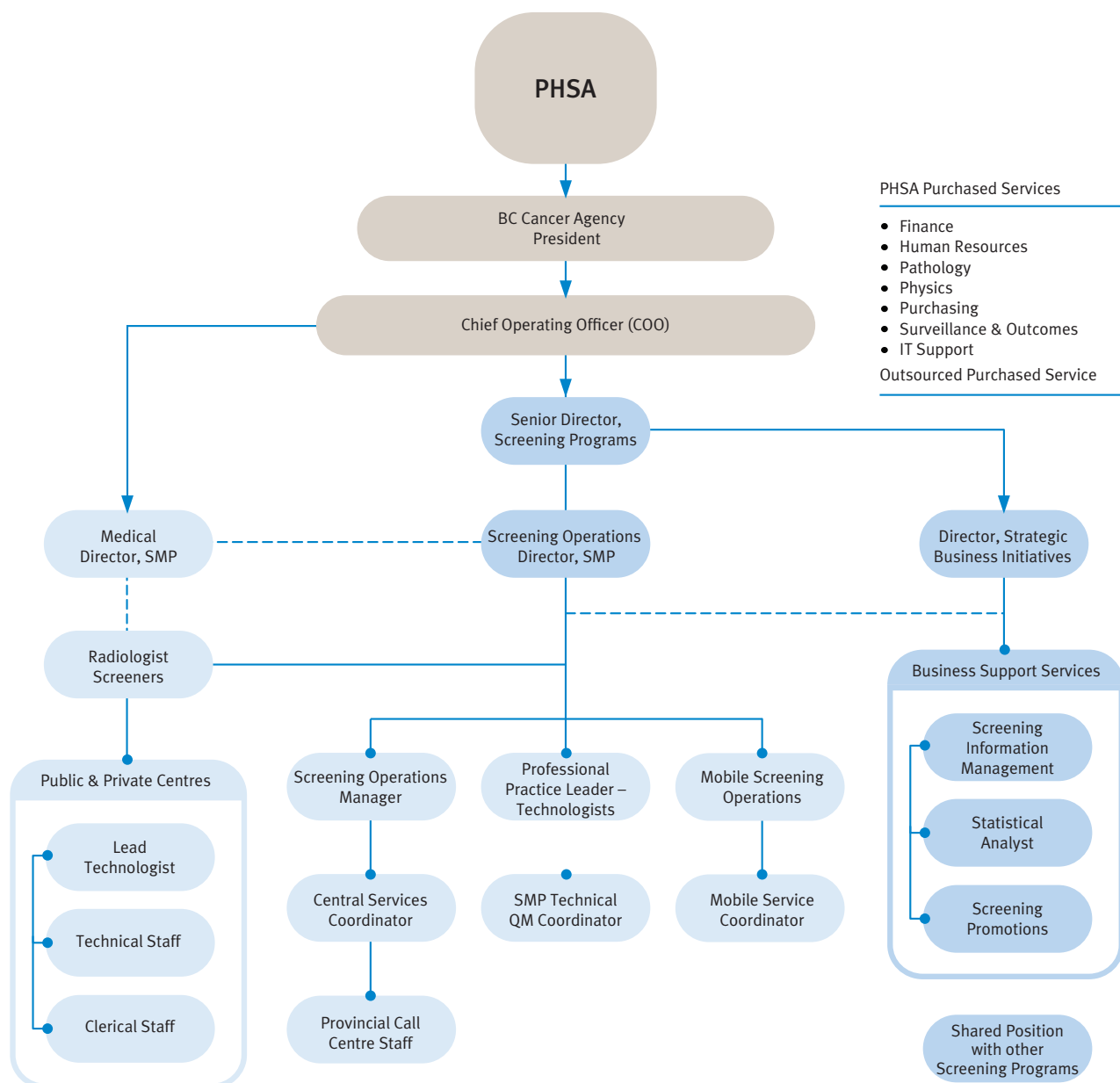
Age	Recall Frequency
<40	Will accept with primary health care provider referral
40-49	Reminders* for 12-month and 24-month anniversary
50-79	Reminders* for 24-month and 36-month anniversary to age 79
80+	Will accept with primary health care provider referral

### 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 doctor to receive the results.

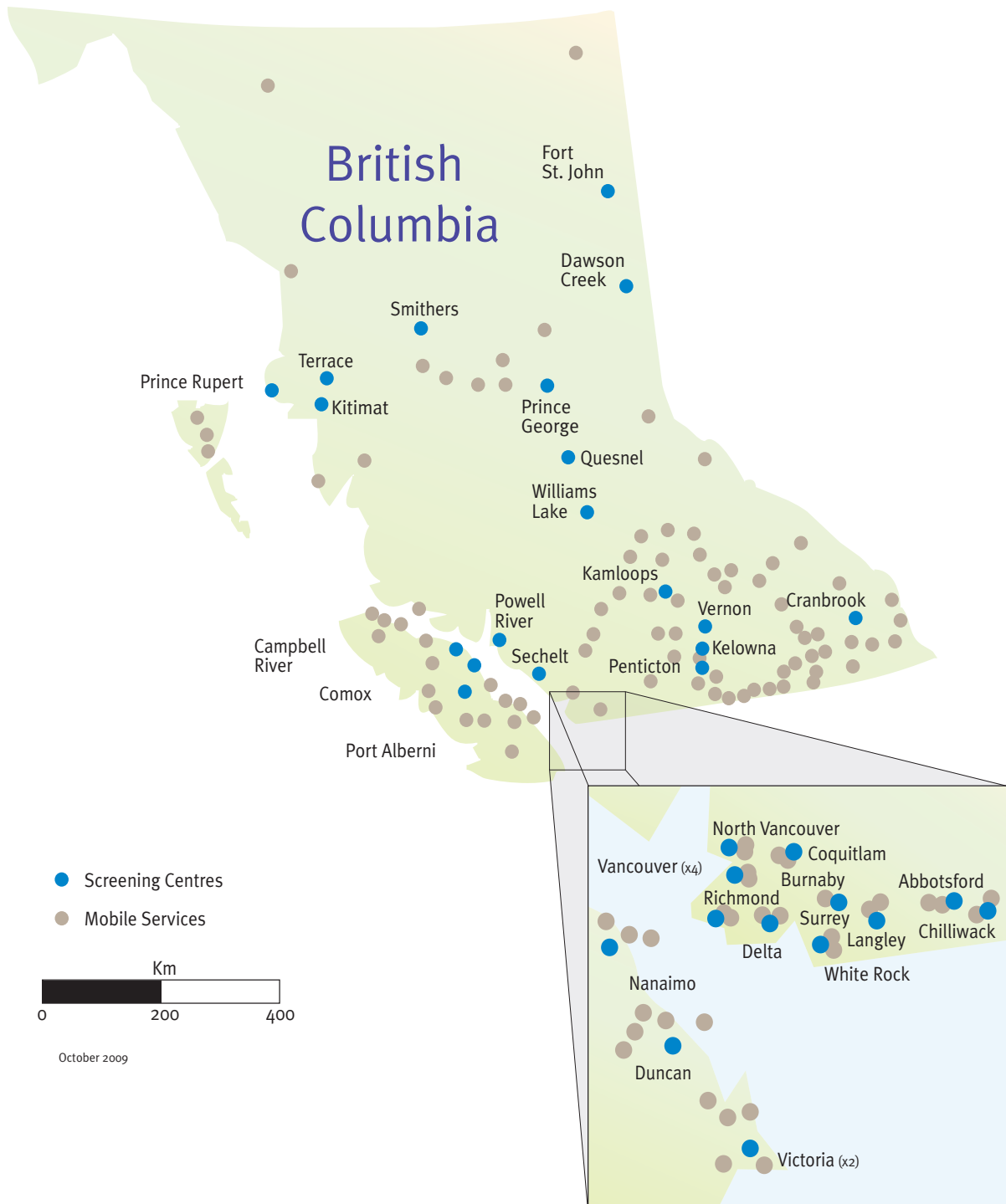
\*If there is a new lump, thickening or discharge, we recommend seeing a doctor immediately, even if the last mammogram was normal.

## Appendix 3 — SMP/BCCA Organization Chart





## Appendix 4 — Map of Screening Centres



## Appendix 5 — Screening Centre Contact Information

Abbotsford	604-851-4750	Prince Rupert	1-800-663-9203
Burnaby	604-436-0691	Quesnel	1-800-663-9203
Campbell River	1-800-663-9203	Smithers	1-800-663-9203
Chilliwack	1-800-663-9203	Sechelt	1-800-663-9203
Comox	250-890-3020	Richmond	604-244-5505
Coquitlam	604-927-2130	Surrey – Guildford	604-586-2772
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	604-877-6232	#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
Prince George	250-565-6816		

### Mobile Screening Service Delivery Areas

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

Lower Mainland locations change from time to time. Latest visits include: Alouette Correctional Centre, BC Biomedical Lab, BCIT Campus, Chilliwack City Hall, Coast Mountain Bus Company, Downtown Eastside Women's Health Centre, Fraser Mental Health, ICBC Head Office, Maple Ridge City Hall, New Vista Society, North Vancouver City Hall, Pacific Blue Cross (Head office, Burnaby) Richmond City Hall SFU Campus, Surrey Tax Centre, Telus, Translink, UBC Campus, Vancouver Primary Care Centre/Native Health, Work Safe BC (Richmond)

First Nations: Chehalis First Nation, Seabird First Nation, Esketemc First Nations, Boston Bar First Nation, tsartlip First Nation, Lake Babine Nation, Bonaparte Indian Band, Canim Lake Indian Band, Cambell River First Nation, Penelakut Tribe, Stz'uminus First Nation, Sto:lo First Nation, Quatsion First Nation, Soowhalie First Nation, Lyackson First Nation, Splatsin First Nation, Prophet River First Nation, Nak'azdli First Nation, Tlaz'ten First Nation, Nadleh Whut'en First Nation, Stella'ten First Nation, Laxgalts First Nation, Kispiox First Nation, Gingolx Indian Band, Gitanyow First Nation, Lower Nicola Indian Band, Upper Nicola Indian Band, Nanoose First Nation, Gitlakdamix First Nation, Esketemc First Nations, Squamish First Nation, Tseshaht First Nation, Gwa'Sala-Nakwaxda'xw, T'sou-ke Nation, Kitselas First Nation, Ahousaht First Nation, Tla-o-qui-aht First Nation, Saik'uz First Nation

## 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 Education Materials

Cancer screening promotion and education 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
Pink Appointment Pads (English)	(max. 20)
Pink Appointment Pads (Simplified Chinese)	(max. 20)
Pink Appointment Pads (Punjabi)	(max. 20)
SMP Program Brochures (English)	(max. 50)
SMP Program Brochures (Simplified Chinese)	(max. 50)
SMP Program Brochures (Punjabi)	(max. 50)
Bookmark	(max. 50)
Fridge Magnet - "Pass it On"	(max. 50)
Poster - "Why Regular Mammograms are Important" (8.5" by 11")	(max. 10)

### Cervical Cancer Screening Program

Item	Quantity Requested
CCSP Program Brochure – "Pap Tests Save Lives"	(max. 50)
CCSP Program Brochure – "Abnormal Pap Test"	(max. 50)

### Colon Screening Program

Item	Quantity Requested
CSP Program Brochure – "Is Colon Screening Right for You?"	(max. 50)
CSP Program Brochure – "What is a Colonoscopy?"	(max. 50)
Colonoscopy Referral Pad (50 sheets)	(max. 5)
CSP Program Fact Sheet	(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.
- Family doctors 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 Medical Association
- BC Women's Health Centre
- BC/Yukon Women's Cancer Alliance
- Canadian Breast Cancer Foundation
- Canadian Cancer Society
- College of Physicians and Surgeons
- University of British Columbia
- Women's Health Bureau



## Appendix 9 — Committees

### Academic Committee

Christine Wilson (Co-Chair)  
 Scott Tyldesley (Co-Chair)  
 Janette Sam (Recorder)  
 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  
 Ms. Ritinder Harry  
 Dr. Malcolm Hayes  
 Ms. Lisa Kan  
 Mr. Karim Karmali  
 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

### Physics 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

### Nancy Aldoff

#### Presentations

Aldoff, N. (2012, September). The Importance of Screening Mammography for First Nation Women. Women's Health Conference. Lecture conducted from Quatsino Health Centre, Coal Harbour Vancouver Island, BC.

Aldoff, N. (2012, October). What is the Screening Mammography Program of BC? Breast Cancer Prevention Day. Lecture conducted from YWCA, Vancouver, BC.

Aldoff, N. (2012, October). Legal and Ethical Responsibilities of the Mammographer. Screening Mammography Forum 2012. Lecture conducted from Sheraton Vancouver Airport Hotel, Richmond, BC.

Aldoff, N. (2012, December). The Importance of Screening Mammography for First Nation Women. Women's Wellness Fair. Lecture conducted from Stz'uminus Health Centre, Ladysmith, BC.

### Andrew Coldman

#### Publications

Olson, R. A., Nichol, A., Caron, N. R., Olivotto, I. A., Speers, C., Chia, S., Davidson, A., Coldman, A., Bajdik, C., & Tyllesley, S. (2012). Effect of community population size on breast cancer screening, stage distribution, treatment use and outcomes. *Canadian Journal of Public Health. Revue Canadienne de Sante Publique*. 103(1), 46-52.

Coldman, A., Phillips, N. (2012). False-positive Screening Mammograms and Biopsies Among Women Participating in a Canadian Provincial Breast Screening Program. *Canadian Journal of Public Health. Revue Canadienne de Sante Publique*. 103(6), e420-e424.

### Paula Gordon

#### Presentations

Gordon, P. (2012, May). Breast Ultrasound. Annual Meeting, American Roentgen Ray Society. Vancouver, BC.

Gordon, P. (2012, November). Essentials of Radiology: Ultrasound-guided Interventional Procedures in the Breast. Radiological Society of North America Annual Meeting. Chicago, IL.

Gordon, P. (2012, November). Small Parts Interventional Ultrasound (Hands-on Workshop). Radiological Society of North America Annual Meeting. Chicago, IL.

Gordon, P. (2012, November). Ultrasound Guided Breast Interventional Procedures (“Hands-on” Workshop). Radiological Society of North America Annual Meeting. Chicago, IL.

### **Presentations and Articles**

Zhang, C., Lewis, D., Nasute, P., Warren, L., & Gordon, P. (2012, June). The Negative Predictive Value of US-Guided 14-Gauge Core Needle Biopsy of Breast Masses: a validation study of 339 cases. Canadian National Medical Student Research Symposium (CNMSRS). Winnipeg, MB.

Rajapakshe, R., Bitgood, C., McAvoy, S., Araujo, C., Gordon, P. B., Coldman, A. (2012, September). Estimation of additional MRI resources needed in British Columbia for screening high risk women for Breast Cancer. Breast Cancer Symposium 2012. San Francisco, CA.

### **Publications**

Zhang, C., Lewis, D., Nasute, P., Warren, L., & Gordon, P. (2012). The Negative Predictive Value of US-Guided 14-Gauge Core Needle Biopsy of Breast Masses: a validation study of 339 cases. *Cancer Imaging*. 12(3), 488-496. doi: 10.1102/1470-7330.2012.0047

### **Rasika Rajapakshe**

#### **Presentations**

Rajapakshe, R. (2012, October). Mapping of Breast Cancer Care Paths in British Columbia for a Breast Cancer Micro-Simulation Model. Screening Mammography Forum 2012, Lecture conducted from Sheraton Vancouver Airport Hotel, Richmond, BC.

#### **Posters**

San Francisco Breast Cancer Symposium, September 13-15, 2012:

Rajapakshe, R., Parker, B., Araujo, C., Chu, C., Wilson, C. M., & Sam, J. (2012, September). Outcomes of an organized breast cancer screening program over the past 15 years. Poster presented at ASCO Meeting. San Francisco, CA.

Rajapakshe, R., Parker, B., Araujo, C., Ruscheinsky, S., McAvoy, S., Hoegg, T., Coldman, A., & Wilson, C. M. (2012, September). Stratification of 5-year cancer detection rate in an organized breast screening program based on Gail model risk factors. Poster presented at ASCO Meeting. San Francisco, CA.

Rajapakshe, R., Bitgood, C., McAvoy, S., Araujo, C., Gordon, P., & Coldman, A. (2012, September). Estimation of additional MRI resources needed in British Columbia for screening high-risk women for breast cancer. Poster presented at ASCO Meeting. San Francisco, CA.

BC Cancer Agency 2012 Annual Cancer Conference, Nov 29 - Dec 1, 2012 - Vancouver, BC.:

Vandenberg, C., Rajapakshe, R., Yang, J., Araujo, C., Wight, T., Sam, J., Aldoff, N., & Wilson, C. M. (2012, November - December). Estimating Diagnostic Reference Levels for Mean Glandular Dose Within the Screening Mammography Program of British Columbia (SMPBC).

McAvoy, S., Rajapakshe, R., Lasserre, P., Gordon, P., & Silver, S. (2012, November – December). A Fully Automatic and Consistent Breast Density Computation Algorithm for Full Field Digital Mammography Images.

McAvoy, S., Rajapakshe, R., Lasserre, P., Gordon, P., Silver, S., Staples, C., & Piche, S. (2012, November – December). Breast Density and its Affect on Inter-Observer Mammographic Density Estimate Variance.

Smithbower S. A., Rajapakshe, R., Sam, J., Aldoff, N., & Yang, J. (2012, November – December). A Centralized Automated Quality Assurance Platform for Digital Mammography Units Within the Screening Mammography Program of BC.

Smithbower, S. A., Lawrence, R., Rajapakshe, R., & Araujo, C. (2012, November – December). Utilizing Consumer Graphics Hardware to Accelerate Monte Carlo Population Simulations.

Smithbower, S. A., & Rajapakshe, R. (2012, November – December). Development of Interactive We-Based Telemetry for Real-Time Cancer Simulations.

Parker, B. A., Rajapakshe, R., Araujo, C., McAvoy, S., Hoegg, T., Coldman, A., & Wilson, C. M. (2012, November – December). Stratification of the 5-Year Cancer Detection in a Provincial Screening Mammography Program Based on Gail Model Risk Factors.

Parker, B. A., Rajapakshe, R., Araujo, C., Chu, C., Wilson, C. M., & Sam, J. (2012, November – December). Outcomes of a Provincial Screening Mammography Program Over the Past 15 Years.

Vandenberg, C., Bitgood, C., Weisstock, C., McAvoy, S., Araujo, C., & Rajapakshe, R. (2012, November – December). Enhancement of the Breast Cancer Risk Information Collected at the Time of Receiving a Screening Mammography.

Vandenberg, C., Araujo, C., Rajapakshe, R., Baliski, C., Ellard, S., Reed, M., Fyles, G., & Tyldesley, S. (2012, November – December). Mapping of Breast Cancer Care Paths in British Columbia for a Breast Cancer Micro-Simulation Model.

Weisstock, C., Rajapakshe, R., Bitgood, C., Parker, B., McAvoy, S., Araujo, C., Gordon, P., & Coldman, A. (2012, November – December). Estimation of Additional MRI Resources Needed in British Columbia for Screening High-Risk Women for Breast Cancer.

### Janette Sam

#### Presentations

Sam, J (2012, October) Increasing Screening Mammography Program Participation & Engagement: SMP Activities. Screening Mammography Forum 2012. Lecture conducted from Sheraton Vancouver Airport Hotel, Richmond, BC.

### Linda Warren

#### Presentations

Zhang, C., Lewis, D., Nasute, P., Warren, L., & Gordon, P. (2012, June). The Negative Predictive Value of US-Guided 14-Gauge Core Needle Biopsy of Breast Masses: a validation study of 339 cases. Canadian National Medical Student Research Symposium (CNMSRS). Winnipeg, MB.

Warren, L. J. (2012, November). Techniques for Interventional Sonography and Thermal Ablation (Hands-on Workshop). Radiological Society of North America Annual Meeting. Chicago, IL.

### Christine Wilson

#### Presentations

Wilson, C. (2012, October). Screening Policy and Provincial Breast Health Strategy Update. Screening Mammography Forum 2012. Lecture conducted from Sheraton Vancouver Airport Hotel, Richmond, BC.

Wilson, C. (2012, September). BC Breast Screening Guidelines and the Provincial Clinical Pathway. Vancouver Imaging Review. Lecture conducted from Rosewood Hotel Georgia, Vancouver, BC.

Wilson, C. (2012, June). BC Breast Screening Guidelines and the Provincial Clinical Pathway. Family Practice Oncology Network (FPON). Lecture conducted from Webinar in Vancouver, BC.

Wilson, C. (2012, January). SMPBC – Challenges and Successes and Breast MRI Utilization: A Regional Cancer Centre Perspective; a teaching session on Breast MRI as well as visiting the multidisciplinary Breast Clinic. University of Sydney, Sydney Australia and the New South Wales Breast Screen Program. Lecture conducted from Royal Prince Alfred Health Centre. Sydney, AU.

Wilson, C. (2012, January). SMPBC – Challenges and Successes. Multidisciplinary Breast Rounds and Tumor Board. Lecture conducted from Queen's Health Centre, Honolulu, HI.

#### Publications

Becker, A. K., Gordon, P. B., Harrison, D. A., Hassell P. R., Hayes M. M., Van Niekerk, D., & Wilson, C. M. (2012). Flat Ductal Intraepithelial Neoplasia 1A Diagnosed at Stereotactic Core Needle Biopsy: Is Excisional Biopsy Indicated? *AJR*. 200(3), 682-688.

## Appendix 12 — SMP/BCCA Contact Information

### **Nancy Aldoff**

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### **Janette Sam**

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### **Dr. Christine Wilson**

Medical Director, SMP  
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### **Administration Office**

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Website: [www.smpbc.ca](http://www.smpbc.ca)







**BC Cancer Agency**

CARE + RESEARCH

*An agency of the Provincial Health Services Authority*

## **BC Cancer Agency Centres:**

### **Abbotsford Centre**

32900 Marshall Road

Abbotsford, BC V2S 1K2

604.851.4710 or toll-free 1.877.547.3777

### **Centre for the North**

1215 Lethbridge Street

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

604.930.2098 or toll-free 1.800.523.2885

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

399 Royal Avenue

Kelowna, BC V1Y 5L3

250.712.3900 or toll-free 1.888.563.7773

### **Vancouver Centre**

600 West 10th Avenue

Vancouver, BC V5Z 4E6

604.877.6000 or toll-free 1.800.663.3333

### **Vancouver Island Centre**

2410 Lee Avenue

Victoria, BC V8R 6V5

250.519.5500 or toll-free 1.800.670.3322

### **BC Cancer Agency Research Centre**

675 West 10th Avenue

Vancouver, BC V5Z 1L3

604.675.8000 or toll-free 1.888.675.8001

### **BC Cancer Foundation**

150 - 686 W. Broadway

Vancouver, BC V5Z 1G1

604.877.6040 or toll-free 1.888.906.CURE/2873

