



BC Cancer Agency

CARE + RESEARCH

An agency of the Provincial Health Services Authority

Screening Mammography Program

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Annual Report

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1.0 MESSAGE FROM THE PROVINCIAL CHIEF RADIOLOGIST

In this 21st year of operation for our program, we conducted 286,993 examinations, nearly 8,000 more than in 2007. We detected 1,203 cancers, which is 80 more than in the previous year. Overall, participation for the 50 to 69 year age group is now 50%. It is this group for which 70% participation is the goal by 2017. The Ministry of Health continues to provide operating funds to help to reach this goal.

Professional and Academic Activities

The annual scientific forum was held on the 25th of October, 2008. Again, our registration was the highest ever at 257. The 2008 program focused on breast cancer risk including a BC perspective, risk calculation for high-risk women, digital transition, new technologies including Magnetic Resonance Imaging (MRI), biopsy, Tomosynthesis, and Computed Tomography (CT). Our out-of-town faculty included:

- Robert Smith, PhD. Cancer Epidemiologist and Director of Cancer Screening, The National Office of the American Cancer Society; Adjunct Professor, Epidemiology, The Rollins School of Public Health, Emory University School of Medicine; Adjunct Professor, Hematology/Oncology, The Winship cancer Center, Emory University School of Medicine, Atlanta, GA, USA
- 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
- Tammy Coryell, RTRN. Clinical Applications Specialist and Clinical Educator, Hologic Breast Imaging, Springfield, CO, USA

Dr. Charmaine Kim-Sing, Dr. Paula Gordon, Dr. Christine Wilson, and myself represented the local faculty.

Again, our screening program was well represented in the radiologic literature; three publications were written and 18 lectures were given by our SMP representatives and scientists.

Administrative Activities

Further work has been done on planning for digital transition for the entire screening program. Digital units are now operational at seven screening centres.

The Technical Workforce project group has held discussions with individual SMP centres focused on various recruitment and retention issues, including: compensation, workload distribution, ergonomics and workplace safety, work force demographics, and, professional development and continuing education.

Our administrative team continues to be the “backbone” of our organization. However, our program’s success is ultimately due to the determination and dedication to service of our staff at all of our screening centres, the central office, and of our health care professionals throughout the Province.

Technological change and service expansion will be our challenges in the future; however, we can continue to meet them and transcend them with everyone’s support.

Dr. Linda Warren, Provincial Chief Radiologist

2.0 PROGRAM OVERVIEW

The SMP provides standard two-view bilateral mammography to British Columbian women between ages 40 to 79 without doctor's referral. Women outside of this age group may be referred to the SMP by their family physicians, if they are at high risk.

Women are not eligible for screening if they have had breast cancer, breast implants, or if they currently have breast symptoms requiring a diagnostic investigation.

The Screening Process

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

1. Identify and invite the target population for screening.
2. Conduct screening examination.
3. Investigate abnormality identified on screening.
4. Screening reminder at the appropriate interval.

Screening Promotion

The SMP's promotion materials are now built around the message, "Your Breast Health Has Support". New materials, such as fridge magnets and bookmarks have been developed as give-aways at the health promotion events. An order form for any of the core promotion and education materials is available on the SMP's website (www.smpbc.ca), under "Publications". An internet banner advertisement has been initiated, and the SMP now has a year-long presence on the Internet. The SMP can also be followed on Twitter under "BreastCheck".



The SMP mobile services visited over 120 communities in 2008. Mobile schedules are posted on the SMP website and sent to health professionals and other community services in the areas being visited. To further support the promotion of these visits, advertisements in the local newspapers and, on occasions, the radio may be used. The mobile services relied on the SMP's network of volunteers to assist with community-based promotion and to greet women when they arrived for their appointments.

The SMP promotion has increased its provincial reach through the establishment of a Community Grants Fund that supports local initiatives around screening, and with the BC Cancer Agency's Prevention Coordinators who dedicate part of their time to the community-based promotion of screening. The SMP is also working with local ethnic and First Nations women's groups and leaders to develop customized education/promotion materials that reflect their unique cultures. Currently, the SMP is conducting an evaluation of its marketing activities in the past three years to identify what are working and what are the gaps, and to help guide its social marketing planning for the next three years.

To attain and retain participants, the SMP sends screening invitations to women turning age 50 each year using addresses provided by the Ministry of Health's Client Registry. Recall reminders are sent to women when they are due to return for another screening mammogram.

The SMP is working with UBC Division of Continuing Professional Development (UBC CPD) to conduct a province-wide needs assessment study into the perceptions and practice patterns of BC primary care physicians with regards to five specific cancers: breast, cervical, colorectal, prostate, and hereditary predisposition to cancer. This project has been well supported by the Medical Association of BC, BC College of Family Physicians, the Society of General Practitioners of BC, the UBC Department of Family

Practice, as well as the Family Practice Oncology Network, British Columbia. The survey phase of the needs assessment was very successful with almost 900 physicians in the province providing feedback. The project team will continue with detailed analysis of survey data and focus groups with physicians in order to discuss the survey findings in greater depth. Physician feedback in this initiative will be instrumental in the design of further educational programming, clinical support strategies, promotional materials, and other engagement strategies to improve cancer screening practices and increase patient uptake in recommended cancer screening.

Quality Assurance and Quality Control

Quality 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.

CAR Mammography Accreditation is mandatory for all SMP Centres. The SMP has a team 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.

Digital mammography is gradually being introduced across the province. The SMPBC Physics Support Group has provided leadership and technical support to centers as they transition to a digital setting. SMP has developed, based upon best practices, and implemented a comprehensive, harmonized quality control program specific for digital mammography equipment. SMP has also developed digital mammography specific phantoms for equipment testing and provides ongoing support to centres in their daily quality control practices.

Technologist Professional Development

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 technologist professional development, including:

- Certificate in Breast Imaging scholarship program, in partnership with the Canadian Breast Cancer Foundation.
- SMP Technologist Writing Contest.
- A Technologist Newsletter.
- An educational event at the Annual SMP Forum with continuing medical education (CME) credits.

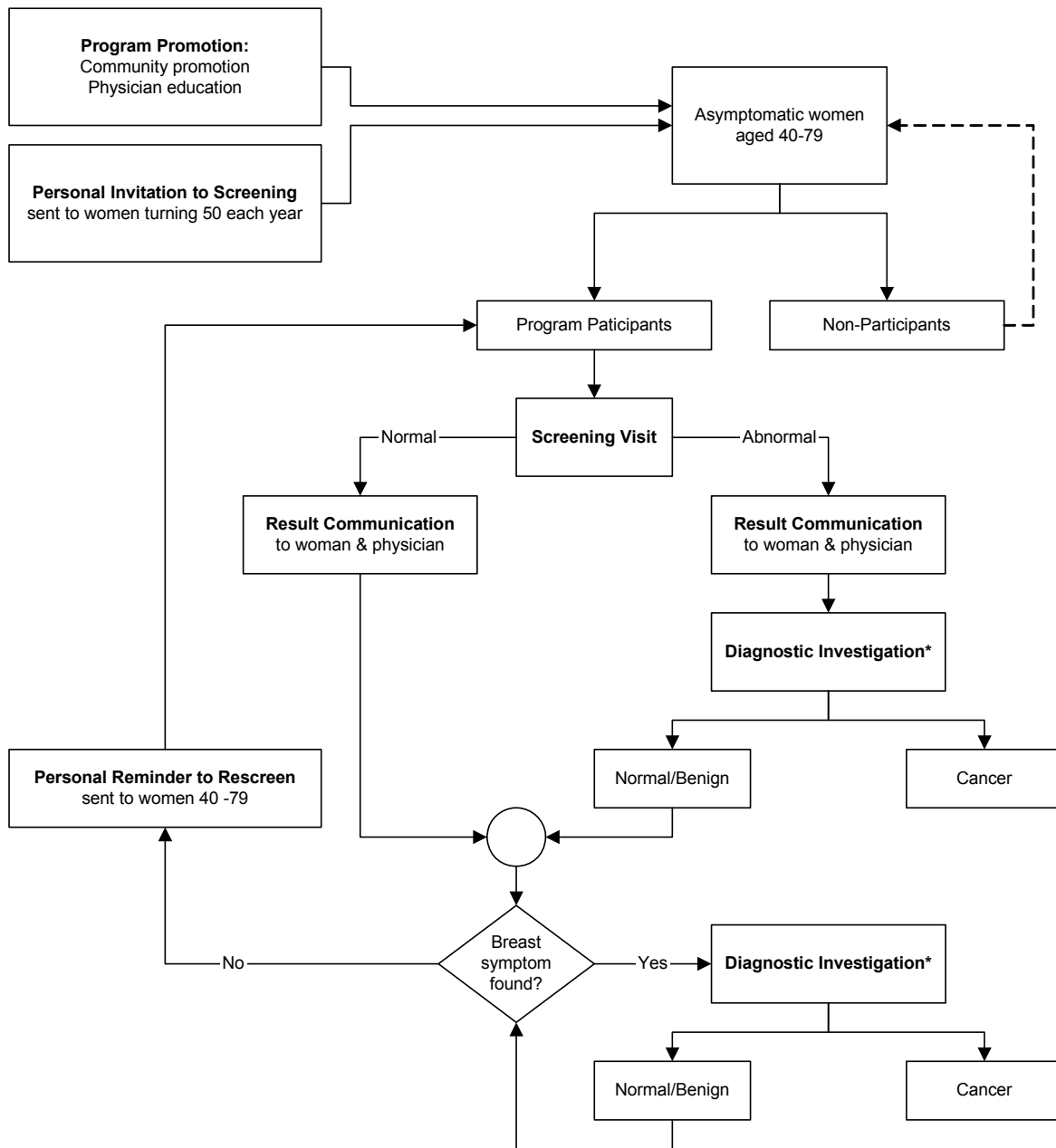
FAST TRACK - Facilitated Referral to Diagnostic Imaging

In 1999, the SMP initiated a voluntary facilitated referral to diagnostic imaging ("Fast Track") for patients with abnormal screening mammograms. Currently, 62% of general practitioners with patients participating in the SMP are enrolled in the Fast Track referral process. Analysis of data from January 2003 to June 2005 showed that the median time between abnormal screening report and the first assessment procedure is 1.5 weeks less for patients on Fast Track referral. General practitioners are encouraged to participate in the Fast Track process.

Evaluation

Data are collected and analyzed on an ongoing basis to monitor the Program's effectiveness and to identify areas for improvement. Results of this analysis are presented in the "PROGRAM RESULTS" section of this report. Age specific breast cancer incidence and mortality rates are tracked in conjunction with the BC Cancer Registry.

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.

3.0 PROGRAM RESULTS

3.1. Recruitment and Re-screening

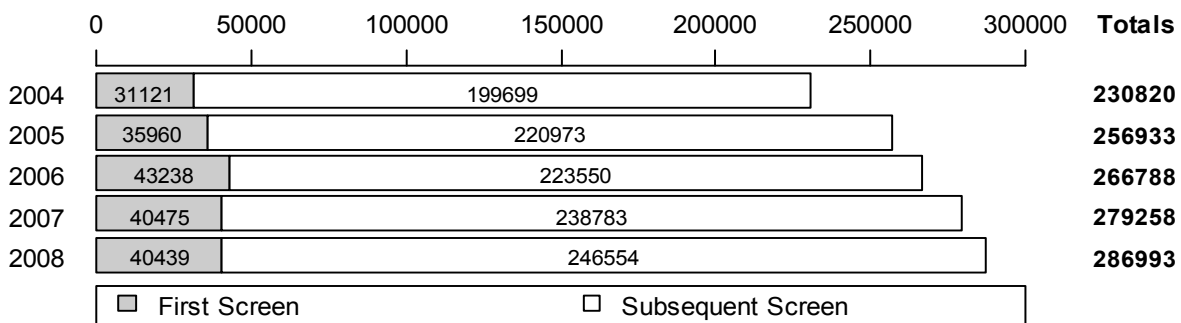
The SMP provided 286,993 examinations to 286,853 women in 2008. During this period, 40,439 (14%) of those examinations were performed for women attending the SMP for the first time, and the remaining 246,554 (86%) of examinations were performed on returning participants.

Figure 1 shows that the number of exams provided by SMP in 2008 increased by 3%, where the number of first time attendees in 2008 decreased by 0.1%, and the number of those women returning for an examination in 2008 increased by 3% over the previous year.

The age distribution of all exams and first exams performed in 2008 by Health Services Delivery Areas (HSDA) are displayed in Table I. In all HSDA's, majority of exams are performed for women ages 50 to 69. Most women in BC had their first examination with SMP before age 50. However, there are regional variations, ranging from 39% to 75% of the new participants.

Age specific participation rates by HSDA are shown in Table II. In the 24-month period of 2007 and 2008, 476,212 women ages 40 and over participated in the SMP. In each and every HSDA, the highest participation rates were seen in the 50 to 59 and 60 to 69 age groups. The overall participation rate for women ages 50 to 69 was 50%. The participation rates for women ages 50 to 69 increased by 5% in the East Kootenay, 3% in the North Shore/Coast Garibaldi, and 3% in the Northwest since the last reporting. These increases are mainly due to the expansion of screening services in these areas. The participation rate in the East Kootenay remains the lowest in the province at 34%, while Richmond has the highest participation rate at 55%.

► **FIGURE 1: SMP Annual Screening Volume (2004-2008)**



NOTE: SMP data extraction date: August 17, 2009.

► **TABLE I: SMP Volume by Health Service Delivery Area (HSDA) (2008)**

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	3,732	27%	61%	12%	1,079	29%	39%	52%	9%
Kootenay Boundary	4,649	27%	59%	13%	677	15%	55%	42%	3%
Okanagan	25,991	29%	56%	15%	2,982	11%	63%	33%	3%
Thompson Cariboo	16,254	31%	58%	12%	1,831	11%	67%	30%	3%
Fraser East	13,839	34%	53%	13%	2,042	15%	67%	30%	3%
Fraser North	36,423	40%	51%	9%	5,402	15%	75%	23%	2%
Fraser South	41,367	38%	53%	9%	6,190	15%	72%	26%	2%
Richmond	14,184	38%	54%	9%	1,867	13%	76%	22%	2%
Vancouver	39,705	39%	51%	10%	5,942	15%	74%	23%	2%
North Shore / Coast Garibaldi	20,964	34%	54%	12%	3,482	17%	60%	34%	6%
South Vancouver Island	26,849	29%	57%	14%	2,999	11%	64%	33%	3%
Central Vancouver Island	18,800	25%	60%	15%	2,109	11%	56%	41%	4%
North Vancouver Island	7,438	30%	59%	11%	948	13%	64%	34%	3%
Northwest	4,067	37%	55%	8%	914	22%	56%	40%	4%
Northern Interior	8,838	35%	56%	9%	1,163	13%	75%	24%	2%
Northeast	2,661	36%	55%	9%	476	18%	67%	31%	2%
Program	286,993	34%	54%	11%	40,439	14%	68%	29%	3%

NOTE: SMP data extraction date: August 17, 2009.

► **TABLE II: Regional Participation Rates by 10-Year Age Groups between 2007 and 2008 Inclusive**

HSDA	10-Year Age Groups					Ages 50-69
	40-49	50-59	60-69	70-79	80-89	
East Kootenay	28%	32%	36%	29%	2%	34%
Kootenay Boundary	32%	39%	45%	37%	2%	42%
Okanagan	42%	51%	57%	46%	3%	53%
Thompson Cariboo Shuswap	41%	51%	55%	43%	2%	52%
Fraser East	36%	44%	50%	41%	2%	46%
Fraser North	43%	49%	51%	38%	2%	50%
Fraser South	42%	48%	50%	39%	2%	49%
Richmond	46%	55%	55%	39%	3%	55%
Vancouver	43%	51%	53%	37%	2%	52%
North Shore/Coast Garibaldi	41%	48%	52%	43%	3%	49%
South Vancouver Island	40%	51%	57%	46%	2%	53%
Central Vancouver Island	36%	49%	56%	44%	3%	52%
North Vancouver Island	36%	46%	52%	42%	1%	48%
Northwest	37%	44%	46%	33%	2%	45%
Northern Interior	40%	50%	51%	40%	2%	50%
Northeast	28%	40%	40%	36%	1%	40%
British Columbia	41%	49%	53%	41%	2%	50%

NOTES:

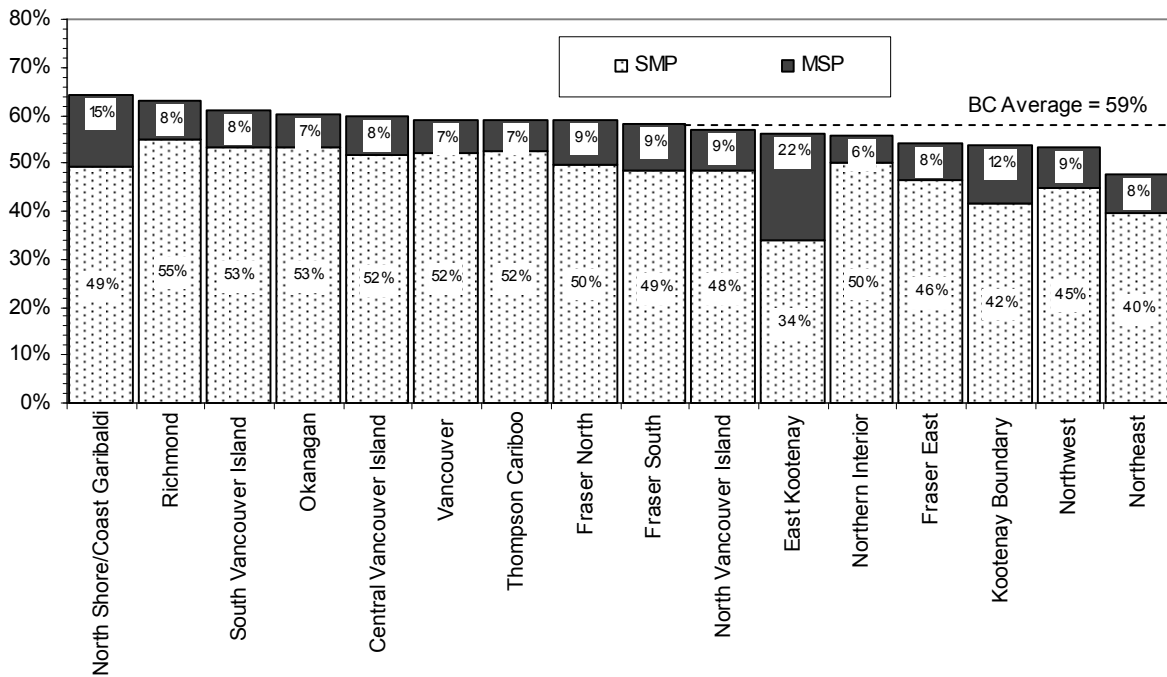
1. Based on the average of 2007 and 2008 female population estimates
2. Population data source: P.E.O.P.L.E. 33 population estimates (Aug 2008), BC STATS, BC Ministry of Labour and Citizens' Services
3. Postal code translation file: TMF0409 (April 2009).
4. Population and postal code data acquired through the Health Data Warehouse, BC Ministry of Health
5. SMP data extraction date: August 17, 2009

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

Figure 2 shows the proportion of women receiving bilateral mammography services through the SMP and MSP over a two-year period. During this two-year period, some women may have had services through both SMP and MSP. The proportions presented here may be slightly higher than the actual figures because of this possible duplication. In HSDA with long established SMP services, the proportion of women using the MSP bilateral mammography has stabilized to 6-9%. The high levels of MSP bilateral mammography utilization in the North Shore/Coast Garibaldi HSDA (15%) and the East Kootenay HSDA (22%) are expected to diminish over time, with the new SMP services established in Sechelt and Cranbrook in 2008.

During the two-year reporting period, 59% of BC women ages 50 to 69 received bilateral mammography services. The percent of women ages 50 to 69 receiving bilateral mammography ranged from 48% to 64% across the province, with Northeast and Northwest having the lowest percentages. Overall, the SMP provided 85% of the bilateral mammography services for this age group.

FIGURE 2: Bilateral Mammography Utilization by Women Ages 50 to 69 in BC between 2007 and 2008 Inclusive



NOTES:

1. MSP data includes only MSP FFS item 8611 on female patients only; all out of province claims are excluded
2. MSP data contains payment data to July 15, 2009 for services provided within years 2007 and 2008.
3. SMP data includes single screen per woman provided in calendar years 2007 and 2008.
4. 2007 and 2008 Estimated Population Data Source: P.E.O.P.L.E. 33, BC Ministry of Health Planning
5. SMP data extraction date: August 17, 2009.

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 based on Statistics Canada's 2006 Census 20% sample-based single response data. The ethnic population size for each HSDA was estimated based on this ethnic population percentage and the P.E.O.P.L.E. 33 population estimates. 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 Simon Fraser, Richmond, and Vancouver HSDAs. The SMP data on ethnic origin was collected at the time of SMP registration, where 28% of 2007-2008 attendees ages 50 to 69 did not specify their ethnicity and were excluded from this analysis.

Participation in SMP by each selected ethnic group is lower than that by the overall population in general. There are regional variations. Participation by First Nations women was lowest in the Northeast (32.5%) and in Central Vancouver Island (33.0%). Participation by East/South-East women was lowest in the Northeast (11.3%) and in the Northwest (29.1%). Participation by South Asian women was lowest in the Fraser South (35.1%) and Fraser East (40.2%).

► **TABLE III: Regional Participation Rates of Women Ages 50 to 69 by Selected Ethnic Groups between 2007 and 2008 Inclusive**

HSDA	First Nations		East/South-East Asians		South Asians	
	Population Percentage	Participation Rate	Population Percentage	Participation Rate	Population Percentage	Participation Rate
11 East Kootenay	0.8%	63.5%	0.9%	48.1%	0.4%	58.8%
12 Kootenay Boundary	0.5%	61.3%	1.0%	46.4%	0.2%	63.7%
13 Okanagan	0.9%	45.6%	1.4%	41.0%	1.1%	41.5%
14 Thompson Cariboo Shuswap	3.7%	39.3%	1.5%	59.4%	1.1%	49.0%
21 Fraser East	1.5%	38.9%	2.2%	56.8%	8.0%	40.2%
22 Fraser North	0.3%	47.6%	22.8%	47.4%	4.9%	41.2%
23 Fraser South	0.3%	70.3%	8.3%	44.7%	14.0%	35.1%
31 Richmond	0.1%	100.0%	45.6%	55.2%	6.5%	49.4%
32 Vancouver	0.8%	43.9%	39.5%	47.1%	4.2%	55.3%
33 North Shore/Coast Garibaldi	1.8%	34.7%	7.0%	46.9%	2.3%	50.3%
41 South Vancouver Island	0.8%	43.8%	4.2%	40.5%	1.2%	53.0%
42 Central Vancouver Island	2.1%	33.0%	1.6%	46.4%	1.5%	42.0%
43 North Vancouver Island	2.3%	43.2%	1.2%	44.9%	0.1%	100.0%
51 Northwest	17.3%	37.0%	2.5%	29.1%	2.2%	40.6%
52 Northern Interior	4.1%	42.1%	1.4%	37.1%	1.6%	58.6%
53 Northeast	5.1%	32.5%	1.4%	11.3%	0.4%	63.5%
British Columbia	1.5%	40.7%	12.4%	47.9%	4.5%	42.0%

PARTICIPATION RATE:

1. Population data sources: P.E.O.P.L.E. 33 population estimates (Aug 2008), BC STATS, BC Ministry of Labour and Citizens' Services and 2006 Census, Statistics Canada (original data source).
2. Postal code translation file: TMF0409 (April 2009).
3. Women attended the SMP at least once in 2007-2008 inclusive
4. East/South-East Asians include Chinese, Japanese, Korean, Filipino, Burmese, Cambodian, Laotian, Thai, Vietnamese, Indonesian, Malay, and other Asians.
5. South Asians include Bangladeshi, Bengali, East Indian, Gujarati, Pakistani, Punjabi, Sinhalese, Sri Lankan, Tamil.
6. SMP data extraction date: August 17, 2009.

POPULATION PERCENTAGE:

1. Original data source - 2006 Census, Statistics Canada
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.

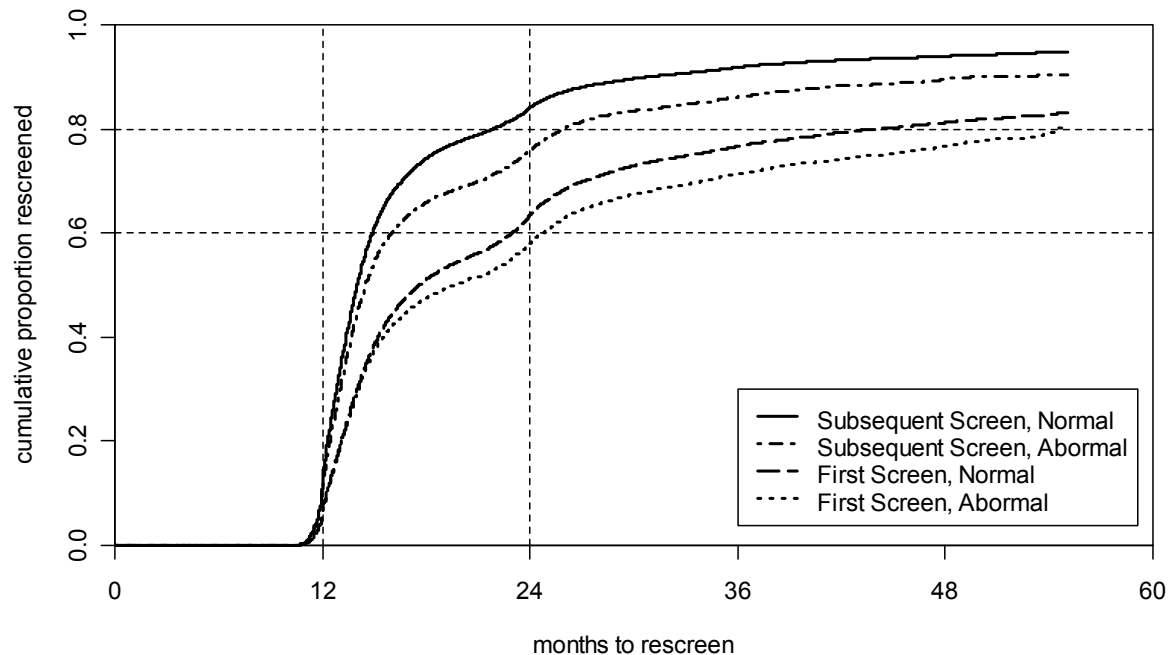
The effectiveness of regular screening mammography is universally recognized for women ages 50 to 69. The BCCA Breast Tumour Group recommends screening at least every two years for women ages 40 to 79. However, research evidence indicates that the sojourn time (i.e. the duration that the disease remains in the pre-clinical, screen-detectable phase) is shorter for women ages 40 to 49 than for older women. Consequently, the SMP reminds women ages 40 to 49 to return annually.

The SMP sends recall reminders to women in accordance with the interval recommendation. A second letter is sent if there is no appointment scheduled within four to six weeks after the first letter. This two-letter reminder system is repeated again for another year if there is no response.

Figure 3 and Figure 4 show the return rates by initial / subsequent re-screen and screen result for women ages 40 to 49 and 50 to 69 respectively, between 2005 and 2007 inclusive, as of August 7, 2009. Women who had breast cancer or implants, or who died after the screen examination, were not included in the calculation.

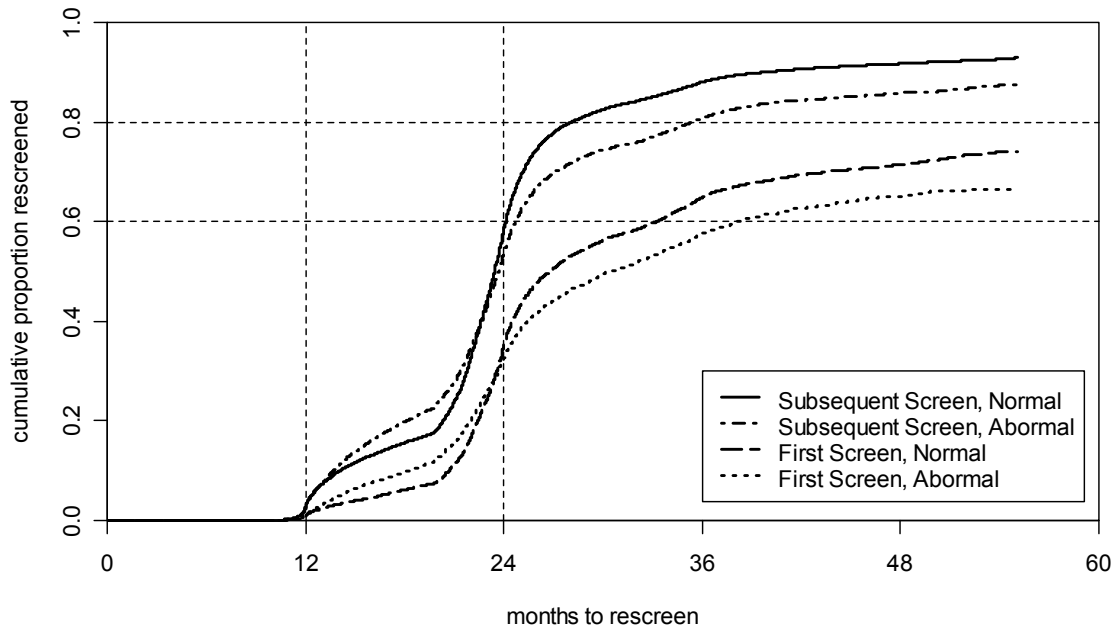
In general, women in both age groups who had a subsequent screen are observed to have a higher return (compliance) rate than those who had an initial screen. Women ages 40 to 49 who had normal screen results are more likely to return for screening than those who had abnormal screen results. However, women ages 50 to 69 who had abnormal screens are more likely to return within 24 months, and less likely to return after 24 months for screening, than those who had normal screens.

► **FIGURE 3: Return Rates for Women Ages 40 to 49 by First/Subsequent Screens (2005-2007)**



NOTE: SMP data extraction date August 17, 2009.

► **FIGURE 4: Return Rates for Women Ages 50 to 69 by First/Subsequent Screens (2005-2007)**



NOTE: SMP data extraction date August 17, 2009.

Table IV summarizes the compliance rate by first and subsequent rescreens and screen result for women ages 50 to 69 screened between 2005 and 2007. The compliance rate for subsequent screens is higher than first screens at all times. In the long run, the compliance rate for women who had normal screen results is higher than for those who had abnormal results.

► **TABLE IV: Cumulative Numbers and Return Rate for Women Ages 50 to 69 (2005-2007)**

	First Screen				Subsequent Screen			
	Normal		Abnormal		Normal		Abnormal	
Total Number to be Re-screened	29175		5206		367,358		20,153	
Returned by								
18 months	1780	6%	499	10%	57,089	16%	3,996	20%
24 months	7689	35%	1088	32%	145,183	59%	6,326	54%
30 months	4913	56%	695	49%	72,831	83%	3,400	74%
36 months	1505	65%	255	57%	12,275	88%	787	81%

NOTE: SMP data extraction date August 17, 2009.

3.2. 2008 Screening Results

Table V summarizes the outcome indicators for screening exams provided in the calendar year 2008 by 10-year age groups. Of the 286,993 screening mammograms performed, 21,191 (7.4%) had an abnormal result and 1,203 breast cancers were reported as of August 17, 2009 (4.2 per 1,000 exams), including 308 in-situ cancers. For every age group, the abnormal call rate is lower on subsequent screens than on first screens. The overall abnormal call rate decreased with ages between 40 to 49 and 70 to 79, from 9.2% to 5.8%. Overall cancer detection rates, DCIS detection rates, positive predictive value, core biopsy yield ratio, and open biopsy yield ratio increase with age in general.

► **TABLE V: SMP Outcome Indicators by 10-Year Age Group (2008)**

Outcome Indicators	Age at Exam						All
	<40	40-49	50-59	60-69	70-79	80+	
Number of Exams	332 0.1%	98,176 34.2%	91,769 32.0%	64,608 22.5%	30,784 10.7%	1,324 0.5%	286,993
Number of First Screens with complete follow-up	298 0.7%	27,021 67.0%	8,438 20.9%	3,395 8.4%	1,111 2.8%	80 0.2%	40,343
Number of Cancers	1 0.1%	199 16.5%	337 28.0%	373 31.0%	282 23.4%	11 0.9%	1,203
Abnormal Call Rate	12.3%	9.2%	7.0%	6.0%	5.8%	4.9%	7.4%
▪ on first screens	13.0%	15.1%	16.6%	15.1%	13.2%	7.5%	15.3%
▪ on subsequent screens	6.1%	6.9%	6.0%	5.5%	5.5%	4.7%	6.1%
Overall Cancer Detection Rate (per 1,000)	3.0	2.0	3.7	5.8	9.2	8.3	4.2
▪ on first screens	3.4	3.3	6.5	12.1	15.3	25.0	5.1
▪ on subsequent screens	---	1.5	3.4	5.4	8.9	7.2	4.0
DCIS Detection Rate (per 1,000)	---	0.7	1.0	1.6	1.5	0.8	1.1
▪ on first screens	---	1.4	1.7	2.7	0.9	---	1.5
▪ on subsequent screens	---	0.4	0.9	1.5	1.5	0.8	1.0
Positive Predictive Value of Screening Mammography	2.5%	2.2%	5.3%	9.7%	16.1%	17.2%	5.7%
▪ on first screens	2.6%	2.2%	4.0%	8.2%	12.1%	33.3%	3.4%
▪ on subsequent screens	---	2.2%	5.7%	9.9%	16.5%	15.5%	6.7%
Core Biopsy Yield Ratio	---	18.3%	34.9%	54.0%	67.5%	77.8%	38.2%
▪ on first screens	---	14.5%	22.2%	46.3%	47.8%	100.0%	20.8%
▪ on subsequent screens	---	23.1%	39.4%	55.2%	69.1%	75.0%	45.9%
Open Biopsy Yield Ratio	25.0%	20.6%	27.4%	44.7%	55.6%	80.0%	32.8%
▪ on first screens	25.0%	20.9%	18.1%	34.4%	62.5%	100.0%	22.6%
▪ on subsequent screens	---	20.3%	30.9%	46.1%	55.2%	75.0%	36.7%

NOTES:

1. See glossary in the Appendix for definitions of terms.
2. Overall Cancer Rate includes ductal carcinoma in situ (DCIS)
3. An additional 240 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. Out of 20951 "abnormal" screens with complete follow-up, there were 14 lobular carcinoma in-situ cases. The final number of cancers is still to be determined.
5. SMP data extraction data: August 17, 2009.

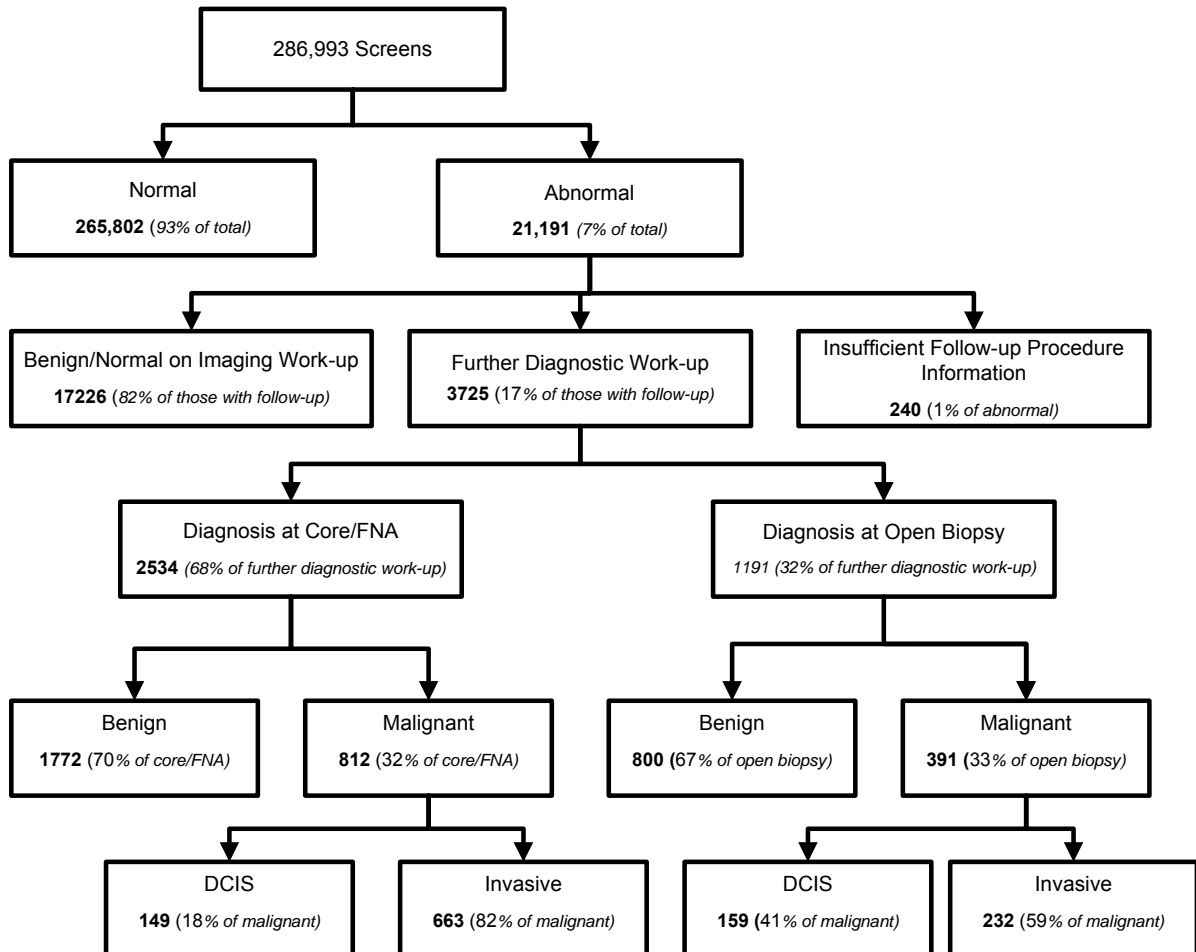
Diagnostic procedure information is available to date on 20,951 (99%) of the screening mammograms with abnormal findings. *Table VI* shows the proportion of women receiving specific diagnostic procedures as part of the work-up on their screen-detected abnormalities. Overall, 11% and 5% of women with abnormal screening mammograms and complete follow-up had core biopsy and/or open biopsy, respectively.

► **TABLE VI: Diagnostic Procedures Received by SMP Participants with “Abnormal” Screening Mammograms (2008)**

Procedure	Age at Exam						All
	<40	40-49	50-59	60-69	70-79	80+	
Diagnostic Mammogram	88%	88%	91%	92%	92%	95%	90%
Ultrasound	73%	66%	64%	63%	64%	61%	65%
Fine Needle Aspiration	0%	5%	4%	4%	4%	8%	4%
Core Biopsy	5%	8%	11%	13%	17%	14%	11%
Surgical Biopsy	10%	4%	6%	7%	8%	5%	5%
▪ with Localization	5%	4%	6%	6%	7%	5%	5%
Number of cases with diagnostic assessment information available	40	8,921	6,339	3,837	1,750	64	20,951

NOTE: SMP data extraction date August 17, 2009.

► **FIGURE 5: Screening Outcome Summary 2008**



3.3. 2007 Cancer Detection

Histologic features of breast cancers detected by the SMP in 2007 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 from the original diagnostic reports. Invasive tumour size was determined from the best available source: (1) pathological, (2) radiological, or (3) clinical.

Overall, 23% of cancers detected were in situ. Of the invasive cancers detected, 64% were ≤ 15 mm, 74% have not had invasion of the regional lymph nodes, and 25% were grade 3 (i.e. poorly differentiated) tumours. Of the grade 3 tumours, 49% were smaller than 15 mm. These overall outcome indicators met the international targets¹ recommended for screening programs.

► **TABLE VII: Histologic Features of Breast Cancers Detected by SMP (2007)**

Histological Features	Age at Exam					Age 40+
	40-49	50-59	60-69	70-79	80+	
Number of Cancers	194	369	339	235	25	1,162
▪ in situ	83 43%	82 22%	61 18%	43 18%	4 16%	273 23%
▪ invasive	111 57%	287 78%	278 82%	192 82%	21 84%	889 77%
Invasive Tumour Size						
▪ ≤ 5 mm	13 12%	30 11%	25 9%	17 9%	2 10%	87 10%
▪ 6-10 mm	24 22%	75 27%	68 25%	65 34%	8 38%	240 27%
▪ 11-15 mm	35 32%	83 29%	72 26%	44 23%	3 14%	237 27%
▪ 16-20 mm	10 9%	44 16%	46 17%	25 13%	3 14%	128 15%
▪ >20 mm	26 24%	50 18%	63 23%	39 21%	5 24%	183 21%
▪ unknown size	(3)	(5)	(4)	(2)	(0)	(14)
Invasive with tumour ≤ 15 mm	72 67%	188 67%	165 60%	126 66%	13 62%	564 64%
Node Involvement in Invasive						
▪ no	77 73%	198 71%	196 75%	132 76%	14 82%	617 74%
▪ yes	28 27%	79 29%	64 25%	42 24%	3 18%	216 26%
▪ no nodes sampled / unknown	(6)	(10)	(18)	(18)	(4)	(56)
Histologic Grade of Invasive						
▪ 1 - <i>well differentiated</i>	23 21%	100 35%	84 31%	62 33%	6 30%	275 32%
▪ 2 - <i>moderately differentiated</i>	52 48%	117 41%	109 41%	86 46%	7 35%	371 43%
▪ 3 - <i>poorly differentiated</i>	33 31%	66 23%	75 28%	38 20%	7 35%	219 25%
▪ unknown grade	(3)	(4)	(10)	(6)	(1)	(24)
Grade 3 tumour ≤ 15 mm	16 48%	33 50%	35 47%	20 53%	3 43%	107 49%

NOTES:

- Targets1: $>50\%$ invasive tumours ≤ 15 mm, $>70\%$ with negative nodes, $>30\%$ grade 3 tumours ≤ 15 mm.
- SMP data extraction date: August 17, 2009.

REFERENCE:

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

3.4. Outcome Indicators by Calendar Year: 2004-2008

The overall abnormal call rate in 2008 of 7.4% is slightly higher than the previous year (7.0%) and the five-year cumulative rate (7.2%). The overall cancer detection rate and DCIS detection rate for 2008, as well as the corresponding rate for first screens, are slightly higher than the respective five-year cumulative rate. The core biopsy yield ratio and the open biopsy yield ratio in 2008 are lower than the five-year cumulative rate.

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 for each year. 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 all interval cancers in the 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 69¹, and had recommended the target of >3.0 for organized screening programs². The annual prevalence to expected incidence ratios for ages 50 to 79 has consistently been above 3.0 from 1995 onwards.

REFERENCES:

1. Tabar L, Fagerberg G, Duffy, SW, Day NE, Gad A, Grontoft O. Update of The Swedish Two-Country Program of Mammographic Screening for Breast Cancer. *Radiol Clin North Am* 1992;30:187-209
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 VIII: SMP Outcome Indicators by Calendar Year
between 2004 and 2008 Inclusive**

Outcome Indicators	Calendar Year					5-Year Cumulative
	2004	2005	2006	2007	2008	
Number of Exams	230,820	256,933	266,788	279,258	286,993	1,320,792
% first screens	13.5%	14.0%	16.2%	14.5%	14.1%	14.5%
Number of Cancers	925	1,113	1,068	1,162	1,203	5,471
% on first screens	16.2%	13.4%	19.5%	17.4%	17.1%	16.7%
Abnormal Call Rate	7.1%	7.2%	7.4%	7.0%	7.4%	7.2%
▪ on first screens	14.7%	15.1%	14.9%	14.7%	15.3%	15.0%
▪ on subsequent screens	5.9%	5.9%	5.9%	5.7%	6.1%	5.9%
Overall Cancer Detection Rate (per 1,000)	4.0	4.3	4.0	4.2	4.2	4.1
▪ on first screens	4.9	4.2	4.8	5.0	5.1	4.8
▪ on subsequent screens	3.9	4.4	3.9	4.0	4.0	4.0
DCIS Detection Rate (per 1,000)	1.0	1.0	0.9	1.0	1.1	1.0
▪ on first screens	1.4	0.8	1.3	1.4	1.5	1.3
▪ on subsequent screens	1.0	1.1	0.9	0.9	1.0	1.0
Positive Predictive Value of Screening Mammography	5.8%	6.2%	5.6%	5.9%	5.7%	5.9%
▪ on first screens	3.5%	2.9%	3.4%	3.4%	3.4%	3.3%
▪ on subsequent screens	6.7%	7.5%	6.6%	7.0%	6.7%	6.9%
Core Biopsy Yield Ratio	39.8%	42.2%	35.7%	38.3%	38.2%	38.6%
▪ on first screens	22.2%	18.7%	20.7%	20.8%	20.8%	20.6%
▪ on subsequent screens	47.0%	52.9%	44.2%	46.9%	45.9%	47.1%
Open Biopsy Yield Ratio	35.2%	37.8%	35.3%	32.8%	32.8%	34.9%
▪ on first screens	23.4%	18.8%	22.7%	19.0%	22.6%	21.2%
▪ on subsequent screens	38.7%	44.1%	40.0%	38.0%	36.7%	39.6%
Interval Cancer Rate (per 1,000)						
▪ 0-12 months	0.59	0.64	0.53	0.50	---	---
after first screens	0.32	0.70	0.42	0.40	---	---
after subsequent screens	0.63	0.63	0.55	0.52	---	---
▪ 13-24 months	0.77	0.66	0.62	---	---	---
Sensitivity (i.e. 1 - false negative rate)	87.3%	87.1%	88.4%	---	---	---
Specificity (i.e. 1 - false positive rate)	93.5%	93.4%	93.2%	93.4%	---	---
Prevalence to Expected Incidence Ratio for Age 50-79 (target1: >3.0)	4.00	3.60	4.00	4.20	4.40	4.00

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 2008 is still to be determined.
4. Number of cancers and related rates do not include data for women whose follow-up is incomplete.
5. SMP data extraction date: August 17, 2009.

REFERENCE:

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

3.5. Outcome Indicators by Age: 2004-2008 Cumulative

In the five-year period from 2004 to 2008, the SMP provided 1,320,792 screening mammography examinations to 573,325 women. Outcome indicators for this five-year period are summarized by 10-year age groups in *Table IX*. Breast cancer risk increases with age; thus, there is increasing cancer detection by age. Nevertheless, the abnormal call rate is higher in the younger age groups. Overall, positive predictive value of screening mammography, core biopsy yield ratio, and open biopsy yield ratio sensitivity and specificity improve with increasing age of the participants.

► **TABLE IX: SMP Outcome Indicators by 10-Year Age Groups between 2004 and 2008 Inclusive**

Outcome Indicators	Age at Exam					All
	40-49	50-59	60-69	70-79	80+	
Number of Exams	453,075	424,881	281,837	153,033	6,494	1,320,792
% first screens	28.4%	9.5%	5.4%	3.3%	7.4%	14.5%
Number of Cancers	929	1,629	1,668	1,171	72	5,471
% on first screens	42.0%	15.8%	10.7%	7.0%	8.3%	16.7%
Abnormal Call Rate	9.0%	7.0%	5.9%	5.4%	5.9%	7.2%
▪ on first screens	14.6%	16.3%	14.9%	13.4%	14.4%	15.0%
▪ on subsequent screens	6.7%	6.0%	5.3%	5.1%	5.3%	5.9%
Overall Cancer Detection Rate (per 1,000)	2.1	3.8	5.9	7.7	11.1	4.1
▪ on first screens	3.0	6.4	11.8	16.3	12.6	4.8
▪ on subsequent screens	1.7	3.6	5.6	7.4	11.0	4.0
DCIS Detection Rate (per 1,000)	0.7	1.0	1.3	1.3	1.1	1.0
▪ on first screens	1.2	1.4	2.2	1.8	2.1	1.3
▪ on subsequent screens	0.5	1.0	1.3	1.3	1.0	1.0
Positive Predictive Value of Screening Mammography	2.3%	5.6%	10.3%	14.6%	19.4%	5.9%
▪ on first screens	2.1%	4.1%	8.2%	12.7%	9.1%	3.3%
▪ on subsequent screens	2.5%	6.1%	10.7%	14.8%	21.6%	6.9%
Core Biopsy Yield Ratio	19.1%	38.0%	54.9%	65.7%	78.3%	38.6%
▪ on first screens	14.0%	24.2%	43.2%	50.0%	57.1%	20.6%
▪ on subsequent screens	25.8%	42.9%	56.8%	67.2%	81.1%	47.1%
Open Biopsy Yield Ratio	20.0%	32.0%	45.2%	56.2%	60.9%	34.9%
▪ on first screens	16.7%	20.6%	39.0%	48.4%	28.6%	21.2%
▪ on subsequent screens	23.3%	35.2%	46.1%	56.8%	66.7%	39.6%
Interval Cancer Rate (per 1,000)						
▪ 0-12 months	0.52	0.46	0.53	0.54	1.23	0.51
after first screens	0.42	0.50	0.39	0.20	<0.01	0.43
after subsequent screens	0.56	0.45	0.53	0.55	1.33	0.52
▪ 13-24 months	<0.01	0.68	0.77	0.81	1.54	0.49
Sensitivity (i.e. 1 - false negative rate)	79.7%	89.4%	91.9%	93.4%	90.0%	89.1%
Specificity (i.e. 1 - false positive rate)	91.4%	93.5%	94.8%	95.5%	95.3%	93.3%

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 2008 is still to be determined.
4. Number of cancers and related rates do not include data for women whose follow-up is incomplete.
5. The "All" column includes women less than 40-years-of-age.
6. SMP data extraction date: August 17, 2009.

3.6. Outcome Indicators by HSDA: 2004-2008 Cumulative

Outcome indicators for 2004 to 2008 are summarized by HSDA in Table X. The Interior and Vancouver Island HSDAs have the lowest abnormal call rate (5%), while Fraser East has the highest (10%). South Vancouver Island has the lowest cancer detection rate (3.3 per 1,000), while Central Vancouver Island has the highest (4.7 per 1,000). Fraser East has the lowest positive predictive value (4%), and Central Vancouver Island and Kootenay Boundary have the highest (9%).

► **Table X: SMP Outcome Indicators by Health Service Delivery Area (HSDA) between 2004 and 2008 Inclusive**

HSDA	% Called Abnormal	Cancer Detection Rate (per 1000)	PPV	In-Situ : Invasive (number)	% Invasive ≤15 mm	% Invasive with -ve nodes
East Kootenay	5%	3.8	7%	6 : 56	46%	71%
Kootenay Boundary	5%	4.2	9%	26 : 68	65%	68%
Okanagan	5%	4.2	8%	119 : 398	65%	75%
Thompson Cariboo	5%	4.3	8%	69 : 261	61%	71%
Fraser East	10%	4.6	4%	68 : 253	57%	70%
Fraser North	8%	4.1	5%	194 : 498	65%	68%
Fraser South	9%	4.4	5%	216 : 596	60%	70%
Richmond	8%	3.7	5%	76 : 171	64%	67%
Vancouver	8%	4.1	5%	215 : 514	67%	68%
North Shore / Coast Garibaldi	6%	4.4	7%	102 : 272	66%	69%
South Vancouver Island	5%	3.3	7%	67 : 349	60%	66%
Central Vancouver Island	5%	4.7	9%	76 : 342	70%	72%
North Vancouver Island	5%	3.7	8%	24 : 115	71%	79%
Northwest	6%	4.0	6%	17 : 49	59%	53%
Northern Interior	7%	4.5	6%	47 : 137	62%	68%
Northeast	7%	3.6	5%	6 : 36	56%	53%
Program	7%	4.1	6%	1330 : 4141	63%	70%

NOTES:

1. See glossary in the Appendix for definitions of terms.
2. Targets¹: >50% invasive tumours ≤15mm, >70% with negative nodes
3. SMP data extraction date: August 17, 2009.

REFERENCE:

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

3.7. Cancer Characteristics by Age (Year: Cumulative up to and including 2007)

From the start of the program in July 1988 to December 2007, 13,002 women have been found to have breast cancer through screening-initiated work-up. Histologic features of breast cancers detected by the SMP cumulative to, and including, 2007 are summarized by 10-year age groups in *Table XI*. The data for women younger than 40 are included in the totals but not listed in a separate column. Internationally recommended targets have been achieved. However, invasive cancers found in women ages 40 to 49 tend to be larger, and more likely to involve nodes than cancers found in the older women.

► **TABLE XI: Histologic Features of Breast Cancers Detected by SMP Cumulative Up To and Including 2007**

Histological Features	Age at Exam										All	
	40-49		50-59		60-69		70-79		80+			
Number of Cancers	2,191		3,740		3,928		2,903		232		13,002	
▪ in situ	702	32%	973	26%	820	21%	521	18%	24	10%	3,043	23%
▪ invasive	1,489	68%	2,767	74%	3,108	79%	2,382	82%	208	90%	9,959	77%
Invasive Tumour Size												
▪ ≤5 mm	152	10%	263	10%	268	9%	172	7%	21	10%	876	9%
▪ 6-10 mm	299	20%	664	24%	846	27%	750	32%	58	28%	2,618	27%
▪ 11-15 mm	417	28%	780	29%	972	32%	707	30%	57	28%	2,934	30%
▪ 16-20 mm	213	15%	467	17%	449	15%	354	15%	38	18%	1,523	15%
▪ >20 mm	385	26%	556	20%	549	18%	376	16%	33	16%	1,900	19%
▪ unknown size	(23)		(37)		(24)		(23)		(1)		(108)	
Invasive with tumour ≤ 15 mm	868	59%	1,707	63%	2,086	68%	1,629	69%	136	66%	6,428	65%
Node Involvement in Invasive												
▪ no	950	70%	1,882	74%	2,204	77%	1,646	81%	109	80%	6,796	76%
▪ yes	406	30%	668	26%	640	23%	387	19%	28	20%	2,129	24%
▪ no nodes sampled / unknown	(133)		(217)		(264)		(349)		(71)		(1034)	
Histologic Grade of Invasive												
▪ 1 - well differentiated	376	28%	853	34%	949	34%	817	39%	71	39%	3,066	34%
▪ 2 - moderately differentiated	589	44%	1,011	41%	1,231	44%	936	44%	78	42%	3,847	43%
▪ 3 - poorly differentiated	388	29%	615	25%	627	22%	358	17%	35	19%	2,025	23%
▪ unknown grade	(136)		(288)		(301)		(271)		(24)		(1021)	
Grade 3 tumour ≤ 15 mm	168	43%	291	47%	347	55%	181	51%	16	46%	1,003	50%

NOTES:

1. Targets¹: >50% invasive tumours ≤15mm, >70% with negative nodes, >30% grade 3 tumours ≤15mm.
2. The 'All' column includes women less than 40 years of age.
3. SMP data extraction date: August 17, 2009.

REFERENCE:

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

3.8. 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.

The Canadian Breast Cancer Screening Database (CBCSD) was first established in 1993. All provincial and territorial programs in Canada are now contributing 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 PHAC.

In this section, the SMP performance measures are presented against the targets set for Canadian breast cancer screening programs¹. 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.

REFERENCE:

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

► **TABLE XII: Comparison of SMP Performance with Canadian Breast Screening Standards for Ages 50 to 69**

Performance Measure	National Target ¹	SMP
Participation Rate (1)	≥70% of the eligible population	50% (plus 9% MSP)
Retention Rate (2)		
▪ Initial Rescreen	≥75% initial re-screen within 30 months	55%
▪ Subsequent Rescreen	≥90% initial re-screen within 30 months	82%
Abnormal Call Rate (3)		
▪ First Screens	<10% first screens	16.2%
▪ Subsequent Screens	<5% re-screens	5.8%
Invasive Cancer Detection Rate (per 1000) (3)		
▪ First Screens	>5 per 1,000 first screens	6.2 per 1000
▪ Subsequent Screens	>3 per 1,000 re-screens	3.1 per 1000
In Situ Cancer Detection Rate (3)		
▪ First Screens	Surveillance and Monitoring only	1.9 per 1000
▪ Subsequent Screens	Surveillance and Monitoring only	1.2 per 1000
Positive Predictive Value (3)		
▪ First Screens	≥5% first screen	5.1%
▪ Subsequent Screens	≥6% re-screens	7.4%
Benign Core Biopsy Rate (per 1000) (3)		
▪ First Screens	Surveillance and Monitoring only	14.6 per 1000
▪ Subsequent Screens	Surveillance and Monitoring only	3.4 per 1000
Benign to Malignant Core Biopsy Ratio (3)		
▪ First Screens	Surveillance and Monitoring only	2.5 : 1
▪ Subsequent Screens	Surveillance and Monitoring only	1.1 : 1
Benign Open Biopsy Rate (per 1000) (3)		
▪ First Screens	Surveillance and Monitoring only	9.0 per 1000
▪ Subsequent Screens	Surveillance and Monitoring only	2.2 per 1000
Benign to Malignant Open Biopsy Ratio (3)		
▪ First Screens	≤1:1	3.6 : 1
▪ Subsequent Screens	≤1:1	1.7 : 1
Invasive Tumour size ≤10 mm (4)	>25%	36%
Invasive Tumour size ≤15 mm (4)	>50%	63%
Node Negative Rate in Cases of Invasive Cancer (4)	>70%	73%

NOTES:

1. Screen years: (1) = 2007 & 2008, (2) = 2005-2007, (3) = 2008, (4) = 2007
2. Population data source: P.E.O.P.L.E. 33 population estimates (Aug 2008), BC STATS, BC Ministry of Labour and Citizens' Services
3. SMP data extraction date: August 17, 2009.

REFERENCE:

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

3.9. Cost Analysis

The SMP 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 XIII*.

Financial reports for PHSA and BCCA are available at the PHSA website:

www.phsa.ca/howeare/budget+accountability

► **TABLE XIII: Cost Comparison by Fiscal Year**

Indicator	2004-2005	2005-2006	2006-2007	2007-2008	2008-2009
Total Cost	\$13,401,773	\$15,759,715	\$16,732,061	\$18,219,310	\$20,311,839
Total cost per screen	\$57.11	\$60.08	\$62.18	\$65.54	\$69.79
▪ Central Services	\$8.16	\$8.24	\$8.74	\$10.46	\$13.88
▪ Other operating costs	\$33.75	\$36.67	\$37.99	\$39.38	\$39.84
▪ Professional Reading Fees	\$13.39	\$13.39	\$13.39	\$13.80	\$14.08
▪ Capital Allocation	\$1.81	\$1.78	\$2.06	\$1.91	\$1.99
Cost per cancer detected	\$14,031.44	\$14,268.65	\$15,010.54	\$15,526.09	Not Available

NOTES:

1. Number of cancers detected in 2008-09 is not available yet, and thus the cost per cancer detected is not computed.
2. Program expenses are audited through PHSA finance annually.
3. Other operating 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 14.08 effective April 1, 2008.
6. Cost per cancer detected is based upon screens with consent and complete follow-up.
7. The cost per screen is exclusive of salary and benefit increases to public screening centres which, commencing in fiscal 2006, have gone directly to the Health Authority.
8. SMP data extraction date: August 17, 2009.

APPENDIX 1:

General Cancer Screening Program Overview

Definition of Screening

Screening is a prevention strategy. Primary cancer prevention strategy involves changes of behavior 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 process¹. A secondary prevention can reduce cancer morbidity and mortality by: diagnosing invasive disease at an earlier, more favorable prognostic stage; and, detecting precursor lesions associated with some cancers that once eliminated, prevent progression to invasive disease. Screening is “*the application of various tests to apparently healthy individuals to sort out those who probably have risk factors or are in the early stages of specified conditions.*”²

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.^{3,4,5}

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).

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, and screening tests fail to identify some individuals who do not have the disease.

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.

¹ US Preventive Services Task Force: Guide to Clinical Preventive Services, Ed 2. Baltimore, Williams & Wilkins, 1996

² Morrison A: Screening in Chronic Disease. New York, Oxford Press, 1992

³ Cole P, Morrison AS: Basic issues in cancer screening. In Miller AB (ed); Screening in Cancer. Geneva, International Union Against Cancer, 1978, p7

⁴ Miller AB; Fundamentals of Screening. In Screening for Cancer. Orlando, Academic Press, 1985, p3

⁵ Wilson JMG, Junger G; Principles and Practice of Screening for Disease. Geneva, World Health Organization, 196

APPENDIX 2: SMP Screening Recommendations

The SMP offers screening mammography to eligible women ages 40 to 79 without doctor referral.

Age	Doctor Referral	Recall Frequency
<40	Yes	Will accept with primary health care provider referral
40-49	No	Reminders* for 12-month and 24-month anniversary
50-79	No	Reminders* for 24-month and 36-month anniversary to age 79
80+	Yes	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.

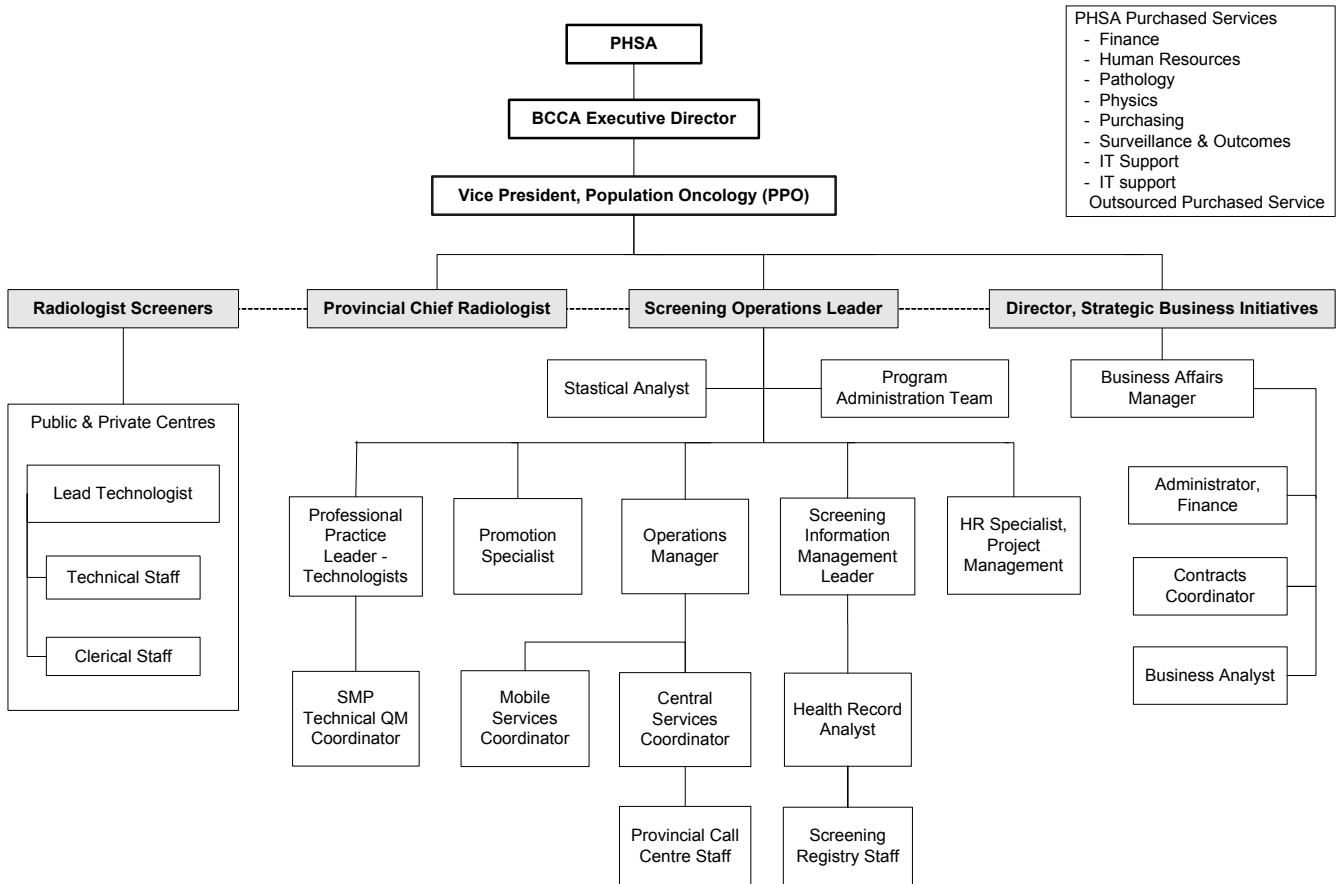
Ages <40 – physician referral required

Primary health care providers may wish to refer women ages <40 with a strong family history of breast cancer (ie. two or more first degree family members), for screening at the SMP. These women may also benefit from discussion of breast cancer risks including genetic counseling and testing. Screening mammography is only one component of care for these higher risk families. The SMP asks that each screening exam for women ages <40 be arranged by primary health care providers after consultation with a radiologist at the SMP centre of choice. The primary health care provider should provide the woman with a referral slip citing the approving radiologist screener's name.

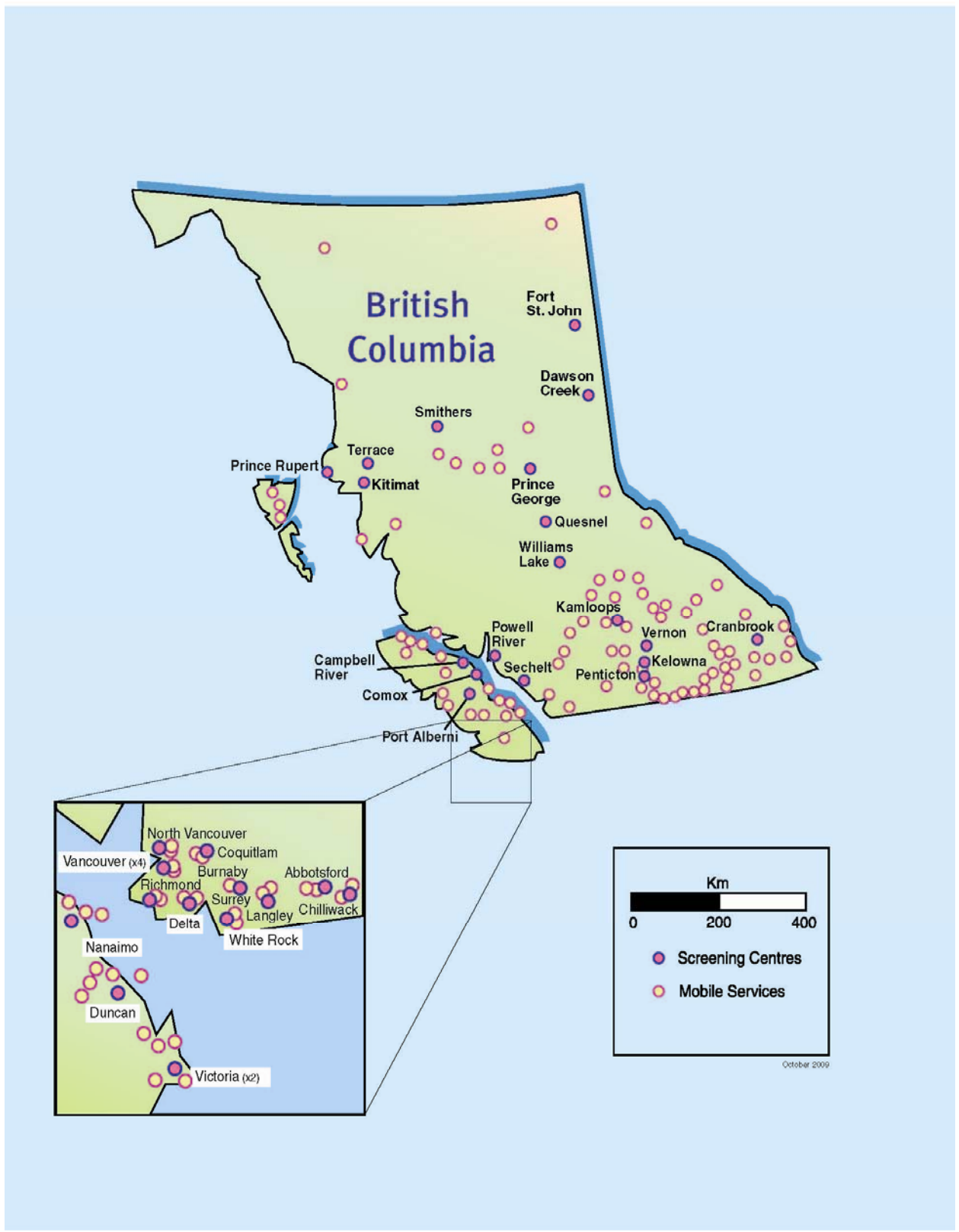
Ages 80+ - physician referral required

Primary health care providers may wish to refer women ages 80+ in good general health (life expectancy of 10 or more years), for screening at the SMP. The possible benefits of screening mammography in light of other potential health concerns should be discussed with the patient. Therefore, the SMP asks that each screening exam for women ages 80+ be referred by primary health care providers to the SMP centre of choice. A requisition should be given to the woman to bring to the appointment.

APPENDIX 3: SMP/BCCA Organization Chart



APPENDIX 4: Map of Screening Centres



APPENDIX 5: Screening Centre Contact Information

Abbotsford	604-851-4750	North Vancouver	604-903-3860
Burnaby	604-436-0691	Penticton	250-770-7573
Campbell River	1-800-663-9203	Port Alberni	1-800-663-9203
Chilliwack	1-800-663-9203	Powell River	1-800-663-9203
Comox	250-890-3020	Prince George	250-565-6816
Coquitlam	604-927-2130	Prince Rupert	1-800-663-9203
Cranbrook	250-417-3585	Quesnel	1-800-663-9203
Dawson Creek	1-800-663-9203	Richmond	604-244-5505
Delta	604-877-6187	Sechelt	1-800-663-9203
Duncan	1-800-663-9203	Smithers	1-800-663-9203
Fort St. John	1-800-663-9203	Surrey	604-586-2772
Kamloops	250-828-4916	Terrace	1-800-663-9203
Kelowna	250-861-7560	Vernon	250-549-5451
Kitimat	1-800-663-9203	White Rock	604-535-4512
Langley	604-514-6044	Williams Lake	1-800-663-9203
Nanaimo	250-716-5904		

Vancouver

BC Women's Health Centre	604-775-0022
Mount St. Joseph Hospital	604-877-8388
5752 Victoria Drive	604-321-6770
#505-750 West Broadway	604-879-8700

Victoria

#230 - 1900 Richmond Ave	250-952-4232
Victoria General Hospital	250-727-4338

Mobile Screening Service Delivery Areas

Interior/Kootenay Mobile	Ashcroft	Creston	Keremeos	New Denver	Scotch Creek	
	Balfour	Elkford	Kimberley	Oliver	Sicamous	
	Barriere	Enderby	Lillooet	Osoyoos	Slocan	
	Beaver Valley	Fernie	Logan Lake	Peachland	Sorrento	
	Castlegar	Fountain	Lumby	Princeton	Sparwood	
	Chase	Golden	Lytton	Radium Hot Springs	Summerland	
	Christina Lake	Grand Forks	Meadow Creek	Revelstoke	Trail	
	Clearwater	Greenwood	Merritt	Rock Creek	Windermere	
	Clinton	Hope	Midway	Rossland	Windfield	
	Cranbrook	Invermere	Nakusp	Salmo	100 Mile House	
	Crawford Bay	Kaslo	Nelson			
	Islands & Coastal Mobile	Alert Bay	Gold River	Parksville	Port McNeill	Skidegate
		Bella Bella	Ladysmith	Pauquachin	Qualicum Beach	Sooke
		Bella Coola	Lake Cowichan	Pemberton	Queen Charlotte City	Squamish
Chemainus		Masset	Pender Island	Saanichton	Tofino	
Fort Rupert		Mill Bay	Port Alice	Saltspring Island	Ucluelet	
Gabriola		Mount Currie	Port Hardy	Sayward	Whistler	
Northern/Okanagan Mobile	Alexis Creek	Dawson Creek	Granisle	McBride	Tatla Lake	
	Anaheim Lake	Dease Lake	Hazelton	Peachland	Tumbler Ridge	
	Barriere	Fort St. James	Houston	Penticton	Valemount	
	Burns Lake	Fort St. John	Hudson Hope	Southside	Vanderhoof	
	Chetwynd	Fort Nelson	Mackenzie	Stewart	Winfield	
	Clearwater	Fraser Lake				
Lower Mainland Mobile	Locations will change from time to time. Latest visits include: Agassiz, Bowen Island, BC Biomed Lab, BCIT Campus, Burnaby, Chilliwack, Cultas Lake/Soowahlie First Nations, Delta, Deroche/Leq'a'mel First Nations, Downtown Eastside, Hope, ICBC Head Office, Langley, Maple Ridge, Mission, New Westminster, North Vancouver, Pitt Meadows, Port Coquitlam, Port Moody, Queensborough, Richmond, SFU Campus, Surrey, Surrey Tax Centre, UBC Campus, Vancouver Primary Care Centre/Native Health, and West Vancouver.					

APPENDIX 6: Educational Materials Order Form

SMP PAMPHLETS, TEAR PADS, POSTERS, BOOKMARKS & CDs/DVDs

PAMPHLETS

1) Pass it On (order code SMP 028)

- | | | | | |
|----------------------------------|--------------------------|----|--------------------------|----|
| <input type="checkbox"/> English | <input type="checkbox"/> | 25 | <input type="checkbox"/> | 50 |
| <input type="checkbox"/> Chinese | <input type="checkbox"/> | 25 | <input type="checkbox"/> | 50 |
| <input type="checkbox"/> Punjabi | <input type="checkbox"/> | 25 | <input type="checkbox"/> | 50 |

Quantities

PLEASE PROVIDE YOUR ADDRESS & PHONE

Name: _____

Address: _____

Postal Code: _____

PHONE NUMBER:

APPOINTMENT PADS (TEAR PADS)

1) Lower Mainland

- | | | | | |
|--|--------------------------|---|--------------------------|----|
| <input type="checkbox"/> English | <input type="checkbox"/> | 5 | <input type="checkbox"/> | 10 |
| <input type="checkbox"/> Punjabi | <input type="checkbox"/> | 5 | <input type="checkbox"/> | 10 |
| <input type="checkbox"/> Traditional Chinese | <input type="checkbox"/> | 5 | <input type="checkbox"/> | 10 |

Quantities

2) All other locations

- | | | | | |
|--|--------------------------|---|--------------------------|----|
| <input type="checkbox"/> English | <input type="checkbox"/> | 5 | <input type="checkbox"/> | 10 |
| <input type="checkbox"/> Punjabi | <input type="checkbox"/> | 5 | <input type="checkbox"/> | 10 |
| <input type="checkbox"/> Traditional Chinese | <input type="checkbox"/> | 5 | <input type="checkbox"/> | 10 |

POSTERS (limit of 10 posters)-English only

- | | | |
|--|--|-------|
| <input type="checkbox"/> Pass it On | | _____ |
| <input type="checkbox"/> Why Regular Mammograms are Important | | _____ |
| <input type="checkbox"/> Balancing Your Health Needs (Aboriginal Poster) | | _____ |

Quantities

BOOKMARKS

Quantities:

CD - How a Screening Mammogram is Given (no audio-PowerPoint)

- | | | |
|---------------------------------------|--------------------------|-------------------------|
| <input type="checkbox"/> English Only | <input type="checkbox"/> | English/Punjabi |
| <input type="checkbox"/> Chinese Only | <input type="checkbox"/> | English/Chinese |
| <input type="checkbox"/> Punjabi Only | <input type="checkbox"/> | English/Punjabi/Chinese |

DVD - Having a Screening Mammogram (with audio)

- English only

ABORIGINAL MATERIALS

Quantities

- | | | | | |
|---|--------------------------|----|--------------------------|----|
| <input type="checkbox"/> Health Check Cards | <input type="checkbox"/> | 25 | <input type="checkbox"/> | 50 |
| <input type="checkbox"/> Posters _____ (maximum 10) | | | | |

**Please fax this form to:
604-877-6113**

or mail to:

SMPBC Central Office, 711-750 W. Broadway, Vancouver, B.C. V5Z 1H6

APPENDIX 7: Glossary

- **Abnormal Call Rate:** Proportion of screening mammography examinations determined to require further diagnostic assessment (*ie. called "abnormal"*).

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

- **Benign Core Biopsy Rate:** Proportion of cases with complete follow-up that resulted in a benign core biopsy.
- **Benign Open Biopsy Rate:** Proportion of cases with complete follow-up that resulted in a benign open biopsy.
- **Benign to Malignant Core Biopsy Ratio**

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

B_b Number of women who had screen-initiated core biopsy and did not have breast cancer diagnosis.

M_b Number of women who had screen-initiated core biopsy and had breast cancer diagnosis.

- **Benign to Malignant Open Biopsy Ratio**

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

B_b Number of women who had screen-initiated open biopsy and did not have breast cancer diagnosis.

M_b Number of women who had screen-initiated open biopsy and had breast cancer diagnosis.

- **Core Biopsy Yield Ratio:** Proportion of cases with core biopsy that resulted in a diagnosis of breast cancer.

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

B_b Number of women without breast cancer diagnosis on screen-initiated core biopsy.

M_b Number of women found to have breast cancer on screen-initiated core biopsy.

- **Open Biopsy Yield Ratio:** Proportion of cases with open biopsy that resulted in a diagnosis of breast cancer.

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

B_b Number of women without breast cancer diagnosis on screen-initiated open biopsy.

M_b Number of women found to have breast cancer on screen-initiated open biopsy.

- **Overall Cancer Detection Rate:** Number of cancer cases detected per 1,000 screens with complete follow-up.
- **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 within the specified period of time per 1,000 "normal" screening episode.
- **Positive Predictive Value (PPV) of Screening Mammography:** Proportion of "abnormal" cases found to have breast cancer after diagnostic workup.

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

- **Prevalence to Expected Incidence Ratio:** Comparison between incidence rate 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.

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

Where N_i is the number of prevalent screens for age group i , Ca_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 percentage of women returned for rescreen within 30 months of their previous visit.

$$\text{Retention Rate} = \frac{\text{Number of women returned for rescreen}}{\text{Number of women eligible for rescreen}}$$

- **Return (Compliance) Rate:** The percentage of women without history of breast cancer diagnosis returned for rescreen within a certain period of time.
- **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".

- **Participation Rate:** The percentage of women who have a screening mammogram (calculated biennially) as a proportion of the eligible population. The eligible population is estimated by the average of the two-year population from forecast.
- **Node Negative Rate in Cases of Invasive Cancer:** Proportion of invasive cancers in which the cancer has not invaded the lymph nodes.

APPENDIX 8: Acknowledgement & Contributors

The Screening Mammography Program 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 process and read 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*):

- Alliance for Breast Cancer
- BC Cancer Foundation
- BC Medical Association
- BC Women's Health Centre
- Canadian Breast Cancer Foundation
- College of Physicians and Surgeons
- Women's Health Bureau

Contributors (*Alphabetical Listing*)

- Margaret Bangen, Director, Strategic Business Initiatives, Population Oncology
- Irene Brown, Administrative Coordinator
- Christina Chu, Biostatistician, Surveillance & Outcomes, Population Oncology
- Dr. Andrew Coldman, Vice President, Population Oncology
- Magali Coustalin, Program Secretary
- Lisa Kan, Screening Operations Leader
- Dr. Linda Warren, Provincial Chief Radiologist

APPENDIX 9: Committees

Alphabetical Listing

Academic Committee

Dr. Andy Coldman
Dr. Paula Gordon - Chair
Dr. Malcolm Hayes
Ms. Lisa Kan
Dr. Rasika Rajapakshe
Ms. Janette Sam
Dr. Linda Warren

Quality Management Committee

Dr. Stephen Chia
Ms. Christina Chu
Dr. Andy Coldman
Dr. Malcolm Hayes
Ms. Lisa Kan
Ms. Ann MacDonald
Ms. Sheila MacMahon
Ms. Janette Sam
Ms. Elaine Simpson
Mr. Larry St. Germain
Dr. Linda Warren - Chair

Screener's Advisory Committee

Dr. Ken Bentley
Dr. Larry Breckon
Dr. Michael Clare
Dr. Eleanore Clark
Dr. Don Coish
Dr. Andy Coldman
Dr. Dan Dolden
Dr. Nancy Graham
Dr. Lynn Jacobsen
Dr. Rob Johnson
Ms. Lisa Kan
Dr. Nicola Lapinsky
Dr. Richard Lee
Dr. Patrick Llewellyn
Dr. Heather MacNaughton
Dr. Daryn Maisonneuve
Dr. Peter McNicholas
Dr. Katherine Miller
Dr. David O'Keeffe
Dr. Rasika Rajapakshe
Dr. Stuart Silver
Dr. Kelly Silverthorn
Dr. Frederick Smith
Dr. Catherine Staples
Dr. Phil Switzer
Dr. Lynette Thurber
Dr. Linda Warren - Chair
Dr. Jose Zanbilowicz

APPENDIX 10: Radiologist Screeners

Alphabetical Listing

Abbotsford

Dr. Lynn Jacobsen
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. Dave McKeown
Dr. Jose Zambilowicz

Coquitlam

Dr. Jennifer Dolden
Dr. Maria Kidney
Dr. Heather MacNaughton
Dr. Carol Miller
Dr. Anita McEachern

Cranbrook

Dr. Daryn Maisonneuve
Dr. Julie Nicol

Interior/Kootenay Mobile

Dr. Kelly Silverthorn

Kamloops

Dr. Michael Clare
Dr. Donal Downey

Kelowna

Dr. Wayne Middelkamp
Dr. Catherine Staples
Dr. Timothy Wall

Langley

Dr. Ron Campbell
Dr. John Matheson
Dr. Kathryn Miller

Nanaimo/Islands & Coastal Mobile

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

Northern/Okanagan/Lower Mainland Mobile

Dr. Kelly Silverthorn

North Vancouver

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

Penticton

Dr. Peter McNicholas
Dr. Stacey Piche

Prince George

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

Sechelt

Dr. Daniel Dolden

Surrey

Dr. Don Coish
Dr. Guy Eriksen
Dr. Dennis Janzen
Dr. Amir Neyestani
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Dr. Paula Gordon
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Dr. Robert Koopmans
Dr. Brent Lee
Dr. Colin Lee
Dr. Delmer Pengelly
Dr. Stuart Silver
Dr. Frederick Smith
Dr. John Wrinch

Victoria Richmond Avenue

See Victoria General Hospital

White Rock

Dr. Eleanor Clark
Dr. Joanne Coppola

APPENDIX 11: Publications & Presentations

Publications

1. Borugian MJ, Kan L. The effect of socioeconomic status on first visits to mammography screening. Network News, Canadian Breast Cancer Network; Summer 2008.
2. Coldman AJ, Phillips N, Olivotto IA, Gordon P, Warren L, Kan L. Impact of changing from annual to biennial screening mammographic screening on breast cancer outcomes in women ages 50 to 79 in British Columbia. J Med Screen. 2008;15(4):182-7
3. Poole B, Gelmon K, Borugian, MJ, Kan L, Stilwell M. Breast cancer screening and diagnosis in BC. British Columbia Medical Journal 2008; 50(4):198-205.

Presentations and Lectures

Alphabetical Listing

- **Dr. Paula Gordon**

1. Breast Lumps in Young Women: Diagnosis and Referral, *Reach Clinic In-Service Day, Vancouver, BC. June 18, 2008.*
2. Ultrasound Guided Breast Interventional Procedures (Hands-on Workshop), *Radiological Society of North America Annual Meeting, Chicago, IL, Dec 1, 2008.*
3. Small Parts Interventional Ultrasound (Hands-on Workshop), *Radiological Society of North America Annual Meeting, Chicago, IL, Dec 4, 2008.*
4. Breast Ultrasound: Equipment and Technique, *Radiological Society of North America Annual Meeting, Chicago, IL, Dec 4, 2008.*
5. New Ultrasound Technologies in the Breast. *Practical Radiology, Whistler, BC, Feb 10, 2009.*

- **Dr. Rasika Rajapakshe**

1. Quality Improvements in Breast Health: Analog to Digital Mammography, Improving Quality of Care and Patient Safety Through Accreditation, *Diagnostic Accreditation Program Educational Conference, Vancouver, BC, May 12, 2008*

- **Dr. Linda Warren**

1. Selection, Training and Monitoring
2. Performance Indicators
3. Abnormal Philosophy
4. CAD – Looking Twice
5. Calcifications
6. The False Negative Mammogram
7. Masses
8. Screening Radiologists Performance and Standardized Test
King Fahad Specialist Hospital, Damman, Saudi Arabia, April 26-30, 2008.

9. Mammography Screening Program – Philosophy and Design
10. How to Set-Up and Run a Screening Program
11. Lessons From Accreditation
12. Economic Factors in Mammography Screening

National Breast Screening Guidelines Symposium, King Fahad Specialist Hospital, Damman, Saudi Arabia, May 1, 2008.

APPENDIX 12: SMP/BCCA Contact Information

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