



**BC Cancer Agency**  
CARE & RESEARCH

An agency of the Provincial Health Services Authority

**SCREENING MAMMOGRAPHY  
PROGRAM OF BC**

# 2004/2005 ANNUAL REPORT

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## MESSAGE FROM THE PROVINCIAL CHIEF RADIOLOGIST

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Since its inception in July 1988, the Screening Mammography Program of BC (SMPBC) has evolved from a single fixed centre with a capacity for 9,000 examinations a year to 37 centres including 3 mobile services.

The fiscal year 2004/2005 was characterized by the highest ever number of screening examinations at 234,678. However, with the population growth, this volume increase was not sufficient to elevate the participation rate. The province wide participation rate in women ages 50 to 74 dropped 1% to 47% from the year before.

In October 2004, the Ministry of Health Services announced a \$3 million investment for earlier breast cancer detection. This included \$1.75 million to the SMPBC annually to provide 25,000 additional screens, \$250,000 for a new mobile unit, and a one-time \$1 million grant to the Canadian Breast Cancer Foundation's B.C./Yukon Chapter for a public awareness campaign. With this financial support and the cooperation of existing screening centres, it was possible to start working toward improving screening participation.

The annual SMPBC Forum was held on October 16, 2004 and attracted 210 registrants. Invited lecturers included Dr. Edward Sickles, Professor-in-Residence at the University of California Medical Centre, Dr. Charmaine Kim-Sing, Medical Leader, Hereditary Cancer Program, Dr. Bal Pawa and Dr. Nishi Dhawan, Board Certified Menopause Clinicians of Westcoast Centre for Women's Midlife Health, and Dr. Christine Wilson, Clinical Assistant Professor, Department of Radiology, University of British Columbia.

The Forum program focused on new technology including breast MRI, computer-aided detection and digital mammography with special break-out sessions on hereditary breast cancer and menopause management. The new format with breakout sessions for radiologists and technologists proved effective and will be used in planning for future forums.

This year, the Cervical Cancer Screening Program (CCSP) and the Screening Mammography Program of BC (SMPBC) collaborated to implement unique reminders on report forms for the two screening examinations. The reminders are to ensure that women in the appropriate age groups are aware of the need for both screening tests.

A new Standardized Interpretation Test for screening radiologists has been developed to replace the previous test known as Test 2 and will soon be available to new screening radiologist candidates.

Ms. Lisa Kan, Screening Operations Leader, Ms. Debbie Leathem, SMPBC Technical Quality Management Leader, and Ms. Elaine Simpson, SMPBC Operations Manager, have brought enthusiasm and diligence to their posts. Further, our physics support group together with Ms. Leathem has ensured all screening centres are either accredited or in the process of being accredited by the Canadian Association of Radiologists – Mammography Accreditation Program (CAR-MAP); a commendable success.

It is the remarkable teamwork of all screening centre staff, the Central Office staff, together with screening radiologists and the community health care professionals throughout the province which has contributed to our province maintaining the lowest mortality rate for breast cancer in Canada.

Thanks to everyone for all you have done.

**Dr. Linda Warren,  
Provincial Chief Radiologist**

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## PROGRAM OVERVIEW

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The SMPBC provides two-view mammography with staff and equipment that meet the national standards, to women in British Columbia between the ages of 40 and 79. The SMPBC will screen eligible women in other age groups with referral from the family physician. Women are not eligible for screening if they have had breast cancer, breast implants, or if they currently have breast symptoms requiring diagnostic investigation.

### **The Screening Process**

The basic screening process can be described in four stages:

- Identification and invitation of the target population
- Provision of the screening examination
- Investigation of abnormality identified on screening examination
- Reminder to rescreen at the appropriate interval

### **Promotion, Recruitment & Recall**

The SMPBC develops and distributes promotion and educational material to doctor offices, health units, libraries, and other interested organizations. The information brochures and tear-out pads are also available in a variety of languages.

A wide network of more than 300 volunteers has evolved informally since the start of the SMPBC. The volunteers assist with the recruitment of women in their communities, and the creation of a warm and welcoming environment for the mobile screening sites.

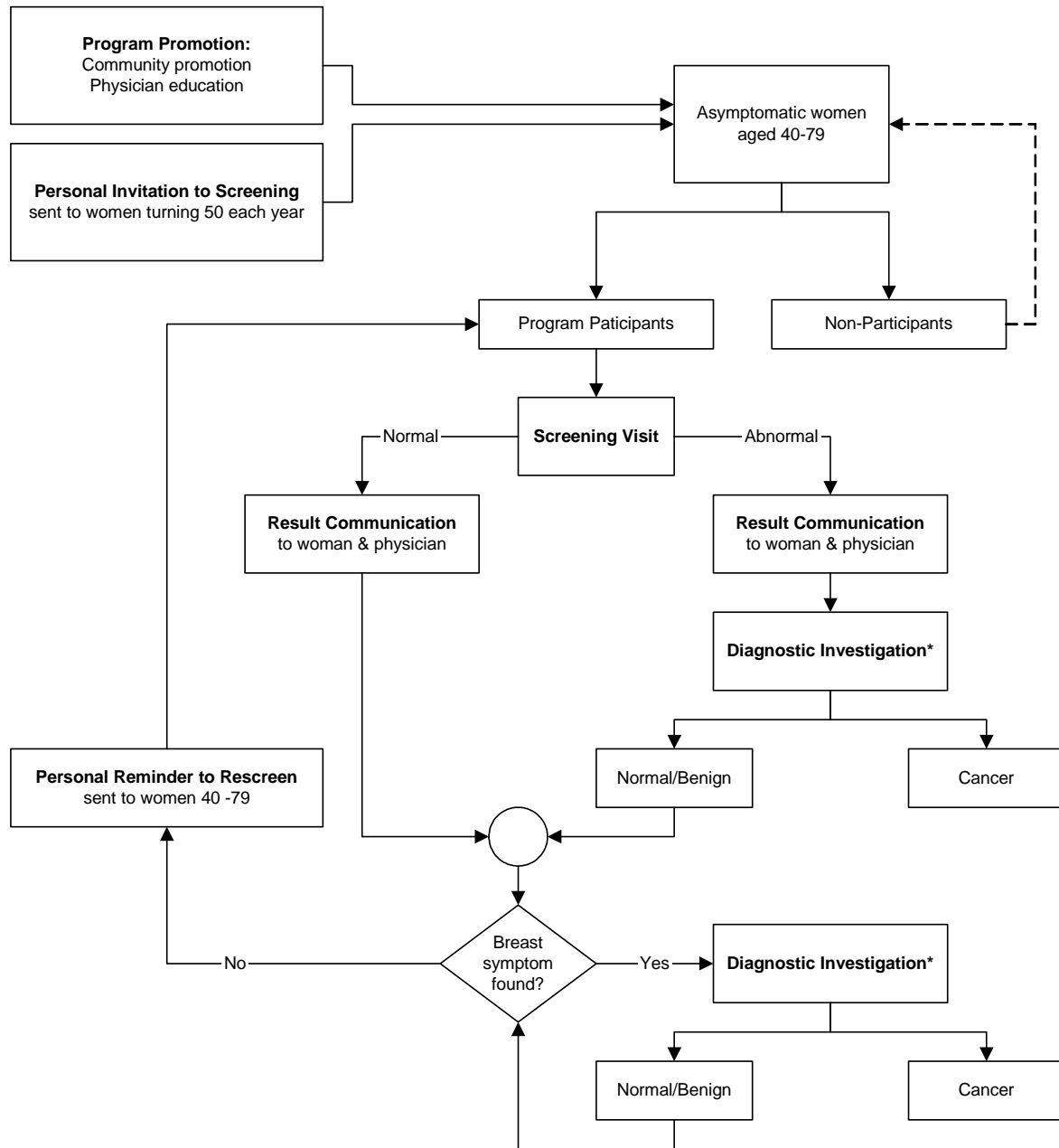
The SMPBC information system facilitates invitation and recall reminder of eligible women for screening. With the support of the Ministry of Health, SMPBC accesses addresses from the Client Registry and generates individualized invitation letters for women turning 50 years of age each year. The SMPBC sends recall reminders to eligible women when they are due to return.

### **Facilitated Process to Diagnostic Investigation (Fast Track)**

A linked “Fast Track” service for the diagnostic investigation of women with abnormal screening mammograms has been implemented with the cooperation of family doctors, and diagnostic radiology facilities across the province. This province-wide initiative reduces the time between an abnormal screening mammogram and the tests that will lead to a final diagnosis.

Fast Track aims to have the majority of women scheduled for further imaging studies within one week of the abnormal screening result.

## SMPBC 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.

## Quality Assurance and Quality Control

Quality standards and systems in the SMPBC are developed based on recommendations from the Canadian Association of Radiologists (CAR), Health Canada, the Canadian Association of Medical Radiation Technologists (CAMRT), the BCCA Physics Department and scientific literature.

To assure the public of a quality service, the SMPBC follows the Quality Management process:

- Establish and regularly review Program standards
- Continually monitor processes to ensure established standards are met
- Take action to correct deficiencies in quality
- Follow up the action to ensure quality improvement

Quality screening is a shared responsibility of all staff. The SMPBC has dedicated resources to support quality assurance and quality control activities. For example, the Physicist Support Group monitors the mammography and film processing equipment, and provides professional direction in equipment selection, acceptance testing and trouble-shooting. The Technical Quality Management Leader works collaboratively with the Physicists and the Provincial Chief Radiologist to monitor image quality, and to support improvement by developing educational material, participate in trouble-shooting, and providing in-services. The SMPBC has established a goal to meet the Canadian Association of Radiologists (CAR) Mammography Accreditation requirements at all the screening clinics by 2005.

## Evaluation

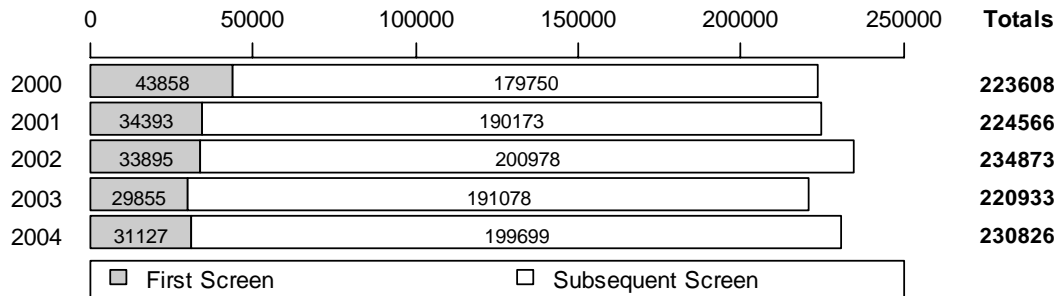
Data is collected and analyzed on an ongoing basis to understand the Program's effectiveness and to identify areas for improvement. Results of this analysis are presented in the "**Program Results**" section of this report. Age specific breast cancer incidence and mortality rates are tracked in conjunction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

## PROGRAM RESULTS

### Recruitment and Re-screening

The SMPBC provided 230,826 examinations to 230,764 women in 2004. During this period, 31,127 examinations were performed for women attending the SMPBC for the first time and the remaining 199,699 (87%) examinations were performed on returning participants. Figure 1 show that the number of first time attendees as well as those women returning for an examination in 2004 increased by slightly more than 4% over the previous year. This increase has occurred despite the fact that, due to delays related to the clarification of privacy issues, no invitation letters were sent to women turning 50 last year.

**Figure 1**  
**SMPBC Annual Screening Volume**  
**Years: 2000 - 2004**





**Active** participants of the SMPBC are defined to be those women who have attended the SMPBC at least once in the last 24-month period. In the 24-month period of 2003 and 2004, 389,076 women age 40 and over participated in the SMPBC. Age specific participation rates by Health Service Delivery Areas (HSDA) are shown in Table I. In each and every HSDA, the highest participation rates were seen in the 50-59 and 60-69 age groups. The overall participation rate for women aged 50-74 was 47%, a decrease of one percentage point from that reported last year. The participation rate in the East Kootenay remains the lowest in the province at 30%, which was the same as in 2002-2003. The Okanagan Health Service Delivery Area has the highest participation rate at 53%.

**Table 1  
Regional Participation Rates by 10-Year Age Groups  
between 2003 and 2004 inclusive**

Health Service Delivery Area	10-Year Age Groups					Ages 50-74
	40-49	50-59	60-69	70-79	80-89	
Central Vancouver Island	29%	50%	56%	42%	2%	51%
East Kootenay	23%	29%	31%	25%	3%	30%
Fraser East	28%	44%	48%	41%	2%	45%
Fraser North	35%	45%	46%	39%	2%	45%
Fraser South	34%	46%	45%	36%	2%	45%
Kootenay Boundary	27%	40%	43%	34%	3%	41%
North Shore/Coast Garibaldi	32%	42%	45%	38%	2%	43%
North Vancouver Island	30%	49%	53%	40%	1%	50%
Northeast	21%	35%	37%	34%	2%	36%
Northern Interior	30%	47%	45%	36%	2%	46%
Northwest	23%	40%	37%	25%	2%	37%
Okanagan	33%	51%	58%	44%	3%	53%
Richmond	44%	50%	49%	43%	3%	49%
South Vancouver Island	31%	50%	53%	46%	3%	51%
Thompson Cariboo Shuswap	33%	50%	52%	40%	2%	50%
Vancouver	35%	50%	48%	35%	2%	48%
British Columbia	33%	47%	49%	39%	2%	47%

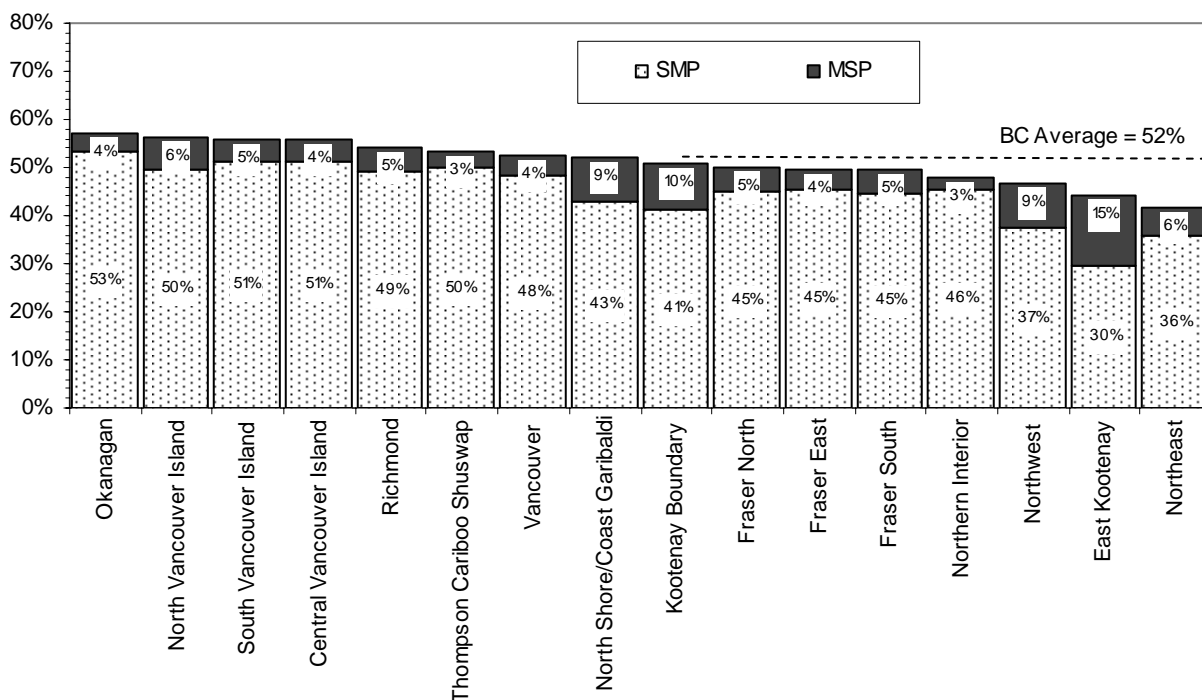
*\* Based on the average of 2003 and 2004 female population estimates*

**Notes:**

1. Population Data Source: People 30 Population Estimates (Sept. 2005), BC STATS, BC Ministry of Labour and Citizens' Services
2. Population Data Acquired Through: the Health Data Warehouse, BC Ministry of Health
3. SMP data extraction date: November 14, 2005

Bilateral mammography is 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 MSP. Figure 2 shows the proportion of women receiving bilateral mammography service through SMPBC and MSP. Over the two-year period, some women may have had services through SMPBC, as well as MSP. The proportions presented may be slightly higher than the actual figures because of possible duplication. During the two years of 2003 and 2004, 52% of BC women age 50-74 received bilateral mammography services. Overall, The SMPBC provided 90% of the bilateral mammography services for this age group. Regionally, the percent of women age 50-74 receiving bilateral mammography ranged from 57% to 42%.

**Figure 2**  
**Bilateral Mammography Utilization by Women Age 50-74 in BC**  
**between 2003 and 2004 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 August 26, 2005 for services provided within years 2003 and 2004, excluding repeat screens for women who came for the services more than once in 2 years.
3. SMP data includes single screen per woman provided in calendar years 2003 and 2004.
4. 2003 and 2004 Estimated Population Data Source: P.E.O.P.L.E. 30, BC Ministry of Health Planning
5. SMP data extraction date: November 14, 2005.

Ethnic origin data was collected at the time of SMPBC registration (31% of attendees did not specify their ethnicity and were excluded), and population estimates by Health Service Delivery Area were obtained from Statistics Canada's 2001 Census. The regional representation of selected ethnic groups both in the SMPBC and in British Columbia is shown in Table II. Ethnic population estimates, especially East/South East Asian population, may be under-represented in the Simon Fraser, Richmond and Vancouver Health Service Delivery Areas.

**Table II**  
**Regional Ethnic Representation of Women Age 50-74**  
**in the Population and within the SMPBC Participants**

Health Service Delivery Area	First Nations		East/South-East Asians		South Asians	
	Population	SMPBC	Population	SMPBC	Population	SMPBC
11 East Kootenay	1.0%	2.4%	1.0%	2.2%	0.6%	1.2%
12 Kootenay Boundary	0.5%	1.2%	1.2%	2.2%	0.2%	0.5%
13 Okanagan	0.7%	1.0%	1.4%	2.0%	0.8%	1.0%
14 Thompson Cariboo Shuswap	3.6%	4.0%	1.3%	2.9%	1.3%	1.7%
21 Fraser Valley	1.3%	1.3%	1.7%	2.5%	6.4%	5.7%
22 Simon Fraser	0.5%	0.4%	18.8%	26.5%	4.6%	5.1%
23 South Fraser	0.4%	0.5%	6.1%	8.8%	10.5%	10.4%
31 Richmond	0.2%	0.2%	38.7%	48.8%	6.0%	6.3%
32 Vancouver	0.8%	0.7%	37.5%	44.4%	4.1%	5.3%
33 North Shore/Coast Garibaldi	1.5%	1.3%	5.5%	8.2%	2.2%	2.9%
41 South Vancouver Island	0.7%	0.8%	3.9%	5.6%	1.2%	1.9%
42 Central Vancouver Island	1.9%	1.2%	1.2%	1.6%	1.1%	1.3%
43 North Vancouver Island	2.2%	2.2%	1.3%	1.1%	0.3%	0.4%
51 Northwest	14.5%	21.8%	2.1%	2.5%	2.0%	3.0%
52 Northern Interior	3.5%	7.1%	1.4%	2.4%	2.5%	3.5%
53 Northeast	5.1%	3.7%	1.1%	0.2%	0.0%	0.8%
British Columbia	1.4%	1.4%	11.0%	15.7%	3.8%	4.4%

**SMPBC Data:**

1. Women attended the SMPBC at least once in 2003-2004 inclusive.
2. *East/South-East Asians* include Chinese, Japanese, Korean, Filipino, Thai, Vietnamese, Indonesian, Malay, Mongolian, and Tibetan.
3. *South Asians* include Punjabi, Singhalese, Tamil, Bangladeshi, East Indian, Pakistani, and Sri Lankan.
4. SMP data extraction date: November 14, 2005.

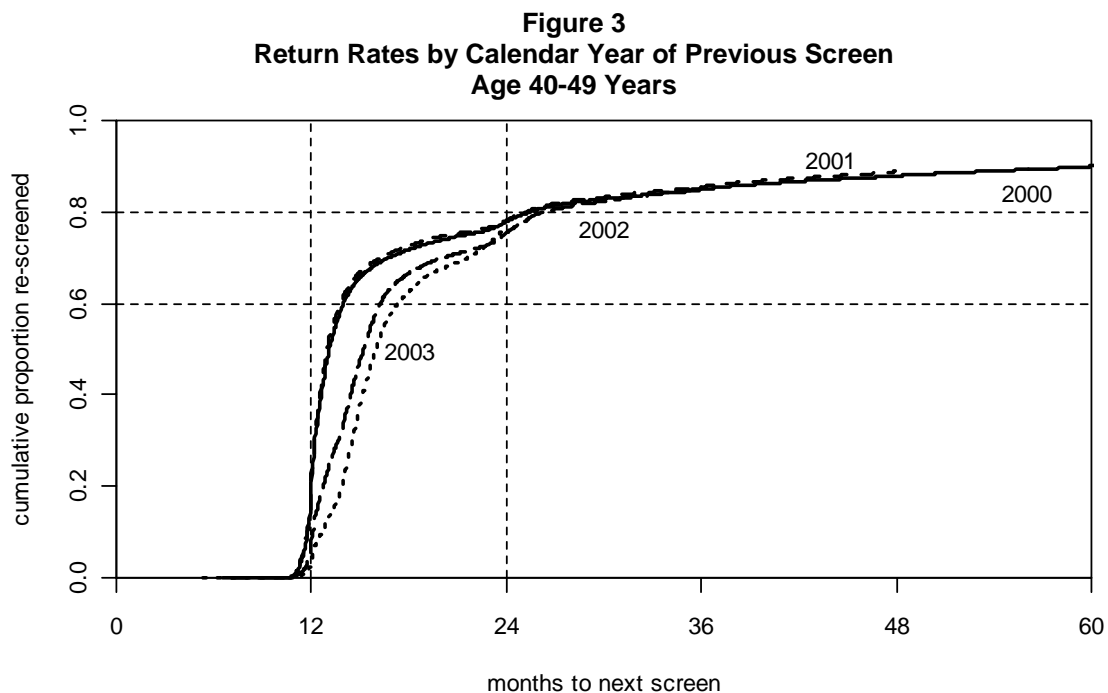
**Population Data:**

1. Original data source - 2001 Census, Statistics Canada
2. *East/South-East Asians* include Chinese, Filipino, Burmese, Cambodian, Laotian, Thai, Vietnamese, Indonesian, Japanese, Korean, Malay, Mongolian, Taiwanese, Tibetan, Asian n.i.e and East/Southeast Asian n.i.e
3. *South Asians* include Bangladeshi, Bengali, East Indian, Hindu, Goan, Gujarati, Pakistani, Ismaili, Muslim, Punjabi, Sikh, Singhalese, Sri Lankan, Tamil, and South Asian n.i.e.

The effectiveness of regular screening mammography is universally recognized for women over age 50. The SMPBC recommends screening at least every two years for women age 40-79. However, there is research evidence indicating that the sojourn time\* is shorter for women age 40-49 than for older women. Consequently, SMPBC reminds women age 40-49 to return annually.

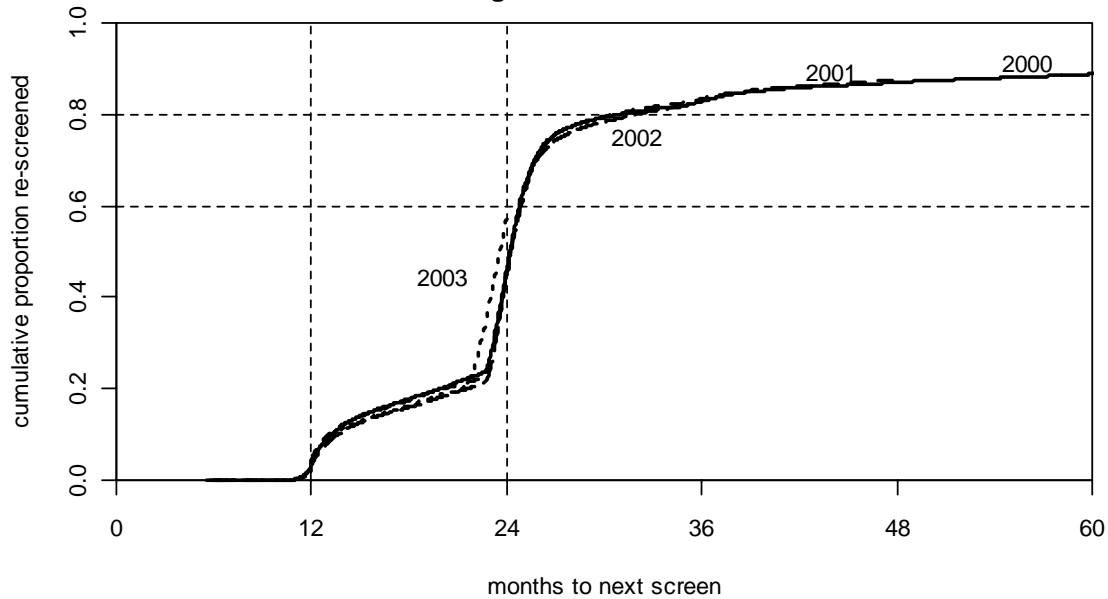
The SMPBC sends recall reminders to women in accordance with the interval recommendation. A second letter is sent if there is no appointment scheduled within 4-6 weeks after the first letter. This two-letter reminder system is repeated again for up to two more years if there is no response.

Figure 3 and Figure 4 show the return rates by year of the previous screening examination for women age 40-49 and 50-74 respectively as of November 14, 2005. The last 6 months of the 2003 data for older subgroup should be interpreted with caution, because a significant proportion of the cohort was not yet due to return. Women who had cancer or implants or died after the screen examination are removed from the calculation (censored).



\* Sojourn time is the duration that the disease remains in the pre-clinical, screen-detectable phase.

**Figure 4**  
**Return Rates by Calendar Year of Previous Screen**  
**Age 50-74 Years**



Most women are returning in accordance to the recommended screening interval for their age group. Slightly more than 20% of women age 50-74 screened elected to return prior to receiving the SMPBC recall letter, which was sent approximately 22 months after the last screen. Table III shows the compliance (return) rate by the year of previous screening examination in 6-month intervals. The proportion of age 50-74 women returning remains at about the same level for the years shown in the table.

**Table III**  
**Cumulative Numbers and Proportions Re-screened**  
**Women Age 50-74**

Calendar year of the previous screen	2000		2001		2002	
<b>Number to re-screen</b>	127,803		128,893		137,159	
<b>Re-screened</b>						
<b>by 18 months</b>	22,710	18%	22,457	17%	21,873	16%
<b>by 24 months</b>	58,713	46%	57,141	44%	61,528	45%
<b>by 30 months</b>	101,427	79%	102,504	80%	107,573	78%
<b>by 36 months</b>	105,912	83%	107,475	83%	113,510	83%

**Notes:**

1. SMP data extraction date: November 14, 2005

## 2004 Screening Results

Table IV summarizes the outcome indicators for screening provided in the calendar year 2004 by 10-year age groups. Of the 230,826 screening mammograms performed, 15,843 had an abnormal result with follow-up information (6.9%) and 922 breast cancers were reported as of August 2003 (4.3 per 1,000 exams), including 238 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 age between 40-49 and 70-79 from 8.4% to 5.0%. Cancer detection rates, positive predictive values and biopsy yield ratios increase with age.

**Table IV**  
**SMPBC Outcome Indicators by 10-Year Age Group**  
**Year: 2004**

	Age at Exam						All
	<40	40-49	50-59	60-69	70-79	80+	
<b>Number of Exams</b>	268	76,366	75,430	48,540	29,069	1,153	230,826
	0.1%	33.1%	32.7%	21.0%	12.6%	0.5%	
<b>Number of First Screens</b>	229	20,838	6,294	2,713	945	108	31,127
	0.7%	66.9%	20.2%	8.7%	3.0%	0.3%	
<b>Number of Cancers</b>	1	161	293	263	193	11	922
	0.1%	17.5%	31.8%	28.5%	20.9%	1.2%	
<b>Abnormal Call Rate</b>	10.1%	8.4%	6.7%	5.7%	5.0%	6.2%	6.9%
<b>on first screens</b>	10.9%	13.7%	14.8%	14.3%	10.9%	17.6%	13.9%
<b>on subsequent screens</b>	5.1%	6.4%	6.0%	5.2%	4.8%	5.1%	5.8%
<b>Overall Cancer Detection Rate (per 1,000)</b>	3.7	2.1	3.9	5.4	6.6	9.5	4.0
<b>on first screens</b>	0.0	3.1	6.4	10.7	13.8	9.3	4.7
<b>on subsequent screens</b>	25.6	1.7	3.7	5.1	6.4	9.6	3.9
<b>DCIS Detection Rate (per 1,000)</b>	0.0	0.7	1.1	1.3	1.3	0.0	1.0
<b>Positive Predictive Value of Screening Mammography</b>	3.8%	2.6%	6.1%	10.4%	15.2%	18.0%	6.2%
<b>Biopsy Yield Ratio</b>	---	22.0%	38.2%	47.7%	60.0%	55.0%	38.5%
<b>Benign:Malignant</b>	---	3.6 : 1	1.6 : 1	1.1 : 1	0.7 : 1	0.8 : 1	1.6 : 1

### Notes:

1. See glossary in the Appendix for definitions of terms.
2. Overall Cancer Rate includes ductal carcinoma in situ (DCIS)
3. Out of 16,347 cases called "abnormal", there were 17 lobular carcinoma in-situ cases and 504 outcomes unknown. The final number of cancers is still to be determined.
4. SMP data extraction date: November 14, 2005.

Diagnostic procedure information is available on 15,851 (97.0%) of the abnormal screening mammograms to date. Eight of these 15,851 abnormal screens were lost to follow-up. Table V shows the proportion of women receiving specific diagnostic procedures as part of the work-up on their screen detected abnormalities. Overall, 9% of women with abnormal screening mammograms had an open biopsy. Figure 5 summarizes screening outcome.

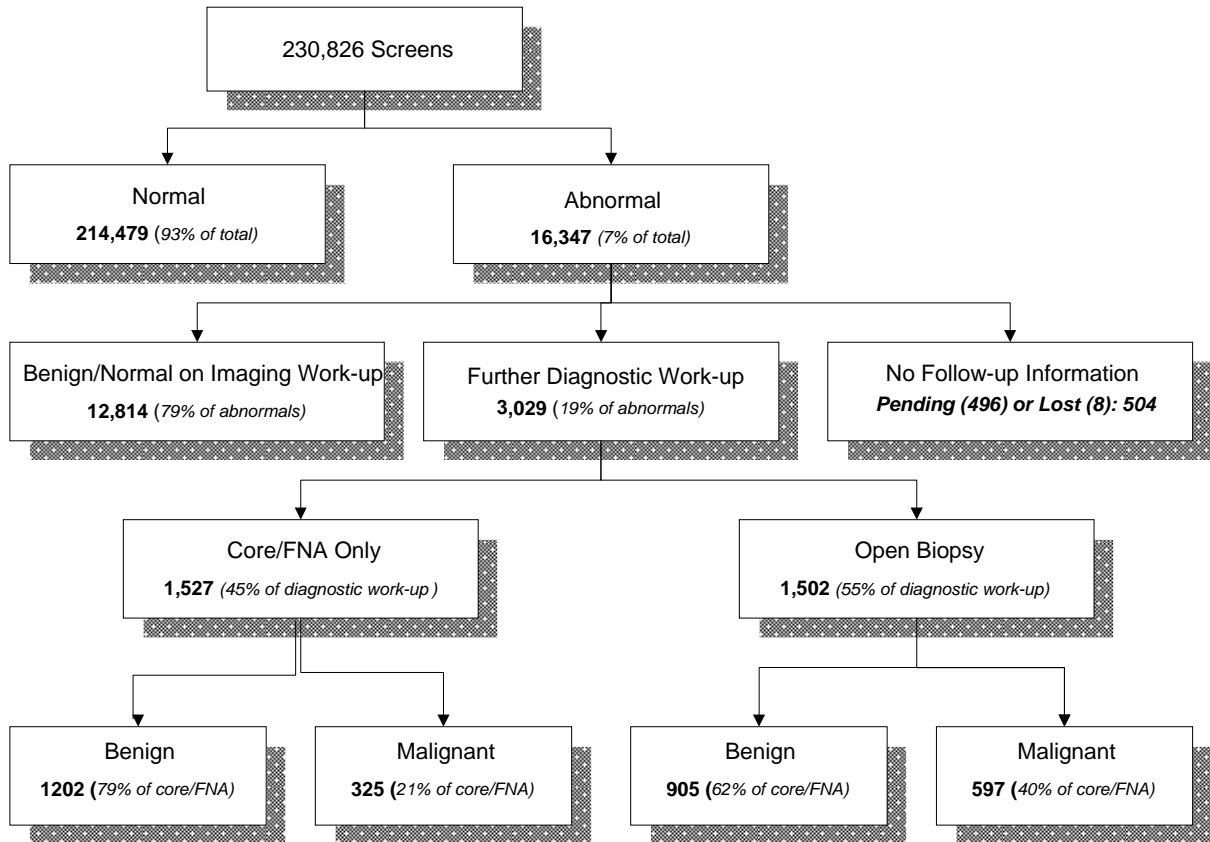
**Table V**  
**Diagnostic Procedures Received by SMPBC Participants**  
**with “Abnormal” Screening Mammograms**  
**Year: 2004**

Procedure	Age at Exam						All
	<40	40-49	50-59	60-69	70-79	80+	
<b>Diagnostic Mammogram</b>	93%	90%	91%	92%	93%	93%	91%
<b>Ultrasound</b>	74%	61%	58%	58%	56%	53%	59%
<b>Fine Needle Aspiration</b>	4%	7%	6%	7%	8%	3%	7%
<b>Core Biopsy</b>	4%	6%	7%	9%	8%	15%	7%
<b>Surgical Biopsy</b>	4%	6%	10%	13%	15%	15%	9%
<b>with Localization</b>	4%	6%	9%	11%	13%	10%	8%
<b>Number of Cases*</b>	27	6,436	5,065	2,787	1,464	72	15,851

**Notes:**

1. \* with diagnostic assessment information available
2. SMP data extraction date: November 14, 2005.

**Figure 5**  
**Screening Outcome Summary**  
**Year: 2004**





## 2004 Cancer Detection

Histologic features of breast cancers detected by SMPBC in 2004 are summarized by 10-year age groups in Table VI. 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, (3) clinical. The TNM cancer staging was determined by assuming no regional lymph node involvement (N0) whenever axillary lymph nodes were not assessed, and no distant metastases (M0) unless otherwise informed.

**Table VI**  
**Histologic Features of Breast Cancers Detected by SMPBC**  
**Year: 2003**

	Age at Exam										Age 40+	
	40-49		50-59		60-69		70-79		80+			
<b>Number of Cancers</b>	159		293		244		200		12		908	
<b>in situ</b>	45	28%	77	26%	54	22%	32	16%	1	8%	209	23%
<b>invasive</b>	114	72%	216	74%	190	78%	168	84%	11	92%	699	77%
<b>TNM Staging</b>												
<b>I</b>	66	58%	146	68%	127	67%	122	73%	8	80%	469	68%
<b>II</b>	44	39%	66	31%	60	32%	37	22%	2	20%	209	30%
<b>III+</b>	3	3%	2	1%	3	2%	8	5%	0	0%	16	2%
<b>unknown stage</b>	(1)		(2)		(0)		(1)		(1)		(5)	
<b>Invasive Tumour Size</b>												
<b>≤5 mm</b>	8	7%	26	12%	23	12%	19	11%	0	0%	76	11%
<b>6-10 mm</b>	29	26%	64	30%	55	29%	58	35%	3	30%	209	30%
<b>11-15 mm</b>	26	23%	53	25%	56	29%	42	25%	4	40%	181	26%
<b>16-20 mm</b>	17	15%	37	17%	25	13%	20	12%	1	10%	100	14%
<b>&gt;20 mm</b>	33	29%	34	16%	31	16%	28	17%	2	20%	128	18%
<b>unknown size</b>	(1)		(2)		(0)		(1)		(1)		(5)	
<b>≤ 15 mm</b>	63	56%	143	67%	134	71%	119	71%	7	70%	466	67%
<b>Node Involvement</b>												
<b>no nodes sampled</b>	8	7%	16	7%	13	7%	24	14%	6	55%	67	10%
<b>no</b>	73	64%	152	70%	132	69%	120	71%	5	45%	482	69%
<b>yes</b>	33	29%	48	22%	45	24%	24	14%	0	0%	150	21%
<b>Histologic Grade</b>												
<b>1 - well differentiated</b>	25	24%	78	38%	68	39%	73	46%	4	44%	248	38%
<b>2 - moderately differentiated</b>	53	50%	80	39%	75	43%	63	40%	4	44%	275	42%
<b>3 - poorly differentiated</b>	27	26%	46	23%	30	17%	22	14%	1	11%	126	19%
<b>unknown grade</b>	(9)		(12)		(17)		(10)		(2)		(50)	
<b>grade 3 tumour ≤ 15 mm</b>	5	19%	27	59%	19	63%	12	55%	1	100%	64	51%

### Notes:

1. TNM staging was determined by using mammographic measurement whenever pathologic measurement of the tumour was not available, and by assuming N0 whenever nodes were not assessed, and M0 unless otherwise informed.
2. Targets: >50% invasive tumours ≤15 mm, <30% invasive tumours with positive nodes, >30% grade 3 tumours ≤15 mm
3. SMP data extraction date: November 14, 2005.

Overall, 75% of cancers detected were in situ or stage I. Of the invasive cancers detected, 67% were ≤15 mm, 22% had invasion of the regional lymph nodes, and 19% were grade 3 (i.e. poorly differentiated) tumours. Of the grade 3 tumours, 51% were smaller than 15mm. These overall outcome indicators met international targets recommended for screening programs.

### **Outcome Indicators by Calendar Year**

Outcome indicators by calendar year are summarized in Table VII. The abnormal call rates on first screens has increased, while the rate for subsequent screens has dropped slightly. The overall abnormal call rate in 2004 remained the same as the preceding years at 6.9%, slightly above the 5 year average of 6.7%. The overall cancer detection rate, as well as the rates for first and subsequent screens for 2004 are close to that of the respective 5 year averages. The biopsy yield ratio is higher than last year, but lower than the average during the 5-year period.

Regular record linkage with the British Columbia Cancer Registry enables the SMPBC to determine the number of non-screen detected (interval) cancers in SMPBC 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 VII. The SMPBC conducts formal reviews, both blinded and retrospective, of all interval cancers in SMPBC participants. Comparison of prevalence rate at first screen with the historical incidence rate prior to the onset of screening practice was introduced in the previous annual report to provide 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 SMPBC, prevalent screens have been restricted to those women with no previous outside mammogram within 24 months of their first SMPBC encounter. Swedish two-county study showed a prevalence to expected incidence ratio of 3.09 for age 50-59 and 4.59 for age 60-69<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 age 50-79 were consistently above 3 from 1995 to 2003.

**Table VII**  
**SMPBC Outcome Indicators by Calendar Year**  
**Years: 2000-2004**

	Calendar Year					5-Year Cumulative
	2000	2001	2002	2003	2004	
<b>Number of Exams</b>	223,608	224,566	234,873	220,933	230,826	1,134,806
<b>% first screens</b>	19.6%	15.3%	14.4%	13.5%	13.5%	
<b>Number of Cancers</b>	853	909	1,035	908	922	4,627
<b>% on first screens</b>	24.9%	18.2%	15.7%	15.3%	15.9%	
<b>Abnormal Call Rate</b>	6.5%	6.6%	6.6%	6.9%	6.9%	6.7%
<b>on first screens</b>	11.5%	12.6%	12.4%	13.6%	13.9%	12.7%
<b>on subsequent screens</b>	5.3%	5.5%	5.6%	5.8%	5.8%	5.6%
<b>Overall Cancer Detection Rate (per 1,000)</b>	3.8	4.0	4.4	4.1	4.0	4.1
<b>on first screens</b>	4.8	4.8	4.8	4.7	4.7	4.8
<b>on subsequent screens</b>	3.6	3.9	4.3	4.0	3.9	4.0
<b>DCIS Detection Rate (per 1,000)</b>	1.0	1.0	1.0	0.9	1.0	1.0
<b>Positive Predictive Value of Screening Mammography</b>	5.9%	6.1%	6.7%	6.0%	5.8%	6.1%
<b>Biopsy Yield Ratio</b>	39.0%	40.4%	44.0%	39.1%	39.9%	40.5%
<b>Benign:Malignant</b>	1.6 : 1	1.5 : 1	1.3 : 1	1.6 : 1	1.5 : 1	1.5 : 1
<b>Interval Cancer Rate (per 1,000)</b>						
<b>0-12 months</b>	0.61	0.67	0.63	0.62	---	0.63
<b>after first screens</b>	0.66	0.41	0.86	0.50	---	0.61
<b>after subsequent screens</b>	0.60	0.72	0.59	0.64	---	0.64
<b>13-24 months</b>	0.72	0.75	0.65	0.56	---	0.67
<b>Sensitivity (i.e. 1 - false negative rate)</b>	86.2%	85.8%	87.5%	86.8%	---	86.6%
<b>Specificity (i.e. 1 - false positive rate)</b>	93.8%	93.8%	93.8%	93.5%	---	93.7%
<b>Prevalence to Expected Incidence Ratio for Age 50-79 (target<sup>2</sup>: &gt;3.0)</b>	3.10	4.07	3.90	3.16	---	---

**Notes:**

1. SMPBC data extraction date: November 14, 2005.
2. The final number of cancers in 2004 is to be determined. Sensitivity, specificity and interval cancer rates are based on the first 4 years of data only.
3. Overall Cancer Rate includes ductal carcinoma in situ (DCIS).
4. See *Glossary* in the Appendix for definitions of terms.

## Outcome Indicators by Age

In the 5-year period from 2000 to 2004, the SMPBC provided 1,134,806 screening mammography examinations to 512,372 women. Outcome indicators for this 5-year period are summarized by 10-year age groups in Table VIII. The abnormal call rate is generally lower for older ages. Additionally, the risk of breast cancer increases with age, which is reflected by higher cancer detection rates for older women. An increasing trend with age is observed in the positive predictive value of screening mammography, biopsy yield ratio, and specificity.

**Table VIII**  
**SMPBC Outcome Indicators by 10-Year Age Group**  
**Years: 2000-2004 Cumulative**

	Age at Exam					All
	40-49	50-59	60-69	70-79	80+	
<b>Number of Exams</b>	395,036	359,201	230,068	142,676	6,129	1,134,806
	34.8%	31.7%	20.3%	12.6%	0.5%	
<b>Number of Cancers</b>	803	1,412	1,330	1,026	54	4,627
	17.4%	30.5%	28.7%	22.2%	1.2%	
<b>Abnormal Call Rate</b>	7.7%	6.7%	5.8%	5.3%	6.2%	6.7%
<b>on first screens</b>	12.7%	13.4%	12.2%	11.1%	11.8%	12.7%
<b>on subsequent screens</b>	5.9%	5.9%	5.3%	4.9%	5.1%	5.6%
<b>Overall Cancer Detection Rate (per 1,000)</b>	2.0	3.9	5.8	7.2	8.8	4.1
<b>on first screens</b>	2.9	5.8	9.9	13.7	11.8	4.8
<b>on subsequent screens</b>	1.7	3.7	5.4	6.8	8.2	4.0
<b>DCIS Detection Rate (per 1,000)</b>	0.6	1.1	1.3	1.5	0.8	1.0
<b>Positive Predictive Value of Screening Mammography</b>	2.6%	5.9%	9.9%	13.7%	14.2%	6.1%
<b>Biopsy Yield Ratio</b>	23.6%	39.3%	51.9%	59.9%	59.2%	40.5%
<b>Benign:Malignant</b>	3.2 : 1	1.5 : 1	0.9 : 1	0.7 : 1	0.7 : 1	1.5 : 1
<b>Interval Cancer Rate (per 1,000)</b>						
<b>0-12 months</b>	0.57	0.69	0.58	0.76	0.40	0.63
<b>after first screens</b>	0.54	0.55	0.81	1.51	0.00	0.61
<b>after subsequent screens</b>	0.59	0.71	0.56	0.71	0.49	0.64
<b>13-24 months</b>	0.00	0.95	1.04	1.21	2.01	0.67
<b>Sensitivity (i.e. 1 - false negative rate)</b>	77.8%	85.0%	91.0%	90.6%	95.6%	86.6%
<b>Specificity (i.e. 1 - false positive rate)</b>	92.7%	93.7%	94.7%	95.4%	94.6%	93.7%

### Notes:

1. SMPBC data extraction date: November 14, 2005.
2. The final number of cancers in 2004 is to be determined. Sensitivity, specificity and interval cancer rates are based on the first 4 years of data only.
3. Overall Cancer Rate includes ductal carcinoma in situ (DCIS).
4. The 'All' column includes women less than 40 years of age.
5. See *Glossary* in the Appendix for definitions of terms.

## Cancer Characteristics by Age

From the start of the Program in July 1988 to December 2003, 8,738 women have been found to have breast cancer through screen-initiated work-up. Histologic features of breast cancers detected by SMPBC cumulative to and including 2003 are summarized by 10-year age groups in Table IX. 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 in all age groups. However, invasive cancers found in women age 40-49 tend to be larger, more likely to have grade 3 histology, and more likely to involve nodes than cancers found in the older women.

**Table IX**  
**Histologic Features of Breast Cancers Detected by SMPBC**  
**Years: Cumulative up to and including 2003**

	Age at Exam										All	
	40-49		50-59		60-69		70-79		80+			
<b>Number of Cancers</b>	1,462		2,448		2,635		2,015		171		8,738	
<b>in situ</b>	451	31%	636	26%	549	21%	362	18%	18	11%	2,019	23%
<b>invasive</b>	1,011	69%	1,812	74%	2,086	79%	1,653	82%	153	89%	6,719	77%
<b>TNM Staging</b>												
<b>I</b>	588	60%	1,159	65%	1,457	71%	1,199	73%	112	74%	4,518	68%
<b>II</b>	369	37%	568	32%	556	27%	382	23%	35	23%	1,911	29%
<b>III+</b>	29	3%	52	3%	53	3%	54	3%	5	3%	193	3%
<b>unknown stage</b>	(25)		(33)		(20)		(18)		(1)		(97)	
<b>Invasive Tumour Size</b>												
<b>≤5 mm</b>	94	10%	177	10%	181	9%	109	7%	14	9%	575	9%
<b>6-10 mm</b>	198	20%	433	24%	569	28%	512	31%	42	28%	1,755	26%
<b>11-15 mm</b>	280	28%	508	28%	682	33%	509	31%	47	31%	2,027	31%
<b>16-20 mm</b>	152	15%	308	17%	296	14%	250	15%	25	16%	1,032	16%
<b>&gt;20 mm</b>	263	27%	357	20%	338	16%	257	16%	24	16%	1,240	19%
<b>unknown size</b>	(24)		(29)		(20)		(16)		(1)		(90)	
<b>≤ 15 mm</b>	572	58%	1118	63%	1432	69%	1130	69%	103	68%	4357	66%
<b>Node Involvement</b>												
<b>no nodes sampled</b>	110	11%	183	10%	226	11%	280	17%	61	40%	860	13%
<b>no</b>	633	63%	1,225	68%	1,465	70%	1,124	68%	74	48%	4,525	67%
<b>yes</b>	268	27%	404	22%	395	19%	249	15%	18	12%	1,334	20%
<b>Histologic Grade</b>												
<b>1 - well differentiated</b>	252	28%	555	35%	642	35%	580	41%	48	36%	2,077	36%
<b>2 - moderately differentiated</b>	381	43%	634	40%	815	45%	625	44%	59	44%	2,516	43%
<b>3 - poorly differentiated</b>	253	29%	379	24%	367	20%	217	15%	26	20%	1,243	21%
<b>unknown grade</b>	(125)		(244)		(262)		(231)		(20)		(883)	
<b>Grade 3 tumour ≤ 15 mm</b>	111	44%	189	50%	212	58%	106	49%	12	46%	630	51%

### Notes:

1. TNM staging was determined by using mammographic measurement whenever pathologic measurement of the tumour was not available, and by assuming N0 whenever nodes were not assessed, and M0 unless otherwise informed.
2. Targets: >50% invasive tumours ≤ 15 mm, <30% invasive tumours with positive nodes, >30% grade 3 tumours ≤ 15 mm
3. The "All" column includes women less than 40 years of age.
4. SMP data extraction date: November 14, 2005.

## Comparison with Canadian standards

The necessity to standardize evaluation of Canadian breast cancer screening programs was first recognized in 1990. In December 1992, the Canadian Breast Cancer Initiative (CBCI) was launched. Under the Canadian Breast Cancer Screening component of this initiative, Health 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. Currently all provincial programs 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.

In this section, SMPBC performance measures are presented against the targets set for Canadian breast cancer screening programs. These targets are presented in the report: Guidelines for Monitoring Breast Screening Program Performance, published in 2002. 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. These national guidelines are currently being reviewed and it is anticipated that an update will be available in 2006.

**Table X**  
**Comparison of SMPBC 2003-2004 performance**  
**with Canadian Breast Screening Standards for 50-69 years old**

Performance measure	National Target	SMPBC 2003-2004
<b>Participation rate</b>	≥70% of the eligible population	48% (plus 5% MSP)
<b>Retention rate</b>	≥75% re-screened within 30 months	79%
<b>Abnormal call rate</b>	<10% first screens	15.3%
	<5% re-screens	5.8%
<b>Invasive cancer detection rate</b>	>5 per 1,000 first screens	7.66 per 1,000
	>3 per 1,000 re-screens	4.24 per 1,000
<b>In situ cancer detection rate</b>	Surveillance and Monitoring only, 04-1.0 per 1,000 in UK standards	1.18 per 1,000
<b>Positive predictive value</b>	≥5% first screen	5.2%
	≥6% re-screens	7.5%
<b>Benign to malignant open biopsy ratio</b>	≤2:1	1.4 : 1
<b>Invasive tumour size ≤10 mm*</b>	>25%	42%
<b>Positive lymph nodes in cases with invasive cancer*</b>	<30%	23%

**Notes:**

1. \*Based on screens provided in 2002 and 2003.
2. Population data source: P.E.O.P.L.E. 30, Ministry of Health Planning.
3. SMP data extraction date: November 14, 2005.

Costing analysis for the current and previous fiscal years is summarized in Table XI. The unit cost of screening mammography has decreased in the last year. Financial reports for PHSA and BCCA are available at the PHSA website: ([www.phsa.ca/WhoWeAre/Budget+Accountability](http://www.phsa.ca/WhoWeAre/Budget+Accountability)).

**Table XI**  
**Cost Comparison by Fiscal Year**

	1999-2000	2000-2001	2001-2002	2002-2003	2003-2004	2004-2005
Number of screens	219,994	224,917	225,064	232,951	222,549	234,678
Number of cancers Detected	884	827	966	981	945	1,000
Total Cost	\$10,299,642	\$11,358,867	\$12,560,751	\$13,016,098	\$13,005,919	\$13,401,773
Total cost per screen	\$46.82	\$50.50	\$55.81	\$55.87	\$58.44	\$57.11
Central Services	\$9.30	\$9.17	\$8.90	\$9.07	\$8.85	\$8.16
Other operating costs	\$29.03	\$29.35	\$31.35	\$31.29	\$34.26	\$33.75
Professional Reading Fees	\$6.12	\$9.36	\$13.00	\$13.39	\$13.39	\$13.39
Capital Allocation	\$2.37	\$2.62	\$2.56	\$2.13	\$1.93	\$1.81
Cost per cancer detected	\$11,651	\$13,735	\$13,003	\$13,268	\$13,763	\$13,402

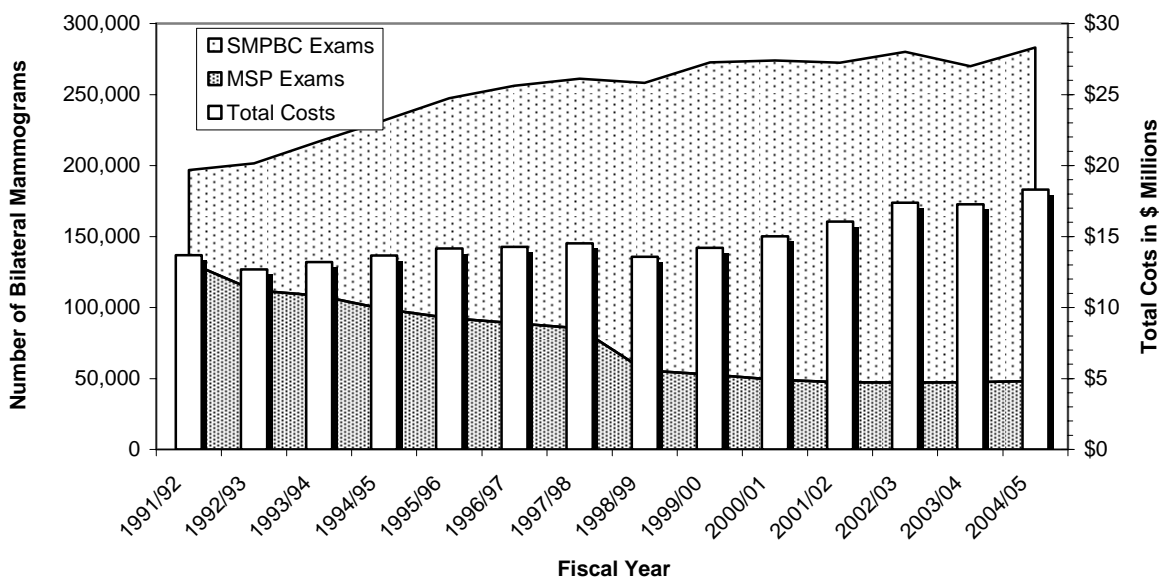
**Notes:**

1. Number of cancers detected in 2004-05 and cost per cancer is estimated because the final number of cancers is not determined yet.
2. Cost per screen per PHSA finance reports includes under and overpayments to screen providers.
3. Other operating costs include 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 is \$13.39 per screen effective April 2002.

Figure 6 shows the number and cost of bilateral mammography services paid through BC Medical Services Plan (MSP) and SMPBC over the last 14 fiscal years. The total annual number of bilateral mammograms provided to BC women age 40 and over increased by an average of 22,000 women through the early years of SMPBC but slowed down to an average increase of 9,000 women from fiscal year 1995/96 onwards.

It can be seen in the figure that the number of screens performed by SMPBC, as well as the number overall is now higher ever. The decrease in the number of screens performed by SMPBC in 2003/2004 was likely the result of a short-term decision to slightly delay recalling women age 40-49. For the most recent fiscal year (2004/2005), SMPBC provided 83% of all bilateral mammography services for women age 40 and over, and accounted for 73% of the total expenditure. Between 1991 and 2004 the total number of bilateral mammography services has increased by 44%, while the cost has increased by only 34%, and by only 6% after adjusting for inflation.

**Figure 6**  
**Bilateral Mammography in BC**  
**Age 40 and Over**



**NOTES ON MSP DATA:**

1. Data for bilateral mammography fee item 8611 on female patients only.
2. Data are reported for the fiscal years in which the services were provided.
3. 2004/05 contain payments to Aug. 15, 2005.
4. Data includes only MSP FFS claims, and excludes all out of province claims.

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- 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 also like to thank the following organizations for their ongoing support:

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

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Dr. Patrick Llewellyn  
Dr. Rob Johnson  
Dr. Joanne Coppola  
Dr. Henry Huey  
Dr. Lynn Jacobsen  
Dr. David O'Keeffe  
Dr. Richard Lee  
Dr. Ken Bentley  
Dr. Heather MacNaughton  
Dr. Jose Zambilowicz  
Dr. Phil Switzer  
Dr. Stuart Silver  
Dr. Ron Campbell  
Dr. Peter McNicholas  
Dr. Rasika Rajapakshe  
Ms. Lisa Kan

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## RADIOLOGIST SCREENERS

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**Abbotsford**

Dr. Lynn Jacobsen  
Dr. John Kreml  
Dr. Caroline Pon  
Dr. Tyrone Soodeen

**Burnaby**

Dr. Lynette Thurber  
Dr. Nancy Graham  
Dr. Brian Ho  
Dr. Elizabeth Tanton

**Comox**

Dr. Jose Zambilowicz  
Dr. Anthony Chilton  
Dr. Dave McKeown

**Coquitlam**

Dr. Heather MacNaughton  
Dr. Maria Kidney  
Dr. Carol Miller  
Dr. Philip Uhrich  
Dr. Anita McEachern

**Interior/Kootenay Mobile**

Dr. Kelly Silverthorn

**Kamloops**

Dr. Michael Clare

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

**Northern Region Mobile**

See Prince George

**North Vancouver**

Dr. Alistair Martin  
Dr. Barry Irish  
Dr. Patrick Llewellyn  
Dr. Catherine Phillips

**Penticton**

Dr. Peter McNicholas  
Dr. Blake Terriff

**Prince George**

Dr. Alasdair Leighton  
Dr. Chong Lim  
Dr. Larry Breckon  
Dr. Greg Shand  
Dr. Chuck Coffey

**Richmond**

Dr. Marty Jenkins  
Dr. Vee Lail  
Dr. Henry Huey  
Dr. Terry Warner

**Surrey**

Dr. Don Coish  
Dr. Guy Eriksen  
Dr. Dennis Janzen  
Dr. John Sisler  
Dr. Earl Tregobov

**Vancouver - BC Women's Health Centre**

Dr. Linda Warren  
Dr. Paula Gordon  
Dr. Pat Hassell

**Vancouver - Mount Saint Joseph Hospital**

Dr. Richard Lee

**Vancouver - Victoria Drive**

Dr. Phil Switzer  
Dr. Lorna Fulton  
Dr. Connie Siu

**Vancouver - #505 - 750 West Broadway**

Dr. Linda Warren  
Dr. Christine Wilson  
Dr. Nicola Lapinsky

**Vernon**

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

**Victoria - Richmond Ave**

Dr. Colin Lee  
Dr. Brent Lee

**Victoria – Victoria General Hospital**

Dr. Delmer Pengelly  
Dr. Stuart Silver  
Dr. John Wrinch

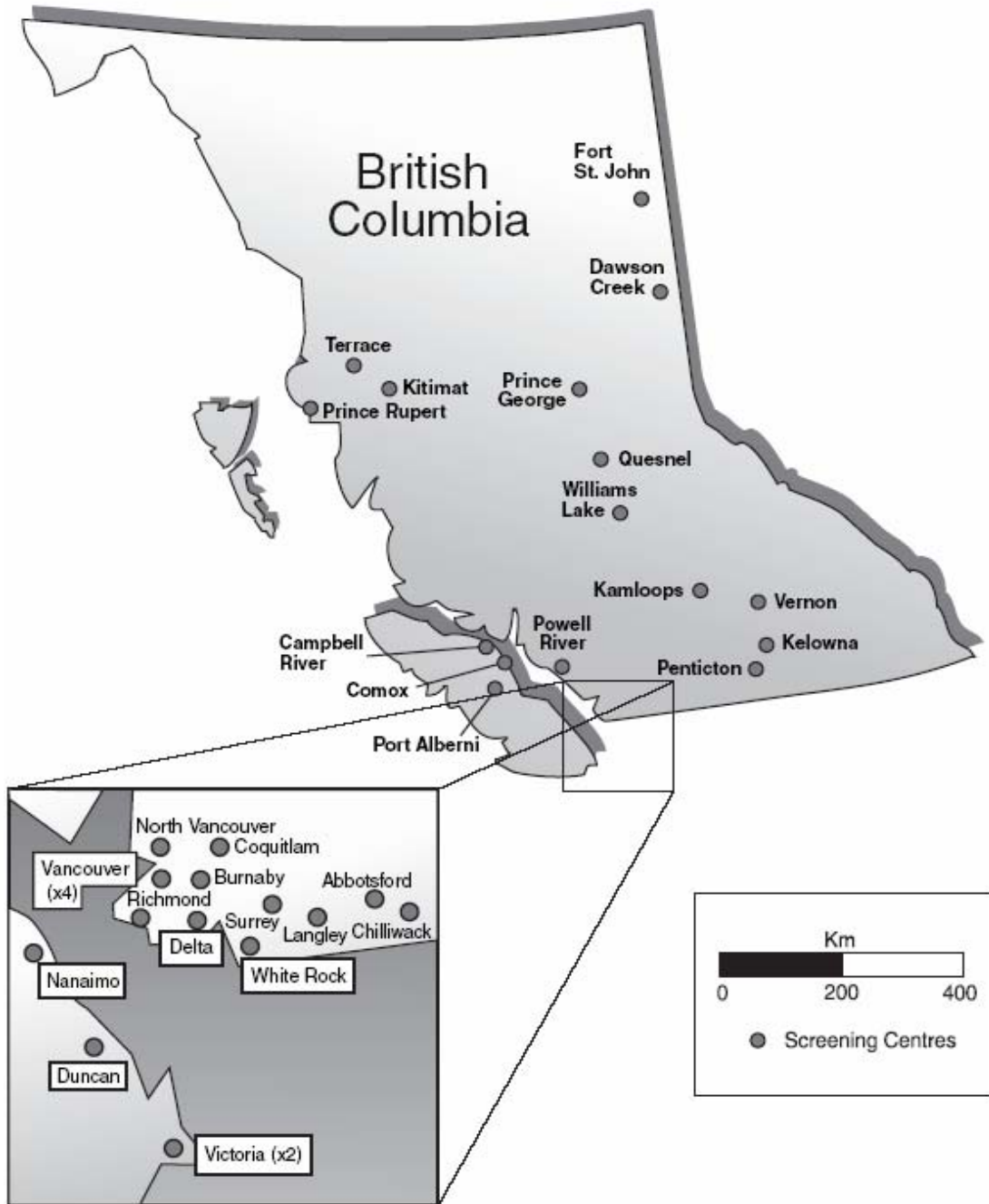
**White Rock**

Dr. Eleanor Clark  
Dr. Susan Hacking  
Dr. Joanne Coppola

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## FIXED SCREENING CENTRES

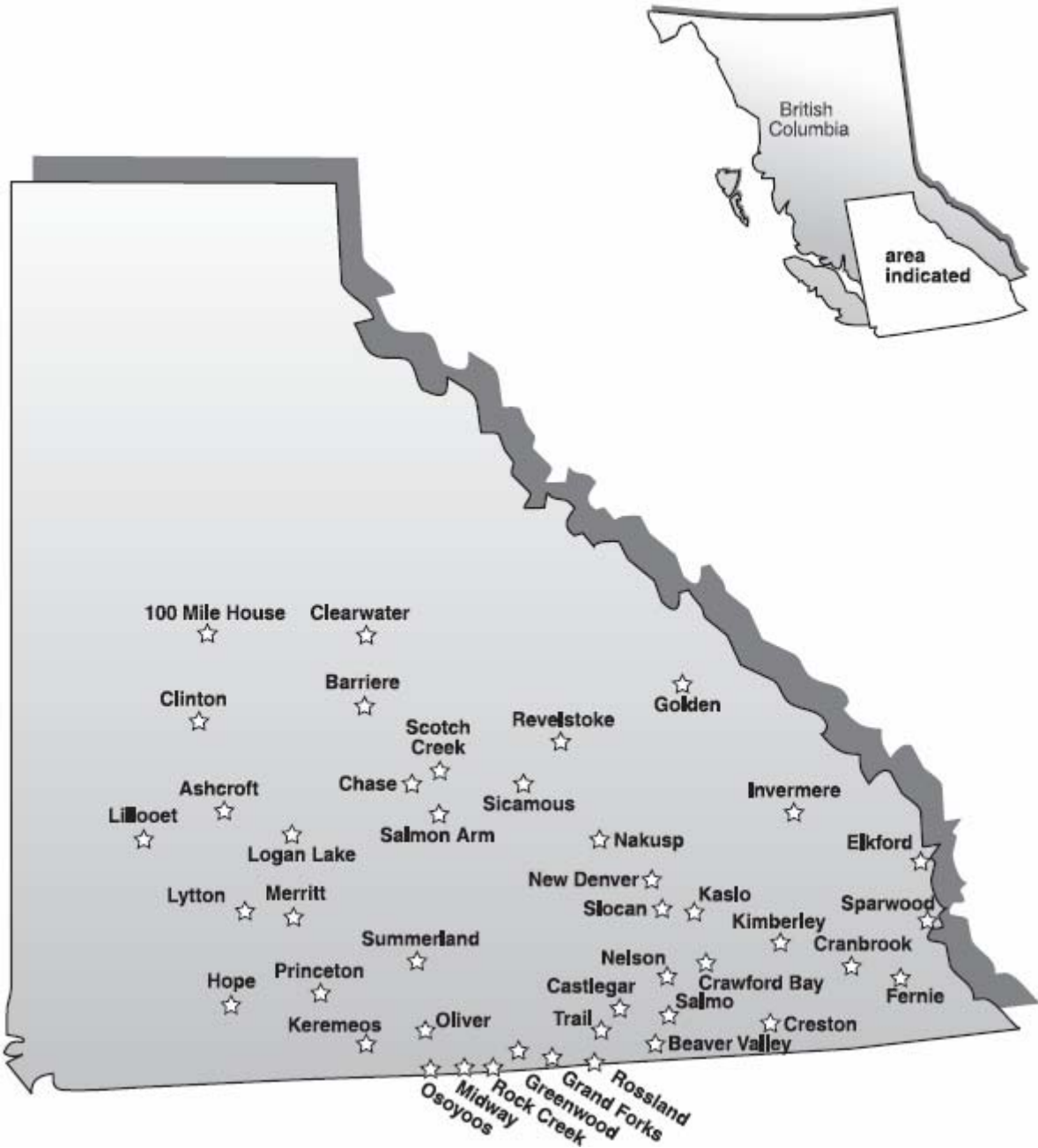
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## INTERIOR/KOOTENAY MOBILE

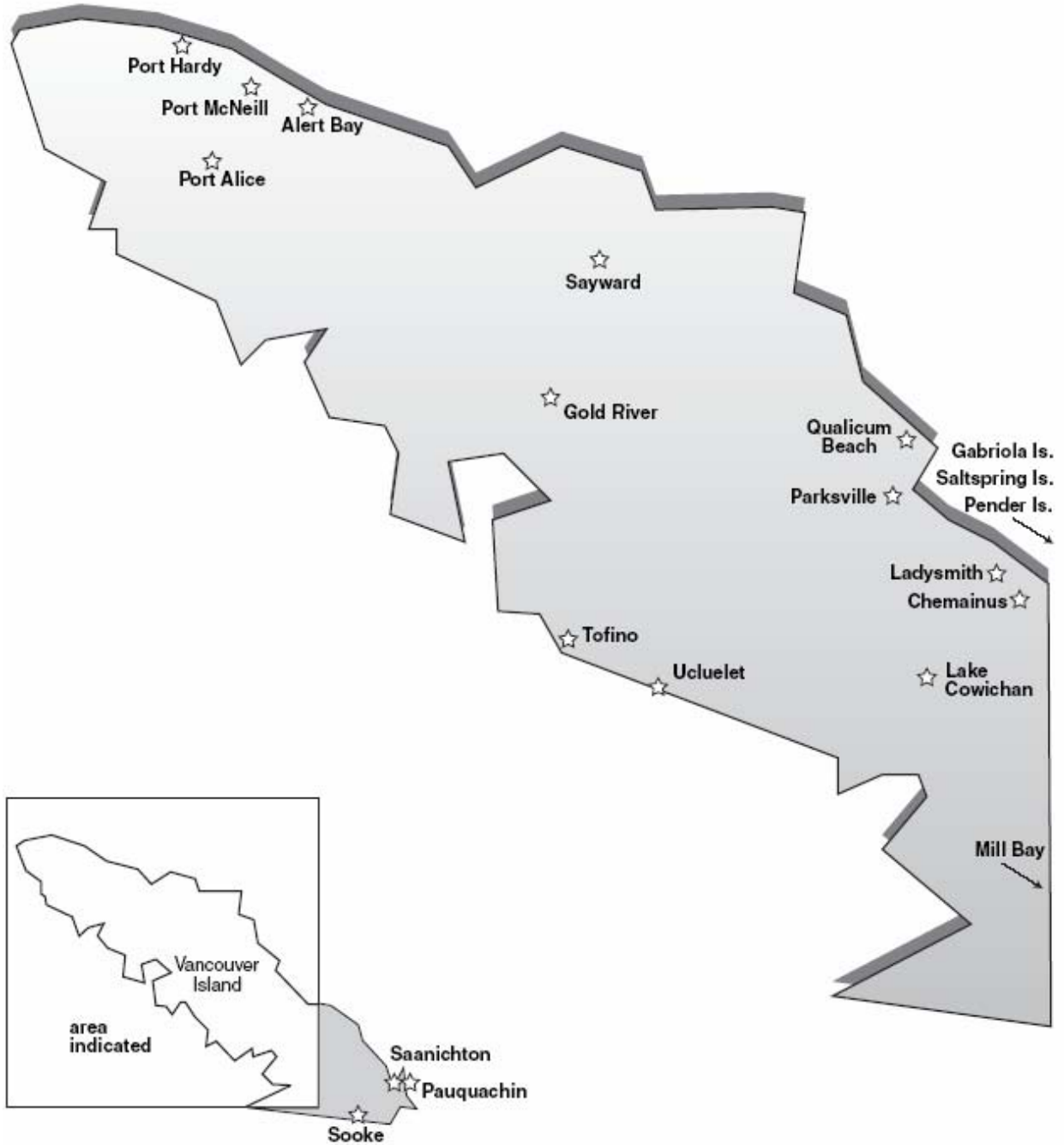
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## ISLANDS & COASTAL MOBILE

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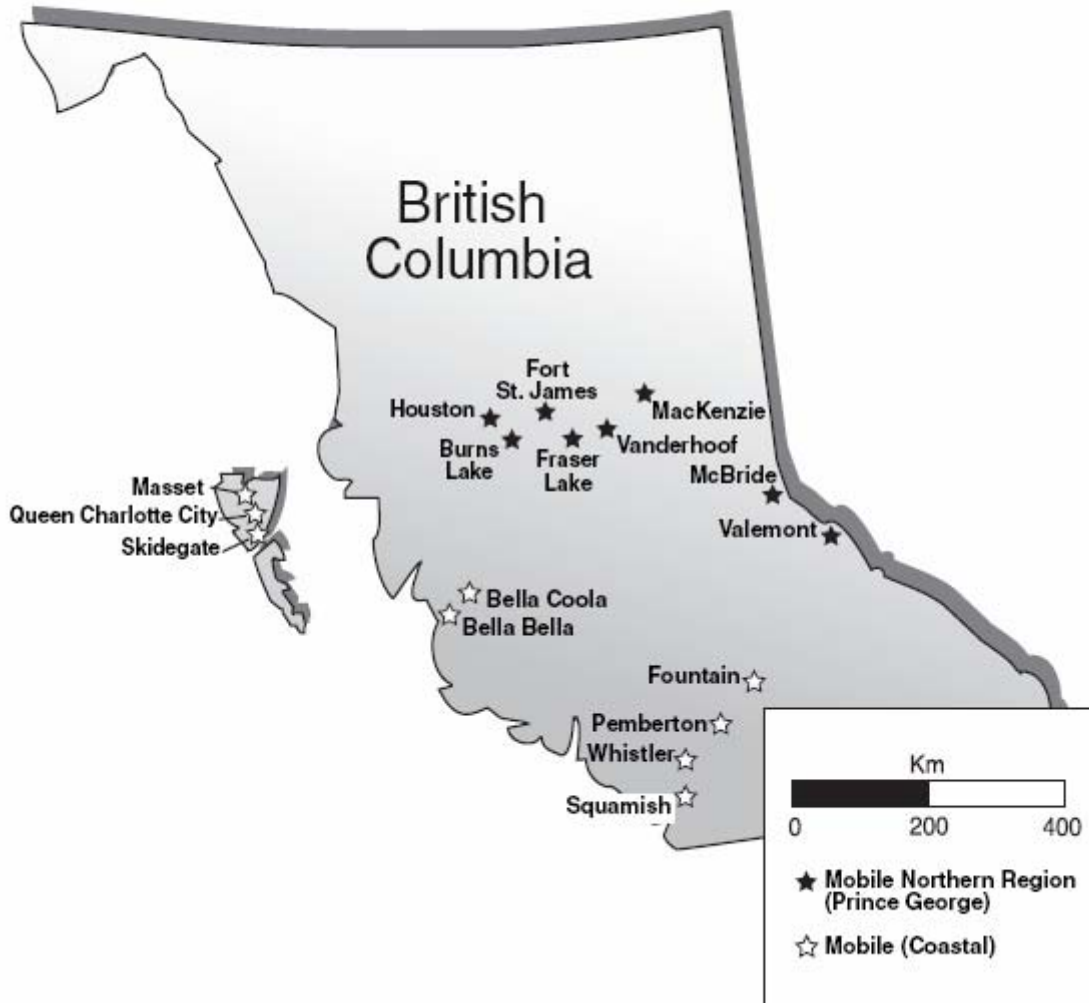




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## NORTHERN REGION & COASTAL MOBILE

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## SCREENING CENTRE PHONE NUMBERS

### FIXED SCREENING CENTRES

Abbotsford	604-851-7027	Prince George	250-565-6816
Burnaby	604-436-0691	Prince Rupert	1-800-663-9203
Campbell River	1-800-663-9203	Quesnel	1-800-663-9203
Chilliwack	1-800-663-9203	Richmond	604-244-5505
Comox	250-890-3020	Surrey	604-586-2772
Coquitlam	604-927-2130	Terrace	1-800-663-9203
Dawson Creek	1-800-663-9203	Vernon	250-549-5451
Delta	604-660-3639	White Rock	604-535-4512
Duncan	1-800-663-9203	Williams Lake	1-800-663-9203
Fort St. John	1-800-663-9203		
Kamloops	250-828-4916	<b>VANCOUVER:</b>	
Kelowna	250-861-7560	B.C. Women's Health Centre	604-775-0022
Kitimat	1-800-663-9203	Mount Saint Joseph Hospital	604-877-8388
Langley	604-514-6044	5752 Victoria Drive	604-321-6770
Nanaimo	250-716-5904	#505 - 750 West Broadway	604-879-8700
North Vancouver	604-903-3860		
Penticton	250-770-7573	<b>VICTORIA:</b>	
Port Alberni	1-800-663-9203	#104 - 2020 Richmond Avenue	250-952-4232
Powell River	1-800-663-9203	Victoria General Hospital	250-727-4338

### MOBILE SCREENING SERVICE DELIVERY AREAS

Toll-Free 1-800-663-9203

<b>Interior/ Kootenay</b>	Fountain	New Denver	Windermere	Parksville	Ucluelet
Ashcroft	Golden	Oliver	100 Mile House	Pauquachin	Whistler
Barriere	Grand Forks	Osoyoos		Pemberton	
Balfour	Greenwood	Princeton	<b>Islands &amp; Coastal</b>	Pender Island	<b>Northern BC</b>
Beaver Valley	Hope	Radium Hot Springs	Alert Bay	Port Alice	Burns Lake
Castlegar	Invermere	Revelstoke	Bella Bella	Port Hardy	Dease Lake
Chase	Kaslo	Rock Creek	Bella Coola	Port McNeill	Fort Nelson
Christina Lake	Keremeos	Rossland	Chemainus	Qualicum Beach	Fraser Lake
Clearwater	Ktunaxa/Kinbasket	Salmo	Fort Rupert	Queen Charlotte City	Fort St. James
Clinton	Kimberley	Salmon Arm	Gabriola	Saanichton	Houston
Cranbrook	Lillooet	Scotch Creek	Gold River	Saltspring Island	MacKenzie
Crawford Bay	Logan Lake	Sicamous	Ladysmith	Sayward	McBride
Creston	Lytton	Slocan	Lake Cowichan	Skidegate	Stewart
Elkford	Merritt	Sorrento	Massett	Sooke	Valemount
Enderby	Midway	Sparwood	Mill Bay	Squamish	Vanderhoof
Fernie	Nakusp	Summerland	Mount Currie	Tofino	
	Nelson	Trail			

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## PUBLICATIONS & PRESENTATIONS

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The following is a list of publications and presentations relating to the SMPBC and/or breast screening:

### Peer-Reviewed Publications

#### *Dr. Linda Warren*

Warren Burhenne, LJ. Routine Mammography is Associated with Earlier Stage Disease and Greater Eligibility to Breast Conservation in Breast Carcinoma Patients Age 40 Years and Older. *Breast Disease: A Year Book Quarterly* – Review (In Press)

Warren Burhenne, LJ. MRI Before Re-excision Surgery in Patients with Breast Cancer. *Breast Disease: A Year Book Quarterly* – Commentary (In Press)

Warren Burhenne, LJ. Changes in the Surgical Management of Patients with Breast Cancer. *Breast Diseases: A Year Book Quarterly* – Review (In Press)

Warren Burhenne, LJ. Screening Mammography Program of British Columbia: Standardized Test for Screening Radiologists. *Breast Disease: A Year Book Quarterly*

Wau, E.S., D'yachkova Y., Olivotto, I.A., Tyldesley, S., Phillips, N., Warren, L.J., Coldman, A.J. Comparison of 1 and 2-year Screening Intervals for Women Undergoing Screening Mammography. *British Journal of Cancer* (2005)92;961-966

#### *Dr. Andrew Coldman*

Wai E, Coldman AJ, Phillips N, Warren LJ. Comparison of 1 and 2 year screening intervals for women undergoing Screening Mammography. *BJC* 2005 (92):961-966.

Ragaz J, Olivotto IA, Spinelli JJ, Phillips N, Jackson SM, Wilson KS, Knowling MA, Coppin CM, Weir L, Gelmon K, Le N, Durand R, Coldman AJ, Manji M. Locoregional radiation therapy in patients with high-risk breast cancer receiving adjuvant chemotherapy: 20-year results of the British Columbia randomized trial. *J Natl Cancer Inst.* 2005 Jan 19;97(2):116-26.

Olivotto IA, Bajdik CD, Ravdin PM, Speers CH, Coldman AJ, Norris BD, Davis CJ, Chia SK, Gelmon KA. Population-based validation of the prognostic model ADJUVANT! For early breast cancer. *J Clin Oncol* 2005, 23:2716-25.

Coldman A, Phillips N, Warren L, Kan L. The effect of Screening Mammography on Breast Cancer Mortality in Women Aged 40-69. *CMAJ* 2005 [in press]

Coldman AJ, Major D, Doyle G, D'yachkova Y, Phillips N, Onysko J, Shumak R, Smith N and Wadden N. Analysis of Radiologists' Reading Volumes on Outcomes in Organised Breast Screening Programs in Canada. *Radiology* 2005 [in press]

#### *Dr. Paula Gordon*

Gordon PB. An Alternative clip-marking method for use after 14-gauge large core needle biopsy of the breast. *Can Assoc Radiol J* 2004; 55(2):75-8.

Chang SD, Abrahams Z, Gordon PB. Patient Compliance with Recommended Follow-up After Needle Biopsy of Solid Breast Masses. *Can Assoc Radiol J* 2005;56(1):36-39.

Gordon PB. Image-Directed Fine Needle Aspiration Biopsy In Nonpalpable Breast Lesions. *Clinics in Laboratory Medicine* 2005, [in press]

*Dr. Greg Hislop*

Tu S-P, Yasui R, Kuniyuki A, Schwartz S, Jackson JC, Hislop G, Taylor V. Mammography screening among Chinese American women. *Cancer* 2003; 97: 1293-1302

## **Presentations and Lectures**

*Dr. Linda Warren*

“Artefacts and Normal Variants”  
Physics for Radiology Residents  
University of British Columbia  
May 2, 2004

“Selection, Training and Monitoring of Interpreting Radiologists For Mammography”  
“Missed Cancers and Proficiency Benchmarks”  
23rd International Congress of Radiology of the International Society of Radiology  
Montreal, Quebec  
June 24, 2004

“Selection, Training and Monitoring of Interpreting Physicians  
The Radiological Society of North America, Chicago, ILL  
November 29, 2004

*Dr. Marilyn Borugian*

Pan Canadian Study of Reader Volumes  
Annual meeting of the U.S. Breast Cancer Surveillance Consortium, Vancouver, BC  
April 18, 2005

*Dr. Paula Gordon*

Ultrasound-Guided Interventional Procedures *and* Ultrasound for Screening and Staging of Breast Cancer  
6th Annual World Class Breast Imaging: Imaging, Intervention and Innovation  
Sponsored by Loma Linda University, Vancouver, BC  
July 27, 2004

Breast Ultrasound, MSK and Small Parts Ultrasound, St. Paul’s Continuing Educational Seminar  
St. Paul’s Hospital, Vancouver, BC  
October 2, 2004

Minicourse: Practical Answers for Complex Imaging Questions—Hands-on/How to: Small Parts  
Ultrasound (“Hands-on” Workshop), Ultrasound Guided Breast Interventional Procedures (“Hands-on”  
Workshop), Radiological Society of North America Annual Meeting  
Chicago, IL  
December 1 & 2, 2004

New BC Screening Mammography Guidelines  
Women’s Mid-Life Years; Heart/Breast/Bone: Putting it all Together  
UBC Interprofessional Continuing Education, Vancouver, BC  
April 8, 2005

Ultrasound Diagnosis and Intervention  
Society of Breast Imaging - 7th Postgraduate Course  
Vancouver, BC  
May 28, 2005

# APPENDIX

## **Cancer Screening Program Overview**

### **Definition of Screening**

Primary prevention of cancer involves changes of behavior or habits that reduce a risk e.g. stop smoking, low fat diet etc. Screening for cancer is a secondary prevention strategy.

Secondary prevention of cancer is distinguished from primary prevention in that it is an intermediate intervention that targets disease in process<sup>1</sup>. 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.”<sup>2</sup>

### **Limitations of Screening**

The decision to screen an at-risk population for preclinical signs of cancer is based on well-established criteria related to the disease in question and the screening tests that re-used to identify individuals who may have occult disease.<sup>3,4,5</sup> Although the overall objective of a screening program is to reduce morbidity and mortality from cancer, the goal of screening per se is the “application of a relatively simple, inexpensive test to a large number of persons in order to classify them as likely, or unlikely to have the cancer which is the object of the screen.” 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 on 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 relationships between these components are illustrated in the figure below. The success of screening is a shared responsibility of the team of individuals who work together to develop goals, set standards, monitor progress, and continue improvement in each of the six components.

### **Footnotes**

<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 University 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

## SMPBC Screening Recommendations

Age	Referral Required	Recall Frequency
<40	Yes	will accept with primary health care provider referral
40-49	No	Reminders* for 12-, 24-month anniversary
50-79	No	Reminders* for 24-, 36-month anniversary
80+	Yes	will accept with primary health care provider referral

*\*a second reminder letter will be sent if no visit/appointment is made 4-6 weeks after the first reminder is sent*

### **Age <40 (with primary health care provider referral only)**

Primary health care providers may wish to refer women age <40 with a strong family history of breast or ovarian cancer (ie. 2 or more 1st degree family members), to be screened at the SMPBC. 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 SMPBC asks that each screening exam for women age <40 be arranged by primary health care providers after consultation with a radiologist at the SMPBC centre of choice. The primary health care provider should provide the woman with a referral slip citing the approving radiologist screener's name.

Exception: For women whose 40th birthday is  $\leq 3$  months away, refer to the following policy

### **Age 40-79 (self-referral)**

Following recommendations from the BCCA Breast Tumour Group, the SMPBC invites eligible women aged 40 to 79 to have a screening mammogram at least every two years. Research studies show that 25-30% fewer breast cancer deaths can be expected in women if they have regular screening mammograms between ages 50 and 69. To achieve this, at least 70% of eligible women in this age group must have regular screening mammography.

### **Age 80+ (with primary health care provider referral only)**

Primary health care providers may wish to refer women age 80+ in good general health (life expectancy of 10+ years), for screening at the SMPBC. The possible benefits of screening mammography in light of other potential health concerns at this age should be discussed with the women. Therefore, the SMPBC asks that each screening exam for women age 80+ be referred by primary health care providers to the SMPBC centre of choice.

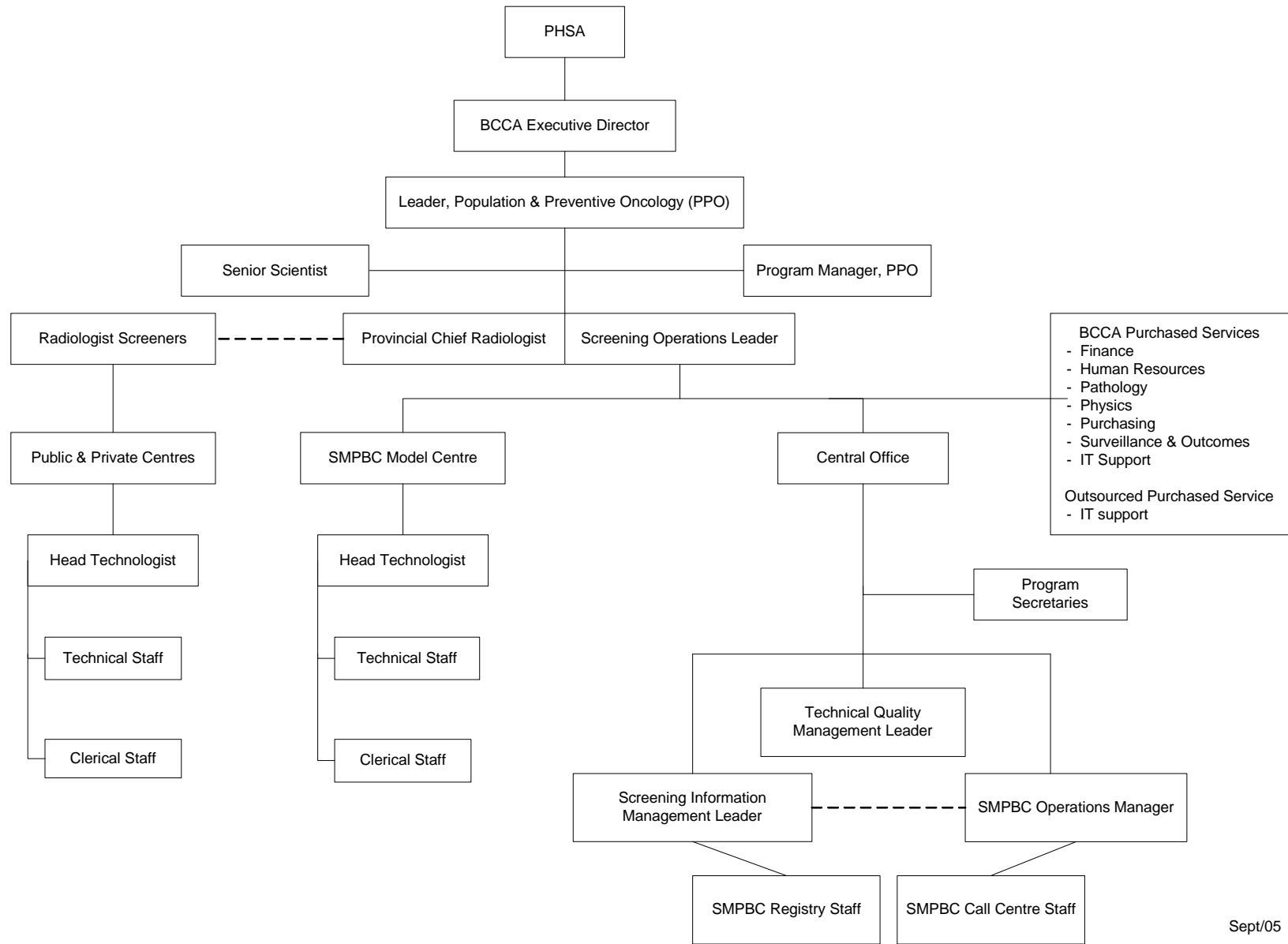
### **SMPBC Eligibility Criteria**

- All B.C. women between the ages of 40 to 79 who:
- Have no breast changes (e.g. new lumps, thickening, or discharge)\*\*
- Can provide the name of a doctor to receive the results
- Have not had a mammogram within 12 months
- Have not had breast cancer
- Do not have breast implants
- Are not pregnant or breast feeding

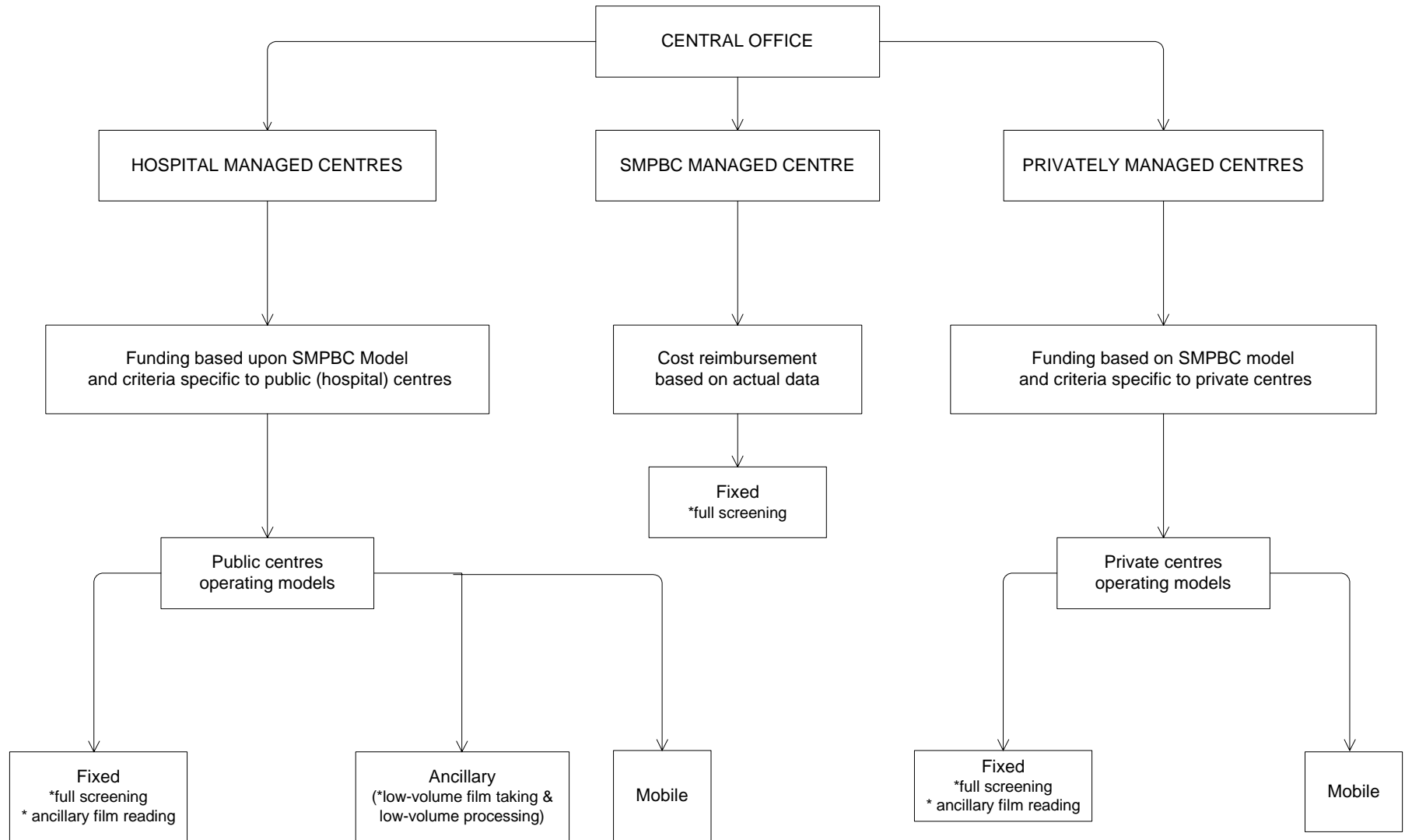
*\*\*If there is a new lump, thickening or discharge, we recommend seeing a doctor immediately, even if the last mammogram was normal.*



# BCCA/SMPBC Organization & Communication Chart



# SMPBC Screening Centre Management Models



\*recruitment, registration, film taking, processing and interpretation

## Glossary

### Abnormal Call Rate

Proportion of screening mammography examinations determined to require further diagnostic assessment (*ie. called "abnormal"*).

$$\text{Abnormal call rate} = \frac{\text{number of exams called abnormal}}{\text{total number of exams}}$$

### Biopsy Yield Ratio

Proportion of cases biopsied that resulted in a diagnosis of breast cancer.

$$\text{Biopsy Yield Ratio} = \frac{M_b}{B_b + M_b}$$

$B_b$  number of cases with without breast cancer on screen-initiated biopsy

$M_b$  number of women found to have breast cancer on screen-initiated biopsy

**Biopsy Yield Ratio** which is sometimes referred to as **Positive Predictive Value of Biopsy**, can also be expressed as **Malignant: Benign Ratio** or **Benign:Malignant Ratio**.

$$\text{Malignant : Benign Ratio} \Rightarrow \frac{M_b}{B_b} : 1$$

$$\text{Benign : Malignant Ratio} \Rightarrow \frac{B_b}{M_b} : 1$$

### Cancer Detection Rate

Proportion of screened cases found to have breast cancer upon further investigation of an "abnormal" screening result.

**Prevalent Cancer Detection Rate** is the cancer detection rate on first screening examinations

**Incident Cancer Detection Rate** is the cancer detection rate on subsequent screening examinations

### Interval Cancer Rate

Proportion of women being diagnosed with breast cancer by within 12 months of having a "normal" screening result.

### False Negative Rate

Probability of interpreting screening mammograms of breast cancer cases as "normal".

$$\text{False Negative Rate} = \frac{FN}{TP + FN}$$

- TP      number of breast cancer cases found at screening  
FN      number of breast cancer cases diagnosed within 12 months of screening

### False Positive Rate

Probability of interpreting screening mammograms of cases with no evidence of breast cancer as "abnormal".

$$\text{False Positive Rate} = \frac{FP}{TN + FP}$$

- 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"

### Positive Predictive Value (PPV) of Screening Mammography

Proportion of "abnormal" cases found to have breast cancer after diagnostic workup

$$PPV = \frac{\text{number of 'screen - detected' cancers}}{\text{number of abnormal} - \text{number of unknowns}}$$

### Prevalence to Expected Incidence Ratio

Comparison between 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 5-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 age 50-79 would be calculated by summing over age groups 50-54, 55-59, 60-64, 65-69, 70-74 and 75-79 in the numerator and denominator.

### Sensitivity

Probability of interpreting screening mammograms of breast cancer cases as "abnormal". It measures how well screening mammography determines the presence of breast cancer.

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

TP     number of breast cancer cases called "abnormal"  
FN     number of breast cancer cases called "normal"

### 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.

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

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"

# Screening Programs Educational Material Order Form

Educational materials are free of charge. Pamphlets are in bundles of 25. Please indicate number of bundles.

## SCREENING MAMMOGRAPHY

### Are you a woman over 40?

English \_\_\_\_\_  
Chinese \_\_\_\_\_  
Punjabi \_\_\_\_\_

\*\*A translated version in other languages is available from our website: [www.bccancer.bc.ca/breastscreening](http://www.bccancer.bc.ca/breastscreening)

### What Happens When You Come for a Screening Mammogram

English \_\_\_\_\_

### After Your Screening Mammography

English \_\_\_\_\_

### SMPBC Appointment Pads (25 tear-off sheets)

Lower Mainland Mammography Centre Locations

English  1 pad  5 pads

### 1-800 # to book Mammography appointments

English  1 pad  5 pads  
Chinese  1 pad  5 pads  
Punjabi  1 pad  5 pads

### VIDEOS or DVD:

*A Step Ahead of Breast Cancer* (Produced 1998) – Educational video about the importance of screening mammograms for the early detection of breast cancer.

*A New Pathway to Women's Health* (Produced 2001 Cantonese and Mandarin)) – Motivational message for Chinese women to attend for Pap smear screening.

*Speculum Exam and Pap Smear Video or DVD* (Produced 2000) – An instructional video about obtaining cervical smears for smear takers to improve the overall quality of the Pap smears submitted to the Cervical Cancer Screening Program.

## CERVICAL SCREENING

### Questions and Answers About Screening for Cancer of the Cervix - Pap Smear

English \_\_\_\_\_  
Chinese \_\_\_\_\_

### Understanding Pap Smear Results

English \_\_\_\_\_

### Laminated Card:

Technique for Obtaining Cervical Smears (pages 6-7 of Office Manual)

English  1 copy

### Office Manual for Health Professionals "Screening for Cancer of the Cervix"

\*\*For an electronic version of the Office Manual, please see [www.bccancer.bc.ca/HPI/Education](http://www.bccancer.bc.ca/HPI/Education)

## HEREDITARY SCREENING

### Hereditary Cancer: Is My Family at Risk?

English \_\_\_\_\_

NAME: _____ (print clearly)
ADDRESS: _____
CITY: _____ POSTAL CODE: _____

FAX TO: 604-660-3645

## SMPBC Centre Volume Year: 2004

Screening Centre	Type	Total Exams	Ave per Day	Age Distribution of All Exams					First Exams		Age Distribution of First Exams				
				40-49	50-59	60-69	70-79	80+	n	% total	40-49	50-59	60-69	70-79	80+
Abbotsford	F	8,992	38	32%	32%	21%	14%	0%	1,253	14%	68%	20%	8%	4%	0%
Burnaby	F	13,683	53	35%	32%	20%	13%	1%	1,891	14%	71%	16%	9%	3%	1%
Comox	F	3,541	18	28%	32%	26%	14%	0%	482	14%	55%	23%	17%	4%	0%
Coquitlam	F	14,669	61	41%	32%	18%	9%	0%	2,159	15%	75%	17%	5%	2%	0%
Kamloops	F	7,440	33	30%	33%	23%	13%	0%	759	10%	75%	17%	6%	1%	0%
Kelowna	F	10,649	44	30%	29%	24%	16%	0%	1,207	11%	69%	17%	9%	4%	0%
Langley	F	6,184	27	39%	31%	19%	11%	0%	1,041	17%	69%	21%	7%	2%	0%
Nanaimo	F	8,310	30	27%	33%	25%	15%	0%	1,006	12%	58%	24%	13%	3%	0%
North Shore	F	11,804	48	33%	32%	21%	13%	1%	1,406	12%	71%	19%	6%	2%	0%
Penticton	F	3,546	20	26%	28%	27%	18%	1%	535	15%	51%	24%	15%	7%	1%
Prince George	F	5,157	25	35%	38%	18%	8%	0%	607	12%	76%	17%	4%	1%	0%
Richmond	F	12,827	47	38%	35%	17%	9%	1%	1,700	13%	71%	18%	7%	3%	0%
Surrey	F	15,342	56	38%	33%	19%	9%	0%	2,276	15%	68%	20%	9%	3%	0%
Vancouver - Victoria Drive	F	9,267	36	42%	31%	17%	10%	0%	1,865	20%	67%	20%	9%	3%	0%
Vancouver – West Broadway	F	10,928	68	35%	35%	19%	11%	1%	1,717	16%	65%	22%	8%	3%	0%
Vancouver – BC Women's	F	8,644	37	35%	37%	18%	10%	0%	940	11%	71%	18%	6%	3%	0%
Vancouver – Mount St. Joseph	F	6,943	25	39%	32%	19%	10%	0%	1,103	16%	68%	19%	10%	3%	0%
Vernon	F	5,916	22	27%	31%	26%	15%	1%	668	11%	61%	22%	10%	3%	1%
Victoria Centre	F	15,225	61	25%	34%	22%	17%	1%	1,698	11%	62%	23%	9%	4%	0%
Victoria General	F	6,082	25	34%	32%	21%	12%	1%	781	13%	68%	21%	7%	3%	0%
White Rock	F	7,036	25	31%	32%	21%	15%	0%	789	11%	66%	20%	9%	3%	0%
Islands & Coastal Mobile	M	5,885	38	26%	32%	25%	16%	1%	825	14%	56%	27%	11%	4%	0%
Terrace Mobile	M	79	26	33%	42%	22%	3%	0%	26	33%	62%	35%	0%	0%	0%
Interior/Kootenay Mobile	M	13,133	50	27%	32%	26%	15%	1%	1,853	14%	60%	22%	12%	4%	0%
Northern Region Mobile	M	1,133	40	38%	34%	19%	9%	0%	184	16%	72%	18%	8%	1%	0%
Campbell River	A	1,960	19	33%	36%	19%	10%	0%	243	12%	60%	23%	10%	4%	1%
Chilliwack.	A	2,732	19	24%	28%	27%	20%	1%	327	12%	57%	20%	16%	5%	1%
Dawson Creek	A	910	17	33%	33%	23%	11%	0%	114	13%	69%	17%	10%	4%	1%
Delta	A	2,653	23	33%	32%	21%	13%	1%	372	14%	72%	19%	6%	1%	1%
Duncan	A	2,271	10	24%	32%	26%	17%	1%	261	11%	53%	26%	13%	6%	2%
Fort St. John	A	826	21	35%	37%	18%	9%	0%	140	17%	70%	22%	6%	1%	0%
Kitimat	A	491	12	43%	29%	19%	10%	0%	73	15%	74%	12%	10%	3%	0%
Port Alberni	A	1,390	9	28%	34%	26%	13%	0%	173	12%	63%	16%	16%	5%	1%
Powell River	A	1,305	23	27%	34%	24%	15%	0%	114	9%	62%	26%	8%	4%	0%
Prince Rupert	A	710	17	38%	37%	16%	9%	0%	112	16%	68%	18%	10%	1%	1%
Quesnel	A	1,049	17	30%	38%	21%	10%	0%	129	12%	60%	28%	9%	2%	0%
Terrace	A	857	8	36%	36%	19%	9%	0%	114	13%	81%	14%	4%	1%	0%
Williams Lake	A	1,257	10	32%	36%	23%	8%	0%	186	15%	59%	29%	10%	2%	1%
<b>Program</b>		<b>230,826</b>		<b>33%</b>	<b>33%</b>	<b>21%</b>	<b>13%</b>	<b>0%</b>	<b>31129</b>	<b>13%</b>	<b>67%</b>	<b>20%</b>	<b>9%</b>	<b>3%</b>	<b>0%</b>

Type: A=Ancillary centre, F=Fixed centre, M=Mobile service

## Anonymous Listing of Outcome Indicators by SMPBC Centre

Centre	Type	Year: 2004					Preceding 2 Years: 2002-2003							
		% Called Abnormal	Cancer Detection Rate (per 1000)			PPV	% Called Abnormal	Cancer Detection Rate (per 1000)			PPV	In-Situ : Invasive (number)	% Invasive ≤15 mm	% Invasive with +iv nodes
			Overall	First Screens	Subsequent Screens			Overall	First Screens	Subsequent Screens				
A	F	5%	4.1	5.0	3.9	9%	5%	3.9	3.6	4.0	8%	27 : 66	70%	21%
B	F	5%	4.4	5.8	4.2	10%	5%	4.2	6.7	3.9	9%	19 : 73	63%	34%
C	F	5%	4.2	2.1	4.6	9%	7%	4.0	7.0	3.5	6%	8 : 20	75%	20%
D	F	9%	4.1	4.8	3.9	4%	9%	4.2	5.3	3.9	4%	10 : 36	75%	6%
E	F	8%	3.5	4.2	3.4	4%	8%	3.8	4.4	3.7	5%	27 : 82	65%	17%
F	F	3%	2.5	2.6	2.5	7%	4%	4.1	2.0	4.5	10%	10 : 35	89%	15%
G	F	6%	4.2	7.5	3.7	8%	8%	6.3	6.2	6.4	8%	8 : 36	56%	25%
H	F	12%	4.9	7.2	4.5	4%	10%	4.0	4.4	3.9	4%	22 : 46	52%	28%
I	F	5%	3.7	3.0	3.8	7%	6%	4.3	5.8	4.1	8%	9 : 40	75%	25%
J	F	8%	3.8	3.2	3.9	5%	7%	4.0	4.6	3.9	6%	17 : 58	67%	23%
K	F	5%	5.5	5.0	5.6	11%	5%	5.0	3.0	5.2	11%	13 : 65	69%	27%
L	F	5%	3.5	7.1	3.0	7%	5%	4.2	2.3	4.4	9%	17 : 113	70%	26%
M	F	9%	3.6	4.0	3.5	4%	9%	4.4	4.9	4.3	5%	44 : 92	62%	19%
N	F	11%	4.8	3.6	5.0	4%	9%	4.5	4.5	4.5	5%	23 : 76	70%	26%
O	F	11%	4.3	3.8	4.3	4%	10%	6.2	5.2	6.4	7%	19 : 69	75%	20%
P	F	8%	3.5	4.7	3.3	4%	8%	4.0	6.3	3.6	5%	31 : 72	63%	30%
Q	F	6%	2.7	0.0	3.1	4%	7%	2.9	3.6	2.8	4%	7 : 22	59%	20%
R	F	7%	2.2	4.8	1.7	3%	8%	3.6	3.9	3.6	5%	10 : 42	64%	20%
S	F	8%	4.5	5.8	4.2	6%	8%	5.1	8.4	4.6	7%	31 : 107	75%	17%
T	F	4%	3.9	4.0	3.9	9%	4%	3.3	2.5	3.4	9%	14 : 31	65%	17%
U	F	6%	3.6	4.3	3.4	6%	5%	3.4	4.8	3.0	7%	11 : 43	65%	17%
V	M	5%	4.5	3.8	4.6	9%	6%	4.7	5.8	4.5	8%	25 : 88	64%	27%
Z	M	0%	12.7	0.0	18.9	13%								
AA	M	5%	5.1	4.9	5.1	11%	4%	4.5	3.3	4.7	11%	12 : 43	77%	29%
AB	M	6%	1.8	0.0	2.1	3%	6%	2.8	0.0	3.3	5%	2 : 4	50%	25%
AC	A	4%	4.8	3.9	5.0	11%	4%	4.1	1.3	4.6	10%	5 : 16	56%	29%
AD	A	5%	6.1	8.8	5.9	12%	5%	5.2	4.1	5.3	11%	2 : 10	70%	44%
AE	A	5%	1.2	7.4	0.0	2%	7%	6.0	9.0	5.5	9%	1 : 9	89%	11%
AF	A	5%	0.0	0.0	0.0	0%	8%	6.2	17.9	4.0	8%	1 : 8	75%	33%
AG	A	11%	5.1	6.2	5.0	4%	11%	5.0	3.4	5.2	5%	7 : 26	65%	13%
AH	A	4%	5.6	10.8	4.7	14%	4%	2.2	4.7	1.8	6%	2 : 4	50%	50%
AI	A	6%	0.0	0.0	0.0	0%	6%	4.4	0.0	5.2	7%	0 : 5	60%	20%
AJ	A	8%	4.4	17.7	2.5	6%	6%	1.1	0.0	1.3	2%	0 : 2	50%	50%
AK	A	9%	2.6	5.4	2.2	3%	9%	4.6	2.9	4.8	5%	2 : 20	75%	19%
AL	A	5%	6.6	8.3	6.4	15%	4%	5.7	7.9	5.3	13%	6 : 18	44%	24%
AM	A	7%	6.7	7.8	6.5	9%	7%	3.4	0.0	3.8	5%	0 : 7	86%	14%
AN	A	5%	5.0	17.3	3.3	10%	5%	4.8	10.0	3.9	10%	5 : 8	88%	29%
AO	A	8%	2.3	0.0	2.7	3%	7%	2.1	3.1	1.9	3%	1 : 3	67%	33%
<b>Program</b>		<b>7%</b>	<b>4.0</b>	<b>4.8</b>	<b>3.9</b>	<b>6%</b>	<b>7%</b>	<b>4.3</b>	<b>4.8</b>	<b>4.2</b>	<b>6%</b>	<b>Standard:</b>	<b>&gt; 50%</b>	<b>&lt; 30%</b>

**Notes:**

**Individual centre identification is provided to the affected centre(s) only.**  
**Type:** Ancillary centre, Fixed centre, Mobile service

**Cancer detection rate** is the proportion of cases found to have breast cancer by screening mammography  
**Positive predictive value (PPV)** is the percent of abnormal findings found to have breast cancer after screen-initiated diagnostic workup