

2002/2003 Annual Report

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2002/2003 ANNUAL REPORT

Evaluation Form

An Annual Report is a document that should impart the results, activities and philosophies of an organization to its members, affiliates and supporters. The information contained therein should be concise, easily understood, clearly laid out, attractive and informative.

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7. What other information would you like to see included in next year's Annual Report?

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MESSAGE FROM THE PROVINCIAL CHIEF RADIOLOGIST

The 15th year of operation of the Screening Mammography Program of BC (SMPBC) has been characterized by both progress and change.

The establishment of “Fast Track”, or facilitated referral, for diagnostic imaging is now well established with documented improvement in the time involved from an abnormal screening mammogram to diagnosis. There are now 1130 general practitioners and 51 diagnostic facilities participating throughout the province. Early results of the improvements are currently being analyzed. The response to the program has been very positive from both physicians and patients.

In the 2002/2003 fiscal year, the SMPBC provided 232,951 screens to BC women in the face of budgetary challenges and increasing costs. Province-wide participation of women in the 50-74 age group over the latest 24-month period was 49%.

Close cooperation between the Physics and Quality Management teams has resulted in an improvement in the proportion of centres that have achieved Canadian Association of Radiologists (CAR) Accreditation. Special commendation goes to Kathy Grabher, Provincial Professional Practice Leader, RTR, for her tireless efforts on this project.

As well, as a quality improvement measure, a new standardized interpretation test for candidate radiologist screeners has been developed and will be put in place this year. The completion of this project represents the coordinated efforts of not only Program staff, but also teams of volunteer screeners. The new test sets will be more user friendly for radiologist screeners and will render analysis by Program staff more efficient.

Education has always been an important Program feature. Planning for a joint Forum of BC Women’s Hospital and the SMPBC has been ongoing for the past two years, and will be held in October 2003. The program has attracted international expert speakers not only from Canada, but also from the United States and Sweden including Program mentors, Dr. Laszlo Tabar and Dr. Edward Sickles whose work has contributed greatly to the world’s body of knowledge on the field of mammography screening. Such meetings, which are for the benefit of BC screening professionals, bring international attention to the SMPBC. At the same time, the input of the experts invariably contributes to the potential for improvement in the expertise of our professionals.

However, perhaps the most significant event of this year was the retirement of Ms. Sheila King, Screening Operations Leader. Over the past 13 years, Ms. King devoted her entire energy to absolutely every aspect of the Program’s operation and development. Her management skills and diplomacy have set the standard for many others; and in many ways her style has personified the SMPBC. It will be impossible to measure her accomplishments; however, all of us wish her the same immeasurable success in her retirement.

Ms. King is succeeded by Ms. Lisa Kan, whose training as a statistician and experience as the Program's Evaluator have afforded her a broad knowledge of all aspects of Program operation. I know Ms. Kan will bring her own brand of confidence and expertise to her new leadership role. All of us are enormously grateful to Ms. King and we are absolutely sure that Ms. Kan will bring great pride to the Program as well.

Together with Dr. Andy Coldman and Ms. Lisa Kan, I am enormously grateful for the personal efforts of our technical, clerical and Central Office staff as well as the screening radiologists for their teamwork. Mortality rates from breast cancer in BC continue to be lower than those in other provinces of similar population. This is considered to be a direct result of early detection with screening, and appropriate and timely therapy. These successes could not have been achieved without the devotion of Program professionals and the loyalty of the public. Thanks to everyone for all you have done.

Dr. Linda Warren
Provincial Chief Radiologist

INTRODUCTION

The Screening Mammography Program of BC (SMPBC) has been in operation since 1988. There are currently 38 screening centres/services providing service to over 100 communities throughout the province.

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 implant, or if they currently have breast symptoms requiring diagnostic investigation.

The Screening Process

The basic screening process (see Figure 1) can be described in three stages:

- Identification and invitation of the target population
- Provision of the screening examination
- Investigation of abnormality identified on screening examination

Promotion, Recruitment & Recall

The SMPBC develops and distributes educational material to doctor offices, health units, libraries, and other interested organizations. The information brochures and cards 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 screening appointments. A Volunteer Handbook outlining guidelines to support the volunteers and standards to ensure effective risk management was developed in 2003.

The SMPBC information system facilitates invitation and recall 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.

See Appendix for current listing of other special outreach activities.

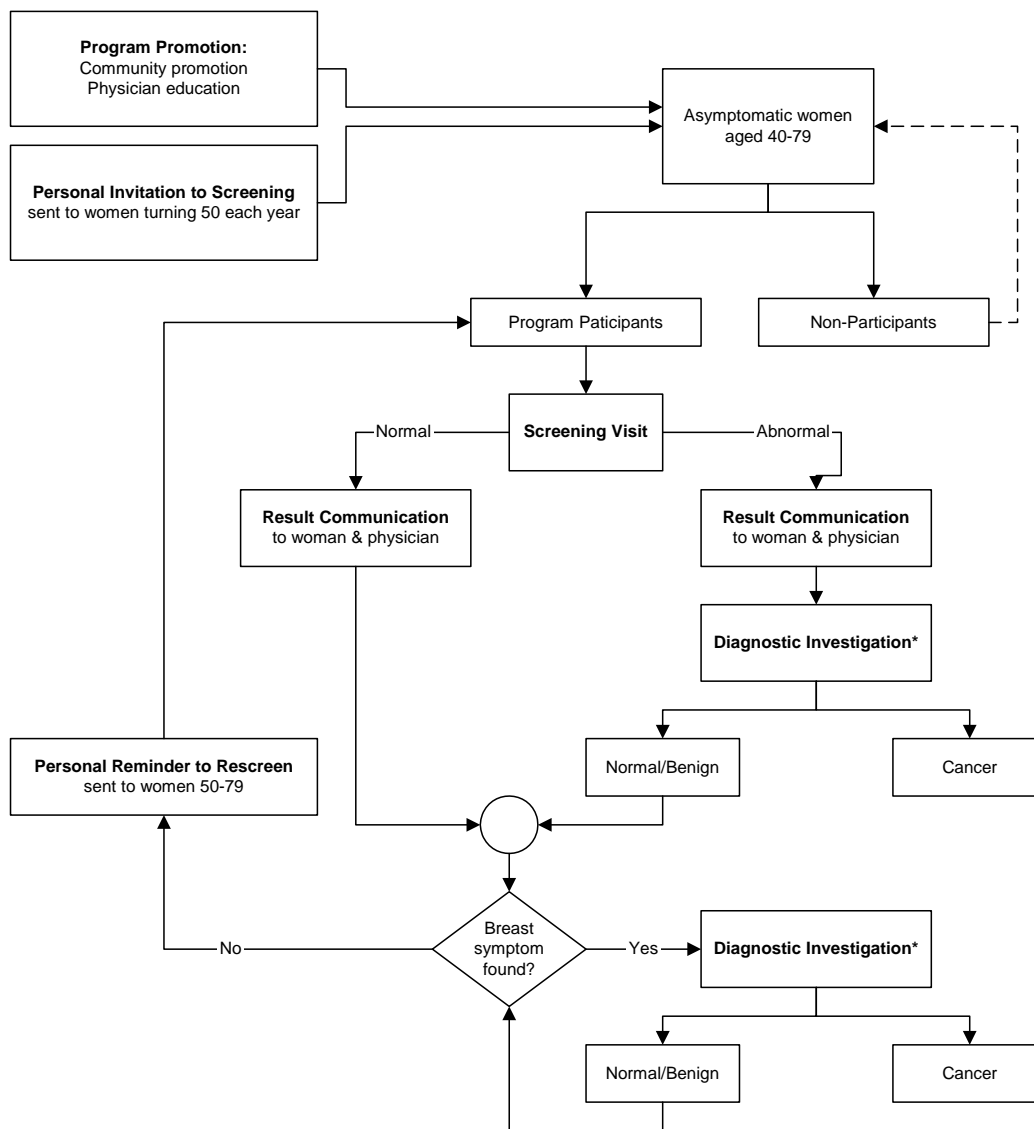
Facilitated Process to Diagnostic Investigation (Fast Track)

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.

| |
|---|
| <p>The Screening Mammography Program of BC is operated by the Division of Population and Preventive Oncology of BC Cancer Agency. The BC Cancer Agency is under the auspices of the Provincial Health Services Authority.</p> |
|---|

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

Figure 1 SMPBC Screening Process Overview



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

Quality Assurance and Quality Control

Quality standards and systems in the SMPBC are developed based on recommendations provided by 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 Provincial Technologist Practice Leader works collaboratively with the Physicists and the Provincial Chief Radiologist to monitor image quality, and to support improvement by developing educational material 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

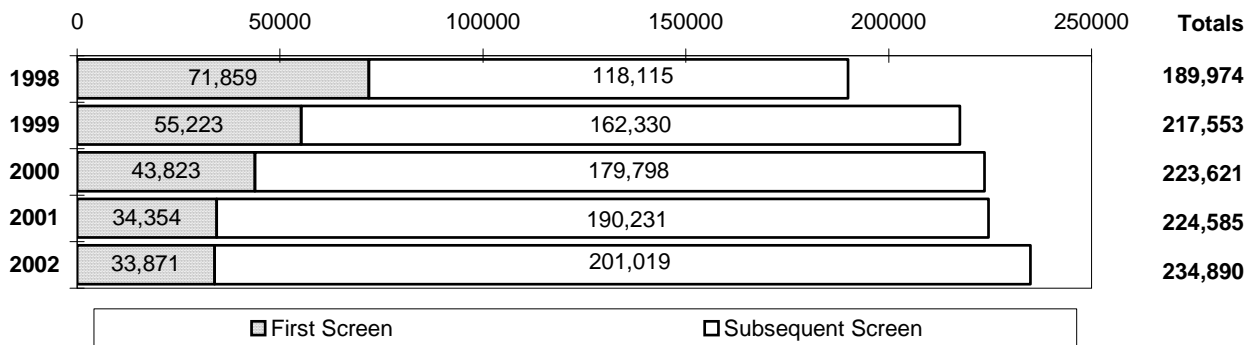
Data is collected and analyzed on an ongoing basis to understand the Program's effectiveness and to identify areas for improvement. Results of this analysis are presented in the "Program Results" section of this report. Age specific breast cancer incidence and mortality rates are tracked in conjunction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

PROGRAM RESULTS

RECRUITMENT & RE-SCREENING

The SMPBC provided 234,890 examinations to 224,752 women in 2002. During this period, 33,871 (14%) examinations were performed for women attending the SMPBC for the first time and the remaining 201,019 (86%) examinations were performed on returning participants. Figure 2 shows that number of first time attendees has been dropping since 1998. There was a sharp increase of first-time attendees in 1998 attributed to the introduction of invitation letters, which were sent to women who were age 50-74 in 1997. Invitation letters are sent only to those women turning 50 in the subsequent years if their home addresses are recorded by British Columbia Medical Services Plan (MSP).

Figure 2
SMPBC Annual Screening Volume
Years: 1998 to 2002



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 2001 and 2002, 379,346 women age 40 and over participated in the SMPBC. Age specific participation rates by health service delivery areas are shown in Table I. In this report, to be consistent with provincial re-organization of geographical regions instead of 20 health regions we used 16 Health Service Delivery Areas (HSDA). In all 16 HSDA, the highest participation rates were seen in the 50-59 or 60-69 age groups. The overall participation rate for women aged 50-74 was 49%, same as reported last year. Participation increased in East Kootenay from 23% in 2000-2001 to 29% in 2001-2002, but remains the lowest in the province. Richmond Health Service Delivery Area has the highest participation rate at 56%.

Table I
Regional Participation Rates by 10-Year Age Groups
between 2001 and 2002 Inclusive

| Health Service Delivery Area | 10-Year Age Groups | | | | | Age 50-74 |
|--------------------------------|--------------------|-------|-------|-------|-------|--------------|
| | 40-49 | 50-59 | 60-69 | 70-79 | 80-89 | |
| 11 East Kootenay | 21% | 28% | 31% | 25% | 4% | 29% |
| 12 Kootenay Boundary | 26% | 38% | 42% | 33% | 4% | 39% |
| 13 Okanagan | 33% | 53% | 55% | 44% | 3% | 53% |
| 14 Thompson Cariboo Shuswap | 32% | 50% | 53% | 41% | 4% | 51% |
| 21 Fraser Valley | 29% | 48% | 51% | 41% | 3% | 49% |
| 22 Simon Fraser | 34% | 50% | 49% | 37% | 3% | 49% |
| 23 South Fraser | 34% | 50% | 48% | 40% | 3% | 48% |
| 31 Richmond | 40% | 59% | 53% | 42% | 3% | 56% |
| 32 Vancouver | 34% | 53% | 49% | 34% | 3% | 50% |
| 33 North Shore/Coast Garibaldi | 31% | 48% | 48% | 39% | 3% | 47% |
| 41 South Vancouver Island | 31% | 54% | 57% | 46% | 4% | 55% |
| 42 Central Vancouver Island | 29% | 52% | 55% | 42% | 4% | 52% |
| 43 North Vancouver Island | 30% | 48% | 51% | 37% | 2% | 48% |
| 51 Northwest | 21% | 36% | 35% | 25% | 2% | 35% |
| 52 Northern Interior | 30% | 51% | 47% | 37% | 2% | 49% |
| 53 Northeast | 22% | 40% | 41% | 34% | 2% | 40% |
| British Columbia | 32% | 50% | 50% | 40% | 3% | 49% |

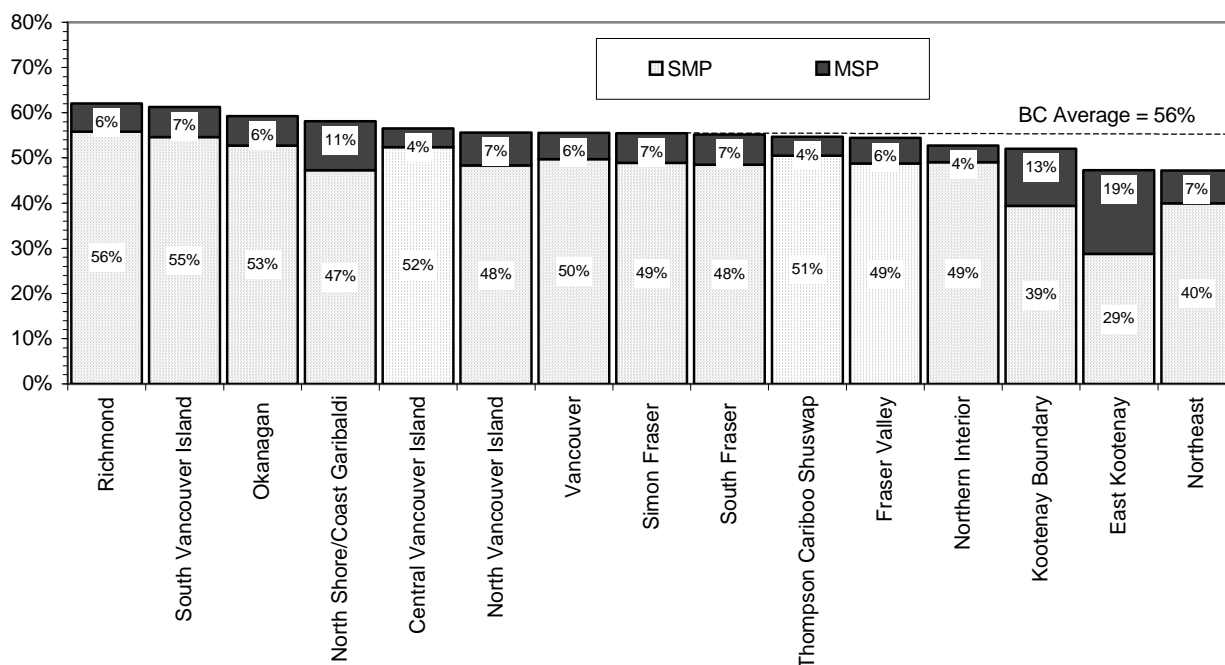
Notes:

- Population Data Source: Population Estimates (Oct. 2003), BC STATS, BC Ministry of Finance and Corporation Relations
- Population Data Acquired Through: the Health Data Warehouse, BC Ministry of Health

Bilateral mammography is used for both screening and diagnostic purposes. Historically, a significant proportion of the bilateral mammography services paid through the MSP was directly related to screening. Data on bilateral mammography utilization were obtained from MSP. Figure 3 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 2001 and 2002*, 56% of BC women age 50-74 received bilateral mammography services. SMPBC provided 88% of the bilateral mammography services for this age group, higher than estimated 82% the year before. Regionally, the percent of women age 50-74 receiving bilateral mammography ranged from 62% to 46%.

Figure 3
Bilateral Mammography Utilization by Women Age 50-74 in BC
between 2001 and 2002 Inclusive

Notes:



- MSP data includes only MSP FFS item 8611 on female patients only; all out of province claims are excluded.
- MSP data contains payment data to Sept. 15, 2003 for services provided within years 2001 and 2002, excluding repeat screens for women who came for the services more than once in 2 years.
- SMP data includes single screen per woman provided in calendar years 2001 and 2002.
- 2001 and 2002 Estimated Population Data Source: BC STATS, BC Ministry of Finance and Corporation Relations.
- Population Data Acquired Through: the Health Data Warehouse, BC Ministry of Health, Sep 2003.

Ethnic origin data is collected at the time of SMPBC registration (34% of attendees did not specify their ethnicity and are excluded), and population estimates by Health Service Delivery Area were obtained from Statistics Canada's 1996 Census. Unfortunately, 2001 Census ethnic data was not available at the time of the reporting. 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 Vancouver, Richmond and Burnaby.

Table II
Regional Ethnic Representation of Women Age 50-74
in the Population and within 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% | 2.5% | 1.0% | 1.8% | 0.6% | 0.7% |
| 12 Kootenay Boundary | 0.5% | 0.8% | 1.2% | 2.7% | 0.2% | 0.4% |
| 13 Okanagan | 0.7% | 1.0% | 1.4% | 2.0% | 0.8% | 1.0% |
| 14 Thompson Cariboo Shuswap | 3.6% | 4.0% | 1.3% | 3.1% | 1.3% | 2.0% |
| 21 Fraser Valley | 1.3% | 1.1% | 1.7% | 2.5% | 6.4% | 5.6% |
| 22 Simon Fraser | 0.5% | 0.5% | 18.8% | 25.8% | 4.6% | 4.7% |
| 23 South Fraser | 0.4% | 0.5% | 6.1% | 8.3% | 10.5% | 9.2% |
| 31 Richmond | 0.2% | 0.2% | 38.7% | 45.6% | 6.0% | 6.1% |
| 32 Vancouver | 0.8% | 0.8% | 37.5% | 43.7% | 4.1% | 5.5% |
| 33 North Shore/Coast Garibaldi | 1.5% | 1.4% | 5.5% | 8.1% | 2.2% | 2.9% |
| 41 South Vancouver Island | 0.7% | 0.8% | 3.9% | 6.1% | 1.2% | 1.9% |
| 42 Central Vancouver Island | 1.9% | 1.3% | 1.2% | 1.3% | 1.1% | 1.0% |
| 43 North Vancouver Island | 2.2% | 3.6% | 1.3% | 1.6% | 0.3% | 0.6% |
| 51 Northwest | 14.5% | 22.3% | 2.1% | 2.9% | 2.0% | 3.2% |
| 52 Northern Interior | 3.5% | 8.0% | 1.4% | 2.1% | 2.5% | 3.9% |
| 53 Northeast | 5.1% | 4.6% | 1.1% | 0.2% | 0.0% | 0.8% |
| British Columbia | 1.4% | 1.5% | 11.0% | 15.3% | 3.8% | 4.2% |

*the figure reported has been rounded to the nearest percent.

SMPBC Data:

- Women attended the SMPBC at least once in 2001-2002 inclusive.
- *East/South-East Asians* include Chinese, Japanese, Korean, Filipino, Thai, Vietnamese, Indonesian, Malay, Mongolian, and Tibetan.
- *South Asians* include Punjabi, Singhalese, Tamil, Bangladeshi, East Indian, Pakistani, and Sri Lankan.

Population Data:

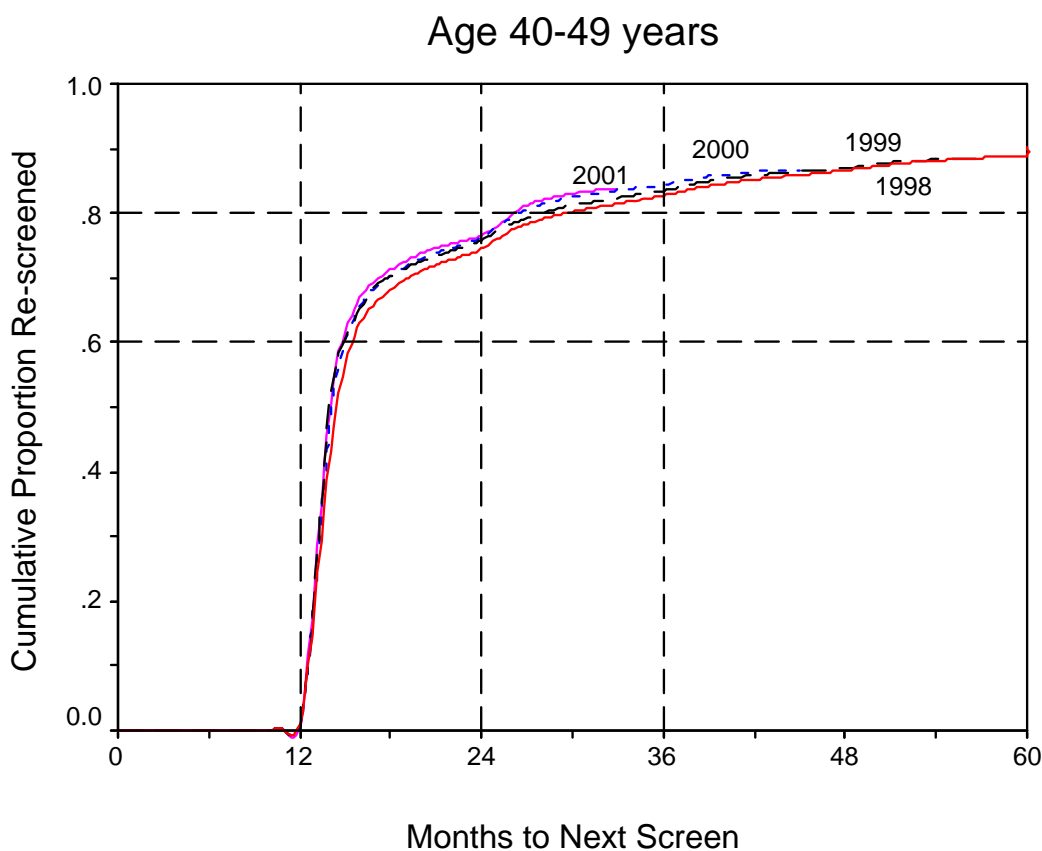
- Original data source - 2001 Census, Statistics Canada.
- *East/South-East Asians* include Chinese, Filipino, Burmese, Cambodian, Laotian, Thai, Vietnamese, Indonesian, Japanese, Korean, Malay, Mongolian, Taiwanese, Tibetan, Asian n.i.e and East/Southeast Asian n.i.e.
- *South Asians* include Bangladeshi,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

The effectiveness of regular screening mammogram is universally recognized for women over age 50. The SMPBC recommends screening every two years for women age 50-79. There remains controversy about the magnitude of the benefit of regular screening mammogram in women age 40-49. However, there is research evidence indicating that the sojourn time* is shorter for women age 40-49 than for the older women. Consequently, SMPBC recommends that women age 40-49 to make their individual decision about screening by considering the possible benefits and risks with their family physicians, but that if they choose screening, it should be performed annually. As of June 2003 recall letters for women aged 40-49 are sent at 15 months after their previous screen.

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 4 and Figure 5 show the return rates by year of the previous screening examination for women age 40-49 and 50-74 respectively as of 15 August 2003. The last 6 months of 2001 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).

Figure 4
Return Rates by Calendar Year of Previous Screen



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

Women are by and large returning in accordance to the recommended screening interval for their age group. About 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 overall compliance for women age 50-74 remains at about the same level for the 4 years.

Figure 5
Return Rates by Calendar Year of Previous Screen

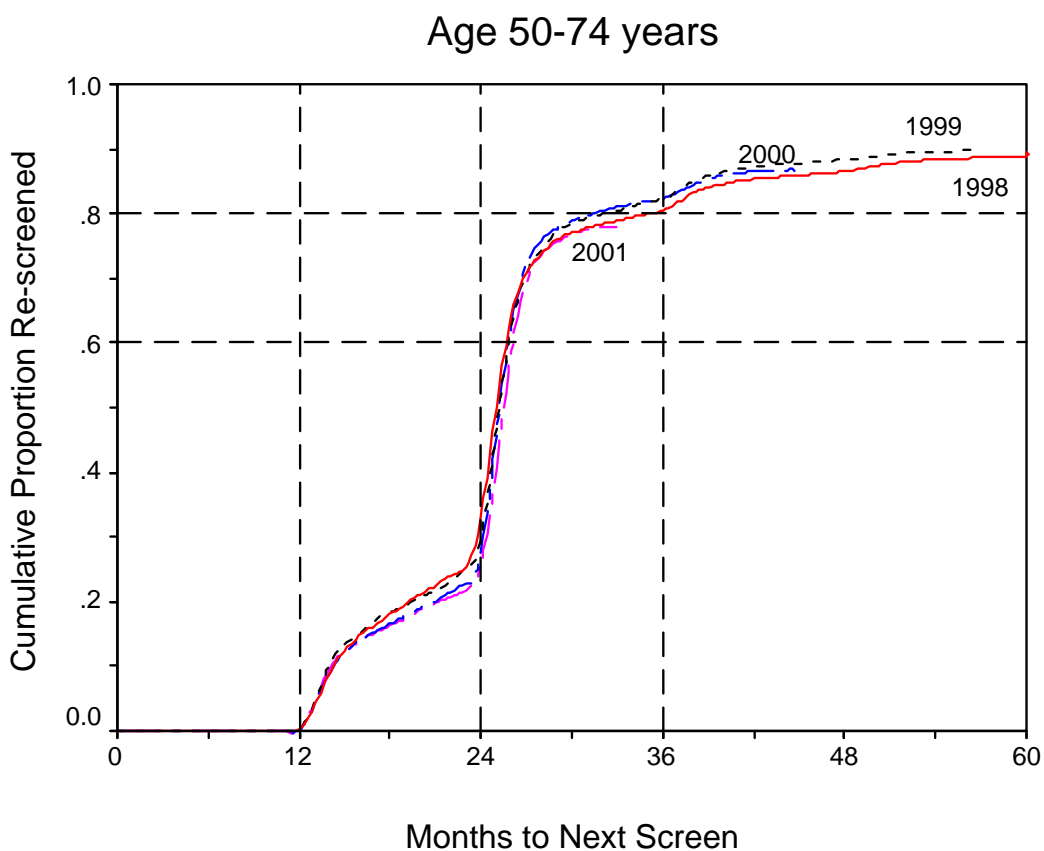


Table III
Cumulative Numbers and Proportions Re-screened
for Women Age 50-74

| Calendar year of the previous screen | 1998 | | 1999 | | 2000 | |
|--------------------------------------|---------|-----|---------|-----|---------|-----|
| Number to re-screen | 119,254 | | 125,758 | | 128,759 | |
| Re-screened | | | | | | |
| by 18 months | 21,289 | 18% | 22,802 | 18% | 21,123 | 17% |
| by 24 months | 38,837 | 33% | 36,864 | 30% | 34,627 | 27% |
| by 30 months | 90,488 | 77% | 97,249 | 78% | 100,301 | 79% |
| by 36 months | 94,573 | 81% | 102,038 | 82% | 104,460 | 83% |

2002 SCREENING RESULTS

Table IV summarizes the outcome indicators for screening provided in the calendar year 2002 by 10-year age groups. Of the 234,890 screening mammograms performed, 15,953 had an abnormal result (6.8%) and 1,019 breast cancers were reported as of August 2003 (4.3 per 1,000 exams), including 233 in-situ cancers. For every age group except <40, 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 7.5% to 5.7%. Cancer detection rates, positive predictive values and biopsy yield ratios increase with age.

Table IV
SMPBC Outcome Indicators by 10-Year Age Group
Year: 2002

| Notes: | Age at Exam | | | | | | All |
|---|-------------|-----------------|-----------------|-----------------|-----------------|---------------|---------|
| | <40 | 40-49 | 50-59 | 60-69 | 70-79 | 80+ | |
| Number of Exams | 339 0.1% | 83,161 35.4% | 74,343 31.7% | 46,800 19.9% | 28,990 12.3% | 1,257 0.5% | 234,890 |
| Number of First Screens | 293 0.9% | 20,639 60.9% | 8,145 24.0% | 3,278 9.7% | 1,316 3.9% | 200 0.6% | 33,871 |
| Number of Cancers | 1 0.1% | 162 15.9% | 302 29.6% | 315 30.9% | 227 22.3% | 12 1.2% | 1,019 |
| Abnormal Call Rate | 6.2% | 7.5% | 6.8% | 6.2% | 5.7% | 7.0% | 6.8% |
| on first screens | 6.1% | 12.8% | 14.0% | 13.8% | 13.3% | 11.5% | 13.1% |
| on subsequent screens | 6.5% | 5.8% | 5.9% | 5.6% | 5.3% | 6.1% | 5.7% |
| Overall Cancer Detection Rate (per 1,000) | 2.9 | 1.9 | 4.1 | 6.7 | 7.8 | 9.5 | 4.3 |
| on first screens | 3.4 | 2.5 | 5.6 | 13.4 | 13.7 | 5.0 | 4.8 |
| on subsequent screens | 0.0 | 1.8 | 3.9 | 6.2 | 7.6 | 10.4 | 4.3 |
| DCIS Detection Rate (per 1,000) | 0.0 | 0.6 | 0.9 | 1.5 | 1.6 | 0.8 | 1.0 |
| Positive Predictive Value of Screening Mammography | 5.0% | 2.7% | 6.2% | 11.2% | 14.4% | 14.5% | 6.6% |
| Biopsy Yield Ratio | --- | 25.5% | 38.2% | 51.1% | 60.1% | 50.0% | 41.4% |
| Benign:Malignant | --- | 2.9 : 1 | 1.6 : 1 | 1.0 : 1 | 0.7 : 1 | 1.0 : 1 | 1.4 : 1 |

- Out of 15,953 cases called “abnormal”, there were 17 lobular carcinoma in-situ cases and 589 outcomes unknown. The final number of cancers is still to be determined.
- Overall cancer includes ductal carcinoma in-situ (DCIS).
- See glossary in the Appendix for definitions of terms.

Diagnostic follow-up information is available on 14,716 (95.5%) of the abnormal screening mammograms to date. Women who did not provide written consent for SMPBC to obtain follow-up information account for the majority with missing information. Table V shows the proportion of women receiving specific diagnostic procedures as part of the work-up on their screen detected abnormalities. Overall, 10% of women with abnormal screening mammograms had an open biopsy. 6 summarizes screening outcome.

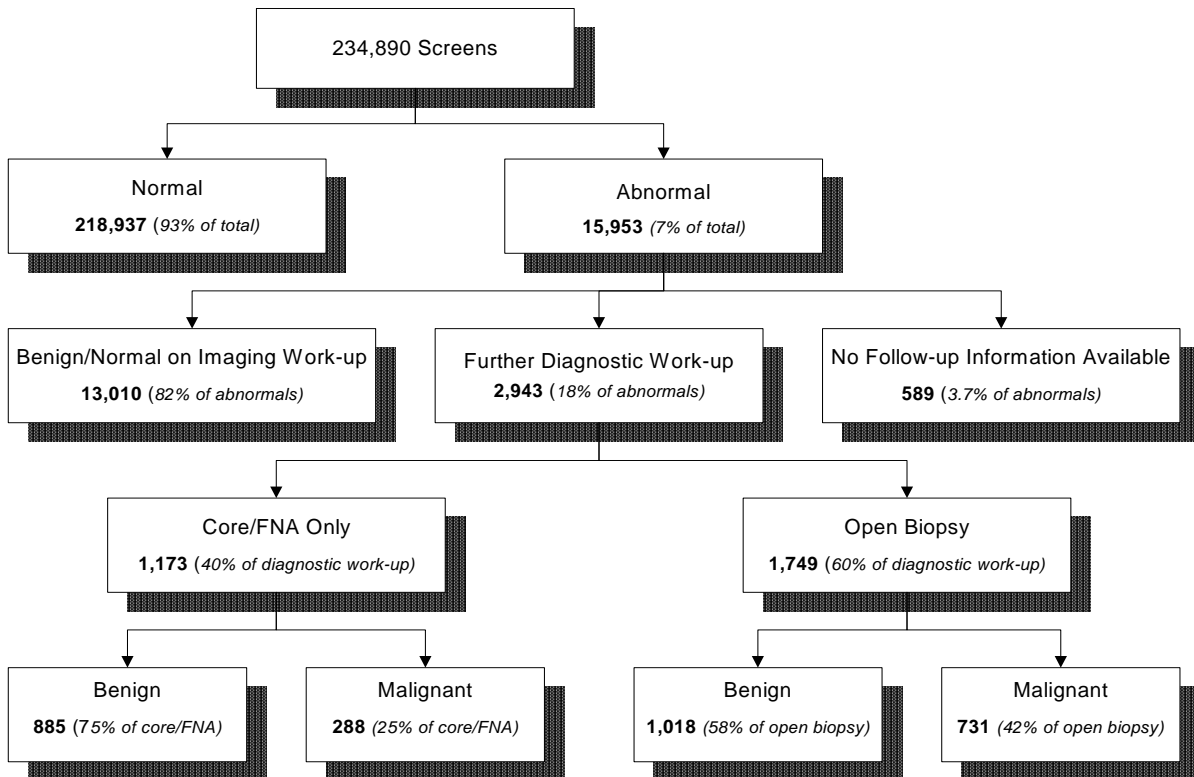
Table V
Proportions (%) of Diagnostic Procedures Received by
SMPBC Participants with “Abnormal” Screening Mammograms
Year: 2002

| Procedure | Age at Exam | | | | | | All |
|-------------------------|-------------|-------|-------|-------|-------|-----|--------|
| | <40 | 40-49 | 50-59 | 60-69 | 70-79 | 80+ | |
| Diagnostic Mammogram | 80% | 88% | 88% | 89% | 89% | 94% | 88% |
| Ultrasound | 40% | 50% | 49% | 48% | 47% | 47% | 49% |
| Fine Needle Aspiration | 5% | 6% | 7% | 7% | 8% | 10% | 7% |
| Core Biopsy | 5% | 4% | 5% | 6% | 7% | 7% | 5% |
| Surgical Biopsy | 10% | 8% | 12% | 15% | 17% | 19% | 11% |
| with Localization | 10% | 7% | 11% | 13% | 15% | 17% | 10% |
| Number of Cases* | 20 | 6,009 | 4,872 | 2,803 | 1,578 | 83 | 15,365 |

* with diagnostic assessment information available

Figure 6

Screening Outcome Summary
Year: 2002



2001 CANCER DETECTION

Histologic features of breast cancers detected by SMPBC in 2001 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 (*NO*) whenever axillary lymph nodes were not assessed, and no distant metastases (*MO*) unless otherwise informed.

Table VI
Histologic Features of Breast Cancers Detected by SMPBC
Year: 2001

| | Age at Exam | | | | | Age 40+ |
|--|-------------|---------|---------|---------|---------|---------|
| | 40-49 | 50-59 | 60-69 | 70-79 | 80+ | |
| Number of Cancers | 147 | 276 | 263 | 213 | 10 | 909 |
| in situ | 40 27% | 78 28% | 58 22% | 45 21% | 1 10% | 222 24% |
| invasive | 107 73% | 198 72% | 205 78% | 168 79% | 9 90% | 687 76% |
| Number of Invasive Cancers with staging information | 88 | 162 | 144 | 108 | 5 | 507 |
| TNM Staging | | | | | | |
| I | 48 55% | 102 63% | 95 66% | 67 63% | 2 50% | 314 62% |
| II | 39 44% | 49 30% | 41 29% | 22 21% | 2 50% | 153 30% |
| III+ | 1 1% | 10 6% | 7 5% | 5 5% | 0 0% | 23 5% |
| (# unknown) | (0) | (1) | (1) | (1) | (1) | (4) |
| Invasive Tumour Size | | | | | | |
| ≤5 mm | 7 8% | 15 9% | 14 10% | 9 8% | 0 0% | 45 9% |
| 6-10 mm | 19 22% | 39 24% | 37 26% | 29 27% | 0 0% | 124 25% |
| 11-15 mm | 21 24% | 44 27% | 44 31% | 38 35% | 0 0% | 147 29% |
| 16-20 mm | 14 16% | 27 17% | 18 13% | 20 19% | 3 75% | 82 16% |
| >20 mm | 27 31% | 36 22% | 30 21% | 12 11% | 1 25% | 106 21% |
| (# unknown) | (0) | (1) | (1) | (0) | (1) | (3) |
| ≤15 mm | 47 53% | 98 60% | 95 66% | 76 70% | 0 0% | 316 63% |
| median tumour size | 15 mm | 14 mm | 12 mm | 12 mm | 18.5 mm | 13 mm |
| Node Involvement | | | | | | |
| no nodes sampled | 0 0% | 8 5% | 13 9% | 15 14% | 2 40% | 38 7% |
| no | 60 68% | 112 69% | 108 75% | 74 69% | 2 40% | 356 70% |
| yes | 28 32% | 42 26% | 23 16% | 19 18% | 1 20% | 113 22% |
| (# unknown) | (0) | (0) | (0) | (0) | (0) | (0) |
| Histologic Grade | | | | | | |
| 1 - well differentiated | 31 36% | 66 42% | 63 44% | 48 45% | 1 25% | 209 42% |
| 2 - moderately differentiated | 36 41% | 62 39% | 58 41% | 43 40% | 2 50% | 201 40% |
| 3 - poorly differentiated | 20 23% | 30 19% | 22 15% | 16 15% | 1 25% | 89 18% |
| (# unknown) | (1) | (4) | (1) | (1) | (1) | (8) |
| grade 3 tumour ≤15 mm | 9 45% | 19 63% | 11 50% | 9 56% | 0 | 48 54% |

Notes:

Targets¹: >50% invasive tumours ≤15 mm
<30% invasive tumours with positive nodes
>30% grade 3 tumours ≤15 mm

Overall, 59% of cancers detected were in situ or stage I. Of the invasive cancers detected, 73% were ≤15mm, 22% had invasion of the regional lymph nodes, and 18% were grade 3 (*i.e. poorly differentiated*) tumours. Of the grade 3 tumours, 54% were smaller than 15mm. These overall outcome indicators met international targets recommended for screening programs¹.

CUMULATIVE MAMMOGRAPHY RESULTS

Outcome Indicators by Calendar Year

Outcome indicators by calendar year are summarized in Table VII. The abnormal call rates on first and subsequent screens respectively continue to be on the rise. However, the overall abnormal call rate in 2002 remained about the same as the preceding two years: 6.8%. The cancer detection rate for 2002 is increasing slightly compared to the previous 3 years. The biopsy yield ratio also shows an increasing trend 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 60-69¹, and had recommended the target of >3.0 for organized screening programs². The annual prevalence to expected incidence ratios for age 50-79 were consistently above 3 from 1995 to 2001.

Table VII
SMPBC Outcomes Indicators by Calendar Year
Years: 1998 – 2002

| | Calendar Year | | | | | 5-Year Cumulative |
|---|---------------|---------|---------|---------|---------|----------------------|
| | 1998 | 1999 | 2000 | 2001 | 2002 | |
| Number of Exams | 189,974 | 217,553 | 223,621 | 224,585 | 234,890 | 1,090,623 |
| % first screens | 37.8% | 25.4% | 19.6% | 15.3% | 14.4% | 21.9% |
| Number of Cancers | 860 | 887 | 852 | 909 | 1,019 | 4,527 |
| % on first screens | 51.6% | 32.1% | 24.9% | 18.3% | 15.9% | 28.0% |
| Abnormal Call Rate | 7.4% | 7.1% | 6.8% | 6.9% | 6.8% | 7.0% |
| on first screens | 11.1% | 12.0% | 12.3% | 13.4% | 13.1% | 12.1% |
| on subsequent screens | 5.2% | 5.5% | 5.5% | 5.7% | 5.7% | 5.5% |
| Overall Cancer Detection Rate (per 1,000) | 4.5 | 4.1 | 3.8 | 4.0 | 4.3 | 4.2 |
| on first screens | 6.2 | 5.2 | 4.8 | 4.8 | 4.8 | 5.3 |
| on subsequent screens | 3.5 | 3.7 | 3.6 | 3.9 | 4.3 | 3.8 |
| DCIS Detection Rate (per 1,000) | 1.2 | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| Positive Predictive Value of Screening Mammography | 6.7% | 6.0% | 5.9% | 6.1% | 6.6% | 6.3% |
| Biopsy Yield Ratio | 36.8% | 36.6% | 39.0% | 39.4% | 41.4% | 38.6% |
| Benign:Malignant | 1.7 : 1 | 1.7 : 1 | 1.6 : 1 | 1.5 : 1 | 1.4 : 1 | 1.6 : 1 |
| Interval Cancer Rate (per 1,000) | | | | | | |
| 0-12 months | 0.82 | 0.73 | 0.61 | 0.68 | n/a | --- |
| after first screens | 0.65 | 0.49 | 0.64 | 0.41 | n/a | --- |
| after subsequent screens | 0.92 | 0.81 | 0.61 | 0.73 | n/a | --- |
| 13-24 months | 0.92 | 0.93 | 0.89 | 0.73 | n/a | --- |
| Sensitivity (i.e. 1 - false negative rate) | 84.6% | 84.9% | 86.1% | 85.7% | n/a | --- |
| Specificity (i.e. 1 - false positive rate) | 93.0% | 93.2% | 93.5% | 93.5% | n/a | --- |
| Prevalence to Expected Incidence Ratio for Age 50-79 (target²: >3.0) | 3.40 | 3.59 | 3.16 | 3.97 | n/a | --- |

Notes:

- Numbers are as reported to August 2003. The final number of cancers in 2002 is still to be determined.
- Overall cancer detection includes ductal carcinoma in-situ (DCIS)
- The terms are defined in glossary.

Outcome Indicators by Age

In the 5-year period from 1998 to 2002, the SMPBC provided 1,090,623 screening mammography examinations to 491,061 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. The risk of breast cancer increases with age, which is reflected in the 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: 1998 – 2002 Cumulative

| Notes: | Age at Exam | | | | | All |
|---|------------------|------------------|------------------|------------------|---------------|-----------|
| | 40-49 | 50-59 | 60-69 | 70-79 | 80+ | |
| Number of Exams | 386,185 35.4% | 336,818 30.9% | 221,670 20.3% | 137,021 12.6% | 7,018 0.6% | 1,090,623 |
| Number of Cancers | 730 16.1% | 1,334 29.5% | 1,357 30.0% | 1,049 23.2% | 55 1.2% | 4,527 |
| Abnormal Call Rate | 7.6% | 7.1% | 6.4% | 5.9% | 6.7% | 7.0% |
| on first screens | 12.2% | 12.7% | 11.6% | 11.3% | 11.0% | 12.1% |
| on subsequent screens | 5.6% | 5.8% | 5.4% | 5.0% | 5.1% | 5.5% |
| Cancer Detection Rate (per 1,000) | 1.9 | 4.0 | 6.1 | 7.7 | 7.8 | 4.2 |
| on first screens | 2.5 | 5.7 | 9.3 | 12.8 | 12.1 | 5.3 |
| on subsequent screens | 1.6 | 3.5 | 5.5 | 6.8 | 6.3 | 3.8 |
| DCIS Detection Rate (per 1,000) | 0.6 | 1.1 | 1.4 | 1.6 | 1.0 | 1.0 |
| Positive Predictive Value of Screening Mammography | 2.6% | 5.8% | 10.1% | 13.8% | 13.0% | 6.3% |
| Biopsy Yield Ratio | 22.0% | 36.1% | 48.9% | 57.8% | 60.6% | 38.6% |
| Benign:Malignant | 3.5 : 1 | 1.8 : 1 | 1.0 : 1 | 0.7 : 1 | 0.7 : 1 | 1.6 : 1 |
| Interval Cancer Rate (per 1,000) | | | | | | |
| 0-12 months | 0.59 | 0.85 | 0.66 | 0.77 | 0.35 | 0.70 |
| after first screens | 0.48 | 0.61 | 0.59 | 0.79 | 0.59 | 0.57 |
| after subsequent screens | 0.64 | 0.91 | 0.67 | 0.76 | 0.25 | 0.75 |
| 13-24 months | 0.39 | 1.07 | 1.10 | 1.26 | 1.74 | 0.87 |
| Sensitivity (i.e. 1 - false negative rate)* | 76.0% | 82.3% | 90.1% | 90.8% | 95.6% | 85.3% |
| Specificity (i.e. 1 - false positive rate)* | 92.6% | 93.1% | 94.1% | 94.8% | 94.0% | 93.3% |

- The final number of cancers in 2002 is still to be determined. Sensitivity, specificity and interval cancer rates are based on the first 4 years of data only.
- Overall cancer detection includes ductal carcinoma in-situ (DCIS).
- The terms are defined in glossary.

Cancer Characteristics by Age

From the start of the Program in July 1988 to **December 2001**, 6,818 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 2001 are summarized by 10-year age groups in Table IX. The 6 cases of cancer for women younger than 40 are included in the total 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
Histological Features of Breast Cancers Detected by SMPBC
Years: Cumulative to and including 2001

| | Age at Exam | | | | | All |
|--|-------------|-----------|-----------|-----------|---------|-----------|
| | 40-49 | 50-59 | 60-69 | 70-79 | 80+ | |
| Number of Cancers | 1,147 | 1,852 | 2,073 | 1,591 | 149 | 6,818 |
| in situ | 356 31% | 494 27% | 422 20% | 284 18% | 17 11% | 1,576 23% |
| invasive | 791 69% | 1,358 73% | 1,651 80% | 1,307 82% | 132 89% | 5,242 77% |
| Number of Invasive Cancers with staging information | 722 | 1,198 | 1,457 | 1,130 | 119 | 4,626 |
| TNM Staging | | | | | | |
| I | 423 59% | 788 66% | 1,036 71% | 837 74% | 86 72% | 3,170 69% |
| II | 254 35% | 350 29% | 356 25% | 247 22% | 28 24% | 1,235 27% |
| III+ | 42 6% | 52 4% | 57 4% | 43 4% | 4 3% | 198 4% |
| (# unknown) | (3) | (6) | (5) | (2) | (0) | (16) |
| Invasive Tumour Size | | | | | | |
| ≤5 mm | 71 10% | 117 10% | 112 8% | 63 6% | 13 11% | 376 8% |
| 6-10 mm | 137 19% | 294 25% | 415 29% | 339 30% | 32 27% | 1,217 26% |
| 11-15 mm | 202 28% | 344 29% | 481 33% | 368 33% | 34 29% | 1,429 31% |
| 16-20 mm | 117 16% | 200 17% | 212 15% | 180 16% | 20 17% | 729 16% |
| >20 mm | 191 26% | 235 20% | 227 16% | 177 16% | 19 16% | 849 18% |
| (# unknown) | (4) | (8) | (10) | (3) | (1) | (26) |
| ≤ 15 mm median tumour size | 410 57% | 755 63% | 1008 70% | 770 68% | 79 67% | 3022 66% |
| | 15 mm | 14 mm | 13 mm | 13 mm | 12 mm | 13 mm |
| Node Involvement | | | | | | |
| no nodes sampled | 77 11% | 130 11% | 170 12% | 202 18% | 49 41% | 628 14% |
| no | 446 62% | 812 68% | 1,023 70% | 764 68% | 55 46% | 3,100 67% |
| yes | 199 28% | 255 21% | 262 18% | 164 15% | 15 13% | 895 19% |
| (# unknown) | (0) | (1) | (2) | (0) | (0) | (3) |
| Histologic Grade | | | | | | |
| 1 - well differentiated | 197 28% | 412 35% | 477 34% | 422 38% | 38 33% | 1,546 34% |
| 2 - moderately differentiated | 291 42% | 473 41% | 657 46% | 508 46% | 55 47% | 1,984 44% |
| 3 - poorly differentiated | 206 30% | 282 24% | 288 20% | 173 16% | 23 20% | 972 22% |
| (# unknown) | (28) | (31) | (35) | (27) | (3) | (124) |
| grade 3 tumour ≤15 mm | 89 43% | 140 50% | 168 58% | 81 47% | 10 43% | 488 50% |

Notes:

- 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.
- Targets¹:
 - >50% invasive tumours ≤15 mm
 - <30% invasive tumours with positive nodes
 - >30% grade 3 tumours ≤15 mm

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, and by 1998, there were 8 provincial programs contributing data to the CBCSD. The first evaluation report on Organized Breast Cancer Screening Programs in Canada was published in 1999 using the 1996 data that prompted the creation of the Evaluation Indicators Working Group to begin the task of defining performance measures for Canadian breast cancer screening programs. The final report from the working group was published in 2002: Guidelines for Monitoring Breast Screening Program Performance. This report defined an initial 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. In this section, SMPBC performance measures are presented against the targets set for Canadian breast cancer screening programs.

Table X
Comparison of SMPBC 2001-2002 performance with
Canadian Breast Screening Standards for 50-69 years old

| Performance measure | National Target | SMPBC 2001-2002 |
|--|---|---------------------------|
| Participation rate | ≥70% of the eligible population | 50% (+6%MSP) |
| Retention rate | ≥75% re-screened within 30 months | 79% |
| Abnormal call rate | <10% first screens | 14.0% |
| | <5% re-screens | 5.8% |
| Invasive cancer detection rate | >5 per 1,000 first screens | 5.82 per 1,000 |
| | >3 per 1,000 re-screens | 3.54 per 1,000 |
| In situ cancer detection rate | Surveillance and Monitoring only, 04-1.0 in UK standards | 1.17 |
| Positive predictive value | ≥5% first screen | 5.8% |
| | ≥6% re-screens | 8.2% |
| Benign to malignant open biopsy ratio | ≤2:1 | 1.3:1 |
| Invasive tumour size ≤10 mm* | >25% | 38% |
| Positive lymph nodes in cases with invasive cancer* | <30% | 21% |
| Post-screen detected invasive cancer rate** | <6 per 10,000 person-years (within 12 months) | 7 per 10,000 person-years |

Notes:

*Based on cancers detected in 2000 and 2001.

**Based on the screens provided in 2000 and 2001.

COSTING SUMMARY

Based upon the *Statements of Revenue, Expense and Surplus* in the Auditor's Report (see Appendix), costing analysis for the current and previous fiscal years is summarized in Table XI. The unit cost of screening mammography has increased in the last year, mainly due to the professional reading fee increases. In the recent years, there is a greater proportion of re-screens for which cancer detection is lower. This, among other factors, causes increase in the cost per cancer detected.

Table XI
Cost Comparison by Fiscal Year

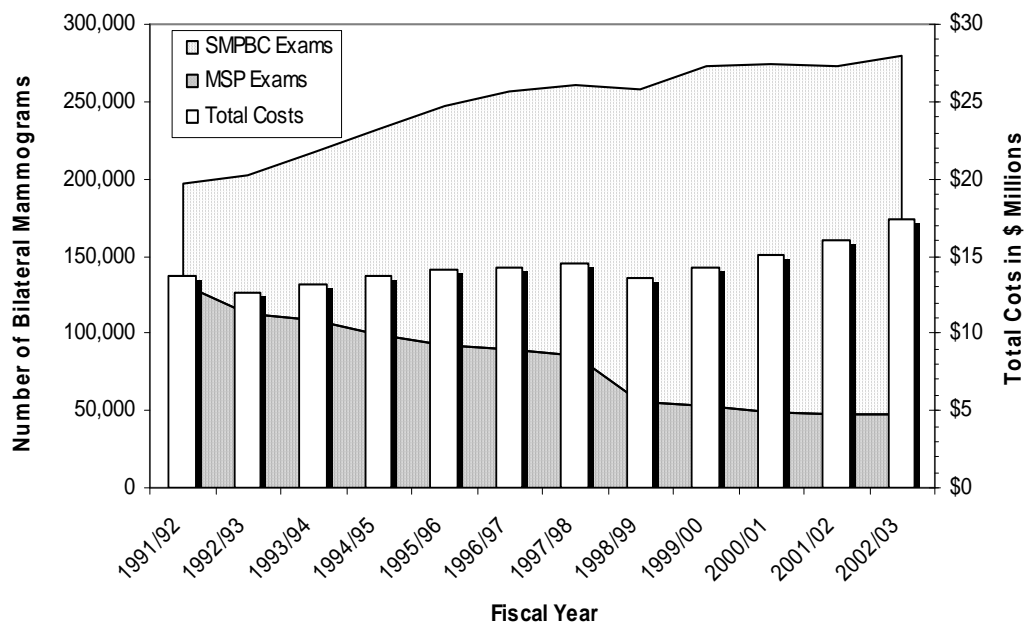
| | 1997/98 | 1998/99 | 1999/2000 | 2000/2001 | 2001/2002 | 2002/2003 |
|-----------------------------------|-------------|-------------|--------------|--------------|--------------|--------------|
| Number of screens | 175,916 | 202,352 | 219,994 | 224,917 | 225,064 | 232,951 |
| Number of cancers detected | 734 | 892 | 884 | 827 | 966 | 1000 |
| Total cost | \$8,228,305 | \$9,486,600 | \$10,299,642 | \$11,358,867 | \$12,335,692 | \$13,262,184 |
| Total cost/screen | \$46.77 | \$46.88 | \$46.82 | \$50.50 | \$54.81 | \$56.93 |
| Central services | \$9.40 | \$9.51 | \$9.88 | \$9.35 | \$9.84 | \$9.61 |
| Other operating costs | \$29.23 | \$27.98 | \$28.45 | \$29.17 | \$30.41 | \$30.82 |
| Professional reading fee | \$5.88 | \$6.08 | \$6.12 | \$9.36 | \$12.00 | \$13.39 |
| Capital allocation | \$2.27 | \$3.31 | \$2.37 | \$2.62 | \$2.56 | \$2.13 |
| Cost per cancer detected | \$11,210 | \$10,635 | \$11,651 | \$13,735 | \$12,770 | \$13,264 |

Notes:

- Numbers of cancers detected in 2002/2003 and cost per cancer is estimated, because the final number of cancers is not determined yet.
- The cost per screen in 2002/2003 includes \$0.99 retroactive payment of professional fee increase for the fiscal year 2001/02 (Lump sum payments of 6.2% of the reading fee for the period April 1 – October 31, 2001 and 11.6% of the reading fee for the period November 1, 2001 –March 31, 2002)
- Total cost includes amortization of capital assets purchased through BCCA (2001/2002: \$278,019, 2002/2003: \$230,363)
- Capital Allocation includes a) capital differential allocated to privately administered centres in their annual operating budget, b) amortization of equipment purchased through BCCA; does not include capital expenditures capitalized and amortized through host hospitals.
- Professional reading fee was \$8 per screen prior to December 2000, \$12 effective December 2000 and \$13.39 per screen effective April 2002.

Figure 7 shows the number and cost of bilateral mammography services paid through BC Medical Services Plan (MSP) and SMPBC over the last 12 fiscal years. The total number of bilateral mammograms provided to BC women age 40 and over increased steadily through the early years of SMPBC but slowed down from fiscal year 1995/96 onwards. MSP initiated a policy change in 1998 to encourage the use of SMPBC services for screening of women age 40 and over. Figure 7 illustrated the shift to SMPBC in 1998/99. The number of bilateral mammography services delivered by MSP has remained steady since. In the last fiscal year 2002/2003, SMPBC provided 83% of all bilateral mammography services for women age 40 and over, and accounted for 76% of the total expenditure. Between 1991 and 2002, the total number of bilateral mammography services has increased by 42%, while the cost has increased only by 27%.

Figure 7
Bilateral Mammography in BC
Age 40 and Over



Notes:

- Data for bilateral mammography fee item 8611 on female patients only.
- Data are reported for the fiscal years in which the services were provided.
- 2002/03 contains payments to Sep 15, 2003.
- Data includes only MSP FFS claims, and excludes all out of province claims.

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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

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- 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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VICTORIA ♦ Victoria General Hospital

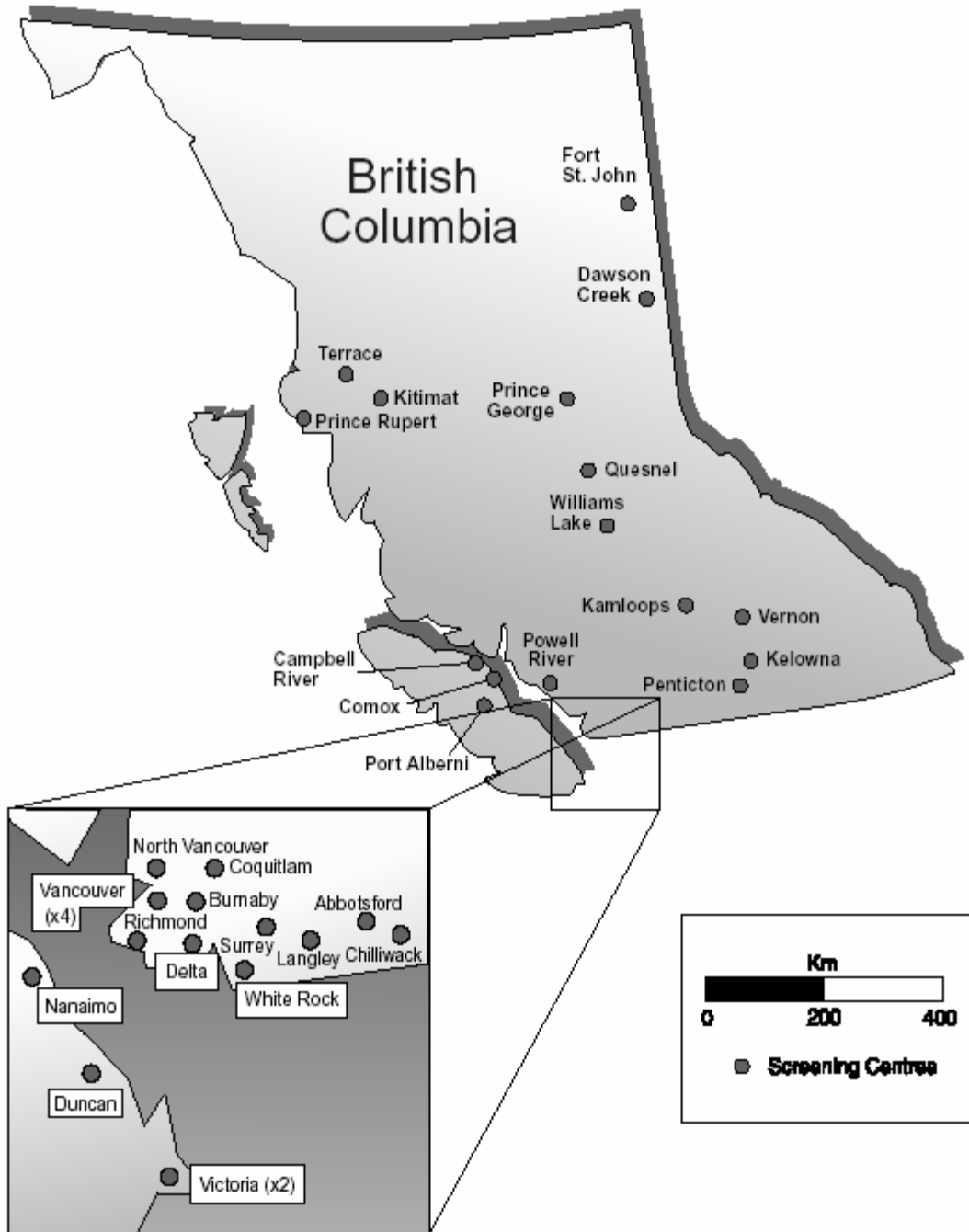
Dr. Delmer Pengelly
Dr. Stuart Silver
Dr. John Wrinch

WHITE ROCK

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

Fixed Screening Centres

as at March 31, 2003



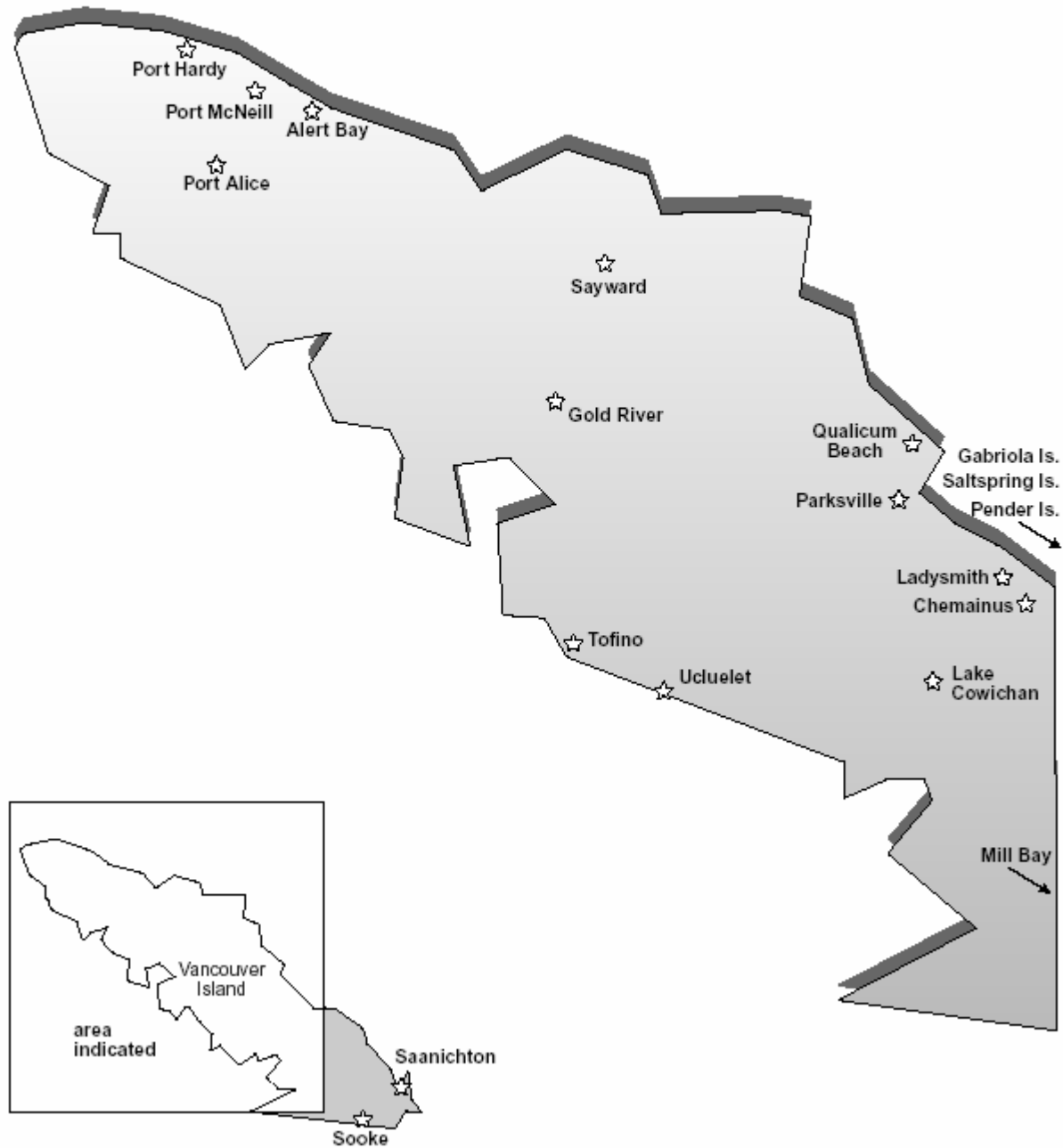
Interior/Kootenay Mobile

as at March 31, 2003



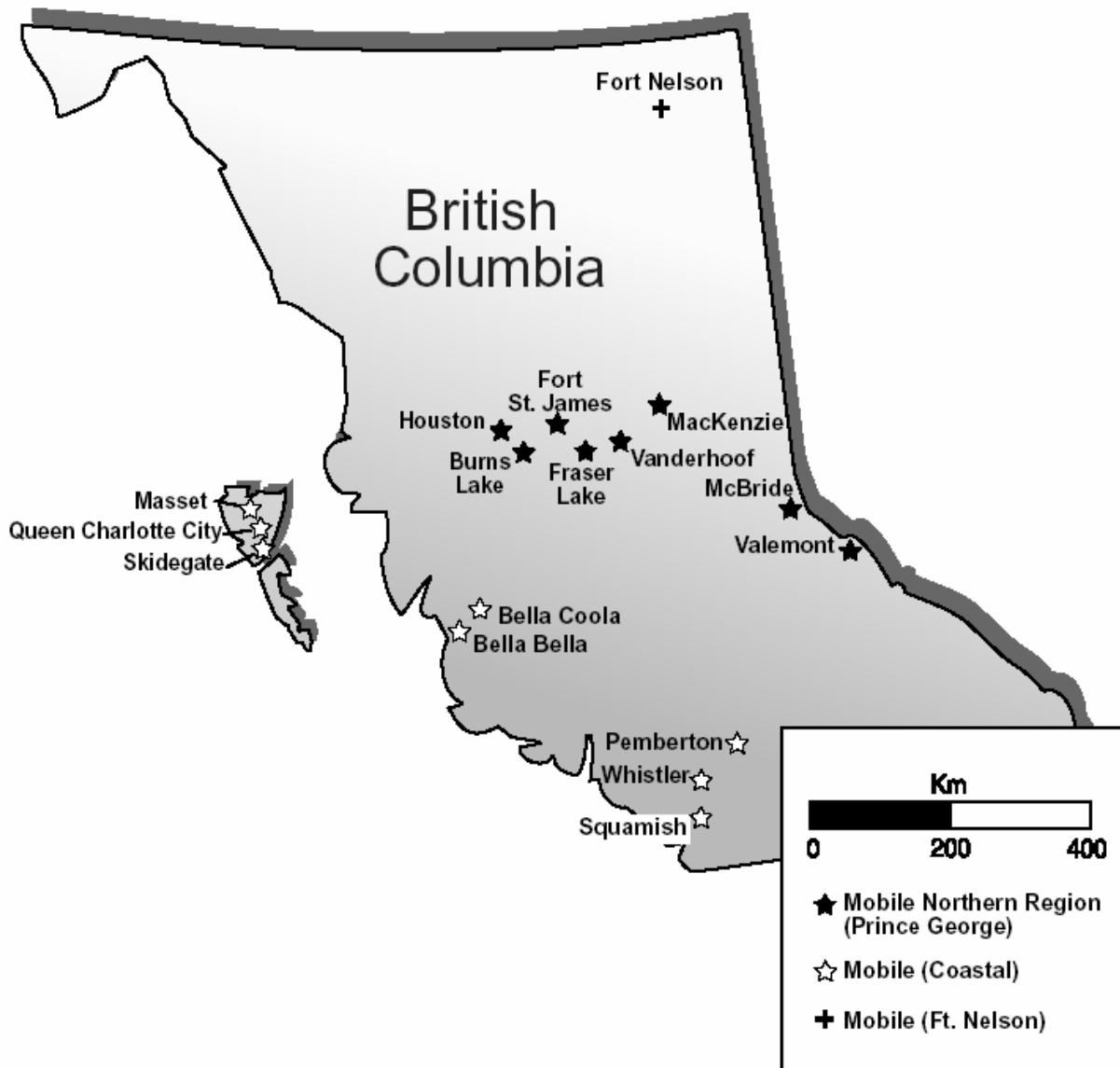
Islands and Coastal Mobile

as at March 31, 2003



Northern Region & Islands & Coastal Mobiles

as at March 31, 2003



PUBLICATIONS & PRESENTATIONS

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

Peer-Reviewed Publications

Hislop TG, Harris SR, Jackson J, Thorne SE, Rousseau EJ, Coldman AJ, Vestrup JA, Wright CJ, Olivotto IA. Satisfaction and anxiety for women during investigation of an abnormal screening mammogram. *Breast Cancer Research and Treatment* 2002;76:245-254.

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

Ultrasound for Breast Cancer Screening and Staging. *Radiol Clin N Am* 2002;40:431-441.

Smith RA, Saslow D, Andrews Sawyer K, et al. (Warren Burhenne LJ , high-risk and new technologies work groups). American Cancer Society Guidelines for Breast Cancer Screening: Update 2003.. *CA: A Cancer Journal for Clinicians* (Vol. 53, No. 3: 141-169).

Warren Burhenne LJ. Mammographic Screening Substantially Reduces Breast Carcinoma Mortality: Modern Results From a Clinical Trial. *Breast Diseases: A Year Book Quarterly* 2002 Vol. 12, No. 4.

Evans WP, Warren Burhenne LJ, O'Shaughnessy KF, Castellino RA. Invasive Lobular Carcinoma of the Breast: Mammographic Characteristics and Computer-aided Detection. *Radiology* 2002; 225:182-189.

Presentations and Lectures

Dr. Linda Warren

“Artefacts and normal Variants in Mammography”

Physics for Radiology Residents

Vancouver, British Columbia

April 12, 2002

“Computer-aided Detection and Double Reading”

American Roentgen Ray Society

Atlanta, Georgia

April 29, 2002

“Age to Start and Stop – Practical Considerations”

Global Summit Meeting on Mammographic Screening

Milan, Italy

June 4, 2002

“Evaluation of Organized Screening Programs: British Columbia”

Global Summit Meeting on Mammographic Screening

Milan, Italy

June 4, 2002

Chair and Moderator, Diagnostic Panel – Case Scenarios

2002 Annual Screening Mammography Forum

Vancouver, British Columbia

October 26, 2002

“Who Should Interpret Mammograms? Selection, Training, and Monitoring.”

Radiological Society of North America

Chicago, Illinois

December 1-6, 2002

Dr. Paula Gordon

Mammography/Sonography. Practical Radiology

Whistler, BC

February 11, 2003.

Freehand Invasive Ultrasound for Breast Biopsy. Hands-on Workshop

Radiological Society of North America Annual Meeting,

Chicago, Illinois

December 1, 2002.

Supplementary Sonographic Screening for Breast Cancer: A Reasonable Suggestion? Radiology

Grand Rounds

Vancouver General Hospital

October 23, 2002.

Interventional Breast Ultrasound: Emphasis on Needle Biopsy.
World Class Breast Imaging
Sponsored by Loma Linda University
Vancouver, BC.
August 6, 2002.

Secondary Screening with Ultrasound: A viable option for women with dense breasts? World
Class Breast Imaging
Sponsored by Loma Linda University
Vancouver, BC
August 5, 2002.

Percutaneous Breast Biopsies: Choice of Guidance Modality and Needle Size. Mammography for
the Millennium
Vancouver, BC
June 1, 2002.

Challenging Cases in Ultrasound
American College of Radiology 30th National Conference on Breast Cancer
Dallas, Texas.
April 20-22, 2002.

Screening with Ultrasound
American College of Radiology 30th National Conference on Breast Cancer
Dallas, Texas.
April 20-22, 2002.

Joy Murray

Proposed Guidelines for Effective Volunteer Management Practice within the Screening
Mammography Program of BC – Specialized Training Services
January 30, 2003

APPENDIX

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.¹ 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 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.^{3,4,5} 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.

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

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

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

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

⁵Wilson JMG, Junger G; Principles and Practice of Screening for Disease. Geneva, World Health Organization, 1968

⁶Smith RA: Screening Fundamentals, Monogr Natl Cancer Inst 22:15, 1997

Screening Mammography Program of BC

A Program of the BC Cancer Agency

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.

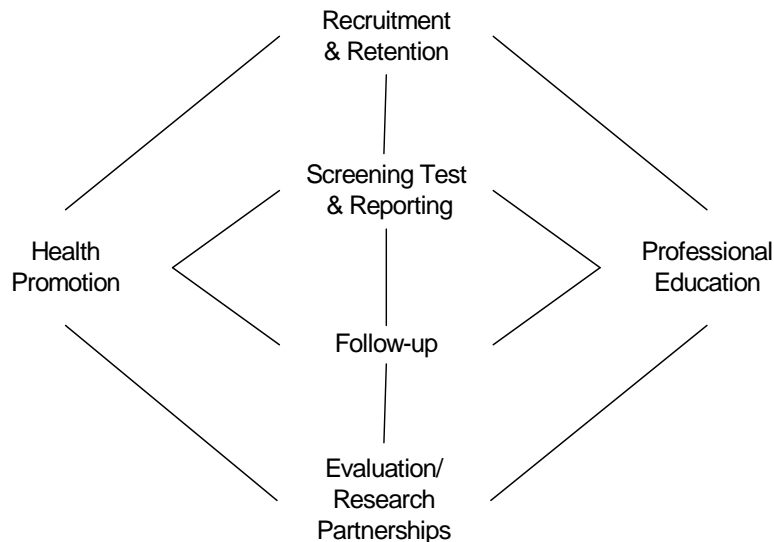
An organized approach to screening ensures that the target population has access to the screening service, and that it accepts and uses the services offered. This is achieved by including the following six program components:

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 **Figure 1**. 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.

Figure 1

Components of the Organized Screening Program



Screening Program Administration

Population & Preventive Oncology of the BC Cancer Agency (BCCA), under the auspices of the Provincial Health Services Authority (PHSA), focuses on early detection and prevention of cancer, and the development and provision of cancer information. Its areas of responsibilities include:

1. Cancer Control Research (Epidemiology)
2. Surveillance and Outcomes Unit (Data and Evaluation)
3. Cancer Information Centre (Libraries)
4. Hereditary Cancer Program
5. Provincial Cancer Screening Programs

The Division of Population and Preventive Oncology is responsible for the administration of two population screening programs: the Cervical Cancer Screening Program (CCSP), and the Screening Mammography Program of BC (SMPBC). Currently, there are two administrative positions with responsibilities for both programs:

1. Screening Operations Leader (SOL)

Accountable to the Population and Preventive Oncology Leader, provides leadership in the coordination of the Cancer Screening Program processes within the B.C. Cancer Agency in collaboration with the various process representatives, oversees resource requirements such as staffing, equipment and space and is responsible for the planning, preparation and monitoring of the Screening Program budgets.

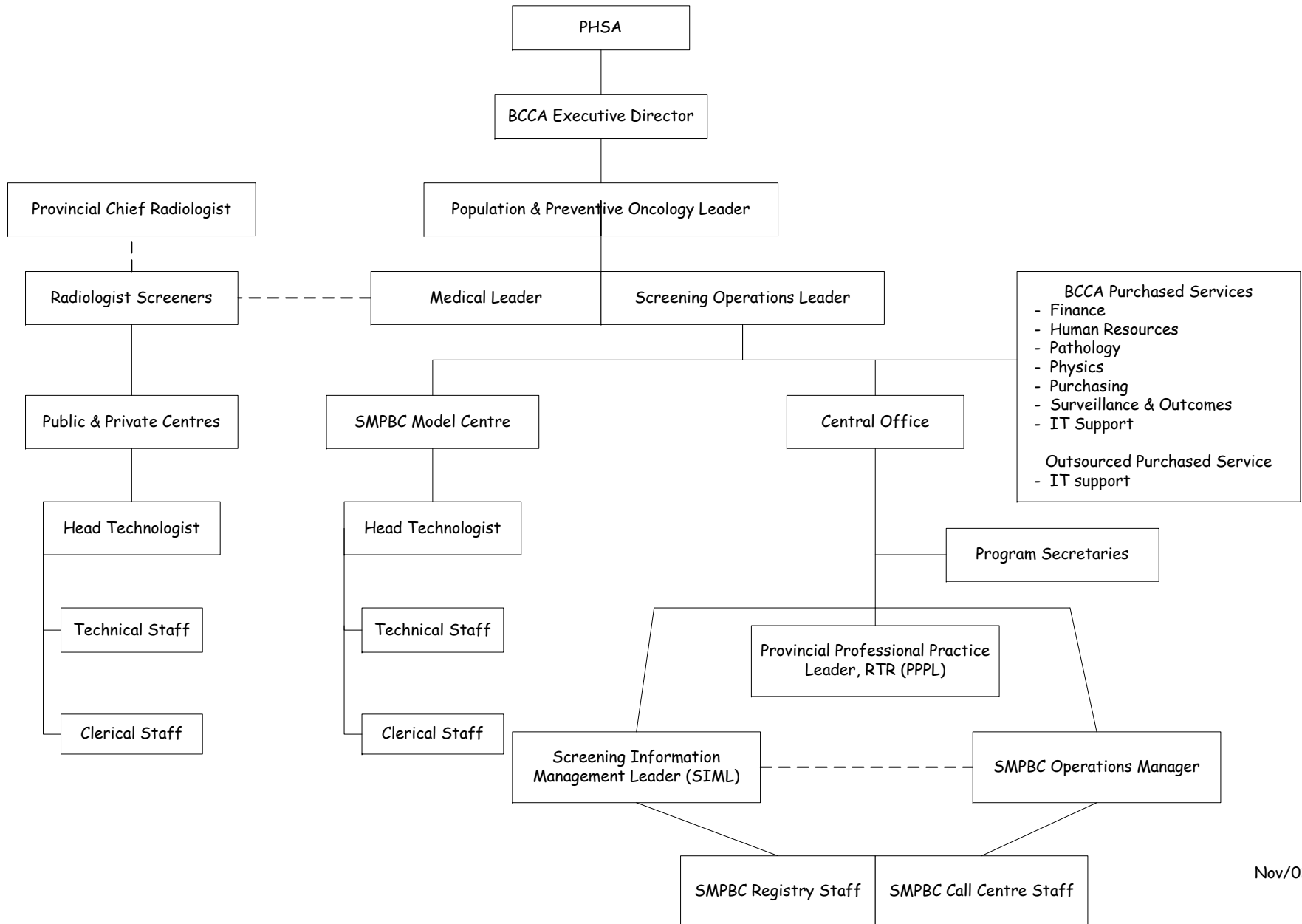
2. Screening Information Management Leader (SIML)

Accountable to the Screening Operations Leader, provides leadership to assigned staff and is accountable for technology development related to the implementation of the Screening Information Management Process for the Provincial Screening Programs within the BC Cancer Agency.

The SIML works collaboratively at the screening centre, regional and provincial levels with the Screening Information Management Process and Cancer Control Process.

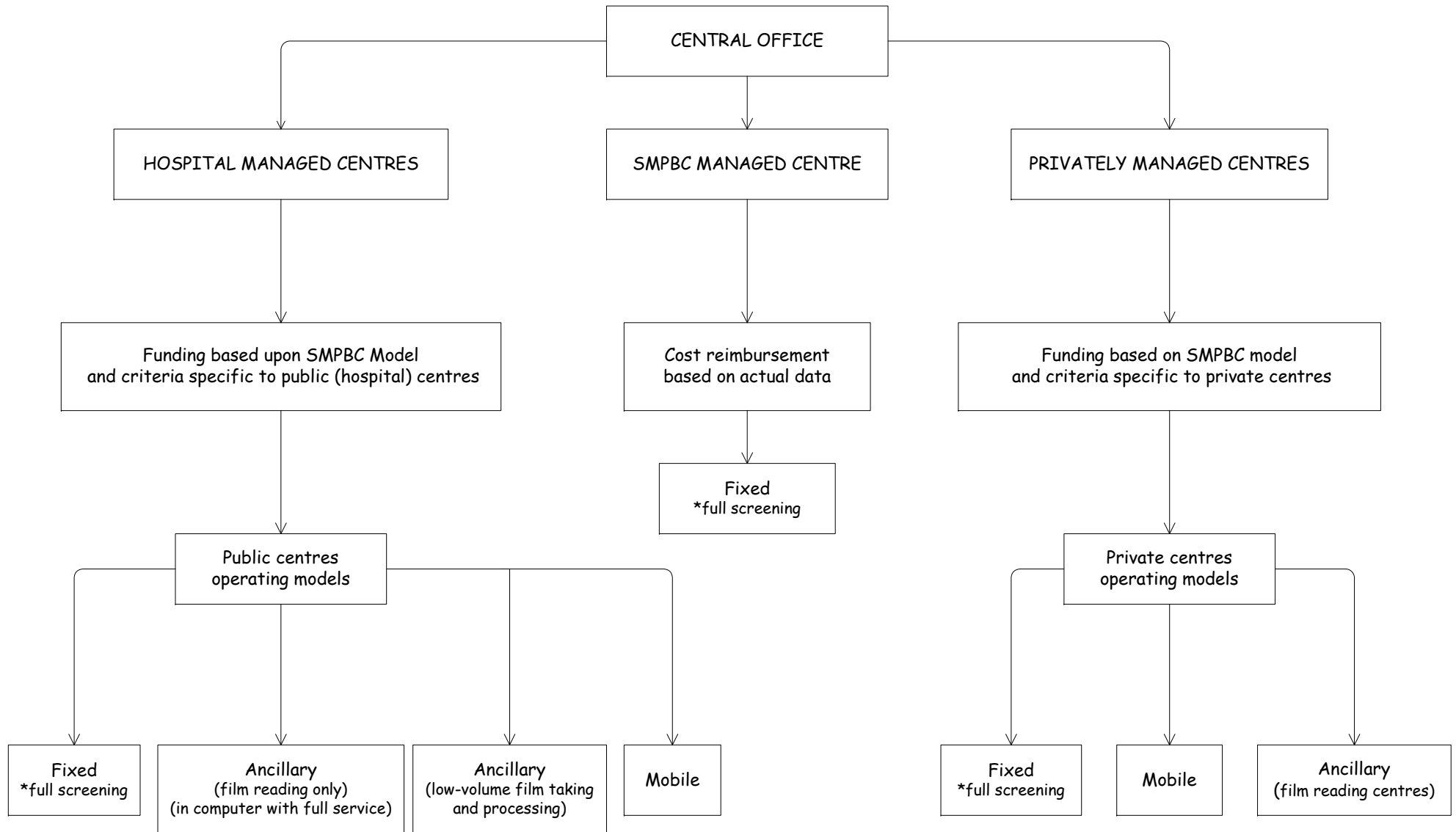
Data and Evaluation support for screening programs is provided by the Surveillance and Outcomes Unit.

BCCA/SMPBC Organization & Communication Chart



Nov/02

SMPBC Screening Centre Management Models



*recruitment, registration, film taking, processing and interpretation

Sept/02

SMPBC Recommendations

| Age | Requires Referral | Recall Frequency |
|-------|-------------------|--|
| <40 | Yes | will accept with primary health care provider referral |
| 40-49 | no | Recall letter annually* |
| 50-79 | no | Recall letter every 2 years* |
| 80+ | Yes | will accept with primary health care provider referral |

*a 2nd reminder letter will be sent if no visit/appointment is made 4-6 weeks after the recall letter 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 ≤3 months away, refer to the following policy

Age 40-49 (self-referral)

Women age 40-49 need to consider the potential benefits and disadvantages of screening mammography before seeking the service. The SMPBC's pamphlet entitled '**Information About Screening Mammography for Women Age 40 to 49**', can assist women in their decision making. Primary health care providers are encouraged to discuss information provided in this pamphlet with women in this age group.

Because the dense breast tissue in younger women makes it harder to see early breast cancer on mammograms, screening done on an irregular basis is less helpful. Therefore, if you consider your risk factors and decide to be screened, you need to have a mammogram **every year**.

Age 50-79 (self-referral)

Women age 50-79 should attend every 2 years. Scientific data shows that for healthy women age 50+, the benefits of screening in terms of reducing death from breast cancer are similar whether the screening is done annually or every 2 years. Attending every year is not necessary.

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. The SMPBC recommends that women age 50-79 have a screening mammogram at least every 24 months.

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.

Recruitment & Retention Resources

The following resources are available without charge from the Screening Mammography Program of BC:

PAMPHLETS

English

- ♦ When Should I Start Having Regular Screening Mammograms? Women 40-49 green
- ♦ Information About Screening Mammograms for Women in Their 50s, 60s and 70s pink
- ♦ What Happens When You Come for a Screening Mammogram blue
- ♦ After Your Screening Mammography burgundy

Chinese

- ♦ When Should I Start Having Regular Screening Mammograms? Women 40-49 green
- ♦ Information About Screening Mammograms for Women in Their 50s, 60s and 70s pink

Punjabi

- ♦ When Should I Start Having Regular Screening Mammograms? Women 40-49 green
- ♦ Information About Screening Mammograms for Women in Their 50s, 60s and 70s pink

OTHER MATERIALS

Posters

- ♦ Mobile Advertising – “The Mobile Breast Screening Service will be in your Community Soon”
- ♦ “Did You Know...As You Get Older Your Risk Of Breast Cancer Increases?”

Flyers

- ♦ Mobile sites listed on one side, pictures of ladies on the other side

Appointment Pads

- ♦ Lower Mainland
- ♦ 1-800# (available in English, Chinese and Punjabi)

10th Anniversary Brochure

Indications for Screening Mammography

Video – One Step Ahead of Breast Cancer

Provincial Activities and Initiatives to Promote the Screening Mammography Program

Access and Promotion Activities Include:

- ♦ Education material order form sent to family doctors and interested organizations once a year (materials available in a variety of languages)
- ♦ Information brochures, posters and cards distributed to doctor's offices, libraries, health units
- ♦ "Expert" speakers available for health fairs, professional rounds and other events
- ♦ Information provided to health fairs and other events
- ♦ Invitation letters to women in BC who turn 50 (except women already in the SMPBC); reminder letter if woman has not responded in 6-8 weeks
- ♦ Reminder to return letter according to SMPBC recommendations
- ♦ Mobile van schedules distributed to community newspapers, doctors offices, health units, businesses, community organizations (eg. seniors centres, First Nations centres)
- ♦ Drop-in ads provided to community newspapers
- ♦ Monitoring of mobile service demand with follow-up action as required eg. local media advertising
- ♦ Screening centres provided limited funding for community specific promotions
- ♦ Part-time community development worker located in the Interior – promotes mobile van visits; coordinates volunteers who assist with the mobile van; distributes publications throughout the community to doctor's offices, department stores, groceries, pharmacies, other businesses, health units and community groups; provides notices to community newspapers, does presentations and holds educational sessions with community organizations, professional groups and businesses; promotes at local events eg. health fair, home show, etc; facilitates group bookings; carries out reminder calls and visits doctors' offices
- ♦ Videotape available in English and Chinese describing the Screening Mammography Program
- ♦ Asian Breast Screening Clinic located at Mount Saint Joseph Hospital in Vancouver
- ♦ Slide presentation available for lay audience
- ♦ On request, group bookings arranged for specific groups so that they can feel more comfortable and/or make appropriate travel arrangements eg. First Nations women, South Asian women, women living in remote areas
- ♦ 38 screening centres including 4 mobiles to provide access in over 100 communities throughout BC

CONDENSED OPERATING STATEMENT
 OF THE SCREENING MAMMOGRAPHY PROGRAM OF B.C.
 Annual Report

For the years ended March 31, 2003 and 2002

STATEMENT OF REVENUE, EXPENDITURE AND SURPLUS

| | <u>2003</u> | <u>2002</u> |
|--|-------------------------|-------------------------|
| Revenue | | |
| Government grants | \$12,674,183 | \$12,074,66 |
| Investment Income | 36,587 | 26,348 |
| Other revenues | 7,566 | 8,356 |
| | <u>12,718,336</u> | <u>12,109,371</u> |
| Expenditures | | |
| Salaries, wages, and benefits | \$1,428,658 | \$1,126,375 |
| Contracted Services | 10,600,156 | 9,665,619 |
| Plant and support services | 1,003,006 | 1,176,650 |
| | <u>13,031,820</u> | <u>11,968,644</u> |
| Invested in capital assets: | | |
| Amortization of deferred contributions | 230,363 | 278,019 |
| Amortization of capital assets | <u>230,363</u> | <u>278,019</u> |
| | <u>-</u> | <u>-</u> |
| Current year's excess (deficiency) of revenue over expense | \$(313,484) | \$140,727 |
| Fund balance beginning of year | <u>600,885</u> | <u>460,158</u> |
| FUND BALANCES, end of year | <u><u>\$287,401</u></u> | <u><u>\$600,885</u></u> |

The information shown in the condensed financial statements is extracted from the BC Cancer Agency's full financial statements for the year ended March 31, 2003 on which the B.C. Cancer Agency's auditors, KPMG LLP, have reported. Copies of their report and the full financial statements are available on request.

Note 1:

Certain of the comparative figures have been reclassified to conform with the presentation adopted in the current year.

GLOSSARY

Abnormal Call Rate

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

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

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.

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

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 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.

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

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.

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

- 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"

**SMPBC Centre Volume
Year: 2002**

| 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 | 9,031 | 39 | 34% | 30% | 21% | 15% | 0% | 1,302 | 14% | 58% | 26% | 10% | 4% | 1% |
| Burnaby | F | 13,811 | 52 | 37% | 30% | 20% | 13% | 1% | 1,906 | 14% | 65% | 22% | 9% | 4% | 1% |
| Comox | F | 3,507 | 26 | 32% | 31% | 24% | 13% | 0% | 509 | 15% | 53% | 30% | 13% | 3% | 0% |
| Coquitlam | F | 14,344 | 60 | 42% | 31% | 17% | 9% | 0% | 2,181 | 15% | 68% | 22% | 8% | 2% | 0% |
| Kamloops | F | 7,511 | 32 | 33% | 32% | 22% | 12% | 0% | 675 | 9% | 73% | 18% | 5% | 1% | 0% |
| Kelowna | F | 11,028 | 45 | 32% | 29% | 23% | 16% | 0% | 1,182 | 11% | 64% | 22% | 10% | 3% | 0% |
| Langley | F | 5,363 | 25 | 39% | 31% | 18% | 11% | 0% | 1,137 | 21% | 59% | 26% | 9% | 4% | 0% |
| Mount St Joseph | F | 7,347 | 25 | 40% | 31% | 19% | 10% | 0% | 1,177 | 16% | 62% | 24% | 10% | 3% | 1% |
| Nanaimo | F | 8,053 | 29 | 30% | 31% | 23% | 14% | 1% | 880 | 11% | 54% | 28% | 11% | 4% | 1% |
| North Shore | F | 12,455 | 50 | 34% | 31% | 20% | 13% | 1% | 1,671 | 13% | 66% | 23% | 6% | 4% | 1% |
| Penticton | F | 3,482 | 19 | 25% | 27% | 28% | 18% | 1% | 848 | 24% | 41% | 24% | 23% | 10% | 1% |
| Prince George | F | 5,498 | 24 | 39% | 36% | 17% | 7% | 0% | 620 | 11% | 74% | 17% | 4% | 1% | 0% |
| Richmond | F | 13,492 | 49 | 42% | 33% | 16% | 9% | 0% | 1,836 | 14% | 65% | 23% | 7% | 3% | 0% |
| Surrey | F | 15,695 | 57 | 41% | 33% | 17% | 9% | 0% | 2,464 | 16% | 62% | 25% | 9% | 3% | 0% |
| Vanc - Victoria Dr | F | 7,929 | 36 | 43% | 30% | 17% | 9% | 0% | 1,806 | 23% | 60% | 24% | 11% | 5% | 1% |
| Vanc - W. Broadway | F | 12,253 | 72 | 37% | 35% | 17% | 10% | 1% | 2,534 | 21% | 55% | 27% | 11% | 4% | 1% |
| Vancouver | F | 9,855 | 42 | 40% | 34% | 16% | 9% | 0% | 1,172 | 12% | 70% | 20% | 6% | 3% | 0% |
| Vernon | F | 5,632 | 23 | 30% | 30% | 25% | 14% | 1% | 623 | 11% | 56% | 26% | 12% | 4% | 1% |
| Victoria | F | 16,757 | 67 | 28% | 33% | 21% | 17% | 1% | 1,797 | 11% | 59% | 25% | 10% | 4% | 1% |
| Victoria - VGH | F | 5,175 | 21 | 34% | 31% | 20% | 14% | 1% | 706 | 14% | 59% | 25% | 8% | 5% | 1% |
| White Rock | F | 7,119 | 30 | 33% | 31% | 19% | 16% | 0% | 792 | 11% | 65% | 20% | 9% | 4% | 1% |
| Coastal Mobile | M | 6,387 | 37 | 32% | 30% | 22% | 15% | 1% | 820 | 13% | 57% | 24% | 11% | 6% | 0% |
| Fort St John Mobile | M | | | | | | | | | | | | | | |
| Interior/Kootenay | M | 12,385 | 52 | 31% | 30% | 23% | 14% | 1% | 2,041 | 16% | 60% | 23% | 10% | 4% | 1% |
| Northern Region | M | 1,080 | 42 | 44% | 31% | 16% | 8% | 0% | 174 | 16% | 67% | 25% | 3% | 3% | 0% |
| Campbell River | A | 2,127 | 20 | 37% | 35% | 18% | 9% | 0% | 322 | 15% | 59% | 27% | 11% | 2% | 0% |
| Chilliwack | A | 3,268 | 44 | 26% | 27% | 28% | 18% | 1% | 480 | 15% | 48% | 30% | 14% | 8% | 0% |
| Dawson Creek | A | 1,025 | 18 | 36% | 35% | 20% | 8% | 0% | 204 | 20% | 58% | 26% | 14% | 0% | 0% |
| Delta | A | 2,419 | 23 | 33% | 30% | 21% | 15% | 1% | 389 | 16% | 62% | 23% | 9% | 5% | 1% |
| Duncan | A | 2,724 | 12 | 27% | 31% | 25% | 16% | 1% | 472 | 17% | 43% | 34% | 15% | 7% | 1% |
| Fort St John | A | 770 | 18 | 36% | 36% | 21% | 8% | 0% | 88 | 11% | 67% | 27% | 5% | 0% | 1% |
| Kitimat | A | 680 | 12 | 39% | 33% | 21% | 7% | 0% | 92 | 14% | 70% | 16% | 5% | 8% | 0% |
| Port Alberni | A | 1,456 | 10 | 31% | 35% | 21% | 12% | 0% | 235 | 16% | 50% | 31% | 11% | 6% | 1% |
| Powell River | A | 1,147 | 19 | 31% | 32% | 21% | 15% | 1% | 138 | 12% | 57% | 31% | 6% | 3% | 1% |
| Prince Rupert | A | 714 | 15 | 42% | 33% | 16% | 9% | 0% | 103 | 14% | 72% | 18% | 8% | 2% | 0% |
| Quesnel | A | 1,128 | 19 | 35% | 36% | 20% | 8% | 0% | 129 | 11% | 69% | 23% | 6% | 2% | 0% |
| Terrace | A | 776 | 17 | 32% | 39% | 19% | 9% | 1% | 111 | 14% | 53% | 32% | 7% | 5% | 3% |
| Williams Lake | A | 1,467 | 10 | 40% | 34% | 18% | 7% | 0% | 255 | 17% | 61% | 27% | 9% | 2% | 0% |
| Program | | 234,890 | | 35% | 32% | 20% | 12% | 1% | | 14% | 25% | 11% | 7% | 5% | 16% |

Type: Ancillary centre, Fixed centre, Mobile service

Anonymous Listing of Outcome Indicators by SMPBC Centre

| Centre | Type | Year: 2002 | | | | | Preceding 2 Years: 2000-2001 | | | | | | | |
|----------------|------|-------------------|----------------------------------|---------------|--------------------|-----|------------------------------|----------------------------------|---------------|--------------------|-----|-----------------------------|-------------------|---------------------------|
| | | % 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 | 3% | 3.3 | 3.0 | 3.4 | 10% | 4% | 3.9 | 7.3 | 3.5 | 9% | 18 : 42 | 50% | 12% |
| B | F | 4% | 4.2 | 4.5 | 4.2 | 10% | 4% | 5.0 | 6.0 | 4.9 | 14% | 26 : 55 | 44% | 12% |
| C | F | 10% | 5.0 | 6.2 | 4.7 | 5% | 12% | 5.9 | 11.6 | 3.6 | 5% | 19 : 26 | 38% | 7% |
| D | F | 9% | 4.4 | 4.5 | 4.4 | 5% | 10% | 3.8 | 5.2 | 3.5 | 4% | 41 : 79 | 35% | 13% |
| E | F | 8% | 3.8 | 4.1 | 3.7 | 5% | 8% | 4.1 | 3.9 | 4.1 | 5% | 30 : 86 | 53% | 13% |
| F | F | 5% | 3.7 | 4.8 | 3.6 | 7% | 8% | 4.3 | 8.7 | 3.6 | 6% | 9 : 43 | 40% | 21% |
| G | F | 5% | 3.9 | 3.0 | 4.0 | 9% | 4% | 3.4 | 4.1 | 3.2 | 8% | 19 : 56 | 55% | 9% |
| H | F | 4% | 4.3 | 2.8 | 4.5 | 11% | 4% | 3.6 | 1.7 | 4.0 | 11% | 6 : 25 | 55% | 23% |
| I | F | 5% | 4.9 | 6.8 | 4.7 | 10% | 5% | 3.2 | 5.1 | 2.9 | 7% | 11 : 63 | 53% | 24% |
| J | F | 8% | 3.1 | 3.4 | 3.1 | 4% | 8% | 2.5 | 3.2 | 2.4 | 4% | 7 : 30 | 54% | 30% |
| K | F | 5% | 4.6 | 1.1 | 5.0 | 9% | 6% | 3.9 | 5.0 | 3.7 | 7% | 22 : 111 | 47% | 26% |
| L | F | 7% | 6.0 | 11.8 | 5.0 | 9% | 2% | 1.9 | 4.5 | 1.1 | 9% | 2 : 11 | 54% | 31% |
| M | F | 8% | 4.3 | 6.8 | 3.9 | 6% | 8% | 4.1 | 6.0 | 3.8 | 6% | 31 : 55 | 42% | 12% |
| N | F | 7% | 1.6 | 3.2 | 1.4 | 3% | 8% | 3.4 | 6.5 | 2.9 | 4% | 8 : 27 | 51% | 17% |
| O | F | 8% | 5.2 | 6.8 | 5.0 | 7% | 7% | 4.2 | 4.9 | 4.0 | 6% | 39 : 83 | 45% | 16% |
| P | F | 8% | 3.9 | 4.9 | 3.7 | 5% | 8% | 3.5 | 5.9 | 3.0 | 5% | 23 : 67 | 54% | 18% |
| Q | F | 10% | 4.0 | 4.6 | 3.9 | 4% | 10% | 4.3 | 4.0 | 4.4 | 4% | 18 : 60 | 50% | 14% |
| R | F | 8% | 4.2 | 5.1 | 3.9 | 5% | 9% | 3.6 | 4.0 | 3.4 | 4% | 15 : 43 | 55% | 9% |
| S | F | 9% | 5.6 | 6.3 | 5.5 | 7% | 8% | 4.7 | 5.9 | 4.5 | 6% | 24 : 46 | 39% | 14% |
| T | F | 5% | 3.0 | 4.4 | 2.6 | 6% | 7% | 3.2 | 3.3 | 3.2 | 5% | 8 : 30 | 58% | 18% |
| U | F | 10% | 6.3 | 8.3 | 5.7 | 7% | 11% | 0.0 | 0.0 | 0.0 | 0% | --- | --- | --- |
| V | M | | | | | | 10% | 0.0 | 0.0 | 0.0 | 0% | --- | --- | --- |
| Z | M | 6% | 1.9 | 0.0 | 2.2 | 3% | 9% | 6.6 | 13.2 | 5.0 | 8% | 2 : 11 | 54% | 0% |
| AA | M | 4% | 4.4 | 2.4 | 4.7 | 12% | 3% | 3.9 | 3.3 | 4.1 | 12% | 16 : 32 | 54% | 8% |
| AB | M | 6% | 5.2 | 6.4 | 4.9 | 9% | 6% | 5.0 | 3.8 | 5.2 | 9% | 25 : 98 | 50% | 19% |
| AC | A | 5% | 4.8 | 4.3 | 4.9 | 10% | 3% | 5.7 | 7.3 | 5.3 | 19% | 2 : 12 | 50% | 14% |
| AD | A | 7% | 1.3 | 9.0 | 0.0 | 2% | 7% | 3.5 | 6.5 | 2.9 | 5% | 2 : 5 | 29% | 14% |
| AE | A | 5% | 6.1 | 9.3 | 5.5 | 14% | 3% | 2.6 | 1.2 | 3.0 | 8% | 2 : 9 | 55% | 18% |
| AF | A | 11% | 5.5 | 2.1 | 6.1 | 5% | 10% | 3.9 | 3.4 | 4.0 | 4% | 5 : 22 | 48% | 37% |
| AG | A | 8% | 4.2 | 9.7 | 3.3 | 6% | 10% | 4.1 | 12.6 | 2.4 | 4% | 1 : 5 | 50% | 33% |
| AH | A | 7% | 5.3 | 0.0 | 6.0 | 8% | 10% | 4.4 | 3.7 | 4.5 | 5% | 1 : 7 | 63% | 25% |
| AI | A | 5% | 6.1 | 7.2 | 5.9 | 12% | 3% | 3.7 | 0.0 | 4.1 | 12% | 2 : 7 | 56% | 11% |
| AJ | A | 7% | 9.1 | 11.4 | 8.8 | 13% | 9% | 2.7 | 2.9 | 2.7 | 3% | 0 : 5 | 60% | 20% |
| AK | A | 4% | 2.7 | 3.9 | 2.5 | 7% | 6% | 2.3 | 3.8 | 1.7 | 4% | 1 : 5 | 83% | 17% |
| AL | A | | | | | | 7% | 3.1 | 2.3 | 3.3 | 5% | 4 : 6 | 20% | 0% |
| AM | A | 10% | 6.2 | 5.1 | 6.4 | 6% | 11% | 6.1 | 6.4 | 6.0 | 6% | 9 : 14 | 35% | 13% |
| AN | A | 6% | 7.4 | 0.0 | 8.5 | 13% | 7% | 3.8 | 4.7 | 3.6 | 6% | 0 : 4 | 75% | 0% |
| AO | A | 4% | 5.9 | 2.1 | 6.7 | 13% | 3% | 5.5 | 4.5 | 5.9 | 16% | 6 : 21 | 56% | 4% |
| AP | A | 6% | 0.0 | 0.0 | 0.0 | 0% | 8% | 3.2 | 4.1 | 2.8 | 4% | 1 : 5 | 67% | 17% |
| Program | | 7% | 4.3 | 4.8 | 4.3 | 7% | 7% | 3.9 | 4.8 | 3.7 | 7% | <i>standard:</i> | >50% | <30% |

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 to have breast cancer after screen-initiated diagnostic workup.

Screening Mammography Program of BC

A Program of the BC Cancer Agency