BC Cancer Agency
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Cervical Cancer Screening Program

2008 ANNUAL REPORT

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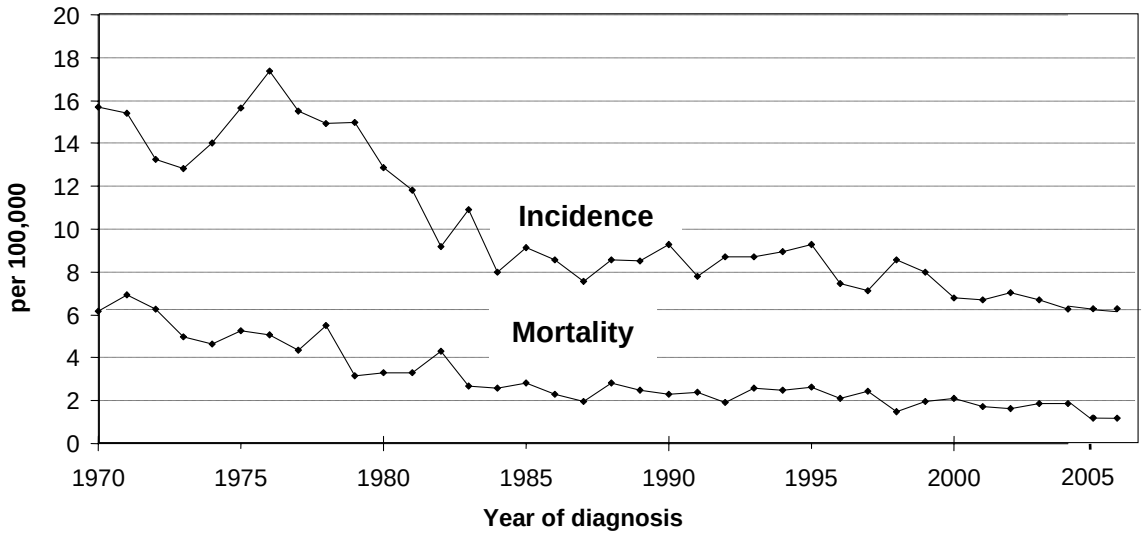


* Rates are standardized to the 1991 Canadian population

The BC Cancer Agency's Cervical Cancer Screening Program (CCSP) continues to successfully in maintaining a low cervical cancer incidence and mortality rates. Further reductions in cervical cancer incidence and mortality depend on a high degree of participation in cervical cancer screening by British Columbia women and appropriate use of technology.

The current annual report provides a more detailed picture of regional participation rates. The hysterectomy-adjusted participation rate indicates an improvement over the previous period. The CCSP is meeting or exceeding participation rate targets in all age groups, except the 20 – 29 year-olds. The low participation rate is especially noticeable amongst young urban women.

This year the CCSP started to implement the five-year plan to enhance and target its education and recruitment activities. The overall goal of these activities is to maintain the participation of women ages 20-69 and increase the participation of women who were not going for regular Pap tests, particularly in the 20-29 age group.

In February, an expanded awareness campaign was launched. It lasted four weeks, and the radio ads produced for the 2007 campaign were supplemented with a new poster design for public washrooms and banner ads on popular websites.

CCSP partnered with 12 clinics in Metro Vancouver to pilot a Pap Awareness Week in May. Local news media coverage and posters in the community raised awareness of cervical cancer screening and linked women to clinics that opened their doors for Pap tests without an appointment on designated days. A 'Find a Clinic' tool was also added to the BC Cancer Agency website so women province-wide can search for a nearby clinic that accepts women for Pap tests.

New resource materials for the public were developed. The brochures on Pap tests and HPV were translated into Traditional and Simplified Chinese and Punjabi. A postcard with answers to common questions about cervical cancer screening and a Pap test reminder calendar sticker were developed. These materials are distributed through health care providers, public libraries, community centres and health events.

CCSP's network of partners in BC communities is growing. A newsletter called *Pap-arazzi – Keeping the spotlight on cervical cancer screening* was launched in November to update health care providers and leaders in women's health on activities underway and supports offered by CCSP.

A Community Grants Fund was established in partnership with the Screening Mammography Program. It makes funding available to not-for profit organizations with ideas for building awareness and knowledge of women's cancer screening and facilitating women's participation in the BC Cancer Agency's screening programs.

The Cervical Cancer Screening Laboratory saw significant increases in Pap test volume compared to the previous period. The number of unsatisfactory smears continues to increase, mainly because of stricter application of the laboratory criteria.

To evaluate the use of Human Papillomavirus (HPV) testing in an organized cervical cancer screening program, CCSP along with PHSA laboratories, and the BC Centre for Disease Control are conducting a randomized control trial called the HPV FOCAL Trial (A Randomized Controlled Trial of HPV Testing For Cervical Cancer Screening). As of March 11, 2009, the trial has recruited 4058 BC women from 145 BC Family Physician study collaborators. For more information visit the HPV FOCAL website at www.bccancer.bc.ca/hpvfocal

PROGRAM RESULTS

Utilization

The Cervical Cancer Screening Program (CCSP) received a total of 592,900 gynecological smears from BC women in 2007. Health care professionals who submitted smears include gynecologists, general practitioners, midwives, naturopaths, nurses, etc. An additional 4701 smears were submitted from outside of BC, of which the majority (98%) originated in the Yukon Territory. The following program results include smears from British Columbia only. Unlabeled or improperly labeled specimens are not processed.

Table I
Smears Received / Processed by Age Group: 2007

	Age* (years)							
	<20	20-29	30-39	40-49	50-59	60-69	70+	All Ages
Number of Smears								
Received	26,613	124,313	135,696	138,550	106,555	53,867	7,305	592,900
Processed (%)	26,207 (98.5%)	122,483 (98.5%)	133,872 (98.7%)	136,706 (98.7%)	105,234 (98.8%)	53,162 (98.7%)	7,149 (97.9%)	584,814 (98.6%)
Smears from Cervix/Endocervix (%)	26,190 (99.9%)	122,345 (99.9%)	133,052 (99.4%)	132,934 (97.2%)	98,837 (93.9%)	47,704 (89.7%)	5,206 (72.8%)	566,269 (96.8%)
Smears from Other Sites (%)	17 (0.1%)	138 (0.1%)	820 (0.6%)	3,772 (2.8%)	6,397 (6.1%)	5,458 (10.3%)	1,943 (27.2%)	18,545 (3.2%)

* Age is computed based on smear date.

Table I shows the number of smears received and age distribution. Smears from “other sites” are those without any cells taken from the cervix or endocervix. The population of women screened by the CCSP includes clinically asymptomatic women (routine screening), follow-up screening for women with previously detected abnormalities, and a small percentage of symptomatic women.

Table II
Patients by Age Group: 2007

	Age* (years)							
	<20	20-29	30-39	40-49	50-59	60-69	70+	All Ages
Number of Patients	24,310	112,770	124,319	130,862	101,537	51,411	6,775	551,985
With Smears from Cervix/Endocervix Site (%)	24,307 (100.0%)	112,708 (99.9%)	123,672 (99.5%)	127,449 (97.4%)	95,642 (94.2%)	46,366 (90.2%)	5,022 (74.1%)	535,167 (97.0%)
With Smears from non Cervix/Endocervix Site (%)	3 (< 0.1%)	62 (0.1%)	647 (0.5%)	3,413 (2.6%)	5,895 (5.8%)	5,045 (9.8%)	1,753 (25.9%)	16,818 (3.0%)

* Age is computed based on patient's last smear.

Table II shows the number of patients who had Pap smears. The numbers of patients is given in total, and by patients with smears from the cervix or endocervix and those with smears only from other sites.

Table III
Number of Smears in Patients with Cervical/Endocervical Smears: 2007

	Age* (years)							
	<20	20-29	30-39	40-49	50-59	60-69	70+	All Ages
Number of Patients	24,307	112,708	123,672	127,449	95,642	46,366	5,022	535,167
with 1 Smear (%)	22,888 (94.2%)	103,624 (91.9%)	114,390 (92.5%)	122,085 (95.8%)	92,436 (96.6%)	44,949 (96.9%)	4,831 (96.2%)	505,204 (94.4%)
with 2 Smears (%)	1,353 (5.6%)	8,744 (7.8%)	8,946 (7.2%)	5,170 (4.1%)	3,104 (3.2%)	1,383 (3.0%)	179 (3.6%)	28,879 (5.4%)
with 3+ Smears (%)	66 (0.3%)	340 (0.3%)	336 (0.3%)	194 (0.2%)	102 (0.1%)	34 (0.1%)	12 (0.2%)	1,084 (0.2%)
New Patients (%)	12,307 (50.6%)	18,855 (16.7%)	8,481 (6.9%)	4,768 (3.7%)	2,532 (2.6%)	1,226 (2.6%)	251 (5.0%)	48,421 (9.0%)

* Age is computed based on patient's last smear.

Table III shows the number and percentage of women having one, two and three or more cervical/endocervical smears in the given year. Also shown is the number of women being screened by the CCSP for the first time, and the percentage they represent of all women screened.

Participation Rates

The CCSP recommends women begin Pap screening for cervical abnormality when they become sexually active or soon thereafter, and stop screening at age 69 if no significant abnormality was detected during their screening history. The CCSP recommends biennial screening after three annual normal screens. For comparison with other jurisdictions providing cervical cancer screening, a 3-year participation rate (i.e. the percent of women with at least one cervical/endocervical smear in a 3-year period) is reported.

Table IV lists participation rates by Health Service Delivery Area (HSDA) and 10-year age groups for the 3-year period ending on December 31 in the year of this report. In addition, the provincial participation rates are further adjusted for hysterectomies. The hysterectomy adjustment is based on the estimated age specific hysterectomy rates for BC to exclude women without a cervix. Hysterectomy rates were not available by health service delivery areas. As there may be significant regional variations, it is not appropriate to adjust regional participation rates using province-wide hysterectomy rates. Table IV shows the adjusted participation rate for the BC female population age 20-69 is 78%.

Table IV
Participation Rates by HSDA and 10-Year Age Groups
January 1, 2005 – December 31, 2007

Health Service Delivery Area	Age* (years)							Age
	<20	20-29	30-39	40-49	50-59	60-69	70+	20-69
East Kootenay	11.0	72.8	64.8	57.0	49.5	40.7	6.8	56.6
Kootenay Boundary	10.5	77.9	71.0	62.1	55.3	44.2	7.0	61.2
Okanagan	9.7	73.3	74.4	65.3	54.1	42.2	5.9	61.4
Thompson Cariboo	11.2	71.9	67.8	57.5	48.2	37.4	6.3	56.4
Fraser East	6.3	61.6	64.1	57.4	45.1	34.5	5.4	54.2
Fraser North	5.8	56.0	70.7	66.5	56.8	43.1	7.5	60.8
Fraser South	5.9	58.3	70.0	63.7	52.0	39.2	5.9	58.5
Richmond	4.5	45.6	72.3	71.1	64.6	50.7	9.1	62.4
Vancouver	5.2	51.1	69.3	70.2	62.6	48.1	7.9	61.5
North Shore/Coast Garibaldi	8.5	64.3	74.4	70.7	63.4	52.2	8.9	66.0
South Vancouver Island	11.0	65.6	73.6	67.7	59.1	47.9	5.6	63.5
Central Vancouver Island	10.9	71.5	70.2	61.1	52.7	43.0	6.7	58.9
North Vancouver Island	11.6	79.8	72.5	64.3	57.1	47.8	7.6	63.6
Northwest	10.2	71.1	66.5	58.5	46.7	34.0	5.6	57.0
Northern Interior	9.7	70.3	68.0	58.3	50.8	39.4	7.1	59.0
Northeast	8.9	67.7	60.2	51.3	41.5	30.8	6.7	53.6
British Columbia	8.6	67.4	74.0	66.7	56.8	44.2	6.9	63.3
Adjusted for Hysterectomy	8.6	67.4	80.5	84.5	84.8	71.3	6.9	78.0

*Age computed based on patient's age in 2006.

Notes:

- Population data was acquired through the Health Data Warehouse, BC Ministry of Health
- Hysterectomy rates were estimated from a population sample of an epidemiological study conducted in 1995

The results highlight areas of the province where CCSP should focus its recruitment efforts, as well as the age groups to target in each area. Participation among 20-29 year olds falls below the 70% benchmark. Looking more closely at this age group across the HSDAs, we see that participation is particularly low in the most populated urban areas (Vancouver, Fraser South, Fraser North and South Vancouver Island). Participation among 20-29 year-olds is lowest in Richmond, which is also the HSDA with the largest visual minority population in the province. Richmond and Vancouver are particularly interesting in that their

overall participation rates are almost as high as the provincial rate, which points to the need for youth-focused, culturally appropriate promotions and primary health care services in these areas.

In some HSDAs, the participation rates in the 20-29 age group are higher than in the overall population (e.g. East Kootenay, Kootenay Boundary, Okanagan, Thompson Cariboo, Central Vancouver Island, Northwest). CCSP should therefore tailor its recruitment activities to appropriate age groups based on the participation rates in the HSDAs in its effort towards increasing the provincial participation rate.

This analysis is based on a preliminary understanding of factors that may influence women's participation in cervical cancer screening in our province's HSDAs. CCSP needs to continue to partner with the Regional Health Authorities and local primary health care providers to more fully understand and effectively address the barriers to cervical cancer screening faced by women each HSDA.

Screening Interval

Repeat interval recommendations were given based primarily on the current smear result and cytology history, but they might be influenced by the patient's clinical condition. The last satisfactory negative smear per patient taken in the reference year was used in the screening interval analyses.

Table V shows the 3-year rescreen rate of women ages 20-69 by 10-year age group for calendar years 2002-2004 inclusive. Table VI summarizes the 2004 rescreen rate for women ages 20-69 by 10-year age groups in 6-month intervals. Lastly, Figure 2 shows the rescreen rate by the recommended screening interval.

Table V
3-Year Rescreen Rate by 10-Year Age Groups for Calendar Years 2002-2004

	Calendar Year					
	2002		2003		2004	
Age*	n	%	n	%	n	%
20-29	103,887	83%	102,054	82%	102,099	81%
30-39	134,882	85%	130,950	84%	128,217	83%
40-49	126,713	85%	127,348	85%	129,477	83%
50-59	78,444	85%	80,607	85%	84,498	84%
60-69	34,841	78%	36,149	77%	38,132	76%
20-69	478,767	84%	477,108	83%	482,423	82%

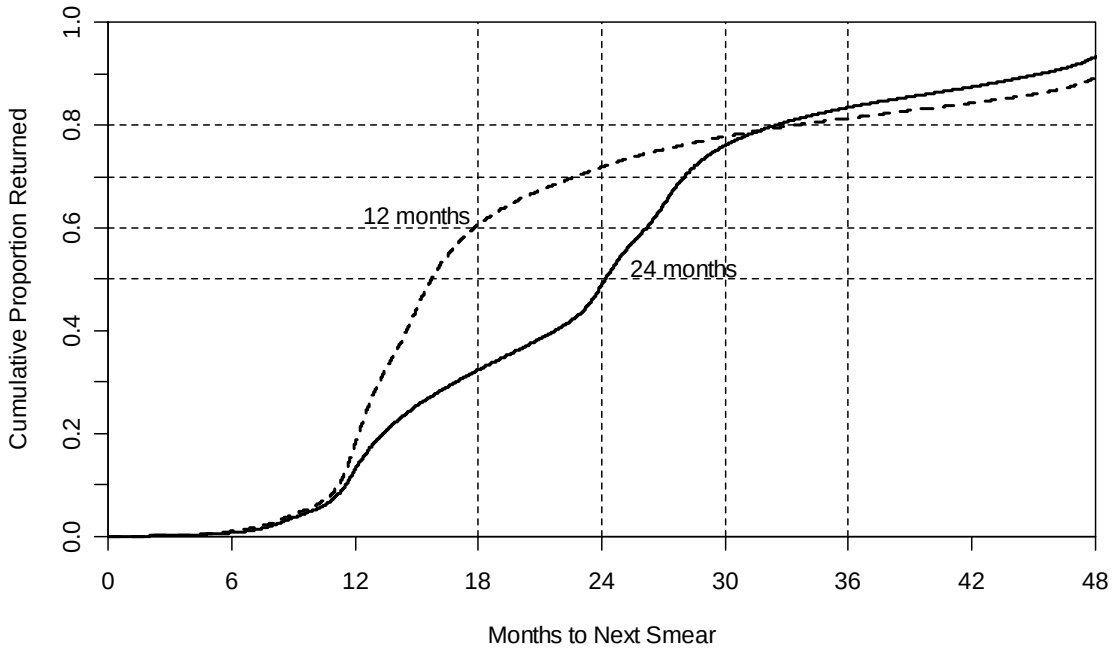
* Age is computed based on patient's age on report date of the index Pap smear.

Table VI
Rescreen Rate by 10-Year Age Groups for Calendar Year 2004

	Age*					
	20-29	30-39	40-49	50-59	60-69	20-69
Number of Patients	102,132	128,248	129,511	84,516	38,150	482,557
Rescreened by						
18 months	50%	47%	44%	42%	36%	45%
24 months	64%	61%	58%	57%	49%	59%
30 months	76%	77%	77%	78%	71%	76%
36 months	81%	83%	83%	84%	76%	82%

* Age is computed based on patient's age on report date of the index Pap smear.

Figure 2
Rescreen Rate for 2004 Patients by Recommended Interval



Quality of Smears

The adequacy of a smear for interpretation is assessed as follows: satisfactory for interpretation, satisfactory but limited for interpretation, and unsatisfactory. The "unsatisfactory" category is used when the smear quality is inadequate for an interpretation. In general, the "satisfactory but limited" category is used when the smear quality is not ideal but still possible to interpret. In previous reportings of CCSP smear quality, "no endocervical cells" was considered "satisfactory but limited" for interpretation. It has been summarized in the "satisfactory" category since the 2004 report. The absence of endocervical, transformation zone component continues to be noted on the cytology report.

Table VII
Smear Quality by Age Group: 2007

	Age* (years)							
	<20	**20-29**	**30-39**	**40-49**	**50-59**	**60-69**	**70+**	**All Ages**
Cervical/Endocervical Smears	26,190	122,345	133,052	132,934	98,837	47,704	5,206	566,269
Unsatisfactory (%)	434 (1.7%)	2,265 (1.9%)	2,632 (2.0%)	1,766 (1.3%)	2,159 (2.2%)	1,473 (3.1%)	212 (4.1%)	10,941 (1.9%)
Limited for Interpretation (%)	660 (2.5%)	3,618 (3.0%)	3,638 (2.7%)	3,155 (2.4%)	2,079 (2.1%)	982 (2.1%)	133 (2.6%)	14,265 (2.5%)

* Age is computed based on smear date.

Table VII summarizes smear quality by 10-year age groups for cervical/endocervical smears.

The most commonly cited factor, for approximately 80% of smears of unsatisfactory quality, is scanty smear material. Scanty smear material is especially common in the older age groups. The next most cited reason is inflammatory exudates (13%). Multiple factors may be cited. The percentage of smears reported as unsatisfactory for interpretation increased by approximately 25% from the previous report. This is largely due to stricter interpretation of reporting rules by the Cervical Cancer Screening Laboratory.

The most commonly cited factor for smears which are limited for interpretation is inflammatory exudates (42%), followed by scanty smear (48%).

Cervical Smear Results

The most severe cervical/endocervical smear results for patients in a given year are summarized in Table VIII. The table shows the result distribution within 10-year age groups.

Table VIII
Distribution of Cytology Findings by Age Group Based on Patient's Most Severe Cervical/Endocervical Smear Result in 2007

	Age* (years)							
	<20	20-29	30-39	40-49	50-59	60-69	70+	All Ages
Number of Patients	24,427	112,705	123,629	127,442	95,601	46,346	5,016	535,167
Unsatisfactory (%)	296 (1.2%)	1,498 (1.3%)	1,586 (1.3%)	1,106 (0.9%)	1,386 (1.4%)	979 (2.1%)	144 (2.9%)	6,995 (1.3%)
Limited for interpretation (%)	502 (2.1%)	2,730 (2.4%)	2,902 (2.3%)	2,654 (2.1%)	1,838 (1.9%)	903 (1.9%)	119 (2.4%)	11,648 (2.2%)
Negative** (%)	21,003 (86.0%)	98,253 (87.2%)	112,731 (91.2%)	116,925 (91.7%)	88,906 (93.0%)	43,446 (93.7%)	4,609 (91.9%)	485,874 (90.8%)
"No endocervical cells "	5	8	3	6	3	1	0	26
Reactive changes (%)	382 (1.6%)	1,565 (1.4%)	1,359 (1.1%)	1,884 (1.5%)	1,068 (1.1%)	332 (0.7%)	28 (0.6%)	6,618 (1.2%)
Atypia (of unspecified significance)*** (%)	5 (< 0.1%)	72 (0.1%)	56 (< 0.1%)	101 (0.1%)	141 (0.1%)	116 (0.3%)	22 (0.4%)	513 (0.1%)
Mild atypia (%)	1,873 (7.7%)	6,623 (5.9%)	3,835 (3.1%)	4,016 (3.2%)	1,919 (2.0%)	428 (0.9%)	43 (0.9%)	18,737 (3.5%)
*No previcous atypia**** in past 2 yrs*	1,475	4,592	2,736	2,854	1,334	267	22	13,280
*Mild or higher atypia**** in past 2 yrs*	398	2,031	1,099	1,162	585	161	21	5,457
Moderate or higher atypia (%)	361 (1.5%)	1,956 (1.7%)	1,157 (0.9%)	750 (0.6%)	340 (0.4%)	141 (0.3%)	51 (1.0%)	4,756 (0.9%)

* Age is computed based on patient's worst smear's smear date.
** Include "no endocervical cells"
*** Small subset of atypical squamous cells of uncertain significance cannot rule out high grade lesion (ASC-H)
**** Atypia – mild or higher atypia

Table IX
Significant Atypia Rates (per 1000) by Age Group
Based on Patient's Most Severe Cervical/Endocervical Smear Result in 2007

	Age* (years)							All Ages
	<20	20-29	30-39	40-49	50-59	60-69	70+	
Number of Patients with Satisfactory Smear	24,131	111,207	122,043	126,336	94,215	45,367	4,872	528,172
Squamous:								
Mild (ASC-US/LSIL)	76.9	57.9	28.3	26.3	15.6	7.8	6.8	32.0
Moderate+ (HSIL)	14.5	16.7	8.5	4.6	2.2	1.9	5.5	7.8
Atypical (of unspecified significance)	0.2	0.6	0.3	0.6	1.2	2.0	2.7	0.8
Glandular:								
Mild	0.5	1.4	2.9	5.2	4.4	1.5	1.4	3.2
Moderate (High grade)	0.1	0.0	0.2	0.6	0.7	0.4	1.0	0.4
Marked+ (High grade)	0.0	0.0	0.1	0.1	0.3	0.4	2.3	0.2
Epithelial:								
Mild (Low grade)	0.2	0.2	0.2	0.3	0.4	0.2	0.6	0.3
Moderate+ (High grade)	0.4	0.8	0.7	0.6	0.4	0.4	1.6	0.6

* Age is computed based on patient's worst smear's smear date.

ASC-US – atypical squamous cells of undetermined significance
LSIL – low grade squamous intraepithelial lesion
HSIL – high grade squamous intraepithelial lesion

Table IX shows the significant atypia rates (per 1000 patients) by 10-year age groups. Rates are presented by cell type and level of significance. Squamous cell type is the most common. Atypical squamous cells of undetermined significance / low-grade squamous intraepithelial lesion (ASC-US/LSIL) is more frequently reported in the younger women.

Follow-up of Abnormals

Follow-up Recommendation

The current CCSP practice is to follow mild atypia with repeat smear at 6-month intervals for up to two years. Patients with persistent mild atypia are then advised to have a colposcopy. Other procedures may be recommended on the basis of patient's clinical condition and cytology history. Table X summarizes follow-up recommendations on the most severe atypia results for patients in a given year.

Table X
Follow-up Recommendation by Age Group
Based on Patient's Most Severe Cervical/Endocervical Smear Result in 2007

	Age* (years)							
	<20	20-29	30-39	40-49	50-59	60-69	70+	All Ages
Patients With Mild Atypia	1,873	6,623	3,835	4,016	1,919	428	43	18,737
Repeat in 6 months (%)	1,794 (95.8%)	6,109 (92.2%)	3,549 (92.5%)	3,635 (90.5%)	1,677 (87.4%)	375 (87.6%)	34 (79.1%)	17,173 (91.7%)
Other investigation** (%)	79 (4.2%)	514 (7.8%)	286 (7.5%)	381 (9.5%)	242 (12.6%)	53 (12.4%)	9 (20.9%)	1,564 (8.3%)
Patients with Moderate or Higher Atypia	361	1,956	1,157	750	340	141	51	4,756
Colposcopy and/or ECC*** (%)	340 (94.2%)	1,868 (95.5%)	1,099 (95.0%)	666 (88.8%)	243 (71.5%)	100 (70.9%)	28 (54.9%)	4,344 (91.3%)
Other investigation (%)	21 (5.8%)	88 (4.5%)	58 (5.0%)	84 (11.2%)	97 (28.5%)	41 (29.1%)	23 (45.1%)	412 (8.7%)
Patients with Atypia NOS	5	72	56	101	141	116	22	513
Repeat in 6 months (%)	1 (20.0%)	12 (16.7%)	17 (30.4%)	20 (19.8%)	15 (10.6%)	8 (6.9%)	3 (13.6%)	76 (14.8%)
Colposcopy and/or ECC*** (%)	3 (60.0%)	49 (68.1%)	29 (51.8%)	42 (41.6%)	21 (14.9%)	13 (11.2%)	2 (9.1%)	159 (31.0%)
Other investigation (%)	1 (20.0%)	11 (15.3%)	10 (17.9%)	39 (38.6%)	105 (74.5%)	95 (81.9%)	17 (77.3%)	278 (54.2%)

* Age is computed based on the smear date of the patient's worst Pap test result in the year.
** The predominant recommendation was colposcopy investigation.
*** ECC: Endocervical Curretage

Compliance to Colposcopy Recommendations

Table XI presents age-specific compliance to colposcopy recommendations for patients with findings of mild atypia and moderate or more severe cervix/endocervix smears. Compliance is defined as having been achieved when a colposcopy examination was conducted within 1 week to 1 year of being recommended. Colposcopy examinations performed within one week of recommendation are not likely to be prompted by that recommendation.

Table XI
Colposcopy Compliance Rate by Age

	Age*							
	<20	**20-29**	**30-39**	**40-49**	**50-59**	**60-69**	**70+**	**All Age**
Number of Patients with Mild Atypia	39	444	242	276	148	37	5	1,191
Colposcopy by								
3 months	44%	43%	43%	51%	52%	59%	20%	46%
6 months	69%	66%	74%	76%	76%	86%	80%	72%
9 months	72%	72%	77%	83%	82%	86%	80%	77%
12 months	72%	75%	79%	83%	83%	86%	80%	79%
Number of Patients with Moderate+ Atypia	340	1,868	1,099	666	243	100	28	4,344
Colposcopy by								
3 months	54%	60%	66%	66%	61%	68%	75%	62%
6 months	72%	77%	81%	80%	79%	80%	89%	79%
9 months	77%	82%	84%	83%	83%	85%	89%	82%
12 months	77%	83%	86%	83%	84%	85%	89%	83%

* Age is computed based on smear date.

Positive Predictive Value of Cytology

The positive predictive value (PPV) of cytology is assessed for positive Pap tests that have had confirmational investigation, such as colposcopy and/or pathology reported within one week to one year after the Pap test is reported. Surveillance with repeat Pap tests only is not regarded as confirmational investigation. This measure is an indicator of the predictive validity of a positive Pap test. However, it is important to note the limitations of cytology and histology, such as specimen sampling may not be representative of the lesion, and interpretation is subject to observer variation for cytology, and to lesser extent for histology. Furthermore, there may be progression or regression of the lesion in the period between cytology and histology, particularly with mildly abnormal lesions. Histological diagnosis was based on the most severe histological diagnosis from cervical pathology reported up to one year after the Pap test. Cervical intraepithelial neoplasia (CIN) result reporting terminology is used.

Table XII below shows the number of Pap tests with finding of mild or higher squamous atypia that are recommended for investigation, and the PPV of cytology for positive Pap tests with confirmational investigation. Results are shown separately for smears with mild squamous atypia recommended to have further investigation, and for smears with moderate or higher atypia.

Table XII
Positive Predictive Value of Cytology: 2006

	Significant Cytology Finding			
	Mild Atypia*		Moderate+ Atypia	
	No.	%	No.	%
Smears:	1,930	100.0%	5,297	100.0%
without confirmational investigation	505	26.2%	597	11.3%
with confirmational investigation**	1,425	73.8%	4,700	88.7%
with pathological diagnosis	1,280	66.3%	4,466	84.3%
Positive Predictive Value:				
CIN II or higher	223	17.4%	2,659	59.5%
CIN III or higher	92	7.2%	1,689	37.8%
Other Histology Finding:				
Glandular				
Severe	-	-	8	0.2%
In situ	3	0.2%	42	0.9%
Invasive	10	0.8%	72	1.6%
Other invasive	-	-	1	< 0.1%

* with recommendation for coloposcopy investigation
** do not include investigation where there are only repeated pap smears

The PPV for CIN II or higher on histology is 59.5% for moderate or higher atypia, and 17.4% for mild atypia that were referred for further investigation. Majority of Pap tests with mild atypia cytology results were recommended to repeat smear in 6 months (91.0%). Some of these smears would have further indication, such as subsequent significant Pap test result, to warrant colposcopy or other investigation within one year (9.0%).

Provincial Colposcopy Program

The Provincial Colposcopy Program was developed to act in a complimentary manner to the Cervical Cancer Screening Program (CCSP). This service currently consists of 24 hospital-based clinics located throughout the province. Their locations and the community gynecologists who staff them are listed under Colposcopy Clinic Locations and Personnel Staffing.

The majority of all diagnostic colposcopic examinations in the province are performed through regional, hospital-based clinics. Individuals who are affiliated with the provincial colposcopy program essentially confine their colposcopic practices to the hospital-based clinics. All participating individuals are certified, and use a uniform reporting system with standardized terminology. Their results are incorporated into the CCSP database, and are summarized for the annual continuing medical education workshop in colposcopy, held by the Provincial Colposcopy Program.

In 2007, 11,070 colposcopy examinations were provided. A cytological abnormality was the most common reason for colposcopy referral (see Figure 3) and the primary site of investigation was the cervix (see Figure 4).

Figure 3
Reason for Referral to Colposcopy Clinic: 2007

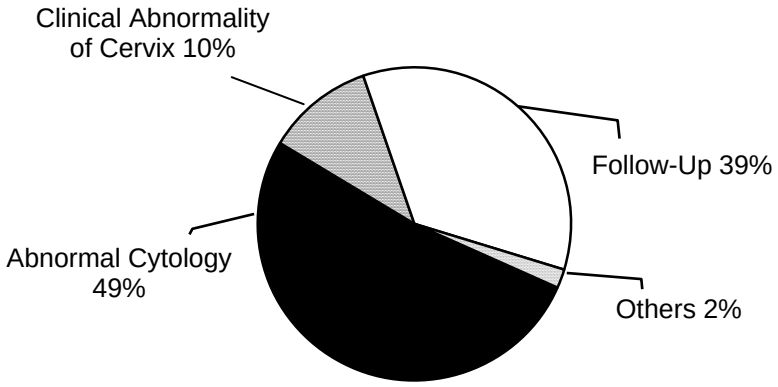
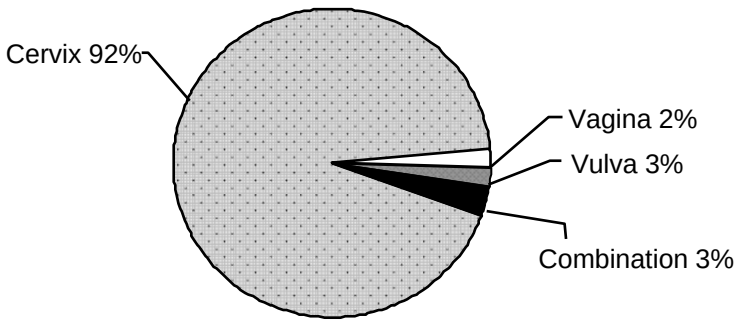


Figure 4
Site of Colposcopic Investigation: 2007



Results of all colposcopic examinations and suggested course of follow-up action are recorded on a standardized form. Copies of this form are sent to both the referring physician and to the CCSP for incorporation into the provincial database. This data collection process forms the basis of a provincial quality assurance program.

In 2007, the BC Cancer Agency Colposcopy Program initiated the process of linking all provincial colposcopy clinics through a centralized colposcopy database. This project will facilitate communication between colposcopists, quality insurance and research and will be a world first. Through the centralized Pap smear screening and now also colposcopy diagnostics, women in British Columbia will have state-of-the-art cervical cancer prevention available to them.

Cancer Statistics

New invasive cervical cancers diagnosed in 2004 to 2006 were identified from the British Columbia Cancer Registry and data collected by the CCSP. The cancer counts and incidence rates for 2004-2006 are presented in Table XIII.

Table XIII
Invasive Cervical Cancers by Age Group

		Age at Diagnosis (Years)						
		20-29	30-39	40-49	50-59	60-69	70+	Age 20+
2006	Number of cases							
	All cell types	7	35	43	25	16	20	146
	Squamous cell only	4	23	26	20	13	17	103
	Incidence rate *(per 100,000)*							
	All cell types	*2.4*	*11.5*	*12.0*	*8.0*	*8.2*	*8.2*	*8.6*
	Squamous cell only	*1.4*	*7.5*	*7.3*	*6.4*	*6.7*	*7.0*	*6.0*
2005	Number of cases							
	All cell types	9	38	37	35	17	13	149
	Squamous cell only	8	26	19	23	13	8	97
	Incidence rate *(per 100,000)*							
	All cell types	*3.1*	*12.5*	*10.4*	*11.7*	*9.1*	*5.4*	*8.9*
	Squamous cell only	*2.8*	*8.5*	*5.3*	*7.7*	*7*	*3.4*	*5.8*
2004	Number of cases							
	All cell types	14	29	45	26	16	17	147
	Squamous cell only	11	25	28	20	13	11	108
	Incidence rate *(per 100,000)*							
	All cell types	*5*	*9.5*	*12.7*	*9.1*	*8.9*	*7.2*	*9*
	Squamous cell only	*3.9*	*8.2*	*7.9*	*7*	*7.2*	*4.7*	*6.6*

Notes:

1. Population estimates: BC STATS, BC Ministry of Finance and Corporate Relations
2. Population data was acquired through the Health Data Warehouse, BC Ministry of Health
3. Cancer data source: BC Cancer Registry and Cervical Cancer Screening Program of BC Cancer Agency

Invasive Squamous Carcinoma

Screening history of women diagnosed with invasive squamous cell carcinomas in 2006 is summarized in Table XIV. As Pap tests performed within 6 months prior to the invasive cancer diagnosis are less likely to be done for screening purpose, these Pap tests are disregarded in the categorization of screening history. Table XIV shows that 64.1% patients are "inactive" screening participants (>5 years or no screening history with the Program), 5.8% are "under screened" (>3 to 5 years), and 30.1% are "active" screening participants (0.5 to 3 years).

Table XIV
Screening History for Invasive Squamous Cell Cervical Cancer
Patients by Age Group: 2006

	Age at Diagnosis (years)						All Cancers
	20-29	30-39	40-49	50-59	60-69	70+	
No. of Invasive Squamous Cell Cancers	4	23	26	20	13	17	103
No Screening History (%)	1 (25.0%)	7 (30.4%)	14 (53.8%)	14 (70.0%)	9 (69.2%)	15 (88.2%)	60 (58.3%)
Last screened >5 years prior (%)	- -	2 (8.7%)	1 (3.8%)	1 (5.0%)	1 (7.7%)	1 (5.9%)	6 (5.8%)
3 to 5 years prior (%)	- -	1 (4.3%)	3 (11.5%)	1 (5.0%)	- -	1 (5.9%)	6 (5.8%)
Pap smear 0.5 to 3 years prior (%)	3 (75.0%)	13 (56.5%)	8 (30.8%)	4 (20.0%)	3 (23.1%)	- -	31 (30.1%)

Note:
Pap tests performed within 6 months prior to the invasive cancer diagnosis are less likely to be done for screening purpose, thus these Pap tests are disregarded in the categorization of screening history.

Adenocarcinoma

Screening history of women diagnosed with adenocarcinoma in 2006 is summarized in Table XV. As Pap tests performed within 6 months prior to the invasive cancer diagnosis are less likely to be done for screening purpose, these Pap tests are disregarded in the categorization of screening history. Table XV shows that 44.7% of patients are “inactive” screening participants (>5 years or no screening history with the Program), 5.3% are “under screened” (>3 to 5 years), and 50.0% are “active” screening participants (0.5 to 3 years).

Table XV
Screening History for Invasive Adenocarcinoma Cervical Cancer Patients by Age Group: 2006

	Age at Diagnosis (years)						All Cancers
	20-29	30-39	40-49	50-59	60-69	70+	
No. of Invasive Adenocarcinoma	2	12	15	4	3	2	38
No screening History (%)	-	2	8	1	-	-	11
	-	(16.7%)	(53.3%)	(25.0%)	-	-	(28.9%)
Last screened >5 years prior (%)	-	-	1	1	2	2	6
	-	-	(6.7%)	(25.0%)	(66.7%)	(100.0%)	(15.8%)
3 to 5 years prior (%)	-	2	-	-	-	-	2
	-	(16.7%)	-	-	-	-	(5.3%)
Pap smear 0.5 to 3 years prior (%)	2	8	6	2	1	-	19
	(100.0%)	(66.7%)	(40.0%)	(50.0%)	(33.3%)	-	(50.0%)

Note:
Pap tests performed within 6 months prior to the invasive cancer diagnosis are less likely to be done for screening purpose, thus these Pap tests are disregarded in the categorization of screening history.

ACKNOWLEDGMENTS

The Cervical Cancer Screening Program would like to thank its partners who have supported and contributed to the Program over the years.

The success of the Program depends on an integrated system of:

- Community health professionals taking the cervical smears (Pap smear slides)
- Dedicated and highly trained staff to process and read the slides
- Community facilities providing space and personnel to support regional colposcopy clinics
- Medical specialists to provide colposcopy follow-up and treatment

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

- All hospitals participating in the Provincial Colposcopy Program
- BC Centre for Disease Control
- BC Medical Association
- BC Ministry of Health Services
- BC Women's Health Centre
- Canadian Cancer Society
- BC College of Physicians and Surgeons
- Provincial Health Services Authority
- Women's Health Bureau

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PUBLICATIONS & PRESENTATIONS

Publications:

Shadeo A, Chari R, Lonergan KM, Pusic A, Miller D, **Ehlen T**, **Van Niekerk D**, Matisic J, Richards-Kortum R, Follen M, Guillaud M, Lam WL, MacAulay C. Up regulation in gene expression of chromatin remodelling factors in cervical intraepithelial neoplasia. BMC Genomics. 2008 Feb 4;9:64.

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 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."[1]

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.[2,3,4] 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 have the disease.[5] The comparative evaluation of accuracy versus error cannot be considered in absolute terms but rather should be evaluated in terms of the relative consequences on the other kind of error.

[1] Morrison A: Screening in Chronic Disease. New York, Oxford University Press. 1992.

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

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

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

[5] Smith RA: Screening Fundamentals, Monogr Natl Cancer Inst 22:15, 1997

Organized Population Screening Program

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

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

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

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

Screening Program Administration

The following Cancer Screening Programs are organized under the Population Oncology portfolio of the BC Cancer Agency:

- Cervical Cancer Screening Program (CCSP)
- Screening Mammography Program (SMP)
- Hereditary Cancer Screening Program (HCP)

These Provincial screening programs share some common functions and staff, and also have somewhat separate elements reflecting the different medical disciplines and stakeholders involved. Screening policies are established through scientific evidence reviews by the BC Cancer Agency Tumour Groups composed of cancer specialists, clinicians and researchers around the province.

In addition to these programs, the Population Oncology portfolio includes an epidemiology group (Cancer Control Research) and a cancer surveillance unit (Surveillance and Outcomes Unit). The population screening programs share key staff in order to improve operation efficiency and make the best use of the knowledge base of the programs.

CCSP SCREENING RECOMMENDATIONS

Criteria	Recommended Action
Onset of sexual activity or soon after	Start regular Pap smear screening
Negative or benign changes	Repeat smear in 12 months until there are 3 consecutive **normal** smears then continue at 24-month intervals
Mild dyskaryosis (squamous and/or glandular)	Repeat in 6 months Colposcopy examination is recommended, if mild atypia persists for 2 years
Moderate or higher dyskaryosis	Colposcopic examination is recommended
After age 69	Stop screening, if there are 3 or more **normal** smears in the last 10 years and no history of previous significant abnormality (moderate atypia or higher)
Pregnant Women	If no history of previous Pap smear, do Pap smear, otherwise follow guidelines as indicated in non-pregnant women
HIV Positive Women	Repeat smear in 6 months until there are 2 consecutive **normal** smears then continue at 12-month intervals

POST-HYSTERECTOMY SCREENING GUIDELINES

I. After Total Hysterectomy (uterus and cervix completely excised)

- Women with no history of moderate or higher abnormality and benign hysterectomy pathology can discontinue screening.
- If no previous pap smear record is available and hysterectomy pathology is benign, the patient should have two consecutive negative smears one year apart before discontinuing screening.
- Women with a history of moderate or higher abnormality (CIN II, CIN III, or carcinoma *in situ* on histology), but no history of invasive cervical carcinoma should have three documented consecutive, technically satisfactory normal / negative vaginal smears one year apart over a 3-year period before discontinuing screening.
- Women with a history of invasive cervical carcinoma should follow the recommendation provided by the BC cancer Agency Gynecological Tumor Group.
- Women with a history of *in utero* DES exposure should continue screening as long as this is clinically feasible.

II. After Sub-Total Hysterectomy (uterine corpus removed, cervix in place)

- Women who have had a subtotal hysterectomy should continue cervical cancer screening as per Screening Program guidelines.

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EDUCATIONAL MATERIAL

The following is a list of educational materials relating to the Cervical Cancer Screening Program and/or Pap smear screening.

For General Audience

- Cervical cancer – protect yourself with regular pap tests *(Brochure – blue)*
- HPV & cervical cancer – what you should know, and do *(Brochure – pink)*
- Preventing cervical cancer *(Booklet – orange)*
- Abnormal pap smear – causes and proper follow-up *(Booklet – green)*

Please note: Booklets are for a physician to use with a patient for further discussions. (Limited distribution)

For Smear Takers

- Technique for obtaining cervical smears *(laminated card)*
- Speculum Exam and Pap Smear (*DVD)*
- Screening for Cancer of the Cervix: An Office Manual for Health Professionals

For Cantonese & Mandarin Speaking Women

- Video motivating this 'hard-to reach' group to have regular Pap smears
- Slide series for health care providers to use with colleagues or the Cantonese/Mandarin public

The material above was developed in collaboration with the Fred Hutchinson Cancer Research Centre in Seattle.

Continuing Medical Education

Continuing Medical Education (CME) rounds or workshops can be arranged for groups through the Cervical Cancer Screening Program by calling 604-877-6200.

Website: www.bccancer.bc.ca

Information for a general audience:

- About BCCA
- Patient/Public Info
  - Screening
    - Cervical Cancer Screening Program

Information for smear takers:

- About BCCA
- Health Professionals Info
  - Cancer Management Guidelines
    - Gynecology
      - Uterine Cervix (1 of 2)
        - 4.2 Screening/Early Detection

REQUEST FOR EDUCATIONAL MATERIAL

Please call or fax this form to the CCSP to receive copies of the following free of charge:

Resources for a General Audience:

Number of Copies	Description
_____	Cervical cancer – protect yourself with regular pap tests (brochure - blue)*
_____	HPV & cervical cancer – what you should know, and do (brochure - pink)*
_____	Postcards (answers to common questions about cervical screening)
_____	Posters (two designs available)
_____	Stickers (Pap test reminder calendar stickers)
_____	Motivational message for Cantonese & Mandarin speaking women to attend for screening (video)
	* available in Traditional and Simplified Chinese and Punjabi

To view the resources, visit : www.bccancer.bc.ca→Patient/Public Info→Screening→Cervical Cancer Screening Program(CCSP) →Resources

Resources for Medical or Other Professionals:

Number of Copies	Description
_____	Preventing cervical cancer (booklet - orange)*
_____	Abnormal pap smear – causes and proper follow-up (booklet - green)*
	** Please note: Booklets are for a physician to use in discussions with patients.*
_____	Technique for Obtaining Cervical Smears (laminated card)
_____	Speculum Exam & Pap Smears (DVD)
_____	Screening for Cancer of the Cervix – Office Manual for Health Professionals**
	** available on website at: www.bccancer.bc.ca → HealthProfessionalsInfo → CancerManagementGuidelines → Gynecology → UterineCervix → Screening/Early Detection

Your name: _____

Your address: _____

_____

_____

Your MSC #: _____

Return this form to:

Cervical Cancer Screening Program
8th Floor, 686 West Broadway
Vancouver, BC V5Z 1G1
Phone: 604-877-6200
Fax: 604-629-2510

BC Cancer Agency
CARE + RESEARCH
An agency of the Provincial Health Services Authority

GLOSSARY

Age-Standardized Incidence Rate

Incidence rate is the proportion of women in the population who develop cervical cancer in a given year, expressed as the number of deaths per 100,000 people. Age-standardized incidence rate is the weighted average of the age-range specific incidence rates, where the weights are the proportions of people in the corresponding age groups of the 1991 Canadian population.

$$\text{Age - Standardized Incidence Rate} = \sum_i \left(\frac{Ca_i}{pop_i} \times weight_i \times 100{,}000 \right)$$

Where Ca_i is the number of cervical cancer detected in a given year for age group *i*, pop_i is the BC female population in a given year for age group *i*, and weight_i is the proportion of people in age group *i* of the 1991 Canadian population.

Age-Standardized Mortality Rate

Mortality rate is the proportion of women in the population who died of cervical cancer in a given year, expressed as the number of deaths per 100,000 people at risk. Age-standardized mortality rate is the weighted average of the age-range specific mortality rates, where the weights are the proportions of people in the corresponding age groups of the 1991 Canadian population.

$$\text{Age - Standardized Mortality Rate} = \sum_i \left(\frac{Deaths_i}{pop_i} \times weight_i \times 100{,}000 \right)$$

Where $Deaths_i$ is the number of cervical cancer deaths in a given year for age group *i*, pop_i is the BC female population in a given year for age group *i*, and weight_i is the proportion of people in age group *i* of the 1991 Canadian population.

Participation Rate

BC Overall

Proportion of women in the BC female population (20-69 years of age) had a Pap smear taken from the cervix and/or endocervix and processed at least once over a 3-year period. Age is calculated in year two of the reporting period.

$$\text{Participation Rate} = \frac{\text{Number of women (age 20 - 69) with at least one Pap test in a 3 - year period}}{\text{Number of women in the BC (age 20 - 69) population at year two}} \times 100$$

BC Adjusted for Hysterectomy

Proportion of women out of the target BC female population (20-69 years of age) without hysterectomy had a Pap smear taken from the cervix and/or endocervix and processed at least once over a 3-year period. The BC female population without hysterectomy is computed using the hysterectomy rates estimated from a population sample of an epidemiological study conducted in 1995.

Positive Predictive Value

Proportion of smears with significant cytology findings and have histological confirmation of cervical abnormality out of those smears with significant cytology and had follow-up investigation with pathological result. Surveillance with repeat Pap smears only are not regarded as follow-up investigation.

$$\text{PPV} = \frac{\text{number of smears with significant pathology and cytology findings}}{\text{number of smears with significant cytology findings, investigated and has pathological diagnosis}}$$

Rescreen Rate

Proportion of women with a negative Pap smear returned for Pap test.

$$\text{Rescreen Rate} = \frac{\text{Number of women returned for Pap test after an index Pap test with negative result}}{\text{Number of women with a negative Pap test eligible to return for Pap test}}$$