

2. Epidemiology of Cervical Cancer

2.1 Risk Factors

Epidemiologic evidence has demonstrated that in terms of risk factors cervical cancer behaves as a sexually transmitted disease⁴. Several indicators, the most convincing and consistent being multiple sexual partners and young age at first intercourse, have been shown to increase the risk of cervical cancer among women⁵. Early onset of sexual activity is thought to be associated with high risk because, during puberty, cervical tissue undergoes a variety of changes that may make the area more vulnerable to damage. Further support for the sexually transmitted etiology of this disease can be found in several studies that indicate the importance of a “male factor”: male partners of cervical cancer patients report considerably more sexual partners than those of unaffected women^{6,7}.

Important Risk Factors for Cervical Cancer

- Inadequate screening
- Human papillomavirus (HPV)
- Multiple sexual partners
- Young age at intercourse
- Male sexual behaviour
- Tobacco

Infection with certain types of the human papillomavirus (HPV) is now considered to be a causal agent for cervical cancer⁸: the relative risks for the association between HPV and cervical neoplasia are high, between 20 and 100 times. HPV is widely prevalent, especially among younger women. However, this may reflect the transient nature of HPV infections, in that older women will have had the opportunity to clear the infection⁹. A recent survey conducted in the province of Ontario demonstrated that women aged 20 to 24 had the highest prevalence of HPV (24%)¹⁰.

The overwhelming majority of women today with a diagnosis of cervical cancer have either not had regular Pap tests or they have not been followed up after detection of an abnormal smear. Not undergoing regular Pap tests is the single greatest risk factor for a poor outcome in women who develop cervical cancer^{11,12}. (*see also Section 5 of this report*).

Cigarette smoking has also been found in a few studies to increase the risk of cervical cancer, especially among long-term smokers¹³. Smoking constituents have been found in cervical mucus, but the biologic mechanisms underlying the smoking–cervical cancer relation have not been identified¹⁴.

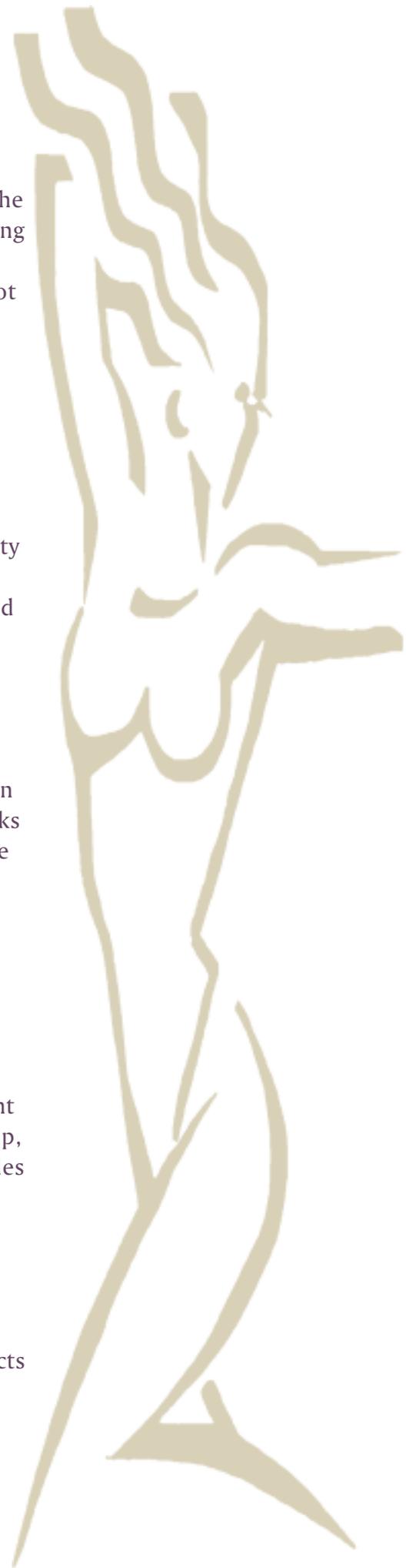
Choice of contraceptive methods appears to affect the risk of acquiring cervical cancer. Barrier mechanisms have been associated with reduced risk, whereas the use of oral contraceptives has been associated with an increased risk¹⁵. The risk associated with oral contraceptives has been found to be stronger for adenocarcinomas than for squamous cell carcinomas, even after adjustment for a variety of socio-economic and sexual factors^{16,17}. Assessing the effect of oral contraceptive use is difficult because this variable is highly associated with factors such as sexual activity and history of Pap smear screening¹⁸.

2.2 Trends in Incidence and Mortality in Canada

Cervical cancer is the 12th most common cancer diagnosed in women in Canada. Among women aged 20 to 34 and women 35 to 49, it ranks third in incidence¹. In the year 2002, it is estimated that there will be approximately 1,400 new cases and 410 deaths due to the disease¹⁹. Both incidence and mortality rates have declined substantially in Canada (Figure 2), age-standardized incidence rates by 50% over a period of 25 years and mortality rates by 73% over 50 years (which coincides with the introduction of the Pap smear).

More recently, there has been an attenuation in the decrease of overall incidence and mortality rates, and this attenuation is apparent in all age groups. The incidence of cervical cancer varies by age group, the highest incidence occurring between the fifth and seventh decades of life¹.

Cervical cancer incidence in Canada varies substantially by region (Figure 3). Age-standardized incidence rates for two 5-year periods, 1982-86 and 1992-96, were highest in the Atlantic provinces. The lowest rate between 1982 and 1986, in British Columbia, likely reflects the influence of that province's well-established screening program;



the low rate between 1992 and 1996 in Quebec may reflect, in part, under-reporting. Overall, incidence rates have declined across all regions.

Figure 2: Age-standardized Incidence (1969-96) and Mortality (1950-97) Rates for Cervical Cancer, Canada (3-year moving average)

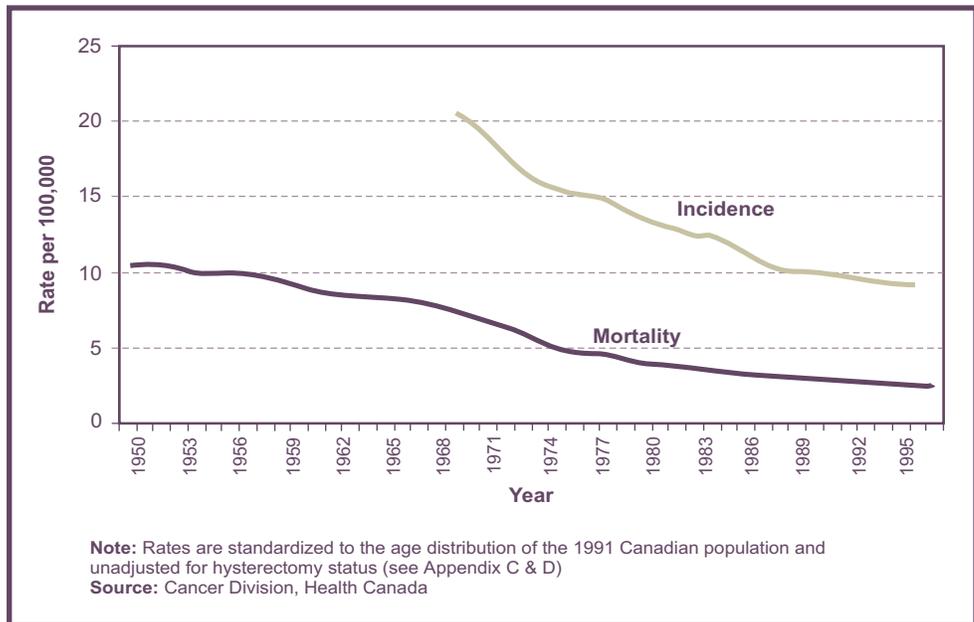
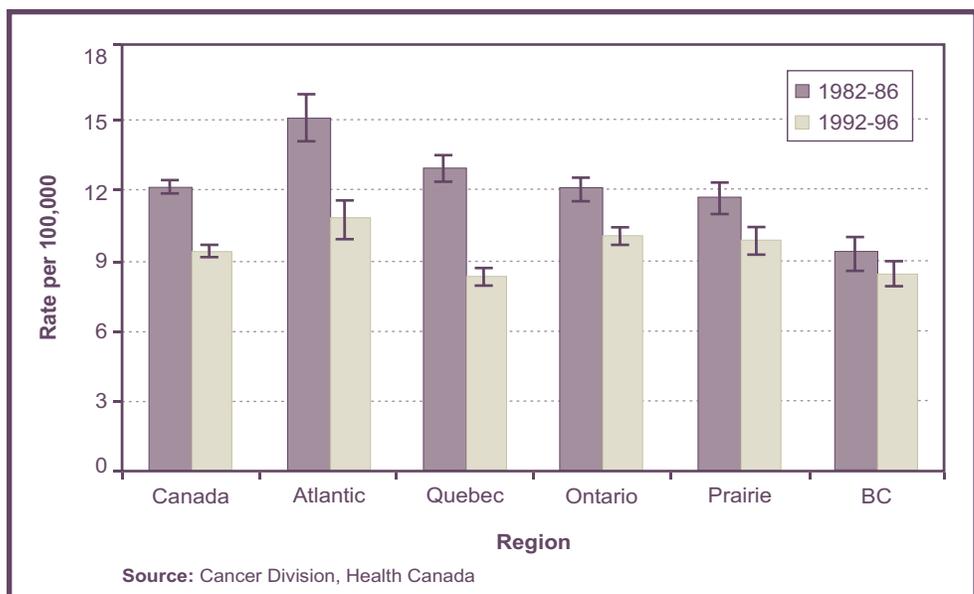


Figure 3: Comparison of Age-Standardized Incidence Rates of Cervical Cancer by Region, 1982-86 and 1992-96



In North America cervical cancer rates in Aboriginal populations are generally high²⁰. Among Canadian Inuit, cervical cancer accounts for approximately 15% of all cancers in women, and age-standardized rates are three times higher than the national average^{9,21}. Among First Nations, elevated incidence rates of from two to six times higher have been reported in Saskatchewan²², Manitoba²³ and Ontario²⁴. Similarly, elevated mortality rates from cervical cancer have been reported among First Nations in British Columbia²⁵. These results are often linked to lower rates of Pap screening²⁶ but may also be due, in part, to differences in underlying risk factors.

2.3 International Comparisons

Canada compares favourably in terms of incidence rates internationally (Figure 4). Cervical cancer ranks third worldwide and accounts for 10% of all cancers worldwide; in developing countries it ranks second, accounting for 15% of all cancers²⁷. The highest risk areas are in South America, east and south Africa, and India, where rates are five to eight times higher than in Canada. Among the lowest risk areas are Shanghai (China), Finland, Navarra (Spain) and Israel. Canada's incidence rate is similar to rates in other developed countries but is still about twice as high as in the countries with the lowest rates, suggesting that there is room for improvement. These comparisons should be interpreted with some caution, as incidence rates may be influenced by differences in hysterectomy rates and there may be some under-reporting of cervical cancers that are identified as uterus, not otherwise specified.

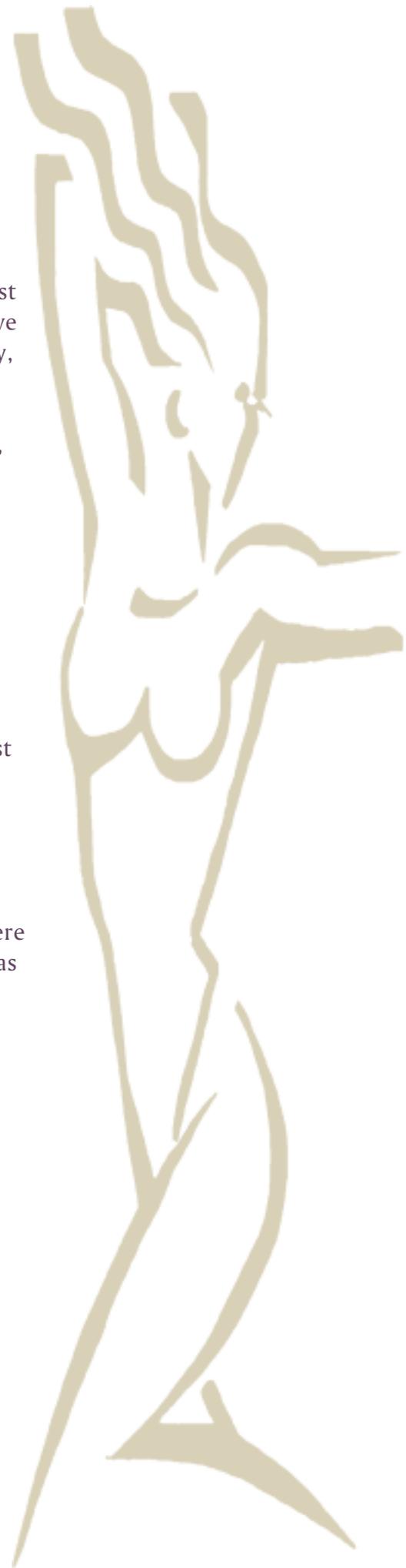
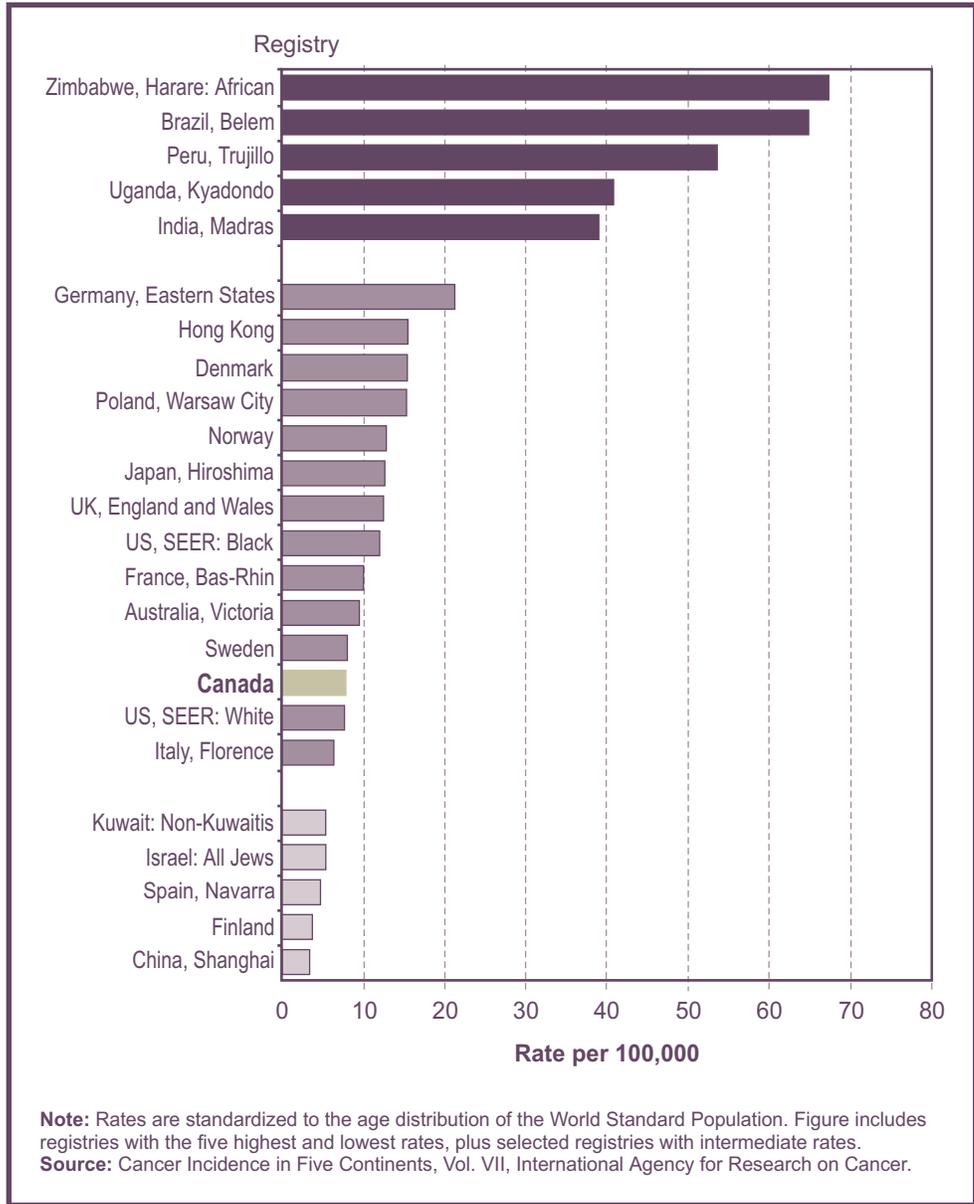


Figure 4: Age-standardized Incidence Rates for Cervical Cancer, Canada and Selected Cancer Registries 1988-1992



2.4 Expected Deaths from Cervical Cancer

Most deaths from cervical cancer are considered to be avoidable. Figure 5 shows the actual and expected number of deaths from cervical cancer that would have occurred if 1950 and 1970 age-specific mortality rates had prevailed. Screening activity in Canada contributed to a saving of between 862 and 1,265 lives in 1997, but there are several hundred more cervical cancer deaths in Canada that are still potentially preventable.

Figure 5: Actual and Expected Number of Deaths from Cervical Cancer, Canada (1970 to 1997), Estimated by 1950 and 1970 Mortality Rates

