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# Prevalence of self-reported hysterectomy among Canadian women, 2000/2001–2008

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## Abstract

**Background:** Hysterectomy is one of the most frequently performed surgical procedures among Canadian women. The consequence is a population that no longer requires cervical cancer screening. The objective of our analysis was to provide more accurate estimates of eligible participation in cervical screening by estimating the age-specific prevalence of hysterectomy among Canadian women aged 20 to 69 by province and territory between 2000/2001 and 2008.

**Methods:** Self-reported hysterectomy prevalence was obtained from the 2000/2001, 2003 and 2008 Canadian Community Health Survey. Age-specific prevalence and 95% confidence intervals (CIs) were estimated for Canada and provinces and territories for the three time periods.

**Results:** Interprovincial variations in hysterectomy prevalence were observed among women in each age group and time period. Among women aged 50 to 59, prevalence was as high as 35.1% (95% CI: 25.8–44.3) ( $p < .01$ ) in 2008 and appeared to decrease in all provinces from 2000/2001 to 2008.

**Conclusion:** Interprovincial and time period variation suggest that using hysterectomy prevalence to adjust the population eligible for cervical cancer screening may be helpful to inform more comparable screening participation rates. In addition, both cervical cancer incidence and mortality rates can be adjusted by hysterectomy to ensure estimates across time and provinces and territories are also comparable.

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**Keywords:** hysterectomy prevalence, cervical cancer screening participation rates, hysterectomy epidemiology

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## Introduction

With nearly 47 000 procedures performed in 2008 to 2009 in Canada,<sup>1</sup> hysterectomy is second only to Caesarean section as the most frequently performed surgical procedure in Canadian women. Complete hysterectomy involves the removal of the uterus and cervix; partial supra-cervical hysterectomy, which is less frequently performed, involves the removal of the uterine fundus. Hysterectomy can be elective, for benign gynecologic conditions, or emergent, for uncontrollable hemorrhage,

to treat various malignant conditions, and to prevent cancer in pre-cancerous cervical conditions and in carriers of the hereditary non-polyposis colorectal cancer genes who are predisposed to endometrial and ovarian cancers. The indications for hysterectomy are becoming more rigorous with respect to its necessity and frequency, resulting in changes in the annual incidence of hysterectomy and therefore the number of women living without a cervix.<sup>2-4</sup>

Pap smear screening is recommended for all women who have ever been sexually

active, but is generally not required among women who no longer have a cervix. The exception to this is among women with a history of treatment for carcinoma in situ (severe cervical dysplasia). As a result, women who have had a hysterectomy and have never been treated for cervical dysplasia should neither be targeted for population-based cervical cancer screening nor included in summary participation screening statistics. When estimates of screening participation have been corrected for history of hysterectomy, the result has been a stabilization of participation across age groups. However, this approach has not been used across all provinces.<sup>5</sup> This is increasingly important in Canada, where participation in cervical cancer screening is used as a benchmark for assessing the performance of national and provincial cancer control and health care delivery systems.<sup>6</sup> An accurate assessment of the target population and screening participation can only be made if women living without a cervix are removed from the denominator. Recognizing the need to correct for history of hysterectomy is in alignment with the Canadian Task Force Guidelines that state that the guidelines do not apply to women who do not have a cervix as a result of hysterectomy.<sup>7</sup>

Canadian health care professionals do not agree on the standard for the use of hysterectomy in treating benign uterine conditions.<sup>8</sup> The incidence of hysterectomy varies over time and across regions,<sup>9-12</sup> suggesting that the prevalence of women living without a cervix also varies. This variance is a result of regional differences in incidence of uterine pathology and physician and patient fac-

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tors.<sup>9,13,14</sup> Physician-related factors include disagreement on indications for hysterectomy, differences in training and variation in regional practices;<sup>2,9,10,13,14</sup> patient factors relate to personal preference and beliefs or attitudes towards hysterectomy.<sup>10,13</sup>

The objective of our analysis was to estimate the prevalence of hysterectomy among Canadian women aged 20 to 69 years, by province and territory and over time.

## Methods

### Data sources

We used data from the Canadian Community Health Survey (CCHS) cycles 1.1 (2000/2001) and 2.1 (2003) and the CCHS Annual Component (2008) to estimate prevalence of hysterectomy. In all three time periods, CCHS data were collected over a 12-month period. Data were unavailable for CCHS cycle 3.1 (2005), the 2007 Annual Component or CCHS 2007–2008.<sup>15–17</sup>

The CCHS is a cross-sectional population health survey targeting Canadians aged 12 years and older living in private dwellings in all provinces and territories. Excluded are full-time members of the Canadian Forces and residents of institutions, certain remote areas and Indian Reserves and Crown Lands.<sup>15–17</sup> Until (and including) 2005, CCHS data were collected every two years; since 2007, data have been collected annually.<sup>17</sup>

Respondents 18 years or older were asked, “Have you had a hysterectomy (in other words, has your uterus been removed),” to which they could answer yes or no.<sup>18–20</sup> This question can be found in the mammography modules of the CCHS cycles 1.1 (2000/2001) and 2.1 (2003) and in the Annual component, 2008.<sup>18–20</sup>

### Data analysis

Frequency estimates were produced to estimate hysterectomy prevalence. We analyzed hysterectomy prevalence for women aged 20 to 69 years by 10-year age groups, nationally and by each pro-

vince and territory, and differences between provincial hysterectomy estimates in a given time period using Ontario as the reference.<sup>21</sup> Weight adjustments, coefficients of variation, standard errors and 95% confidence intervals (CIs) were analyzed using the bootstrap method.<sup>16</sup> Prevalence estimates with fewer than 30 sampled respondents and/or coefficients of variation (CV) higher than 33.3% were suppressed, and prevalence estimates with CV between 16.6% and 33.3% were identified as needing to be interpreted with caution.<sup>15–17</sup> CV is commonly used by Statistics Canada to determine the quality of an estimate obtained from survey samples when applying the bootstrap method.<sup>15–17</sup> Statistical significance ( $p < .05$  and  $p < .01$ ) was determined using variance estimates for difference between ratios analysis ( $t$  test) available through the bootstrap method.<sup>21</sup>

## Results

We observed interprovincial variations in hysterectomy prevalence among women in each age group and time period. Hysterectomy prevalence among 20- to 29-year olds and 30- to 39-year olds in the majority of regions was suppressed due to small sample sizes and/or higher CV ( $> 33.3\%$ ). For the same reasons, hysterectomy prevalence was suppressed for Yukon, Northwest Territories and Nunavut in all age groups in all three time periods.

In 2008, the prevalence of hysterectomy ranged from 9.6% to 21.2% in women aged 40 to 49 years. The differences were statistically significant only between Nova Scotia (21.2%, 95% CI: 13.1–29.3) and New Brunswick (19.5%, 95% CI: 12.6–26.5) when compared to Ontario (9.6%, 95% CI: 7.1–12.1) ( $p < .05$ ) (Figure 1). Between 2000/2001 and 2008, the prevalence appeared to increase in three provinces, decrease in three and remain stable in one; however, all estimates were characterized by wide and overlapping confidence intervals (Table 1). In women aged 50 to 59 years, prevalence was as high as 35.1% (95% CI: 25.8–44.3) ( $p < .01$ ) in 2008 (in Newfoundland and Labrador) and appeared to decrease in all provinces from 2000/2001 to 2008

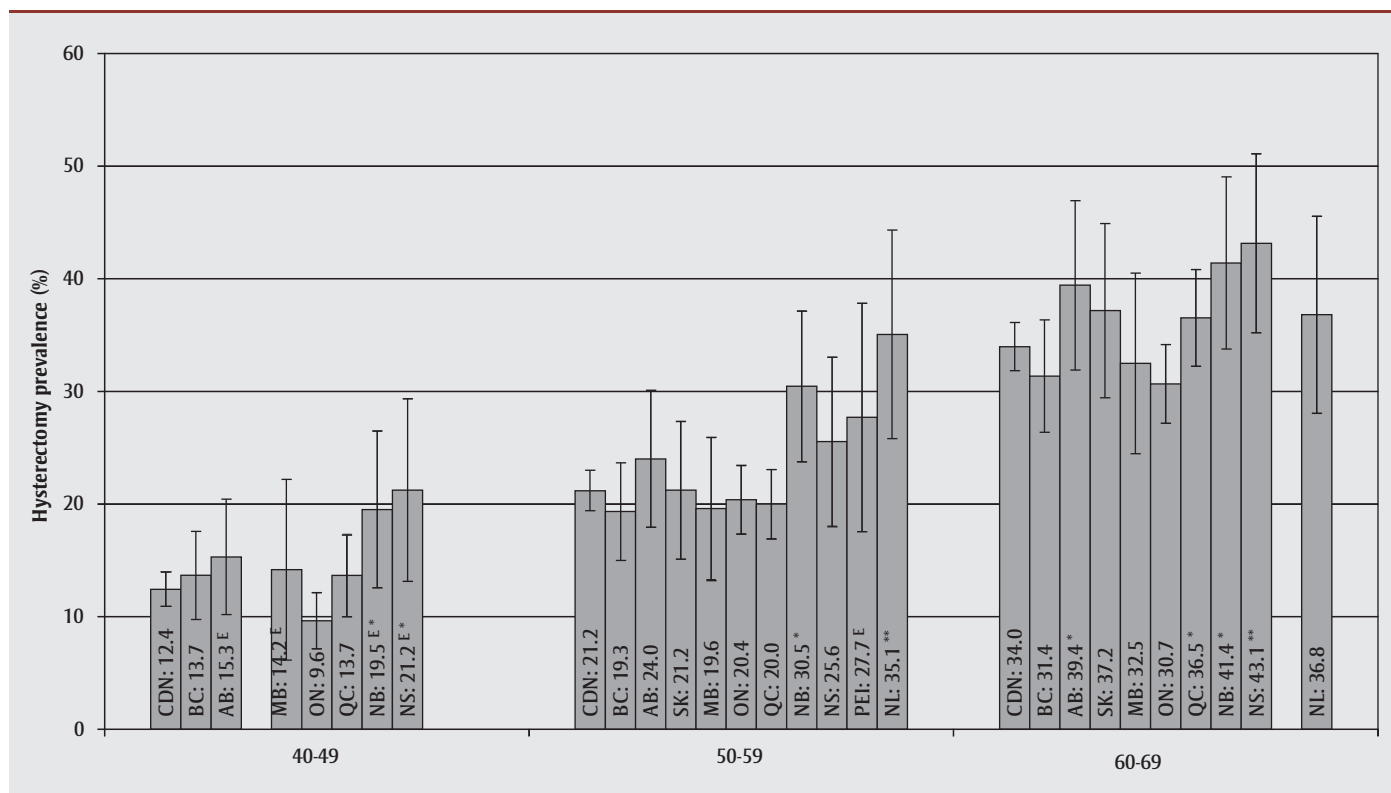
(Figure 1; Table 1), although estimates were characterized by wide and overlapping CIs in all provinces apart from Nova Scotia, Quebec and Ontario. In women aged 60 to 69 years, the prevalence of hysterectomy ranged from 30.7% to 43.1% in 2008. When compared to Ontario (30.7%, 95% CI: 27.2–34.2), the differences were statistically significant for Nova Scotia (43.1%, 95% CI: 35.2–51.1), New Brunswick (41.4%, 95% CI: 33.8–49.0), Quebec (36.5%, 95% CI: 32.2–40.8) and Alberta (39.4%, 95% CI: 31.9–47.0) (Figure 1). In this age group, prevalence appeared to decrease between 2000/2001 and 2008 in all provinces but one, where it remained stable (Table 1).

## Discussion

The prevalence of hysterectomy in Canada declined from 2000/2001 to 2008 and varied by province, with over half showing gradual decline over time in the 50- to 59- and 60- to 69-year age groups. We did not report patterns for the youngest age groups (20- to 29- and 30- to 39-year) due to the relative rarity of the procedure. Provincial variation in the incidence of hysterectomy in this time period has been previously demonstrated and shows similar trends to that of the prevalence data.<sup>11</sup> The variations observed across the provinces demonstrate how important it is to accurately report provincial prevalence since these will affect participation in cervical cancer screening rates and adjustment for cervical cancer incidence and mortality rates.<sup>22</sup>

Direct comparison of our analysis of hysterectomy prevalence to international estimates is difficult, primarily because of the different analysis periods and age ranges used.<sup>13,23–25</sup> However, most developed countries appear to have experienced a decline in new cases of women undergoing hysterectomy.<sup>26,27</sup> Within Canada, the lower prevalence seen in certain provinces may reflect a variation in the practice of limiting hysterectomy and a shift to conservative treatments for discretionary conditions. Among women aged 60 to 69 years, the smaller reductions in prevalence over time are likely because this cohort underwent hysterectomy before more conservative treatments

**FIGURE 1**  
Self-reported hysterectomy prevalence rates in Canada among women aged 40 to 49, 50 to 59 and 60 to 69 in 2008



**Abbreviations:** AB, Alberta; BC, British Columbia; CDN, Canada; CV, coefficients of variation; MB, Manitoba; NB, New Brunswick; NL, Newfoundland and Labrador; NS, Nova Scotia; ON, Ontario; PEI, Prince Edward Island; QC, Quebec; SK, Saskatchewan.

**Note:** Data for 40-49 year olds in NL, PEI, SK and 60-69 year olds in PEI is too unreliable to be published.

<sup>E</sup> Use with caution (CV: 16.6-33.3%).

<sup>\*</sup>  $p < .05$

<sup>\*\*</sup>  $p < .01$

became more common. Treatments such as the progesterone intrauterine device and endometrial ablation did not become widely available until the last decade.<sup>28</sup> Reduced prevalence of Canadian women living with a history of hysterectomy will probably continue to be observed until a minimum level is reached when its use will be limited to non-elective treatment for hemorrhagic emergencies and malignancies.<sup>29</sup>

The consequence of including in the denominator women who have had hysterectomies results in overestimating the target population and underestimating cervical cancer screening participation. A significant proportion of invasive cervical cancer cases in Canada, 40% to 50%, occur in the under-screened and never-screened population; while some provinces achieve almost 80% screening coverage for the

population at risk once in three years, half the women presenting with invasive cervical cancer had not been screened.<sup>5</sup> In addition, failure to remove women without a cervix from the denominator calculations results in less accurate comparisons of target populations and screening participation across programs and age groups: a recent Canadian report estimated overall participation at 70.2% (uncorrected for hysterectomy) and 74.1% (corrected).<sup>5</sup> More importantly, these results demonstrated the stabilizing effect of correction resulting in more uniform participation across age groups.<sup>5</sup>

### Limitations

Our estimates of prevalence are limited by the nature of self-reported responses to CCHS questions including those about hysterectomy. There is also no indication of hysterectomy type, resulting in an

overestimate of total hysterectomy. However, partial supra-cervical hysterectomy is uncommon (less than 10%) in Canada, and thus it is not likely to contribute significantly to the numbers.<sup>30</sup> Removal of the cervix only, trachelectomy, is also a very uncommon procedure used to treat early stage cervical cancer. It, too, will not significantly affect the numbers.<sup>31,32</sup> Other limitations include data unavailability in certain years.

### Conclusion

Our analysis contributes to the current knowledge of hysterectomy epidemiology in Canada. Given provincial and age variations, up-to-date knowledge of hysterectomy prevalence will contribute to more accurate population denominators for post-hoc calculation of cervical cancer screening participation rates.

**TABLE 1**  
Prevalence of hysterectomy rates in 2000/2001, 2003 and 2008, Canada and provinces, by age group

Age group, years	Province	Year						
		2000/2001		2003		2008		Difference between 2000/2001 and 2008
		%	(95% CI)	%	(95% CI)	%	(95% CI)	
40–49	NL	18.9	(15.0–22.9)	15.1 <sup>E</sup>	(9.7–20.5)	— <sup>F</sup>	— <sup>F</sup>	—
	PEI	18.6	(13.1–24.0)	25.6 <sup>E</sup>	(16.0–35.1)	— <sup>F</sup>	— <sup>F</sup>	—
	NS	18.2	(14.4–22.1)	25.6	(18.2–33.1)	21.2 <sup>E</sup>	(13.1–29.3)	3.0
	NB	21.2	(17.1–25.3)	20.9	(15.6–26.2)	19.5 <sup>E</sup>	(12.6–26.5)	–1.7
	QC	14.7	(12.6–16.7)	13.4	(11.3–15.6)	13.7	(10.0–17.3)	–1.0
	ON	12.4	(11.0–13.8)	10.6	(9.3–11.9)	9.6	(7.1–12.1)	–2.7
	MB	9.2 <sup>E</sup>	(6.1–12.3)	11.6	(8.0–15.1)	14.2 <sup>E</sup>	(6.2–22.2)	5.0
	SK	16.2	(12.5–19.8)	16.7 <sup>E</sup>	(11.1–22.3)	— <sup>F</sup>	— <sup>F</sup>	—
	AB	14.3	(11.6–17.1)	13.7	(10.7–16.7)	15.3 <sup>E</sup>	(10.2–20.4)	1.0
	BC	13.6	(11.5–15.6)	13.8	(11.3–16.4)	13.7	(9.8–17.6)	0.1
	Canada	13.9	(13.0–14.8)	13.0	(12.1–13.9)	12.4	(10.9–13.9)	–1.5
50–59	NL	35.4	(29.4–41.3)	34.8	(28.7–40.9)	35.1	(25.8–44.3)	–0.3
	PEI	29.7	(22.8–36.7)	34.2	(24.3–44.2)	27.7 <sup>E</sup>	(17.6–37.8)	–2.0
	NS	39.8	(34.5–45.1)	36.8	(30.9–42.6)	25.6	(18.1–33.0)	–14.2
	NB	38.6	(33.0–44.3)	36.9	(31.3–42.4)	30.5	(23.8–37.2)	–8.2
	QC	31.3	(28.2–34.4)	31.0	(28.0–34.1)	20.0	(16.9–23.1)	–11.3
	ON	26.9	(24.5–29.3)	24.8	(22.8–26.7)	20.4	(17.4–23.4)	–6.5
	MB	24.4	(19.4–29.5)	17.3	(13.1–21.6)	19.6	(13.3–25.9)	–4.8
	SK	30.3	(25.0–35.6)	24.5	(20.0–29.1)	21.2	(15.1–27.4)	–9.0
	AB	33.4	(29.0–37.8)	24.5	(20.6–28.4)	24.0	(18.0–30.1)	–9.4
	BC	25.8	(22.8–28.9)	25.8	(22.5–29.0)	19.3	(15.0–23.7)	–6.5
	Canada	29.4	(28.0–30.8)	27.2	(25.9–28.4)	21.2	(19.4–23.0)	–8.2
60–69	NL	37.7	(30.0–45.4)	38.1	(31.2–45.0)	36.8	(28.1–45.6)	–0.9
	PEI	43.6	(36.6–50.6)	36.6	(26.2–46.9)	— <sup>F</sup>	— <sup>F</sup>	—
	NS	42.4	(35.2–49.5)	49.7	(42.4–57.0)	43.1	(35.2–51.1)	0.8
	NB	42.8	(36.2–49.4)	47.0	(39.9–54.1)	41.4	(33.8–49.0)	–1.4
	QC	42.8	(38.8–46.9)	37.7	(34.6–40.8)	36.5	(32.2–40.8)	–6.3
	ON	34.2	(31.3–37.1)	32.7	(30.3–35.1)	30.7	(27.2–34.2)	–3.5
	MB	40.8	(34.1–47.6)	38.5	(31.6–45.3)	32.5	(24.5–40.5)	–8.3
	SK	41.1	(35.3–46.8)	34.4	(28.5–40.3)	37.2	(29.4–44.9)	–3.9
	AB	40.3	(35.2–45.4)	40.5	(35.6–45.3)	39.4	(31.9–47.0)	–0.8
	BC	35.3	(31.5–39.1)	36.2	(32.3–40.2)	31.4	(26.4–36.3)	–3.9
	Canada	38.1	(36.4–39.8)	36.4	(35.0–37.9)	34.0	(31.8–36.1)	–4.1

**Abbreviations:** AB, Alberta; BC, British Columbia; CV, coefficients of variation; MB, Manitoba; NB, New Brunswick; NL, Newfoundland and Labrador; NS, Nova Scotia; ON, Ontario; PEI, Prince Edward Island; QC, Quebec; SK, Saskatchewan.

<sup>E</sup> Use with caution (CV = 16.6%–33.3%).

<sup>F</sup> Too unreliable to be published (n < 30 and/or CV > 33.3%).

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