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3 **TITLE:** Sociodemographic Characteristics of Women with Invasive Cervical Cancer in British Columbia,  
4 2004-2013.

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**ABSTRACT**

**BACKGROUND:** Despite reductions in invasive cervical cancer (ICC) incidence across Canada, largely due to cancer screening, benefits of prevention efforts are not equally distributed by all women. This study investigated sociodemographic characteristics of women with ICC in British Columbia (BC) compared to the general female population of BC.

**METHODS:** ICC cases 18 years and older diagnosed between 2004-2013 were obtained from the BC cancer registry. Self-reported sociodemographic characteristics were derived from standardized health assessment forms (HAFs) completed upon BC Cancer admission. Age-standardized proportions (ASPs) were calculated using the direct-method by ethnicity/race, language, marital-status, smoking-status, and rural-urban status. Standardized rate-ratios (SRRs) were calculated for ICC cases compared to the general female population. Sociodemographic characteristics of BC females were derived from public-use microdata files of the Census, National Household Survey, and Canadian Community Health Survey.

**RESULTS:** Of 1705 ICC cases over the study period, 1315 were referred to BC Cancer (77.1%). Of referred cases, 1215 (92.4%) had completed HAFs. The ASP of visible-minority women did not differ compared to Census (SRR=1.07, 95%\_CI=0.94-1.25). Stratified-analysis identified elevated ASPs for Filipino (SRR=1.45, 95%\_CI=1.01-3.35) and Japanese women (SRR=2.54, 95%\_CI=1.12-18.53). The ASP for Indigenous women was elevated (SRR=2.37, 95%\_CI=1.55-4.31) and lower for Caucasian women (SRR=0.82, 95%\_CI=0.90-1.00) relative to Census. ASPs for rural women, current smokers and widowed/separated/divorced were also elevated.

**INTERPRETATION:** Women who self-identified as non-Caucasian, were current smokers, widowed/separated/divorced and from rural areas were over-represented among women with ICC in BC. Efforts are needed to address inequities to ensure all women benefit from cervical cancer prevention.

## INTRODUCTION

Significant reductions in incidence and mortality of invasive cervical cancer (ICC) have been observed across the Canadian population, largely due to access to cytology-based cervical cancer screening<sup>1,2</sup>. With the addition of new technologies and practices in cervical cancer prevention, such as HPV vaccination and HPV-based testing, the World Health Organization (WHO) issued an international call to accelerate efforts towards the elimination of cervical cancer globally<sup>3-5</sup>. However, despite reductions in ICC rates overall in Canada, benefits of prevention efforts are not equally distributed among all women.

Programmatic cervical cancer screening using cytology is offered across Canadian jurisdictions to detect and treat pre-cancerous lesions and has been successful in reducing cervical cancer incidence and mortality<sup>2</sup>. Screening is publicly funded in all Canadian provinces for women in target age groups who are at average risk and asymptomatic<sup>2,6</sup>. Despite the availability of publicly funded cervical cancer screening, the proportion of women who are up-to-date with screening (i.e. at least one Pap test in the past 3 years) is below the national target (i.e. greater or equal to 80%) in all jurisdictions<sup>7</sup>.

Sociodemographic characteristics are associated with disparities in access to cervical cancer screening and diagnosis across Canada. Factors associated with lower access to screening services include lower educational attainment, lower socioeconomic status, not having a regular physician, immigration history, and identifying as Indigenous<sup>8-18</sup>. Disparities in cervical cancer incidence were reported among First Nations women in BC and Indigenous women in Manitoba compared to Non-First Nations and Non-Indigenous women, respectively<sup>16,19</sup>.

With recent calls for the acceleration of cervical cancer elimination in Canada, it is critical that strategies ensure all women benefit from cervical cancer prevention and control efforts. Although evidence exists across Canada of disparities in cervical cancer screening and diagnosis<sup>8,9,11-16</sup>, information is incomplete in BC. The purpose of this study was to investigate sociodemographic characteristics of women with ICC in BC compared to the general population of women in BC.

## METHODS

### *Study setting*

There are nearly 2.4 million women in BC<sup>20</sup>. Overall, 722,975 women (31.1%) identify as a visible minority and 156,280 women as Indigenous (6.7%)<sup>20</sup>. Canada's first organized cervical cancer screening program was rolled out in BC in 1960, and is operated by BC Cancer<sup>21</sup>. Routine cervical cancer screening with conventional cytology is fully publicly funded for women aged 25-69 years, reflecting national recommendations<sup>2,21</sup>.

### *Data sources and final analytic sample*

Population-based administrative databases and national survey data used in this study are described in Table 1. Personal, tumour, and geographic information on all cases of ICC diagnosed among BC residents 18 years and older between 2004 and 2013 were obtained from the BC cancer registry (BCCR) (N=1705). This included codes for invasive cervical cancer, C53.0-9, as defined by the International Classification of Diseases for Oncology, Third Edition<sup>22</sup>. Self-reported responses to sociodemographic information were derived from standardized health assessment forms (HAFs) completed upon admission to BC Cancer. Sociodemographic information was only available for women who were referred to a BC Cancer clinic (N=1315, or 77.1% of all ICC cases). HAFs were located as a hard copy in each of the patients' charts and reviewed by a research assistant. HAF-data were linked to BCCR records deterministically. Of 1315 ICC cases, HAFs were available for 1215 women (92.4%).

Information for the general female population in BC 18 years and older were obtained from Statistics Canada public use microdata files (PUMF) for the Census 2006<sup>23</sup>, National Household Survey (NHS) 2011<sup>24</sup>, Canadian Community Health Survey (CCHS) Cycle 2011/12<sup>25</sup>, and BC Stats<sup>26</sup> (Table 1).

**Table 1.** Data sources access for the present study.

Population	Database	Description	Years of data used	Variables used in analysis
BC ICC Cases	BC Cancer Registry (BCCR)	A population-based registry of all cases of cancer diagnosed in BC residents since 1970. Data includes basic personal, geographic and tumour diagnosis information. Sociodemographic information are only available for cases referred to a BC Cancer clinic.	2004-2013	Age, Geography
	BC Health Assessment Forms (HAFs)	Standardized health assessment forms are completed upon first admission to BC Cancer, which typically occurs shortly after diagnosis. HAFs contain questionnaires related to sociodemographic characteristics. Over the analytic period, there were two iterations of HAFs: the Health Assessment Form and PRISM Form. The PRISM replaced the Health Assessment Form in 2011 and is an extension of the original HAF questionnaires.	HAF: 2004-2010 PRISM: 2011-2013	Self-reported Ethnicity/Race, Language, Smoking status, Marital Status
General population of women in BC	Canadian Census PUMF (Individuals file)	The Canadian Census of the Population is a primary source of sociodemographic data in Canada and vital for government, community and planning services <sup>27</sup> . The 2006 Census public use microdata file (PUMF) contains 844,476 records, representing 2.7% of the Canadian population. These records were drawn from a sample of one-fifth of the Canadian population. The file does not include people living in institutions <sup>23</sup> .	2006	Self-reported Age, Ethnicity/Race, Language
	National Household Survey PUMF (Individuals file)	In 2011 the mandatory long-form census was replaced with a voluntary survey called the National Household Survey (NHS). The NHS collected similar information as gathered from the Census. The national response rate in was 77.2% <sup>28</sup> . The 2011 NHS PUMF on individuals represents a 2.7% sample of the Canadian population. It contains social, demographic, and economic data <sup>24</sup> .	2011	Self-reported Age, Ethnicity/Race, Language
	Canadian Community Health Survey (CCHS) PUMF	The CCHS is a national cross-sectional survey that collects health information and is conducted every two years by Statistics Canada. The survey uses multistage cluster sampling and collects data on The Canadian Community Health Survey PUMF provides data on a two year period. Data are based on in-person and telephone interviews are administered to participants with approximately 130,000 respondents aged 12 or older, residing in households in all provinces and territories. Data are not collected on members of the Canadian Forces and those residing on First Nations Reserves, institutions, and in some remote regions. Exclusions represent less than 3% of the Canadian population <sup>25</sup> .	2011/12 cycle	Self-reported Smoking status, Marital Status
	BC Stats <sup>26</sup>	Population statistics by BC geographical classifications.	2006, 2011	Geography

PUMF = public use microdata file

### *Sociodemographic characteristics and health behaviours*

Variables included age (five-year bands), level of urbanization classified by community health service area (CHSA) urban-rural classifications (metropolitan, large-urban, medium-urban, small-urban, rural hub, rural/remote), ethnicity/race, language most often spoken at home, marital status (single and never married/married/divorced, separated/widowed), and smoking history (current/former/never). Categories of ethnicity/race and language most often spoken at home were categorized according to Census categories<sup>29</sup>. Marital and smoking status were categorized as per the CCHS 2011/12<sup>25</sup>.

BCCR records' postal codes were linked to the Postal Code Conversion File Plus<sup>30</sup> to obtain longitude and latitude attributes. Point locations were mapped on the BC Ministry of Health CHSA boundary map<sup>31</sup> to identify corresponding CHSA urban-rural classifications. Geocoding was completed in R<sup>32</sup>. For the general population, CHSA population estimates were not available. Local health areas were classified by the highest level of CHSA urban-rural classification. Local health areas are composed of multiple CHSAs and the smallest area for which population estimates were available<sup>26</sup>.

### *Analysis*

A frequency analysis was conducted for all variables. For the general female population of BC, responses to the 2006 Census and 2011 NHS were combined to reflect the distribution over the analytic period. Population statistics from BC Stats for 2006 and 2011 were also combined.

The direct method was used to calculate annual age-standardized incidence rates. The 2011 Canadian age structure with 19 five-year age groups was used<sup>33</sup>. The direct method was also used to calculate age-standardized proportions (ASPs) of sociodemographic and health characteristics. A custom standard from the 2011 Canadian age structure was used (18-29 years, 30-44 years, 45-59 years, 60-74 years, and 75+ years), to limit zeros among age-strata. Standard errors for the ICC cohort were derived using the R package 'epitools' to calculate exact 95% confidence intervals<sup>34</sup>.

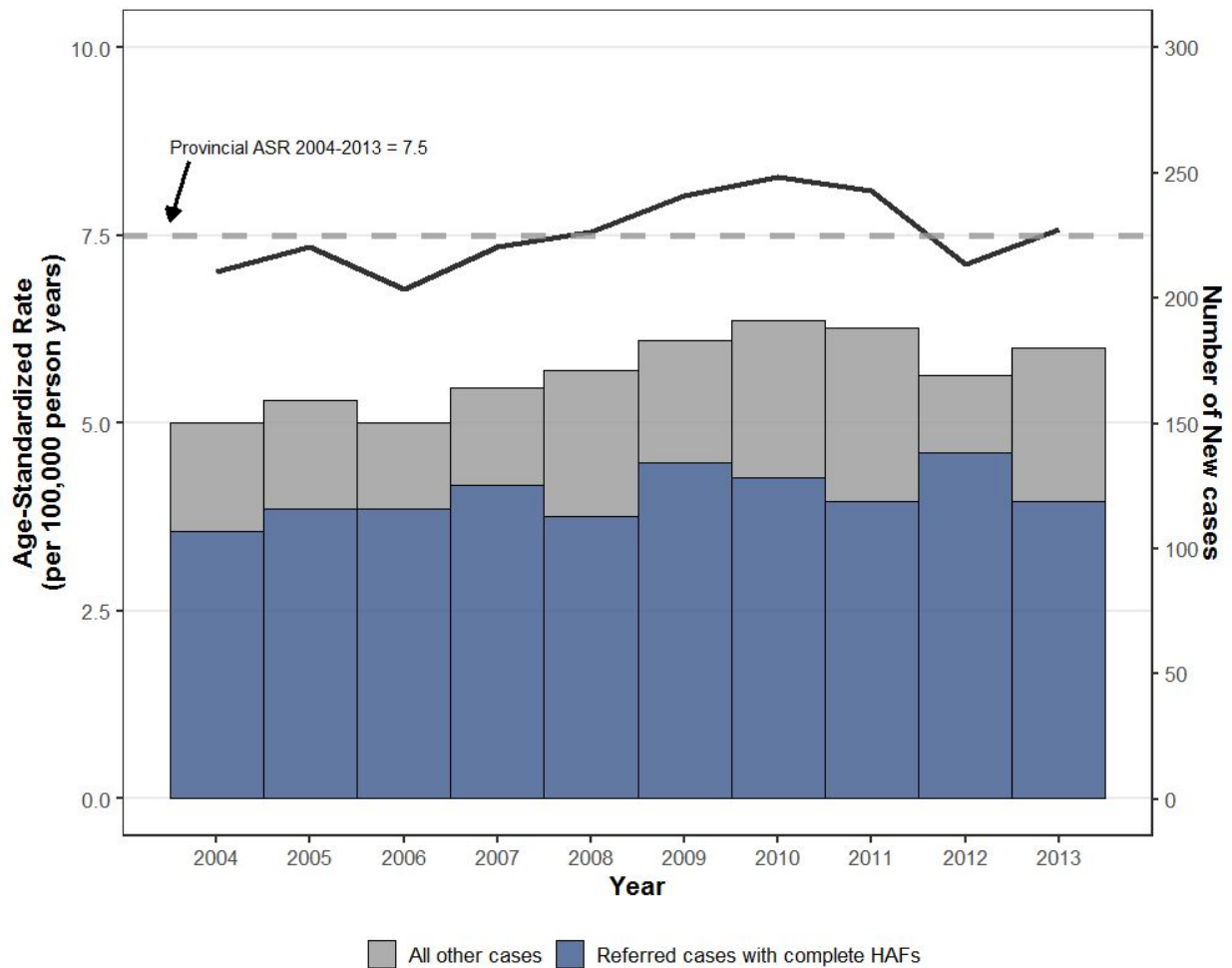
Estimates derived from Statistics Canada datasets were weighted to account for non-probability sampling and referred to as age-standardized weighted proportions (ASWPs). Standard errors used to compute 95% confidence intervals were derived as described in Statistics Canada User Guides<sup>23-25</sup>. Standardized rate-ratios (SRR) were calculated by dividing the ICC cohort ASP by the ASWP of the general population. SRR confidence intervals were approximated using Smith's method<sup>35</sup>. All analyses were conducted using R<sup>32</sup>.

## RESULTS

### *Cervical cancer incidence and counts over time*

Age-standardized incidence rates and counts of new cases by referral status are shown in Figure 1. Incidence rates remained stable over the analytic period with slight fluctuations around the cumulative provincial rate (7.5 per 100,000 person-years). There were 1705 cases over this period. On average, there were 170 cases per year ranging from a 150 to 191 cases. Referred cases that completed HAFs accounted for, on average, 71.5% of all ICC cases per year and ranged from 63.3% to 81.7%.

**Figure 1.** Cervical cancer age-standardized incidence rates and number of new cases by year, 2004-2013.



### Age distribution

The age distribution of ICC cases was compared to the general population (Table 2). The three most common age groups at diagnosis were between 35-49 years (nearly 40% of ICC cases). The median age of women with ICC that were referred and had complete HAFs was 49 years (interquartile range, 40-61.5 years). This was similar to the age distribution of all ICC Cases in BC (median = 47 years, interquartile range, 38-60 years). Nearly 85% of cancers were diagnosed among age groups eligible for screening under current guidelines (i.e. 25 to 69 years).

**Table 2.** Age distribution of ICC cases and general population of females in BC, 2004-2013.

Age Group	BC Cancer ICC Cases <sup>a</sup> (All cases in BC; N = 1705)		BC Cancer ICC Cases <sup>a</sup> (Referred with complete HAFs; N = 1215)		BC female population 18 years and older*
	Count	Proportion (%)	Count	Proportion (%)	Proportion (%)
18-24	13	0.8	5	0.4	11.2
25-29	87	5.1	40	3.3	8.3
30-34	165	9.7	92	7.6	8.0
35-39	209	12.3	154	12.7	8.7
40-44	269	15.8	188	15.5	9.4
45-49	195	11.4	145	11.9	9.9
50-54	166	9.7	123	10.1	9.5
55-59	164	9.6	124	10.2	8.5
60-64	118	6.9	94	7.7	7.0
65-69	89	5.2	78	6.4	5.4
70-74	64	3.8	47	3.9	4.3
75-79	62	3.6	50	4.1	3.6
80-84	65	3.8	48	4.0	3.0
85+	39	2.3	27	2.3	3.1

<sup>a</sup> Only ICC cases aged 18 years and older were considered.

\* Data for the BC Female population aged 18 years and older were derived from BC Stats<sup>26</sup>.



### *Ethnicity/race and language*

Analyses by ethnicity/race and language most often spoken at home are presented in Table 3a. Non-responses to ethnicity (N=98 or 8.1%) and language (N=134, or 11.0%) were excluded. The most common population groups among the ICC cohort were Caucasian, Chinese and Indigenous. The most common population groups among the general population were Caucasian, Chinese and South Asian.

No significant differences were detected among aggregate-level groups, 'Not a Visible Minority' or 'Visible Minority', in relation to Census (Table 3a). Among 'Not a Visible Minority' categories, ASPs for Indigenous women were elevated among the ICC cohort compared to Census (SRR = 2.37, 95% CI = 1.55-4.31). For Caucasian women, ASPs were lower among the ICC cohort relative to Census (SRR = 0.90, 95% CI = 0.82-1.00). Among Visible Minorities, elevated ASPs were detected among Filipino (SRR = 1.45, 0.59-0.98) and Japanese women (SRR = 2.54, 95% CI = 1.12-18.53) compared to Census. The ASP for South Asian women was lower compared to Census (SRR = 0.71, 95% CI = 0.59-0.98).

### *Smoking Status and Marital Status*

Non-responses to smoking status (N=24, or 2.0%) and marital status (N=12, or 1.0%) were excluded. The ASP of ever smokers was not significantly different compared to the general population (Table 3b). However, the proportion of current smokers was significantly elevated compared to the general population (SRR = 1.41, 95% CI = 1.14-1.83). Women in the ICC cohort and general population of BC most commonly reported being married. Women in the ICC cohort had a greater ASP of 'widowed, separated or divorced' compared to the general population (SRR = 1.25, 95% CI = 1.09-1.48) (Table 3b).

### *Level of urbanization at diagnosis*

Cancer registry records without postal code were excluded (N = 22, or 1.3%). The majority of the ICC cohort and general population of women in BC lived in metropolitan areas (Table 3b). The least common classification was 'rural hub' for both the ICC cohort and general population. The proportion of women with ICC living in metropolitan areas was significantly lower than the general population (SRR = 0.89, 95% = 0.82-0.97). The proportion of women with ICC living in 'rural hub' (SRR = 1.38, 95% = 1.05-2.01), and rural/remote areas (SRR = 2.52, 95% = 2.01-3.32) were significantly elevated compared to the BC general population.

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**Table 3a.** Age-standardized proportions of self-identified ethnicity/race and language most often spoken at home, among BCCR ICC cases and BC female general population.

Category	Counts	Age-standardized proportion	95% CIs	Age-standardized proportion (Weighted)	95% CIs	Standardized rate ratios	95% CIs
<b>Ethnicity/Race</b>	<b>1117</b>						
Not a visible minority	797	74.7	67.7 - 82.6	76.3	76.2 - 76.5	0.98	0.89 - 1.09
Caucasian	712	65.2	58.9 - 72.5	72.3	72.2 - 72.4	0.90	0.82 - 1.00
Indigenous <sup>a</sup>	85	9.5	6.8 - 13.3	4.0	3.9 - 4.2	2.37	1.55 - 4.31
Visible minority	320	25.3	22.3 - 29.1	23.7	23.5 - 23.8	1.07	0.94 - 1.25
Chinese	118	8.7	7.2 - 11.1	8.2	8.0 - 8.3	1.07	0.89 - 1.42
South Asian <sup>a</sup>	72	5.8	4.5 - 8.0	8.2	8.0 - 8.3	0.71	0.59 - 0.98
Filipino <sup>a</sup>	38	2.7	1.9 - 4.6	1.9	1.8 - 1.9	1.45	1.01 - 3.35
Korean	21	1.9	1.0 - 4.1	1.0	0.9 - 1.1	1.88	0.99 - 8.96
Japanese <sup>a</sup>	17	1.7	0.8 - 3.9	0.7	0.6 - 0.7	2.54	1.12 - 18.53
All other	54	4.4	3.1 - 6.8	3.8	3.7 - 3.9	1.16	0.84 - 2.08
<b>Language</b>	<b>1081</b>						
Official Languages <sup>b</sup>	901	84.8	77.6-93	82.2	82-82.4	1.03	0.95 - 1.14
Non Official Languages	180	15.2	12.8-18.4	17.8	17.7-17.9	0.85	0.74 - 1.04
Chinese Languages	80	6.1	4.8-8.3	7.2	7.0-7.3	0.85	0.70 - 1.19
Punjabi	45	3.8	2.8-5.8	3.5	3.4-3.5	1.09	0.82 - 1.92
Other Indo-Iranian Languages	16	1.3	0.7-3.1	1.3	1.2-1.5	0.98	0.63 - 3.75
All Other Languages	39	3.9	2.5-6.5	5.8	5.7-6.0	0.68	0.50 - 1.15

CI = Confidence Interval

<sup>a</sup> SRR confidence intervals don't overlap 1.0.

<sup>b</sup> Official Languages = English or French.

**Table 3b.** Age-standardized proportions of smoking status, marital status and community health services area (CHSA) urban-rural classification of BCCR ICC cases compared BC female general population.

Category	Counts	Age-standardized proportion	95% CIs	Age-standardized proportion (Weighted)	95% CIs	Standardized rate ratios	95% CIs
<b>Smoking Status</b>	1191						
Ever Smoker	658	56.5	50.7-63.2	51.8	49.5-54.1	1.09	0.98-1.23
Current Smoker <sup>a</sup>	229	21.0	17.3-25.7	15.0	9.6-20.4	1.41	1.14-1.83
Former Smoker	429	35.5	31.1-40.7	36.8	33.6-40.0	0.96	0.85-1.11
Never Smoker	533	43.5	38.7-49.1	48.2	45.7-50.7	0.90	0.81-1.02
<b>Marital Status</b>	1203						
Married	725	60.0	54.2-66.6	60.5	58.5-62.5	0.99	0.90-1.11
Widowed/separated/divorced <sup>a</sup>	289	21.1	18.6-24.3	16.9	12.1-21.7	1.25	1.09-1.48
Single	189	18.9	15.1-23.8	22.6	18.6-26.6	0.84	0.70-1.06
<b>CHSA classifications</b>	1683						
Metro <sup>a</sup>	766	45.0	41.3-49.1	50.7	50.6-50.8	0.89	0.82-0.97
Large Urban	244	14.8	12.6-17.4	15.3	15.3-15.4	0.97	0.84-1.15
Medium Urban	240	14.7	12.5-17.3	16.4	16.4-16.4	0.89	0.78-1.06
Small Urban	130	8.1	6.5-10.1	8.8	8.8-8.9	0.91	0.75-1.16
Rural Hub <sup>a</sup>	87	5.4	4.1-7.2	3.9	3.9-3.9	1.38	1.05-2.01
Rural/Remote <sup>a</sup>	216	12.1	10.3-14.2	4.8	4.8-4.8	2.52	2.01-3.32

CI = Confidence Interval

<sup>a</sup> SRR confidence intervals don't overlap 1.0.

## INTERPRETATION

### *Main findings*

Non-Caucasian women were over-represented among women diagnosed with ICC from 2004-2013. Specifically, the proportion of women who self-identified as Indigenous, Filipino, and Japanese were significantly elevated compared to the general female population of BC. The proportion of South Asian women was significantly lower. Other important sociodemographic factors related to ICC incidence included smoking status, marital status and level of urbanization.

### *Ethnicity/race, cervical cancer screening and incidence in Canada*

Canadian cervical cancer incidence trends are closely tied to patterns in screening participation<sup>33</sup>. Generally, immigration history, visible minorities, and being foreign-born are associated with lower cervical cancer screening participation rates<sup>9,11,17,18,36,37</sup>. In the United States (US), cervical cancer incidence trends differ by race and follow screening rates closely<sup>38</sup>. Risk factors for cervical cancer include smoking history and number of lifetime sexual partners. Human Papilloma Virus (HPV) is associated with nearly all cervical cancers. Stage at diagnosis is related to primary care access, screening history, sex of primary care provider, income, age, and sociocultural determinants of health<sup>11,18,39-41</sup>.

In Ontario, cervical cancer screening rates were significantly lower among urban immigrant women (53.1%)<sup>11</sup> compared to long-term residents (64.6%)<sup>10</sup>. Immigrant women from South Asia showed the lowest rates. Rates were generally lower among immigrant women older than 50, the lowest income quintile and those not enrolled in a primary care enrolment model<sup>10</sup>. Visible minority women were more than twice as likely never to have had a Pap test compared to Caucasian women<sup>12</sup>. The proportion of never having had a Pap test was highest among new immigrants and women without a regular physician<sup>12</sup>.

Canadian cervical cancer incidence trends by immigration history and birth country are less clear. A stratified analysis revealed significant variations whereby immigrant women from East Asia, Western Europe and American had higher early stage incidence. South Asian women had higher incidence of late stage ICC<sup>18</sup>. Similar variations were reported for screening mammography, stage at diagnosis and screen-detected breast cancer in BC and Ontario<sup>36,42</sup>. Stratified analyses indicate that potential differences are masked when immigration history and birth country are not considered<sup>42</sup>.

### *Indigenous peoples, cervical cancer screening and incidence in Canada*

Consistent with the present study, ICC incidence rates were reported to be 1.92 times greater among First Nations compared to Non-First Nations women in BC<sup>19</sup>. In Manitoba, ICC incidence was two times greater among First Nations women compared to non-First Nations<sup>16</sup>. Similar incidence trends were reported among Indigenous peoples in Australia, New Zealand and the US<sup>43</sup>. Increased risk for ICC may be related to a higher prevalence of HPV and decreased access to and uptake of screening<sup>16,44</sup>.

Disparities across the cancer continuum experienced by Indigenous peoples in Canada are rooted in the legacy of colonialism, the residential school system, racism, and oppression<sup>45,46</sup>.

### *Level of urbanization, marital, and smoking status*

Canadian studies have found little variation of cervical cancer screening by levels of urbanization<sup>17,18,47</sup>. One study suggested that rural residence was associated with lower screening rates<sup>12</sup>. The present study found metropolitan regions had lower and rural regions had higher proportions of ICC than expected. Geographic and urban-rural variations may indicate differences in access to screening and diagnostic services, but also, distributions of HPV prevalence, and sociodemographic and health characteristics.

Consistent with the present findings, marital status was associated with cancer screening uptake<sup>12,37,48</sup>, stage at diagnosis, mortality and survival<sup>49-51</sup>. Canadian women who self-reported as never-married, separated or divorced were 2.3 times as likely to never having a Pap test as married women<sup>12,37</sup>. Marriage and common-law status may be protective for screening, early detection and survival through positive influences of health seeking behaviours<sup>48,50,52</sup>.

The present study found a higher proportion of current smokers, but not former smokers, among women with ICC compared to the general population. The proportion of current smokers was similar to reported prevalence among female cancer patients in Canada (18.7%)<sup>53</sup>. Tobacco smoking is a causal factor of ICC and the risk may increase with intensity and duration<sup>54</sup>. The association appears to be specific to squamous cell carcinoma (the majority of ICC), while less clear for adenocarcinoma<sup>54</sup>. There is an increased risk of cervical cancer for smokers among HPV positive women. Smoking may increase the risk of progression after HPV is acquired<sup>55</sup>. There is no clear association among former smokers<sup>54,55</sup>.

### *Limitations*

Sociodemographic information was only available for referred ICC cases, which represented 77.1% of all cases. Among referred cases who completed HAFs, missing information ranged from 1.0-11.0%. Information on relevant factors such as screening history, primary care visits, immigration history, country of birth, among others, were not available. Self-reported data may be subject to survey and response biases. Two versions of HAFs were used between 2004-2013 and differed slightly in wording. Information for the general female population in BC was derived from multiple data sources and periods, impacting the internal validity. They may not be reflective of sociodemographic distributions over the period. HAF questions may have differed in purpose and wording compared to Statistics Canada surveys, which may impact internal validity.

### *Conclusion*

Cervical cancer is almost entirely preventable and should very high global coverage of HPV vaccination be achieved, it could be eliminated globally by the end of the century. Canada is poised to be one of first countries to eliminate cervical cancer. However, elimination will not be possible without equitable access to elimination efforts. The present study provides evidence of important differences in ICC incidence in BC by ethnicity/race, level of urbanization, marital status and smoking status. Similar concerns have been echoed among international peers<sup>56</sup>. The present study also emphasizes that social and sociocultural determinants of health are closely linked to cervical cancer incidence and screening, even in the context of universal access.

Information on indicators of cervical cancer screening by ethnicity/race were not available in BC and this void is a barrier to informing equitable cancer control and prevention strategies. However, significant variations of ICC incidence indicate differences in screening and risk factors. Efforts are needed to reverse this information gap to better understand and address inequities, and inform strategies to ensure elimination of cervical cancer for all women.

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