



*the* Métis  
Nation<sup>of</sup>  
Ontario

# CANCER IN THE MÉTIS NATION OF ONTARIO

**CLINICAL SIGNIFICANCE REPORT**  
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## GLOSSARY OF TERMS AND ABBREVIATIONS

|      |                                  |      |  |
|------|----------------------------------|------|--|
| APS  | Aboriginal Peoples Survey        | FNIM | First Nations, Inuit and Métis             |
| BMI  | Body Mass Index                  | ICES | Institute for Clinical Evaluative Sciences |
| CCHS | Canadian Community Health Survey | MNO  | Métis Nation of Ontario                    |
| CI   | Confidence Interval              | OCR  | Ontario Cancer Registry                    |
| CV   | Coefficient of Variation         | RPDB | Registered Persons Database                |

## INTRODUCTION

### WHO ARE THE MÉTIS? WHAT IS THE MÉTIS NATION OF ONTARIO?

There are three major Aboriginal groups in Canada recognized by the Canadian Constitution: First Nations, Inuit and Métis. Definitions of the contemporary Métis population vary but the term generally refers to descendants of people born of relations between Indian women and European men. The Métis have typically been under-represented in research compared to their proportion of the Canadian Aboriginal population(1;2). This is likely at least in part attributable to challenges specific to the study of Métis as unlike some other Aboriginal groups, they are rarely defined by specific geographic areas of residence (i.e. Indian reserves, northern communities)(1).

The Métis Nation of Ontario (MNO) is the sole representative body for the Métis in Ontario. The main purpose of the MNO is to support and further the development of self-government institutions for the Métis Nation in Ontario and to represent and advocate for the distinct interests of the Métis people in Ontario. The MNO maintains the only recognized Métis registry in Ontario, formed in 1994. Applications for inclusion in the registry are made to the MNO and are based on self-identification and ancestry. Registration is voluntary, and requires genealogical evidence of a Métis ancestor. Only a subset of those people who self-identify as Métis will belong to the provincial registry.

### PURPOSE AND CONTEXT OF THE REPORT

Over the last half-century, the health challenges facing the First Nations, Inuit and Métis (FNIM) have changed. Infectious disease as a major cause of morbidity and mortality has largely been replaced by chronic disease and injury(3). While in Canada's general population, cancer incidence tends to be remaining relatively stable over time(4), the incidence of cancer in Canadian FNIM appears to be increasing(5-7). As of 2002, cancer was the first and second most common cause of death in Métis women and men respectively(8). In light of these trends, prevention and control strategies are of utmost importance.

Unfortunately, there are very few sources of health data specific to the Métis, and subsequently, few rigorous studies of their distinct health needs. The lack of evidence quantifying the burden of various diseases imposes a major barrier to prevention and planning efforts(9;10). In 2010 the MNO, in collaboration with the Institute of Clinical Evaluative Sciences (ICES) and with funding from the Public Health Agency conducted linkages between the MNO registry and disease databases. A series of technical reports aimed at quantifying the burden of cardiovascular disease, diabetes, respiratory disease and cancer in the Métis Nation in Ontario resulted.

The Cancer Technical Report compared rates of cancer diagnoses in registered Métis to those in the general Ontario population. This Cancer Clinical Significance report aims to contextualize and interpret the findings reported in the Cancer Technical Report(11). The current Significance Report draws on population-based surveys to measure the prevalence of three major cancer risk factors (i.e. attributes or exposures that change the probability of disease) among the Métis in Ontario and compares them to those estimated for the general population of Ontario. We also consider the uptake of breast and cervical screening in the Métis compared to that in the general Ontario population. Finally, we discuss the implications of these findings for the current and future cancer burden, and the study of chronic disease in the Métis people of Ontario.

### RISK MODIFIERS AND SCREENING

There are several lifestyle factors for which there is strong evidence of association with the risk of cancer. The degree to which any single factor contributes to this risk varies by cancer type. Main "lifestyle" risk modifiers for the four most common cancers (prostate, lung, breast, colorectal) are listed in Table 1. As is illustrated in the table, tobacco smoke, alcohol, obesity, physical inactivity and diet can all modify the risk of cancer(12;13). Our choice

of three of these (tobacco smoke, alcohol and obesity) for inclusion in this report was based on the availability of Métis-specific prevalence data that was comparable to province-wide data.

Very little is known about the prevalence of risk factors, uptake of screening or overall burden of cancer among the Métis in Ontario. In an effort to elucidate some of the similarities and differences in cancer screening and risk factors between the Métis people in Ontario, and the general Ontario population, the authors extracted information about smoking, binge drinking, body mass index (BMI), and breast and cervical cancer screening among the Ontario Métis from the 2006 Aboriginal Peoples Survey (APS) and among the general Ontario population from the Canadian Community Health Survey (CCHS) Cycle 3.1 (2005).

Cancer screening aims to detect pre-cancerous changes or cancer at an early stage in people without any cancer symptoms. Ontario offers screening programs for three types of cancer: breast, cervical and colorectal. All screening programs ultimately aim to reduce the number of deaths attributable to the targeted cancer. The means by which they accomplish this, however, varies by screening type.

Screening mammography aims to detect breast cancer earlier, leading to earlier initiation of treatment and improved chances of survival. As is illustrated in Table 2, guidelines suggest that women aged 50-69 undergo breast screening by mammography every two years(14). The goal of cervical cancer screening, or Pap tests, is to detect pre-cancerous cells so that they may be destroyed and in so doing, prevent the progression of pre-cancerous lesions to cervical cancer. Provincial guidelines suggest that women begin Pap testing at age 20 (or at onset of sexual activity) and receive annual Pap tests until there are three consecutive normal tests, at which point the woman may increase the screening interval to 2-3 years until age 70(15). In 2008, Ontario launched a provincial colorectal cancer screening program. Given that there were no questions about colorectal cancer screening in the APS, it is not included in this report. (Refer to Table 2 for more details.)

## **METHODS**

### **CANCER – DATA LINKAGE**

Given that provincial health records do not include descriptors of ethnic or cultural background, a means by which to identify Métis people in health records was necessary in order to estimate the incidence of cancer in the Métis population based on administrative data. The MNO registry was therefore linked to the Ontario Cancer Registry (OCR) to identify Métis individuals with a cancer diagnosis in 2005 to 2007. The MNO registry included approximately 14,000 people at the time of linkage (2009) (11). The OCR is a comprehensive database of all Ontario residents who have been newly diagnosed with or died of cancer.

Methods for the linkage are outlined in greater detail elsewhere(11). Briefly, the MNO registry, limited to citizens aged 18 and over, was probabilistically linked to the Registered Persons Database (RPDB), a database of all people in the province eligible for the Ontario Health Insurance Program. Subsequently, the cohort of MNO citizens successfully matched to the RPDB was linked to the OCR. Crude and indirectly age-standardized cancer incidence rates in registered Métis and the general Ontario population were estimated and compared. Indirect standardization is a method used to take into account the fact that cancer risk increases with age and the MNO registry population is younger than the Ontario population(11).

## **RISK MODIFIERS AND SCREENING**

### **DATA SOURCES**

Responses to two cross-sectional surveys were used to compare the prevalence of risk factors and use of screening in Ontario Métis to the general Ontario population: the 2006 APS and the CCHS Cycle 3.1(2005). While both

surveys are administered nationwide, analyses for this report were restricted to Ontario respondents. All responses were self-reported.

The APS provided the data for the Métis risk modifiers and screening estimates. The APS was a post-censal survey conducted by Statistics Canada from October 2006 to March 2007. The survey aimed to provide comprehensive data on the lives of FNIM people in Canada and includes questions pertaining to education, language, employment, income, health, communication, mobility and housing. Individuals eligible for inclusion in the APS were those who claimed Aboriginal ancestry and/or identity on the long form of the 2006 Canadian General Census of the Population. A children and youth survey was administered to parents of Aboriginal children aged 6-14 and an adult survey was administered to individuals aged 15 and over. For the purposes of this analysis, only Ontario APS respondents aged 18 and over who self-identified as Métis and/or reported Métis ancestry are included.

Cancer screening practices were not covered in the core section of the APS. Instead, screening estimates were calculated using responses from the Métis supplement, one of two supplemental questionnaires associated with the APS. This supplemental section was administered to the subset of the Aboriginal adult population who self-identified as Métis and/or reported Métis ancestry. The supplement covered four themes; family background, child welfare, social interaction and health. In Ontario, both the adult core survey and Métis supplement were conducted via telephone(16).

The CCHS was the primary source of data for the risk factor and screening estimates for the general population of Ontario. The CCHS is a cross-sectional, population-based survey conducted bi-annually by Statistics Canada. Cycle 3.1 was conducted between January and December 2005 and collected information relating to health status, health care utilization and determinants of health. Individuals eligible for inclusion in the CCHS included non-institutionalized persons aged 12 or over in all provinces and territories. Persons living on Indian Reserves or Crown Lands, institutional residents, full-time members of the Canadian forces and residents from some remote regions were excluded. For the purposes of this analysis, only respondents residing in Ontario aged 18 and over were included. Subjects who identified as Métis in the CCHS were not excluded from the overall Ontario estimates. The authors believe this to be justified since less than 1% of Ontario respondents identified as Métis on the CCHS.

Both surveys were administered via personal or telephone interviews using a questionnaire designed for computer-assisted interviewing(17). The content, wording and reference periods of many questions in the APS and CCHS were not identical. To ensure comparability across the two surveys, questions were chosen which had similar wording, interpretation and reference periods. Furthermore, inclusion and exclusion criteria for each question were designed to be consistent between the two surveys (i.e. pregnant women were excluded from BMI estimates in both cases).

## DATA ANALYSIS

**Smoking:** In both surveys, respondents were asked "At the present time, do you smoke cigarettes daily, occasionally or not at all?" For the purposes of this report, smoking rates were calculated as the proportion of all respondents aged 18 years or older who reported daily or occasional smoking.

**Binge Drinking:** Reference periods for the alcohol-related questions varied widely between the two surveys and many questions were therefore not comparable. Although the cancer prevention recommendation regarding alcohol does not mention binge drinking (rather it suggests limiting alcohol intake to no more than one drink per day for women and no more than two drinks per day for men(12) only the questions relating to binge drinking were identical between the two surveys. These were therefore used as the basis of the alcohol consumption indicator. Individuals who had replied in an earlier question that they had had at least one alcoholic beverage in the last year were asked, "How often in the past 12 months have you had five or more drinks on one occasion?"

**BMI:** In both surveys, participants' height and weight was provided by self-report. A new variable, body mass index, was calculated within the study file by dividing weight (in kilograms) by height (in metres-squared). In accordance with World Health Organization guidelines, an individual was classified as overweight if his or her BMI was

greater than or equal to 25 and was classified as obese if his or her BMI was equal to or exceeded 30(18). Pregnant women were not included in the calculation of prevalence of overweight or obesity.

**Screening:** To assess screening behaviours, women were first asked whether or not they had ever undergone the screening procedure (mammogram or Pap test). Those who answered yes were subsequently asked when they were last screened. For the mammogram variable, in order to ensure comparability between surveys and to estimate the proportion of women who were guideline concordant, we aggregated responses into one of four categories; screened within the last two years, screened two to five years ago, screened five or more years ago, and never screened. We restricted our analyses to women aged 50 to 69, the ages between which bi-annual screening is particularly recommended.

For the Pap test variable, in order to maintain comparability between surveys despite different possible response categories, women were aggregated into three categories: those who had been screened within the last five years, those who had been screened five or more years ago and those who reported never having been screened. The five-year time interval is longer than the guideline-suggested time between screens, but was the smallest meaningful common interval across both surveys. In the case of Pap screening, responses were stratified according to two age groups, young adults (18-44) and older adults (45+), and are also reported for all ages.

**General:** Both surveys had a multi-stage, complex sampling design. Because only a subset of the target population is included in a survey, sampling weights are used to account for the fact that each respondent represents not only him or herself, but also several other people. The sampling weights assigned by Statistics Canada account for selection probability, non-response and non-coverage. In the APS, the weights equate the APS sample to the 2006 Census Aboriginal population 15 and over. In the CCHS, the weights equate the sample to the 2001 Canadian population aged 12 and over. In estimating the prevalence of a given risk factor from either survey, the weighted number of cases were used(16).

Prevalence of each of the three risk factors was not stratified by age group, largely due to small sample size and instable estimates for the Ontario Métis. Because of the different age structures of the Métis and general Ontario populations, however, risk factor prevalence rates for the Ontario population were directly standardized using, as the standard, the age distribution of the combined male and female Métis population as identified in the 2006 Census of the Population (and shown in Table 3). Participants with a missing or invalid response to a given question were excluded from the denominator of the prevalence estimate for the given question.

To accommodate the complex sampling strategy, bootstrapping techniques were used to calculate the coefficient of variation (CV) and 95% confidence intervals. The coefficient of variation is a measure of our confidence in a given estimate and is calculated by taking the ratio of the standard deviation to the mean. In accordance with Statistics Canada regulations, estimates with a CV from 16.6% to 33.3% were flagged to be interpreted with caution. Those with a CV greater than 33.3% were suppressed and not reported because of extreme sampling variability. Statistical significance was assessed based on confidence intervals. If two parameter estimates had non-overlapping confidence intervals, they were considered significantly different.

## RESULTS

### CANCER

Of the 14,480 individuals in the Métis citizenship registry, 14,021 (96.8%) were successfully linked to the RPDB. Of those, 13,439 (92.8% of total) had a valid Ontario address recorded in the Registered Persons Database and were 18 years of age or older. Compared to Ontario adults who self-reported Métis identity in the 2006 Census, Métis in the linked registry cohort were on average older, more likely to be male, and more likely to live in a rural setting. Compared to the non-Aboriginal population of Ontario, the Métis in the registry cohort were on average younger, more likely to be male, and more likely to live in a rural setting (see Table 1).

As in the general population, prostate, lung, breast and colorectal cancer had the highest incidence among the Métis (refer to Appendix, Table 1)(11;19). Crude (i.e. unadjusted) incidence of all cancers combined was significantly lower in Métis men and women (4.4 cases/1000 persons, 95%CI: 2.76-5.12) compared to men and women in the general population(5.25 cases/1000 persons, 95%CI:5.22-5.27). Statistically significant differences in incidence did not persist, however, after stratification by age and sex (refer to Appendix, Table 2). Annual age- and sex-standardized incidence rates in the Métis between 2005 and 2007 were highly variable, with lower incidence rates in 2006 and 2007 compared to 2005. Over the same time period, the annual incidence rate in the general population remained relatively constant (refer to Appendix, Table 3).

## **RISK MODIFIERS AND SCREENING**

### **RISK FACTORS**

Prevalence of self-reported smoking was significantly higher among Métis compared to the general population. This was consistent across all age groups and both sexes (See Figure 1.) In men, 37% (95%CI: 32.5-41.7) of Métis respondents reported daily or occasional smoking, while the corresponding age-standardized prevalence in men from the general population was 30%. Of the women, 36% (95%CI: 31.3-40.4) of Métis respondents reported daily or occasional smoking, while the corresponding age-standardized prevalence in women from the general population was 22% (95%CI: 21.28-23.58). Male Métis aged 18 to 44 were more likely to report daily or occasional smoking than those 45 or older. In the younger age group (18 to 44), smoking was more prevalent amongst Métis males than females, however in the older age group (45+), females were more likely to report smoking than males.

As illustrated in Figure 2, binge drinking was significantly more common amongst Métis than the general Ontario population: 71% (95%CI: 66.1-75.8) of Métis men and 48% of Métis women reported binge drinking in the last year compared to 61% (95%CI: 59.8-62.2) and 37% (95%CI: 35.5-38.0) of all Ontario men and women respectively. Binge drinking was more common in men than in women in both populations.

The percentages of overweight and obese individuals in each population are illustrated in Figure 3. Ontario Métis were significantly more likely than the general population to be overweight or obese. 73% (95%CI: 67.8-76.7) of Métis men and 57% (95%CI: 55.8-58.3) of Ontario men were classified as overweight or obese based on BMI. 59% (95%CI: 54.4-64.1) of Métis women and 39% (95%CI: 38.2-40.6) of all Ontario women were classified as overweight or obese. In both the Métis and in all Ontarians, a greater share of the female overweight or obese population was obese compared to males. Métis men and women were nearly twice as likely as all Ontario men and women to be classified as obese.

### **SCREENING UPTAKE**

Compared to Ontario females aged 50-69, Métis women of the same age were equally likely to have ever had a mammogram (approximately 90%) but were significantly less likely to report having had a mammogram within the recommended interval of two years. As illustrated in Figure 4, 60% (95% CI: 50.4-68.4) of Métis women reported having had a mammogram within the last two years compared to 73% (95%CI: 71.3-75.0) of women in the general population.

Compared to all Ontario women aged 18 and over, Métis women were more likely to have ever had a Pap test (see Figure 5). The proportion of Métis women who had been screened within the last five years, however, was not significantly different than the general population suggesting that any excess of ever-screened women in the Métis had not been screened within the guideline screening intervals. This pattern was consistent in the two age groups, 18 to 44 years and 45 years of age and older. Due to small sample sizes and the resultant large coefficients of variation, rates of "never screening" among Métis women should be interpreted with caution.

# DISCUSSION

## CANCER

### *Key Messages*

- The Cancer Technical Report found no substantial differences in cancer incidence between the registry-identified Métis and the general Ontario population(11).
- Future studies of cancer incidence in the Ontario Métis should build on the strengths of the Technical Report, while overcoming some of its limitations (see below).

### *Strengths and Limitations*

- This first population-based study of cancer incidence specific to Ontario Métis lays the groundwork for future linkages of the Métis registry and administrative health data.
- The use of the Ontario Cancer Registry to identify incident cancers in both the Métis and the general population is preferred over methods that use different sources to ascertain cancer in each population.
- The MNO citizenship registry used in this study represents only 18% of the total Métis population in Ontario as identified by self-report in the 2006 Census of the Population(11).
- Registered Métis citizens are not representative of all self-identified Métis in the province. A limited demographic comparison showed that registered Métis citizens were more likely to be older, to be male and to live in rural areas compared to Métis who self-identified in the 2006 census. They may also differ in other ways that may affect cancer risk, such as socio-economic status. These differences should be taken into account when considering the generalizability of findings.
- The limited number of registered Métis citizens, and 3-year observation interval yielded only 168 incident cancer cases, limiting the statistical power of the study to detect differences in site- and sex- specific cancer incidence.

### *Recommendations for Research*

Studying the burden of cancer in the Métis population of Ontario is important. Studies should continue to be conducted over time with the following considerations.

- Expansion of the registry will improve statistical power and potentially improve generalizability.
  - Increasing the size of the registry will increase the number of individuals at risk of a cancer diagnosis and will improve statistical power to identify important patterns and to detect differences between the Métis and the general population.
  - Improved generalizability could result from an expanded registry if the registry grows to become more representative of the self-identifying population (e.g. the inclusion of more urban residents and females).
- The linkage should be repeated in a few years' time.
  - This will allow identification of changes in cancer incidence over time.
- Survival analyses based on future linkages between the MNO Registry and the Ontario Cancer Registry should be conducted.
  - This will allow identification of differences in prognosis following a cancer diagnosis, compared to the general population.
  - Linkage with other databases at ICES can be used to explore the impact of co-morbidities on incidence and survival.



- Studies of cancer based on linkages with the Métis Citizenship Registry should be complemented with data from other sources.
  - Linkage with other databases at ICES can be used to explore the impact of co-morbidities on incidence and survival.
  - The long form census could be used to identify Ontarians who report Métis identity and linked to administrative health records.
  - The census will not only yield a more representative sample, but will also provide a larger cohort for analysis.
  - The 1991 Census Mortality Follow-Up Study(20) is already underway. Plans are in place for cancer incidence and survival to be estimated for Métis nationwide, based on this cohort.
  - The inclusion of Aboriginal/ethno-cultural identifiers in administrative health records, as exists in some other provinces, would greatly improve the capacity for studies of disease trends and burden in the Ontario Métis population(10).
- All of these expansions will serve as a platform for future research to explore reasons for disparities and develop strategies for improvement.

## RISK MODIFIERS

### *Key messages*

- Surveys are a valuable source of information about “lifestyle” associated risk modifier prevalence in the Ontario Métis population.
- Based on analyses from the APS and CCHS, high rates of smoking and obesity in the Ontario Métis are likely to result in increased incidence of cancers associated with these modifiable factors in the upcoming years.
- Interventions that successfully lower the prevalence of these risk modifiers in Ontario Métis will have benefits not only in reducing cancer, but chronic disease as a whole.

### *Public Health Implications*

- Interventions to reduce smoking prevalence should be a priority.
  - Smoking rates were significantly higher among the Métis population compared to the general population of Ontario.
  - These findings are consistent with those of studies of Métis nationwide(9;20-22)
  - The high rate of smoking among Métis people is likely to result in an increase in the incidence of lung and other smoking-associated cancers (such as esophagus, kidney, bladder and even colorectal).
- Primary prevention efforts should also aim to reduce rates of overweight and obesity in the Ontario Métis.
  - Métis were nearly twice as likely to be obese compared to Ontarians in general.
  - These findings are consistent with those of studies of Métis nationwide(21;23).
  - Obesity has been associated with increased risk of colorectal, breast, gallbladder and kidney cancers, among others.
- Interventions targeting smoking, obesity or alcohol consumption will also help to prevent other chronic diseases.
  - All of these factors increase ones risk of cancer and are also associated with risk of diabetes, for example, which has been estimated to be nearly 25% higher in Ontario Métis than in the general population(24).
  - Diabetes has been associated with an increased risk of certain cancers (i.e. liver, pancreas, endometrium)(25) and mortality from some cancers(26). Interventions to reduce diabetes itself may also reduce the burden of cancer.

- Adherence to recommended screening intervals may be poor for breast and cervical cancer screening among Métis.
  - For both breast and cervical screening, Métis women were equally or more likely to have ever been screened, but a greater percentage of Métis women had not been screened within the recommended interval.
  - Future research should continue to monitor the uptake of screening in this population and to identify physical, geographical and cultural barriers to repeated screening.
  - Efforts to increase adherence to recommended screening intervals should be increased.

### *Strengths and Limitations*

- These analyses of risk modifiers and screening in the Ontario Métis have highlighted potential targets for intervention to reduce not only cancer, but chronic disease in general.
- The Métis included in these analyses are representative of Ontario residents who self-identify as Métis and are therefore representative of the target population for Métis-specific health interventions and initiatives.
- Differences between the APS and CCHS in the content and wording of questions resulted in some limitations.
  - Due to inconsistencies in response categories between the two surveys, the smallest meaningful interval for time since last Pap test was five years, significantly longer than the two to three year guideline interval.
  - The estimations of uptake of cervical cancer screening may have been affected by a difference in prevalence of hysterectomy between the two populations that was not taken into account in the analyses.
  - Moderate, rather than binge drinking, has been associated with increased cancer risk(12). Research from the U.S. has shown that under a quarter of moderate drinkers (1 or 2 drinks per day for a woman or man respectively) also report binge-drinking(27). The degree to which binge drinking represents overall alcohol consumption patterns in the two populations presented here is unknown.
- Despite the fact that the APS is the largest study of its kind, once analyses were limited to Métis residing in Ontario, meaningful and stable prevalence rates by age and sex could not always be estimated.

### *Recommendations for Research*

Identifying and comparing the prevalence of “lifestyle”-associated risk modifiers in the Métis and general population of Ontario will be integral in order to plan and provide effective primary prevention services. In order to monitor trends and identify targets for intervention, analyses such as this should be repeated, keeping in mind the following recommendations.

- Future research should explore reasons for differences in cancer incidence, screening and lifestyle-associated risk factors.
  - Linkages such as this and others available via ICES will facilitate exploration of the role of primary health care, comorbidities, and access to screening facilities, for example.
- To overcome issues of comparability, coverage and statistical power associated with the use of two surveys, several approaches could be considered.
  - The CCHS could adopt sampling strategies like the APS and using the National Household Survey (formerly the long form census) as a sampling frame, over-sample Métis and/or Aboriginal people more generally.
  - The questions pertaining to health in the APS could adopt wording and/or response options which are more similar to the CCHS.
  - The APS and/or Métis supplement could aim to include more cancer and chronic disease-relevant questions.

- Alternative sources of data could be used to supplement survey-based screening information.
  - The potential to link sources of ethno-cultural identifiers (i.e. the census, the MNO registry) to data from provincial screening programs could be explored.
  - This would have the double benefit of permitting both monitoring and more precise program interventions to improve screening.

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## TABLES

**Table 1.** Summary of evidence of association between select risk modifiers and four most common cancers.

| Risk Factors        | Cancer Type |      |        |            |
|---------------------|-------------|------|--------|------------|
|                     | Prostate    | Lung | Breast | Colorectal |
| Tobacco smoke       |             | ✓    |        | ✓          |
| Alcohol             |             |      | ✓      | ✓          |
| Obesity             |             |      | ✓      | ✓          |
| Physical Inactivity |             | ✓    | ✓      | ✓          |
| Diet                | ✓           | ✓    |        | ✓          |

Sources: Cancer in Young Adults in Canada, Cancer Care Ontario (2006); Food, Nutrition, Physical Activity and the Prevention of Cancer: A Global Perspective, World Cancer Research Fund/American Institute for Cancer Research (2007)

**Table 2.** Summary of provincial screening guidelines for Ontario.

| Cancer     | Test                    | Sex    | Age   | Frequency   |
|------------|-------------------------|--------|-------|---|
| Breast     | Mammography             | Female | 50-69 | Every two years   |
| Cervical   | Pap                     | Female | 20-69 | Annually until there are 3 consecutive normal tests<br>Every 2-3 years following 3 consecutive normal tests |
| Colorectal | Fecal Occult Blood Test | Both   | 50-74 | Every two years   |

Source: Cancer Care Ontario (www.cancercare.on.ca)

**Table 3.** Demographic characteristics of the Métis Nation of Ontario citizenship registry, Ontario Métis identified in the 2006 Census and non-Aboriginal Ontario residents in the 2006 Census.

|                 | Métis Nation of Ontario<br>Citizens Registry Linkage |        | Ontario Métis people<br>identified in the 2006<br>Census |        | Ontario non-aboriginal<br>identity in 2006 Census |        |
|-----------------|--|--------|--|--------|---|--------|
|                 | n  | %      | n  | %      | n   | %      |
| <b>TOTAL</b>    | 13,439   | 100.00 | 73,605.00  | 100.00 | 11,786,405  | 100.00 |
| <b>Sex</b>      |  |        |  |        |   |        |
| Female          | 6,169  | 45.90  | 37,025   | 50.30  | 5,760,285   | 48.87  |
| Male            | 7,270  | 54.10  | 36,580   | 49.70  | 6,026,115   | 51.13  |
| <b>Age</b>      |  |        |  |        |   |        |
| (15 or 18)-24*  | 1,541  | 11.47  | 13,260   | 22.79  | 1,583,955   | 16.43  |
| 25-34           | 2,676  | 19.91  | 10,510   | 18.06  | 1,495,910   | 15.52  |
| 35-44           | 2,780  | 20.69  | 12,075   | 20.75  | 1,869,630   | 19.39  |
| 45-54           | 3,114  | 23.17  | 11,660   | 20.04  | 1,818,570   | 18.86  |
| 55-64           | 1,825  | 13.58  | 6,875  | 11.82  | 1,329,545   | 13.79  |
| 65 and over     | 1,503  | 11.19  | 3,800  | 6.53   | 1,543,640   | 16.01  |
| <b>Rurality</b> |  |        |  |        |   |        |
| Urban           | 8,816  | 68.97  | 52,895   | 71.86  | 10,077,385  | 85.50  |
| Rural           | 4,170  | 31.03  | 20,475   | 27.82  | 1,706,165   | 14.48  |
| On-reserve      |  |        | 235  | 0.32   | 2,860   | 0.02   |

\*In the citizenship registry, the youngest age group is 18 to 24, since only those 18 and older were linked to the OCR. In the Census-identified populations, the youngest age group is 15-24.

Sources: Cancer in the Métis Nation of Ontario Technical Report (2010), 2006 Census of Population(28).

**Table 4.** Risk factor prevalence and screening uptake in Ontario adults by population and sex.

|  | Male        |           |             |           | Female      |            |             |           |
|--|-------------|-----------|-------------|-----------|-------------|------------|-------------|-----------|
|  | Métis       |           | Ontario     |           | Métis       |            | Ontario     |           |
|  | Percent (%) | 95% CI    | Percent (%) | 95% CI    | Percent (%) | 95% CI     | Percent (%) | 95% CI    |
| <b>Smoking<sup>†</sup></b>                   | 37          | 32.5-41.7 | 27          | 25.9-28.0 | 36          | 33.1-39.7  | 19          | 18.6-20.1 |
| <b>Binge Drinking<sup>†</sup></b>            |             |           |             |           |             |            |             |           |
| Never  | 29          | 24.2-33.9 | 39          | 37.8-40.2 | 52          | 45.9-57.1  | 63          | 62.0-64.5 |
| ≤3 times/ month                              | 52          | 46.4-57.0 | 47          | 45.3-47.8 | 45          | 39.4-50.4  | 32          | 30.8-33.2 |
| ≥1/week                                      | 19          | 15.2-24.3 | 14          | 13.5-15.3 | 4*          | 2.0-6.0*   | 5           | 4.1-5.4   |
| <b>Body Mass Index<sup>†</sup></b>           |             |           |             |           |             |            |             |           |
| Obese  | 28          | 23.9-32.9 | 16          | 15.2-17.0 | 28          | 23.4-32.9  | 14          | 13.3-14.9 |
| Overweight                                   | 45          | 39.8-48.7 | 41          | 39.7-42.2 | 31          | 25.9-35.6  | 25          | 24.1-26.4 |
| <b>Time since last mammogram<sup>∞</sup></b> |             |           |             |           |             |            |             |           |
| <2 years                                     | -           | -         | -           | -         | 60          | 50.4-68.4  | 73          | 71.3-75   |
| 2-5 years                                    | -           | -         | -           | -         | 15*         | 9.4-22.2*  | 10          | 8.7-11.4  |
| ≥5 years                                     | -           | -         | -           | -         | 17*         | 10.7-27.0* | 6           | 4.8-6.5   |
| Never  | -           | -         | -           | -         | 8*          | 4.6-13.6*  | 11          | 9.9-12.5  |
| <b>Time since last Pap test</b>              |             |           |             |           |             |            |             |           |
| <i>Aged 18 and over<sup>†</sup></i>          |             |           |             |           |             |            |             |           |
| <5 years                                     | -           | -         | -           | -         | 80          | 75.2-83.2  | 77          | 76.4-78.5 |
| ≥5 years                                     | -           | -         | -           | -         | 15          | 11.4-18.3  | 9           | 8.6-9.6   |
| Never  | -           | -         | -           | -         | 6*          | 4.0-8.5*   | 14          | 12.6-14.4 |
| <i>Aged 18 to 44</i>                         |             |           |             |           |             |            |             |           |
| <5 years                                     | -           | -         | -           | -         | 86          | 80.7-89.3  | 80          | 78.7-81.3 |
| ≥5 years                                     | -           | -         | -           | -         | 6*          | 3.5-9.5*   | 3           | 2.6-3.6   |
| Never  | -           | -         | -           | -         | 9*          | 5.7-12.5*  | 16.9        | 15.7-18.1 |
| <i>Aged 45 and over</i>                      |             |           |             |           |             |            |             |           |
| <5 years                                     | -           | -         | -           | -         | 71          | 63.1-77.1  | 70          | 69.0-71.6 |
| ≥5 years                                     | -           | -         | -           | -         | 28          | 21.2-34.9  | 22          | 21.1-23.2 |
| Never  | -           | -         | -           | -         | **          | -          | 8           | 6.6-8.4   |

Sources: Aboriginal Peoples Survey (2006) and Canadian Community Health Survey 3.1 (2005).

CI: Confidence Interval

† Includes respondents aged 18 and over. Ontario (CCHS) responses age-standardized to the Ontario Métis population identified in the 2006 Census of Population(29).

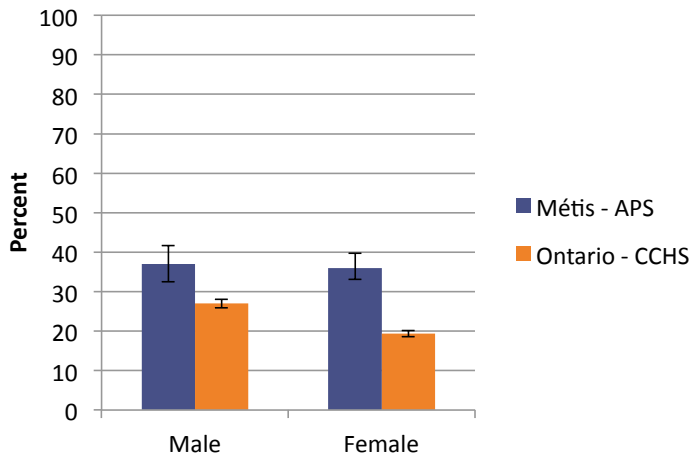
∞Estimates for time since last mammogram limited to women 50-69.

\*Estimates should be interpreted with caution. Coefficient of variation is between 16.6 to 33.29.

\*\* Estimate too unreliable to publish. Coefficient of variation is 33 or greater.

## FIGURES

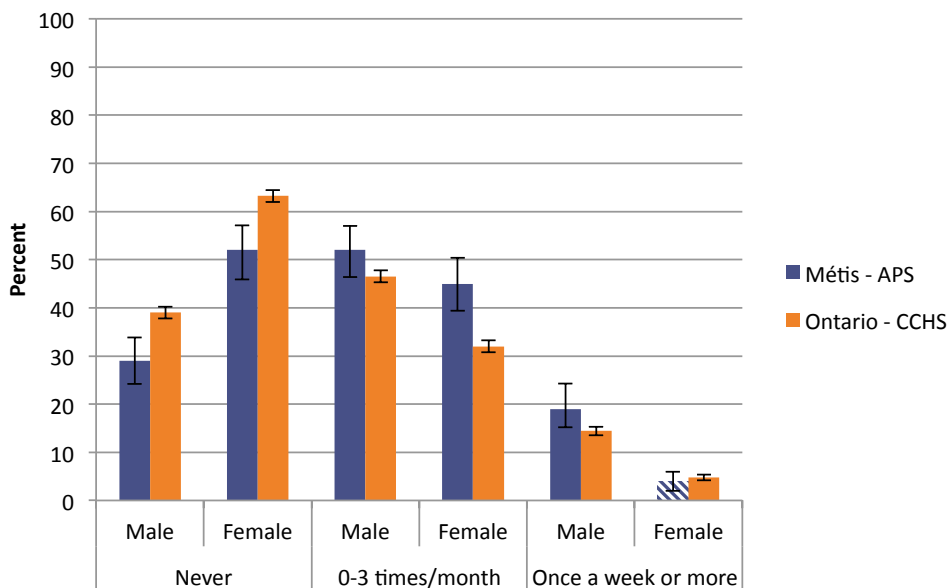
**Figure 1.** Percentage of adult smokers (aged 18+ years) in Ontario, by population and sex.



Note: Ontario (CCHS) responses were age-standardized to the Ontario Métis population identified in the 2006 Census of Population(29).

Sources: Aboriginal Peoples Survey (2006) and Canadian Community Health Survey 3.1 (2005).

**Figure 2.** Percentage of adult (aged 18+ years) binge drinkers (5 or more drinks per occasion) in Ontario, by population and sex.

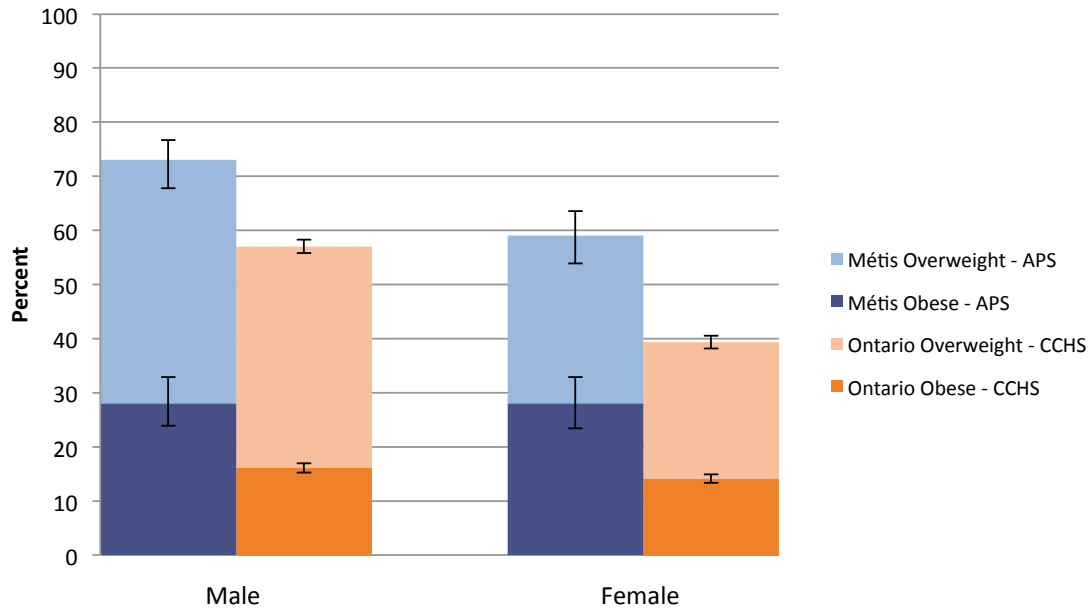


Hatched bars represent estimates that are to be interpreted with caution. Coefficient of variation is between 16.6 to 33.29.

Note: Ontario (CCHS) responses were age-standardized to the Ontario Métis population identified in the 2006 Census of Population(29).

Sources: Aboriginal Peoples Survey (2006) and Canadian Community Health Survey 3.1 (2005).

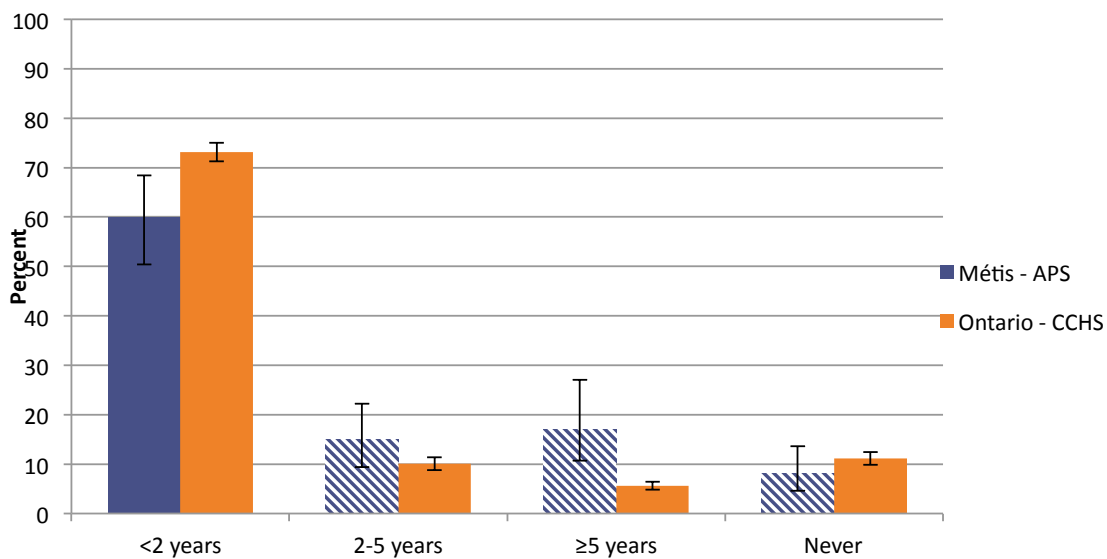
**Figure 3.** Percentage of Ontario adults (aged 18+ years) who are obese or overweight, by population and sex.



Note: Ontario (CCHS) responses were age-standardized to the Ontario Métis population identified in the 2006 Census of Population(29).

Sources: Aboriginal Peoples Survey (2006) and Canadian Community Health Survey 3.1 (2005).

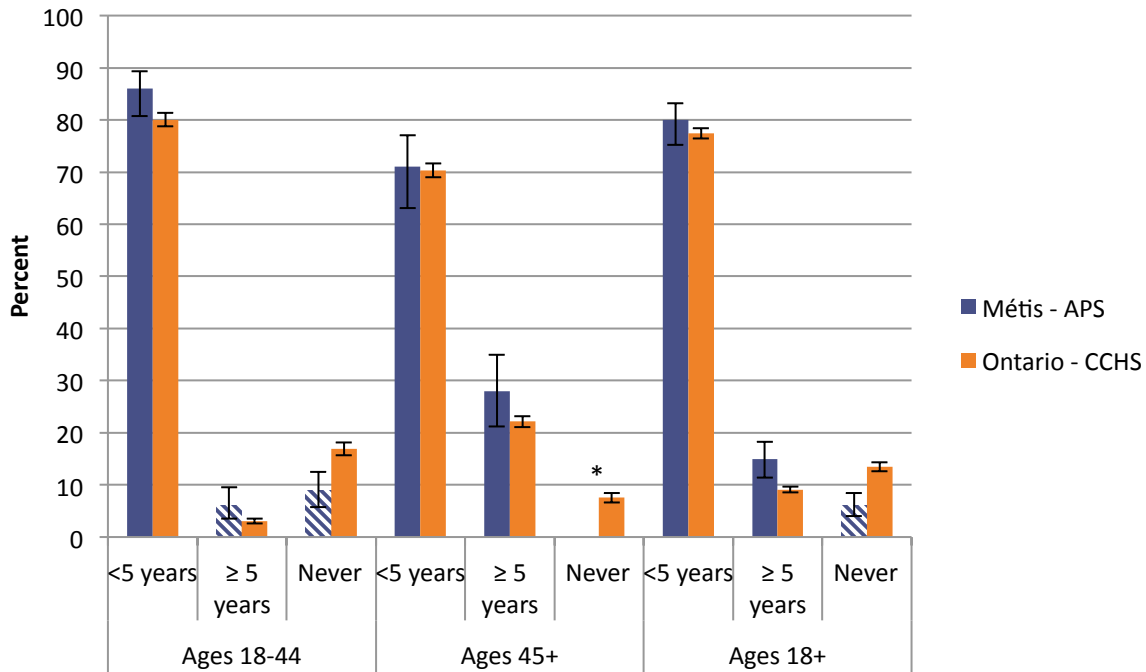
**Figure 4.** Time since last mammogram in Ontario females aged 50-69, by population.



Hatched bars represent estimates that are to be interpreted with caution. Coefficient of variation is between 16.6 to 33.29.

Sources: Aboriginal Peoples Survey (2006) and Canadian Community Health Survey 3.1 (2005).

**Figure 5.** Time since last Pap test in Ontario females (aged 18+ years), by age and population.



Note: Ontario (CCHS) responses were age-standardized to the Ontario Métis population identified in the 2006 Census of Population(29).

Hatched bars represent estimates that are to be interpreted with caution. Coefficient of variation is between 16.6 to 33.29.

\* Estimate too unreliable to publish. Coefficient of variation is equal to or greater than 33.3.

Sources: Aboriginal Peoples Survey (2006) and Canadian Community Health Survey 3.1 (2005).



## APPENDIX

**Table 1.** Incidence of cancer per 1000 persons during 2005 to 2007 among the Métis and among the Ontario General Population, by type and sex.

| Crude Incidence per 1000 population (95% CI), by type | Métis                    | General Population       |
|---|--------------------------|--------------------------|
| <b>Total</b>  |                          |                          |
| Breast  | 1.05 (0.63, 1.64)        | 1.48 (1.46, 1.50)        |
| Cervix  | -                        | 0.10 (0.09, 0.10)        |
| Colorectal  | 0.56 (0.35, 0.85)        | 0.67 (0.66, 0.67)        |
| Lung  | 0.74 (0.49, 1.06)        | 0.68 (0.67, 0.69)        |
| Non-Hodgkin Lymphoma                                  | 0.15 (0.06, 0.33)        | 0.25 (0.25, 0.26)        |
| Ovary   | 0.17 (0.03, 0.48)        | 0.19 (0.19, 0.20)        |
| Prostate  | 1.10 (0.70, 1.65)        | 1.82 (1.80, 1.84)        |
| Uterus  | 0.27 (0.09, 0.64)        | 0.31 (0.30, 0.32)        |
| <b>All Cancers</b>                                    | <b>4.40 (3.76, 5.12)</b> | <b>5.25 (5.22, 5.27)</b> |
| <b>Males</b>  |                          |                          |
| Colorectal  | 0.57 (0.30, 1.00)        | 0.74 (0.73, 0.76)        |
| Lung  | 0.62 (0.32, 1.06)        | 0.74 (0.73, 0.76)        |
| Non-Hodgkin Lymphoma                                  | 0.24 (0.08, 0.55)        | 0.28 (0.27, 0.29)        |
| Prostate  | 1.10 (0.70, 1.65)        | 1.82 (1.80, 1.84)        |
| <b>All Cancers</b>                                    | <b>4.24 (3.40, 5.23)</b> | <b>5.54 (5.50, 5.58)</b> |
| <b>Females</b>  |                          |                          |
| Breast  | 1.05 (0.63, 1.64)        | 1.48 (1.46, 1.50)        |
| Cervix  | -                        | 0.10 (0.09, 0.10)        |
| Colorectal  | 0.55 (0.26, 1.01)        | 0.59 (0.58, 0.60)        |
| Lung  | 0.88 (0.50, 1.43)        | 0.62 (0.61, 0.63)        |
| Non-Hodgkin Lymphoma                                  | 0.06 (0.00, 0.31)        | 0.22 (0.21, 0.23)        |
| Ovary   | 0.17 (0.03, 0.48)        | 0.19 (0.19, 0.20)        |
| Uterus  | 0.27 (0.09, 0.64)        | 0.31 (0.30, 0.32)        |
| <b>All Cancers</b>                                    | <b>4.59 (3.64, 5.70)</b> | <b>4.97 (4.93, 5.00)</b> |

**Table 2.** Incidence of all cancers per 1000 persons during 2005 to 2007 among the Métis and among the Ontario General Population, by age and sex.

| Crude Incidence, per 1000 population (95% CI) | Métis                    | General Population       |
|---|--------------------------|--------------------------|
| <b>Total</b>                                  |                          |                          |
| < 65 years                                    | 2.79 (2.27, 3.41)        | 2.87 (2.85, 2.89)        |
| 65-74 years                                   | 17.76 (13.00, 23.69)     | 16.87 (16.71, 17.03)     |
| 75+ years                                     | 28.57 (18.49, 42.18)     | 20.25 (20.06, 20.43)     |
| <b>Overall</b>                                | <b>4.40 (3.76, 5.12)</b> | <b>5.25 (5.22, 5.27)</b> |
| <b>Males</b>                                  |                          |                          |
| < 65 years                                    | 2.56 (1.89, 3.40)        | 2.70 (2.67, 2.72)        |
| 65-74 years                                   | 18.72 (12.23, 27.43)     | 21.51 (21.24, 21.77)     |
| 75+ years                                     | 32.26 (17.18, 55.16)     | 27.27 (26.91, 27.62)     |
| <b>Overall</b>                                | <b>4.24 (3.40, 5.23)</b> | <b>5.54 (5.50, 5.58)</b> |
| <b>Females</b>                                |                          |                          |
| < 65 years                                    | 3.07 (2.27, 4.05)        | 3.04 (3.01, 3.07)        |
| 65-74 years                                   | 16.65 (10.17, 25.72)     | 12.71 (12.52, 12.90)     |
| 75+ years                                     | 25.42 (13.14, 44.41)     | 15.89 (15.67, 16.10)     |
| <b>Overall</b>                                | <b>4.59 (3.64, 5.70)</b> | <b>4.97 (4.93, 5.00)</b> |

CI: Confidence Interval

**Table 3.** Crude and age-sex standardized annual incidence of cancer per 1000 persons among the Métis, 2005 to 2007.

| Incidence per 1000 population, by year | Métis             |                                   | General Population |                                   |
|--|-------------------|-----------------------------------|--------------------|-----------------------------------|
|  | Crude Rate (CI)   | Indirectly Standardized Rate (CI) | Crude Rate (CI)    | Indirectly Standardized Rate (CI) |
| <b>2005</b>                            | 5.29 (4.10, 6.72) | 5.43 (4.21, 6.90)                 | 5.17 (5.13, 5.22)  | 5.19 (5.15, 5.24)                 |
| <b>2006</b>                            | 3.93 (2.92, 5.18) | 3.93 (2.92, 5.19)                 | 5.26 (5.21, 5.30)  | 5.26 (5.21, 5.30)                 |
| <b>2007</b>                            | 3.99 (2.97, 5.24) | 3.89 (2.89, 5.11)                 | 5.31 (5.26, 5.35)  | 5.29 (5.24, 5.33)                 |

CI: Confidence Interval

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