Smoking Frequency, Prevalence and Trends, and Their Socio-demographic Associations in Alberta, Canada

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ABSTRACT

Objectives: To determine the numbers of smokers, smoking prevalence and trends, and to examine their socio-demographic associations in Alberta using data from three Canadian national health surveys undertaken between 2000 and 2005.

Methods: The three surveys collected self-reported health data from Canadians aged 12 years and older. The weighted number of smokers and the smoking prevalence by health region and by urban/rural status were determined. The socio-demographic associations of smoking in Alberta were examined using logistic regression analysis.

Results: The numbers of smokers and the smoking prevalence were both higher among men than women, in middle-aged groups (20-39 and 40-59 years) than in younger (12-19 years) and older (>60 years) groups, and among Canadian-born people than immigrants to Canada. The smoking prevalence tended to 1) increase with the increasing rurality of residence, 2) decrease over the timeframe examined, 3) be inversely proportional to educational level and 4) be inversely proportional to household income. The number of smokers was largest in urban areas and among those who reported the highest education and household income.

Discussion: The new tobacco legislation being introduced in Alberta in 2009 may decrease the smoking prevalence in the province, but additional interventions in the regions with the largest numbers of smokers may help further reduce the smoking population and overall smoking prevalence in Alberta.

Key words: Smoking; prevalence; trend; socio-demographic factors; public health

Tobacco smoking is one of the most important yet preventable causes of diseases and deaths in the world.1-5 Despite substantial declines over the past few decades in Canada,6 one-fifth of Canadians still smoked in 2006.7 In 2007, the Canadian Federal Tobacco Control Strategy set a new target to further reduce the smoking rate to 12% by 2011.8 Although the strategy has been articulated at a federal level, the provincial/territorial health authorities have an important role to play in achieving this national goal.

In Alberta, regional health authorities (RHAs) have been responsible for making and implementing local public health policies, including those relevant to cigarette smoking. While there are data describing the smoking trends in Alberta,9 there is a paucity of published information concerning the numbers of smokers, and smoking prevalence and trends at the RHA level. Furthermore, the socio-demographic factors that may be associated with smoking in Alberta have not been examined.

The aims of this study were to determine the smoking frequency, prevalence and trends at the RHA level, and to examine their socio-demographic associations in Alberta. Such information will help guide policy-makers in facilitating resource planning and in evaluating the effectiveness of smoking control programs.

METHODS

Three Canadian Community Health Surveys (CCHS: Cycle 1.1, 2000/01; Cycle 2.1, 2002/03; Cycle 3.1, 2004/05) were carried out by Statistics Canada between 2000 and 2005. The surveys collected self-reported health information from a representative sample of Canadians aged 12 years and older, with the exclusion of the population on Indian reserves and Canadian forces bases, in institutions and in some remote areas. The three surveys were designed to provide reliable health estimates at the RHA level across Canada. The sample sizes were, respectively, 130,880, 134,072 and 132,221 for Canada, and 14,456, 13,871 and 11,800 for Alberta. The response rates ranged from 78.9% to 84.7% for Canada and from 81.5% to 85.1% for Alberta. The survey methodology has been published widely6,10,11 and can also be found on the Statistics Canada website.12

Acknowledgements: We wish to express our gratitude to Statistics Canada for granting our access to the Research Data Centre (RDC), where this data analysis was conducted. We also thank Ms. Shirley Loh at the RDC for her full support and assistance when the data analysis was conducted. The research and analysis are based on data from Statistics Canada, and the opinions expressed do not represent the views of Statistics Canada.

* See page 478 for a letter to the editor updating the information in this article.

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During CCHS 1.1, there were 17 RHAs in Alberta. The 17 RHAs were collapsed into nine RHAs by Alberta Health and Wellness in 2003. To facilitate comparisons over time, the 17 RHAs were regrouped into the nine corresponding RHAs using a 2006 Postal Code Translation File (prepared by Alberta Finance). This contains information on both postal codes and RHA designations, and can be merged with the postal codes in the CCHS 1.1 dataset to redefine the RHAs. To characterize the urban/rural status of the population using the 2008 RHA boundaries is presented in Figure 1.

In the CCHS surveys, a variable known as “type of smoker” was derived. For the purposes of this analysis, respondents defined as “current daily smokers” or “occasional smokers” were combined into a single group (smokers), and all other respondents were combined into a “non-smoker” group. The missing values (i.e., “don’t know” or “refusal”), accounting for less than 6% of the responses in each survey, were excluded from the analysis. The respondents’ sex, age, educational level, household income and immigration status were also extracted to examine their association with smoking.

The estimated numbers of smokers and smoking prevalence were first determined by survey, sex and RHAs, and then by the socio-demographic and urban/rural status of the population using the final and Bootstrap weights. The final weight was used to adjust the sample into the appropriate population distribution. The Bootstrap weight was used in variance estimation to account for the complex sample design of the surveys. The association between smoking and socio-demographic factors was further examined using logistic regression. The likelihood ratio test was used to retain the significant predictors of smoking by means of backward elimination. For all significance tests performed, a p-value of <0.05 was considered statistically significant. The analyses were performed using SAS 9.1 (SAS Institute Inc., Cary, NC, US) and STATA 9.2 (Stata Corporation, College Station, TX, US).

**RESULTS**

Table 1 presents the smoking prevalence and numbers of smokers by survey and sex for the nine RHAs and for the entire province of Alberta. The smoking prevalence in the nine RHAs ranged from 18.5% to 36.1% among men and from 15.5% to 32.5% among women during the 6-year period. Over the three surveys, smoking...
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<th>Variable</th>
<th>Category</th>
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<th>Female 2000/01</th>
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<th>20-39</th>
<th>40-59</th>
<th>60</th>
<th>Education level</th>
<th>Household income</th>
<th>Immigrant status</th>
<th>2002/03</th>
<th>Male 2002/03</th>
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<th>2004/05</th>
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<td>24.8 (21.8-28.6)</td>
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* Unweighted number of respondents who were current daily or occasional smokers
† Weighted number of respondents who were current daily or occasional smokers
‡ Weighted prevalence in percent (95% confidence interval)
was more prevalent among men than women in Alberta as a whole. However, in each survey, the smoking prevalence varied widely by RHA. In addition to the weighted prevalence, Table 1 also presents the estimated number of smokers in each RHA. While Calgary ranked lowest or second lowest for smoking prevalence in each of the three surveys for both men and women, the size of the smoking population was much greater than in any of the other RHAs, with the exception of Capital Health.

On the basis of the PUP, the nine RHAs were grouped into three categories: major urban RHAs, including Calgary and Capital Health (PUP: 93%, 91%); minor urban RHAs, including Palliser, Northern Lights and Chinook (PUP: 76%, 73%, 72%); and rural RHAs, including David Thompson, Peace County, East Central and Aspen (PUP: 60%, 58%, 50%, 46%). The weighted number of smokers and the prevalence were further cross-tabulated against the socio-demographic variables and urban/rural status of the three surveys (Table 2). As shown, both the smoking prevalence and the number of smokers were higher among men than women, in middle-aged groups (20-39 and 40-59 years) than in younger (12-19 years) and older (≥60 years) groups, and among Canadian-born people than immigrants to Canada. The smoking prevalence tended to 1) increase with the increasing rurality of the RHAs, 2) decrease over the three surveys, 3) be inversely proportional to educational level and 4) be inversely proportional to household income. However, when examined in terms of numbers of smokers in the three surveys, the smoking population was the largest in the major urban RHAs and among those who reported the highest educational achievement and highest household income.

The above associations were further examined using logistic regression (Table 3). As shown, the odds of being a smoker were significantly lower during the second and third survey than during the first survey.

## DISCUSSION

Tobacco smoking was essentially a male habit about half a century ago but became more common among women after World War II. In 1965, the smoking prevalence among Canadian women aged 15 years and older reached 38%, compared with 61% among men. Over the past 30 years, tobacco use, especially among male Canadians, has decreased significantly, so much so that in 2005 the smoking prevalence among Canadian men and women aged 12 years and older was 24% and 20%, respectively. Smoking has been widely reported to be more prevalent in the lower socio-economic classes and among Canadian-born people than Canadian immigrants. The socio-demographic distributions of the smoking rates, as observed by this study, are consistent with the previous findings.

Several Canadian studies have examined the urban/rural variation in smoking rates. According to Mitura and Bollman, smoking prevalence was significantly higher in small towns, rural areas and northern regions of Canada. Our finding that smoking prevalence was positively associated with the rurality of the RHAs is consistent with these findings. It has been suggested that the differences may be associated with the fewer smoking restrictions in rural areas. This may be compounded by an over-representation of blue-collar jobs in rural areas relative to urban areas. Previously, smoking rates among those performing manual labour have been observed to be higher than those in non-manual occupations. Our finding of higher smoking rates in the lower socio-economic groups does appear to support these findings.

It should be noted that we also observed a negative association between the immigrant population and the rurality of the RHAs, immigrants accounting for an average of 22%, 12% and 7% (data not shown) of the population of the major urban, minor urban and rural RHAs, respectively, during the six years. The proportionately greater immigrant population in the urban RHAs may have contributed to the lower smoking prevalence in those regions. However, this potential contribution did not substantially change the
According to a health behaviour model, people under stress are other jurisdictions, our findings suggest that additional strategies have been shown to be effective in decreasing smoking prevalence in restricting tobacco retail displays. Although such strategies have absolute numbers of smokers. These findings illustrate smokers rose, because the number of smokers is a function of both smoking prevalence and population size. These findings illustrate that smoking prevalence should not be examined in isolation from absolute numbers of smokers.

Alberta is currently establishing new tobacco legislation to prevent initiation of tobacco use and to increase motivation to quit, by increasing tobacco taxes, restricting smoking in public places and prohibiting tobacco retail displays. Although such strategies have been shown to be effective in decreasing smoking prevalence in other jurisdictions, our findings suggest that additional strategies may have to be employed if the numbers of smokers in the large urban RHAs are to be reduced. Given that the smokers in these regions tend to have higher income, it is conceivable that financial penalties associated with the new tobacco legislation may have less impact in such regions than in the regions of lower socioeconomic status. Smoking control programs targeting these regions may lead to more effective reduction of the smoking population and the overall smoking prevalence in Alberta.

This study was conducted using data from three consecutive surveys that had high response rates and consistent methodology, making the data highly comparable across these surveys. Since the surveys depended on respondents’ self-report of their smoking status, a potential for misclassification of information exists. Such misclassification, if it exists, is likely to be consistent across the three surveys and should have minimal impact on the smoking trends examined.

CONCLUSIONS

Although the new tobacco legislation being introduced in Alberta in 2009 may have a positive impact on smoking reduction, targetted interventions tailored to the regions or groups with the largest numbers of smokers may help further reduce the smoking population and the overall smoking prevalence in Alberta.

REFERENCES

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