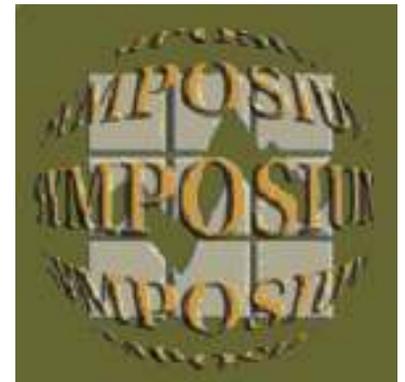


Catalogue no. 11-522-XIE

**Statistics Canada International
Symposium Series - Proceedings**

**Symposium 2006 :
Methodological Issues in
Measuring Population Health**



2006



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Obesity Rate Differences Between U.S. and Canadian Women and Between U.S. and Canadian Men: Findings from the Joint Canada/United States Survey of Health

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Abstract

This study investigates factors associated with obesity in Canada and the U.S., using data from the 2002-03 Joint Canada/United States Survey of Health, a telephone survey conducted jointly by Statistics Canada and the U.S. National Center for Health Statistics. Essentially the same questionnaire was administered in both countries at the same time, yielding a data set that provided unprecedented comparability of national estimates from the two countries. Analysis of empirical distributions of body mass index (BMI) show that American women are appreciably heavier than Canadian women, whereas the distributions of BMI are almost identical for American men and Canadian men. Factors are investigated that may account for the differences between women.

KEY WORDS: Joint Canada/United States Survey of Health; obesity; body mass index

1. Introduction

On June 3, 2004, in response to the simultaneous release by Statistics Canada and the U.S. National Center for Health Statistics of public use microdata files and an analytic report on the Joint Canada/United States Survey of Health (JSUSH), The Winnipeg Sun, Edmonton Sun, and other Canadian newspapers featured an article headlined "Yank Women Fatter." Perhaps because of growing awareness of what is now acknowledged as an obesity epidemic, journalists singled out that finding, among many other findings in the analytic report (Sanmartin et al., 2004), for attention. The article stated that "[W]hen it comes to obesity, American women tip the scales compared with their Canadian sisters, a cross border health study confirms for the first time. Overall, 21% of Americans were obese compared with 15% of Canadians..." Previous research has suggested obesity may be more prevalent in the United States, but this is the first definitive confirmation," said Diane Finegood, a scientific director of the Canadian Institutes for Health Research (CIHR)..." [T]his is in fact the first data I'm aware of where a survey was done at the same time in Canada and the United States with the same question and the same methodology by the same people," said Finegood."

This study utilizes the JCUSH data to provide a more in-depth comparison of the two countries by looking at empirical distributions of body mass index and multivariate models predicting obesity. The focus in this analysis is on race/ethnicity as a first attempt to explain the previously-noted differences in obesity rates between Canadian women and American women, since it is well known that obesity rates differ according to race/ethnicity.

2. Data and Methods

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The Joint Canada/United States Survey of Health (JCHSH) was a collaborative effort between the two national statistical agencies—Statistics Canada (STC) and the U.S. National Center for Health Statistics (NCHS). The survey originated in an effort to improve cross-national comparisons of health-related estimates. Questions on this one-time telephone survey were drawn from the two countries' large, ongoing national health surveys: Statistics Canada's National Population Health Survey and Canadian Community Health Survey, and the National Center for Health Statistics' National Health Interview Survey. To maximize comparability of estimates based on JCUSH data, the Canadian and American parts of the survey were designed and administered as similarly as possible. The basic sample design was the same for both parts of the survey, stratified by province in Canada and by four geographic regions (Northeast, South, Midwest, and West) in the U.S. Territories in both countries were not covered by JCUSH. Between November 2002 and June 2003, telephone calls were made to both countries from Statistics Canada's Regional Offices, with respondents able to have the survey administered in English or French in Canada and in English or Spanish in the U.S. The questions asked were essentially the same in both countries, except for differences in race/ethnicity categories and use of metric units of measurement in Canada and Imperial units in the U.S. Editing and weighting of the data were carried out at Statistics Canada, under the direction of both agencies.

The JCUSH sampled residents of Canada and the U.S. aged 18 and over living in private dwellings with landline telephones. One randomly-selected adult was interviewed per household. The interviewed sample size was 3,505 in Canada and 5,183 in the U.S., with response rates of 66% and 50%, respectively.

Weight and height were self-reported by JCUSH respondents. For this study, weight was categorized according to World Health Organization standards, based on Body Mass Index (BMI, which is calculated as weight in kilograms divided by the square of height in meters). The weight categories were as follows:

Underweight:	$BMI < 18.5$
Normal weight:	$18.5 \leq BMI < 25.0$
Overweight:	$25.0 \leq BMI < 30.0$
Obese:	$30.0 \geq BMI$

This analysis of the JCUSH weight data included calculation of prevalence rates for the weight categories and production of the empirical distributions (kernel estimates) of obesity. These statistics were disaggregated by country, sex, and race/ethnicity. Also, multivariate logistic regressions were fitted predicting overweight and/or obesity.

As noted above, the categories used in the JCUSH race/ethnicity questions were different in the two countries. This was appropriate because the racial/ethnic makeups of the two populations are different, and because government requirements for categorizing race/ethnicity in federal surveys are different in the two countries. In addition, not all of the race/ethnicity categories used in the JCUSH questions are shown in our results because of small sample sizes for some categories. Thus, in this analysis, Canadians are categorized as White or Other, and Americans are categorized as White or Other for some parts of the analysis and as Hispanic, Non-Hispanic white, Non-Hispanic black, or Non-Hispanic other for other parts of the analysis.

For this analysis, the respondent's family income was categorized by income quintile, calculated separately for Canadian and American incomes, and adjusted for family size.

3. Results

Table 1 shows that there were no significant differences between men in Canada and men in the U.S. in any of three weight categories—Underweight or Normal weight, Overweight, and Obese. Canadian women, however were significantly more likely than American women to be Underweight or of Normal weight (57.3% for Canadian women and 48.8% for American women), and Canadian women were significantly less likely than American women to be obese (11.9% for Canadian women and 20.0% for American women). However, no significant differences in Overweight rates were noted between women in the two countries, which is why this study focuses on rates of obesity.

Figure 1 shows two empirical distributions (kernel estimates) superimposed: the distribution of Body Mass Index (BMI) for Canadian men (shown in black) and the distribution of U.S. men (shown in blue). The two distributions

are astonishingly alike, confirming not only that rates of obesity are not significantly different, but that rates for any categories of body mass index are very much the same for men in the two countries.

All of the other BMI distributions presented here have the same general shapes as the shapes of the BMI distributions shown in Figure 1: all are skewed to the right, i.e., their right tails are thicker than their left tails.

Figure 2 shows two empirical distributions superimposed: the distribution of Body Mass Index (BMI) for Canadian women (shown in green) and the distribution of U.S. women (shown in red). Unlike the distributions in Figure 1, these two distributions are quite distinct. The right tail of the distribution is thicker for U.S. women than for Canadian women, indicating that probabilities of having these higher BMI values are higher for American women. The distributions peak at approximately the same BMI values for the two distributions, but the peak is appreciably higher for Canadian women.

Figures 1 and 2 may thus be interpreted as depicting graphically the existence of a strong interaction between country and sex: the effect of country on BMI varies according to sex, and the effect of sex on BMI varies according to country.

Figures 3 and 4 show the superimposed distributions of BMI for women and men, in the U.S. and Canada, respectively. As expected, the distributions for men are shifted to the right of the distributions for women.

Table 2 compares Overweight and Obesity rates for women in the two countries, by race. Overweight rates are not significantly different for White women in the two countries, but Overweight rates are significantly lower for women of Other races in Canada (21.5%) than for women of Other races in the U.S. (30.0%). Obesity rates are significantly lower in Canada than in the U.S., both for White women and for women of Other races (12.5% and 19.2% for White Canadian and White U.S. women, respectively, and 13.8% and 28.3% for Canadian and U.S. women of Other races, respectively).

Table 2 also displays Overweight and Obesity rates by race/ethnicity for U.S. women. It is notable that obesity rates are much higher for Non-Hispanic black U.S. women (33.2%) than for U.S. women in any of the other race/ethnicity categories (ranging only from 18.2% to 20.1%).

Figure 5 shows superimposed empirical BMI distributions for White Canadian women (in grey) and for Canadian women of Other races (in teal). The distribution for women of Other races has both a thicker left tail and a thicker right tail than the distribution for White women, indicating that women of Other races are likelier to have lower BMI and also likelier to have higher BMI than White women.

Figure 6 shows superimposed empirical BMI distributions for American women in each of the four race/ethnicity categories shown in Table 2. The distributions for Non-Hispanic white American women and Non-Hispanic Other women peak at the lowest BMI values, and the distributions for Hispanic women and Non-Hispanic women peak at the highest BMI values. The distribution for Non-Hispanic black women has the largest variance of all four distributions.

No significant differences in overweight rates were found between women in the two countries for any of the four education categories (Less than high school, High school diploma/GED, Technical certificate/diploma, and College certificate/degree), but Canadian women had significantly lower rates of obesity than American women in all of the education categories. For example, of Canadian women with less than a high school diploma, 14.4% were obese, while more than twice as many (33.7%) American women with a high school diploma were obese.

Analyses of overweight and obesity rates by family income quintile showed no significant differences in Overweight rates between women in the two countries for any of the six income categories (five quintiles and a Missing income category), but Canadian women had lower rates of obesity than American women in all six of the income categories, and those difference were significant for four categories. For example, of Canadian women in the lowest income quintile (i.e., of the poorest Canadian women), 14.8% were obese, while more than twice as many American women (29.8%) in the lowest quintile were obese.

Analyses of overweight and obesity rates by self-reported health status showed no significant differences in Overweight rates between women in the two countries for any of the five health status categories (Excellent, Very good, Good, Fair, or Poor), but Canadian women had lower rates of obesity than American women in all five of the health status categories. For example, of Canadian women who reported themselves to be in Poor health, 12.4% were obese, while almost four times as many American women (47.1%) reported themselves to be in Poor health.

The variable chosen to be the dependent variable in the multivariate logistic regressions was an indicator variable for obesity. An indicator variable for whether an individual was either overweight or obese was *not* used because of the significant differences that had been found between obesity rates in Canadian and American women but not between overweight rates. The independent variables used in the regressions were dichotomous variables created from discrete categories of selected variables: demographic characteristics (age, race for Canadians and race/ethnicity for Americans, marital status, immigrant status), socio-economic factors (education and family income), health status (self-reported health status, chronic conditions, restriction of normal daily activity, occurrence of a depressive episode), and health behaviors (participation in leisure-time physical activity, smoking status), and whether or not the individual had a regular medical doctor).

The first logistic regression fitted used all female respondents from both countries, and used all of the above-mentioned independent variables as well as an indicator variable for country (1 for U.S., 0 for Canada). The odds ratio for country was 1.88 (95% confidence interval = (1.52, 2.33)), indicating that U.S. women were more likely to be obese than Canadian women even after controlling for all of the independent variables.

The country variable was not significant in a similar logistic regression fitted using all men respondents from both countries.

Next, logistic regressions were fitted separately for Canadian and American women, using all of the above-mentioned independent variables (except country). Some examples of results: Age was not significant in the Canadian model, but the odds of being obese for American women aged 65+ were half the odds for American women aged 18-44. Immigrant status was not significant in the Canadian model, but the odds of being obese for immigrant residents of the U.S. were .64 times the odds for native-born American women. Race was not significant in the Canadian model, but the odds of Non-Hispanic black U.S. women being obese were 2.57 times both the odds for Non-Hispanic white American women and the odds for Hispanic women. Education was not significant in the Canadian model, but the odds of American women with less than a college certificate/degree being obese were significantly higher than for American women with a college certificate/degree. Participating in leisure-time physical activity was not significant in the American model, but the odds of Canadian women who did not participate in leisure-time physical activity being obese were 1.90 times the odds for those who did participate in such activity.

4. Conclusions

This analysis of obesity in Canadian and American women yielded some striking results. This distribution of BMI for Canadian men is almost indistinguishable from that for American men, while the distribution of BMI for Canadian women is quite different from that for American women. Obesity rates—but not overweight rates—for American women are much higher than for Canadian women. Canadian and American women do not differ significantly in rates of overweight when measured overall, by education, by family income, or by health status, but American women have considerably higher rates of obesity than Canadian women when measured overall, by education, by family income, or by health status. In addition, different racial/ethnic subpopulations have different BMI distributions, suggesting that differences in the racial/ethnic compositions of the two countries may explain some of the differences between overall obesity rates in Canada and the U.S. But other characteristics also appear to play a role in accounting for those differences.

JCUSH data have the usual limitations of self-reported data. However, we have no reason to believe that Canadian adults would self-report height and weight differently than American adults. As a result, we believe that the phenomenon of significant differences between BMI in Canadian and American women but no significant differences between BMI in Canadian and American men is real.

For more information on JCUSH, see the following Web sites:

On the NCHS Web site: http://www.cdc.gov/nchs/about/major/nhis/jcush_mainpage.htm

On the Statistics Canada Web site: <http://statcan.ca/english/freepub/82M0022XIE/2003001/pumf.htm>

References

Sanmartin, Claudia; Ng, Edward; Blackwell; Debra; Gentleman, Jane; Martinez, Michael; Simile, Catherine (2004). "Joint Canada/United States Survey of Health, 2002-03." Analytic report released jointly by Statistics Canada and the National Center for Health Statistics.

Figure 1: Distribution of BMI: Canadian men (black) and American men (blue)

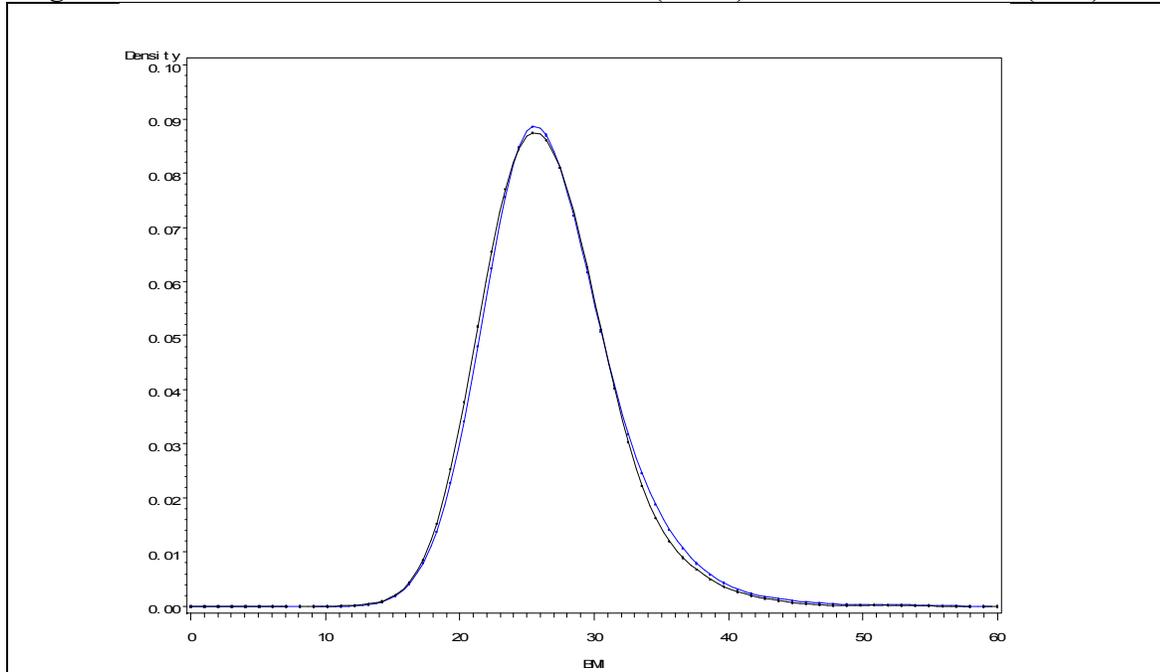


Figure 2: Distribution of BMI: Canadian women (green) and American women (red)

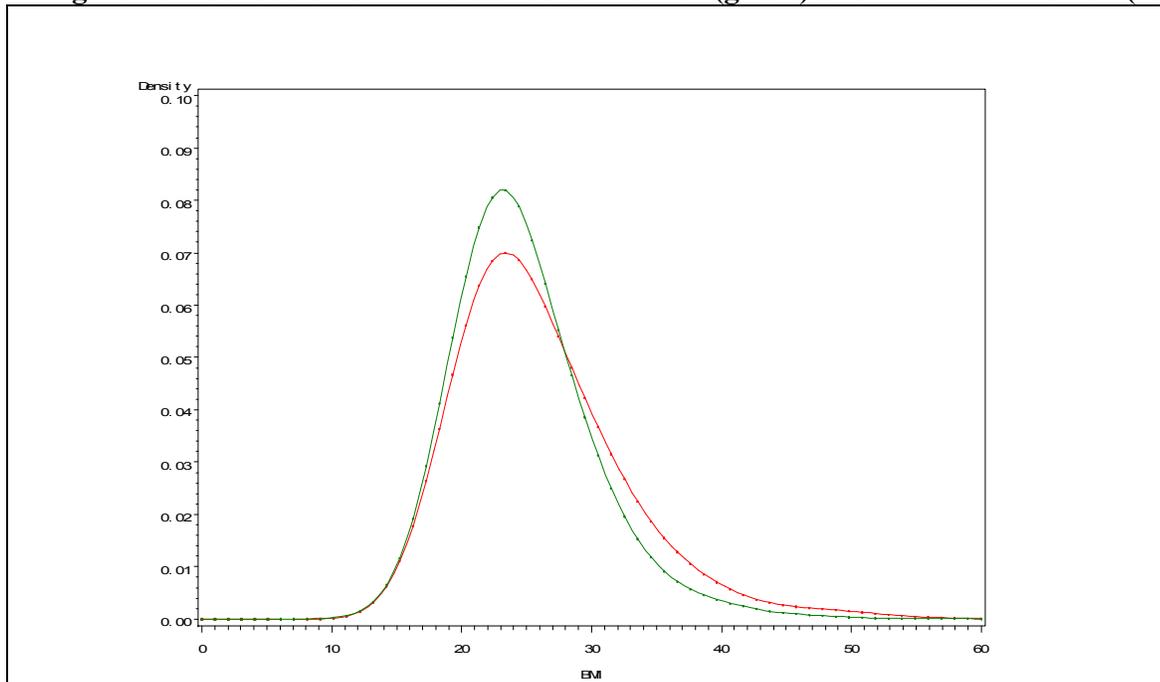


Figure 3: Distribution of BMI: American women (red) and American men (blue)

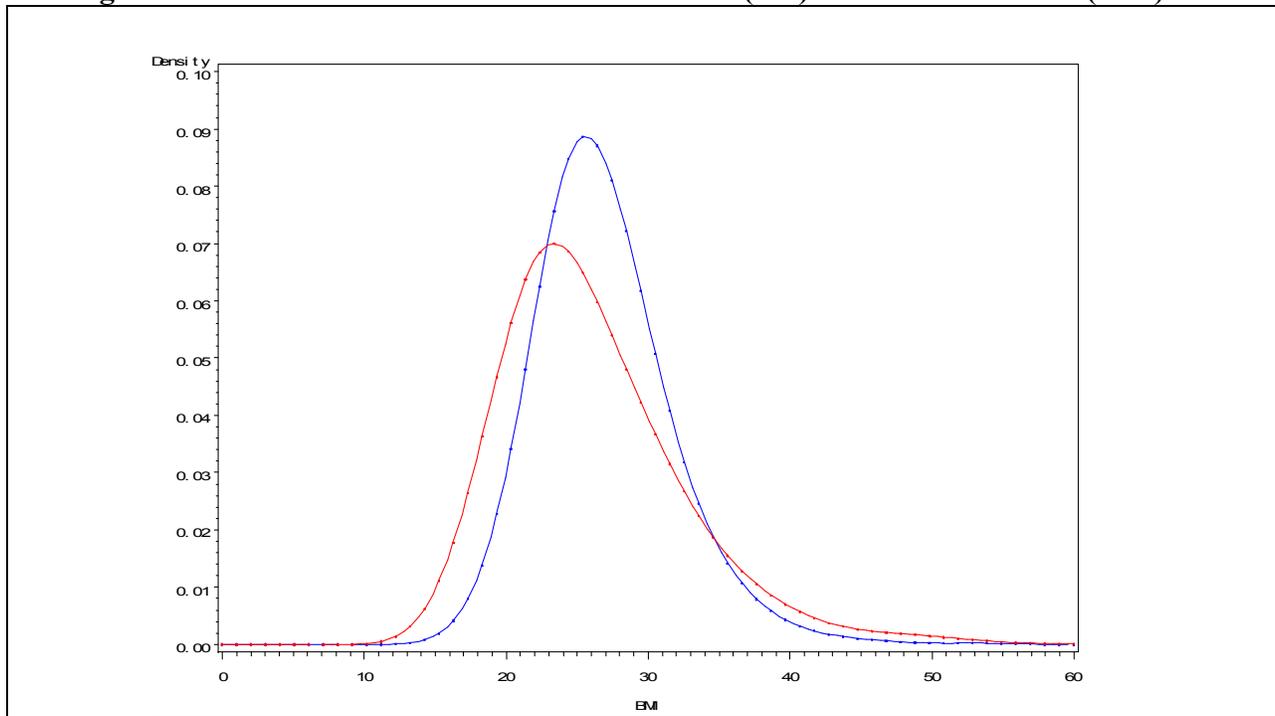


Figure 4: Distribution of BMI: Canadian women (green) and Canadian men (black)

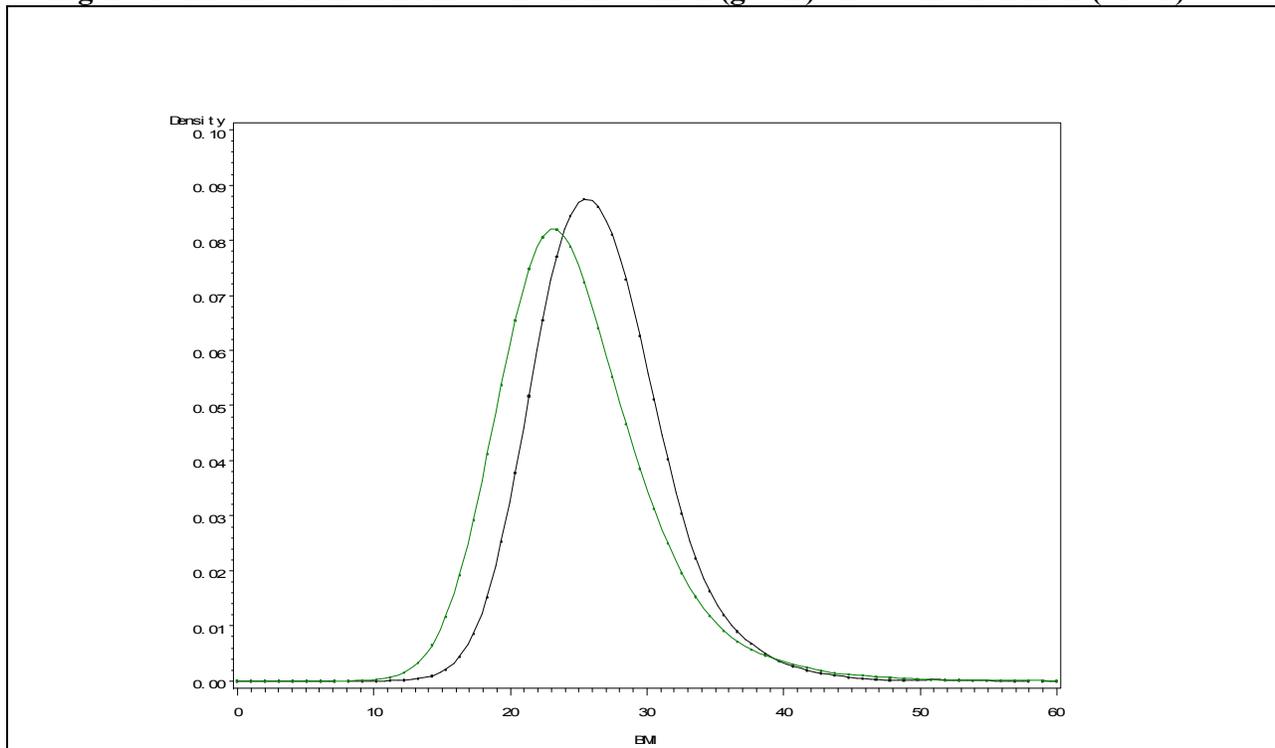


Figure 5: Distribution of BMI: Canadian white women (grey) and other women (teal)

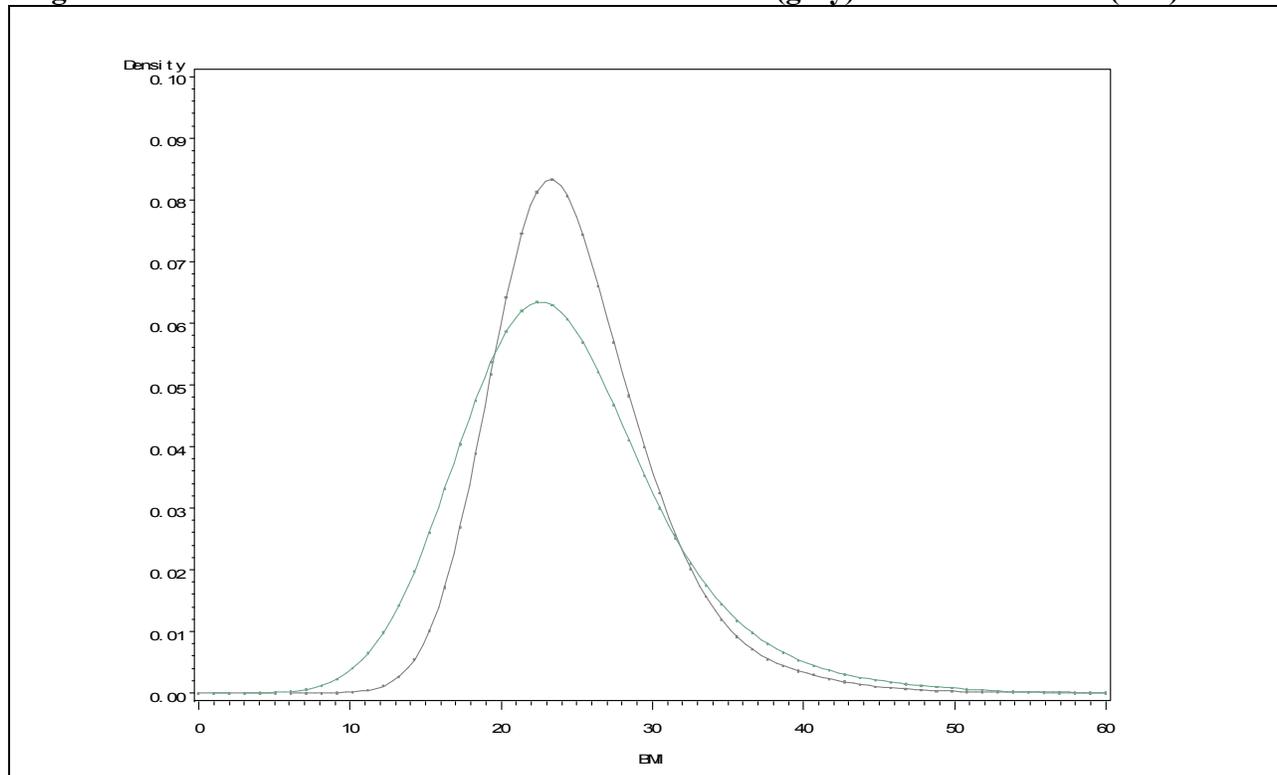


Figure 6: Distribution of BMI: American NH-white women (pink), Hispanic women (brown), NH-other women (orange), NH-black women (magenta)

