Food Habits of Canadians: Reduction in Fat Intake Over a Generation

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The role of diet in the prevention of chronic disease is well established: fruit and vegetable consumption has a strong protective effect on the development of cancer at numerous sites; saturated fat intake is clearly associated with coronary heart disease; and the total direct cost of obesity in Canada was estimated to be $1.8 billion for 1997.

In the U.S., the National Health and Nutrition Examination Surveys and the Continuing Survey of Food Intake of Individuals provide useful data on nutritional intake and food trends. These data show a downward trend in energy intake levelling off in the 1990s, but total fat consumption continuing to decline from 42% of energy intake in 1965 to 33% in 1995. The most recent national data in Canada derive from the Nutrition Canada survey (1970-72) conducted a generation ago.

Four provincial surveys were completed more recently. The Ontario and Manitoba surveys used semi-quantitative food frequency questionnaires while the Nova Scotia and Sainte Québec surveys used 24-hour recalls which provide quantitative measures of dietary intake. Total fat intakes have declined but remain above the recommended 30% of energy and low intakes of calcium, iron and folate were identified for specific age-sex groups.

National data estimated from Canada’s family food expenditure survey also indicated declines in total fat content of foods purchased.

Our survey “Food Habits of Canadians” provided data between August 1997 and July 1998 in five regions of Canada (Atlantic, Québec, Ontario, Prairies and British Columbia) on current food and nutrient intake. This report focuses on current nutrient intake and compares these data to earlier studies.

METHODS

The sampling of respondents (18-65 years and adolescents 13-17 years) was done using a multi-stage random sample of adult Canadians living in five regions of Canada: Atlantic (New Brunswick, Nova Scotia, Prince Edward Island, Newfoundland), Québec, Ontario, Prairies (Manitoba, Saskatchewan, Alberta), and British Columbia. Fifteen percent of the Canadian population who lived in regions far from major population centres were not sampled. Aboriginal communities were not included. In each region, four Canada census divisions were randomly chosen with a probability proportional to the population. For each of the 20 divisions, a random sample of two subdivisions was similarly selected, and for each subdivision, two enumeration areas were selected, resulting in 80 enumeration areas across the country. Boundaries of enumeration areas were identified using Statistics Canada maps and address ranges within an enumeration area. The sampling for individual random households from within each enumeration area was done using the 1996 computerized telephone directory (Pro CD Inc., Mass.). Each household received a personalized letter to explain the study prior to telephone contact. Interviewers attempted
to enrol one adult per household (the adult with the next birthday) for a total of 20 adult respondents from each enumeration area.

Appointments for interviews were made on different days of the week including weekends. Interviews were held in the respondents’ homes or at other convenient locations. A repeat 24-hour recall was conducted on 30% of the adult sample within approximately one week of the initial interview in order to estimate intra-individual variability.

Each adult participant was asked whether there was a potential adolescent (13-17 years) participant living in the household. The adolescent sample was not proportional to the population and is not independent of the adult sample.

Measurements

Dietary intake was measured using the 24-hour recall, commonly used for national surveys. A single 24-hour recall is an appropriate method to assess the average intake of a large group of individuals provided all days of the week and seasons are covered. Interviews were conducted in French or English by professional dietitians who received a two-day training session in Montreal. Food portion models (graduated cup, two bowls, a plate, spoons and a ruler) were used to quantify intake. A sociodemographic questionnaire was used, including data on country of origin, language of interview, civil status, birth date, educational level, smoking status, number of adults and children in the household and perceived health status as well as reported height and weight. Average income per enumeration area was obtained from the 1991 census.

Double verification of all 24-hour recalls was done and data were entered into the nutrient analysis program Candat (Godin London Inc., London, Ontario, 1991). The most recent Canadian Nutrient File (Health Canada, Ontario, 1997) was used and a total of 267 food items were added to the data set using nutrient information obtained from food manufacturers’ data when possible or from the American data base. Food portion sizes from the four food groups of Canada’s Food Guide to Healthy Eating were calculated based on categories of foods and standard weights assigned to those categories.

**ANALYSIS**

In order to eliminate potential bias resulting from the sampling strategy, individual results were multiplied by weights calculated using 1991 Canadian census data of the total population and the number of households in each region. The weighting process involved three compo-
nts: a ratio of populations estimating how many people each respondent represented within their region; the number of households in a given region because we sampled by household not individuals; and the number of adults in each household responding to the survey.

In order to provide the 25th and 75th percentiles of the distributions of nutrients, repeat measures were used to calculate the ratio of within-person to between-person variability for each nutrient for men and women separately. Log and square root transformations were used to normalize the data. The nutrient distribution for usual intake of these nutrients was modelled using the method described by the National Research Council.\(^1\)\(^9\) The basal metabolic rate (BMR) for each subject was calculated.\(^2\)\(^0\)

**RESULTS**

The study sample consisted of 1,544 adults and 178 adolescents from 80 enumeration areas across Canada. These ranged from a fishing village in Newfoundland to a suburb of Victoria, British Columbia. The response rate (interviewed/interviewed and refusals) was calculated for each enumeration area. The average rate was 30%. In three enumeration areas in inner city Montreal and Vancouver, we were unable to obtain more than 10 subjects because of the very low response rate. More women than men accepted to be interviewed (972 vs. 572 respectively). Our sample was similar to the Canadian population (1991 Census) in number of people born in Canada (86% vs. 84%), number of subjects with less than high school education (22% vs. 26%), and single marital status was 26% vs. 32% respectively. The percentage of adults reporting a BMI of >27 was 32% in our survey and 30.5% in the National Population Health Survey.\(^2\)\(^1\)

Nutrient intake data for the country, weighted for the sampling strategy, are presented separately for males and females in three age groups (Table I).\(^2\)\(^2\)\(^2\)\(^3\) A comparison of reported energy intake compared to basal metabolic requirements yielded ratios of 1.3 to 1.7 for men and 1.2 to 1.4 for women indicating some under-reporting for women.\(^2\)\(^2\)\(^3\) The mean values for all nutrients listed for men and women are above the recommended intakes for Canadians\(^2\)\(^2\) with the exception of calcium in some age/sex groups. The mean intake of calcium for most groups, however, is below the new Dietary Reference Intake (a new common standard for Canadians and Americans).\(^2\)\(^4\) The percent of energy from fat (29-31%) was close to the recommended value of 30% and saturated fat represented approximately 10% of energy intake. Mean intakes of adolescents (Table II) indicated higher energy intakes than for adults as expected, however, fat intakes as a percent of energy were similar to those of adult participants. Mean micronutrient levels met intake recommendations except for vitamin A in adolescent girls.

Table III provides the 25th, 50th and 75th percentiles of intake for each adult age-sex group adjusted for within-person variability. (The sample size for the adolescent population was not sufficiently large to do this adjustment.) The median intake for the percentage of energy from total fat was 29-30% in all age-sex groups while the 75th percentile was 33-35%. Calcium intake among women at the 25th percentile of intake was under 500 mg for all age groups indicating very low intakes in many women. Similarly iron intakes in women of reproductive age were low in a substantial portion of the population.

A comparison with the Nutrition Canada Survey indicates major changes in the intake of a number of nutrients over a generation (Table IV). Mean nutrient intakes, using the two age groups originally reported on in the Nutrition Canada Survey of 1970,\(^2\)\(^6\)\(^7\) are compared to our data (1997-1998). Mean energy intakes were lower in our survey in most age-sex groups. Total fat intake, however, declined far more over the last 27 years, as did the
The increase in obesity.25 The last three decades and is blamed for the serious problem of obesity in Canada,3 where the authors conclude, “Les Québécoises et les Québécois mangent donc mieux, mais pas encore bien...” (Quebecers eat better but still not well).12 Although there are a number of indicators of an improvement in diet quality, it is very evident from statistics on body weight that observed in Quebec,12 where the declines in fat intake, however, is not related to the decreases in obesity. In fact, Willett suggests that dietary fat is not a major determinant of body fat.27 The vegetable and fruit consumption is difficult to compare to Nutrition Canada because of changing definitions of portion sizes over time, but the intake of nutrients that are usually found in fruits and vegetables – such as vitamin C and folate – has increased.

As with any dietary survey, there are important limitations in terms of the accuracy of the reporting of dietary data and the response rate. The accuracy of the reported intake cannot be ascertained in a survey, but 24-hour recall was observed to compete with telephone soliciting. The Nutrition Canada Survey had a response rate of 46%, the U.S. Continuing Food Survey 1987, 35%. The particular difficulty of recruiting participants in very low income housing settings, means that the poorest Canadians in large cities may not be well represented in this survey. In addition, high-risk groups with well-known nutritional problems – such as children living in poverty30,31 and frail elderly32 – were not included in the sample.

In summary, the diets of Canadians appear to be improving in general, with important decreases in fat intake and higher intakes of some micronutrients. Given the very important role of diet in the prevention of cardiovascular disease, cancer and diabetes, it is important to encourage further improvements and to monitor the changes in the diet of Canadians on a regular basis.
REFERENCES

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