Periodic national nutrition monitoring is necessary for developing effective health and nutrition programs. Reliable nutrient intake data from nutrition surveys are vital to implementing a nutrition action plan and ultimately to improve the nutritional health of Canadians. As the food supply changes, it is advantageous to have many national level monitoring points for assessing trends in intake. To help provide national nutrient intake data necessary to discern trends, we reasoned that existing provincial nutrition surveys could be utilized. Diet quality is important throughout life and poor nutrition is a preventable risk factor for chronic disease. Micronutrients are vital for many physiological processes and play critical roles in preventing deficiency disease and reducing chronic disease risks. Intake of micronutrients is an indicator of diet quality. The purpose of this report is to describe micronutrient intakes of adult Canadians in the 1990s. Our complete analyses have been published elsewhere.

**Nutrition Monitoring in Canada**

**Nutrition Canada Survey 1970/72**

The 1970/72 Nutrition Canada Survey (NCS) is an important legacy. The NCS was Canada’s first national nutrition survey and provides the base for understanding Canadians’ nutritional status. It was a comprehensive look at nutritional status involving dietary intake, biochemical measures, and clinical examinations. The NCS collected data from 13,000 respondents, from infants to seniors, with an overall response rate of 46%.

**Dietary Intake Surveys 1990/99**

Ten provincial nutrition surveys were conducted between 1990 and 1999; each has a published report except Alberta (currently a draft) and Manitoba. These were provincial initiatives supported by Health Canada. Each survey collected dietary intake information from a similar target population, men and women 18-74 years. Dietary intake was collected as a 24-hour recall and adjusted for intrasubject variability so usual intake could be assessed. Measured heights and weights, and in many cases, waist and hip circumference measures, were also obtained. Each province surveyed approximately 2,000 respondents and reported response rates ranged 29-80%. There were 16,915 study subjects from the nine available reports; these data are the subject of our analysis.

During 1997/98 researchers from Montreal conducted a national nutrition survey called Food Habits of Canadians. The response rate for this study was approximately 30% and the sample size was small, at 1,544 adults, 18-65 years. This study was unique in that 178 adolescent 13-17 year olds were also included. Approximately 30% and the sample size was small, at 1,544 adults, 18-65 years. This study was unique in that 178 adolescent 13-17 year olds were also included. Gray-Donald and coworkers have published results from this national survey.

**Dietary Intakes of Canadians 2004**

Recently, the 2004 Canadian Community Health Survey (CCHS) collected dietary intake data from 35,107 subjects of all ages, with an overall response rate of 77%. Preliminary results indicated 41-52% of males and 48-60% of females 19+ years do not consume the minimum recommended number of servings of vegetables and fruit; 47-48% of males and 65-64% of females 17+ years do not consume the minimum recommended servings of milk products. Results of nutrient intake may be forthcoming in 2007. Two reports on obesity were issued and can be accessed through Statistics Canada.

**National Intake Data from the Provincial Surveys**

We reviewed nine provincial nutrition reports, to summarize group mean nutrient intakes from food. Although supplement intake was determined in each survey, few reports provide intake from both food and supplements together. Each report provided intakes for eight age/gender groups. Sample populations from each province were similar but not identical. All provinces selected subjects from 18-74 years and BC also included senior adults 75-84 years. There were also two reporting categories for age. Six provincial surveys reported data using 18-34, 35-49, 50-64, and 65-74 years; three provincial surveys reported data using 19-30, 31-50, 51-70, and 71+ years; the latter corresponding to the Dietary Reference Intake (DRI) platform.

Mean group nutrient intake data were population-weighted to provide an estimated national mean value of each nutrient for each of the eight age and gender groups. Population weighting adjusted data to reflect the Canadian population, a necessary step as each province sampled a similar number of residents. Canadian census estimates during the time of sampling were used. Given the overall favourable response rates and relatively large sample sizes of each provincial nutrition survey, a good estimate of nutrient intakes of the adult Canadian population in the 1990s was achieved. These provincially-derived estimates of national intake will be useful as a monitoring point lying between the 1970/72 NCS and the 2004 CCHS.

**National Micronutrient Intakes Assessment Considerations**

As our data are derived from mean intakes only, without a measure of variation, we cannot use traditional Dietary Reference Intake (DRI) assessment methodology. To estimate micronutrient adequacy, we determined whether the mean was less than the Recommended Dietary Allowance (RDA), which by definition is the intake level where 97-98% of a population’s requirements are met. If mean intake equals the RDA, it is likely that a large proportion (perhaps as much as one-third) of the group may be inadequate. If the mean is less than the RDA, a greater proportion may be inadequate. For nutrients with no RDA, the recommended value is an Adequate Intake (AI). This reference value denotes greater caution in interpretation; it is not scientifically derived and represents a value only assumed to be adequate. Calcium, pantothenic acid, sodium, potassium, and dietary fibre have AI values.

**Nutrients of concern**

Table 1 shows the nutrients having group mean estimates less than the corresponding RDA or AI value for that age/gender group. Nutrients of concern common to all age and gender groups were magnesium, folate, and potassium. Calcium intake was a concern for most adult age groups. Iron was of particular concern for women under 50 years of age and zinc was a concern for elderly men. Pantothenic acid intake was less than the RDA for all women and above for all men. For men 50+ years however, mean intake of pantothenic acid was only slightly above the AI. In general, nutrients of concern indicate low consumption of milk products, vegetables, and fruit as well as meat, fish, and poultry.

**Calcium**

Calcium requirement increases with age yet Canadians’ intake decreased. The AI for calcium is 1,000 mg for adults 19-50 years and 1,200 mg for those 51+ years. The association of calcium to bone health is well recognized however, vitamin D is required for regulation. Because of limitations in the foods database used to assess dietary intakes, vitamin D values were not determined. Calcium and vitamin D are important for prevention and treatment of osteoporosis.

Mean calcium intake in all women was below the AI, with intakes for those over 50 years being much below the AI. Men fared slightly better. Mean calcium intake for men 18-34 years was slightly higher than the AI of 1,000 mg but those 35-49 years were below the AI. Men 50-74 years were well below 1,200 mg although less so than women of the same age.

**Magnesium**

The RDA for magnesium has a recommendation for men and women ranging 400-420 mg and 310-320 mg respectively. The RDAs are 1.5 to 2 times higher than the 1990 recommendations indicating a greater need for magnesium than previously thought. Mean magnesium intakes were below the RDA for women and men. Intake in men over 50 years was below the RDA by a greater amount than were the women. Magnesium is important for bone health and calcium balance as well as for activity of numerous enzymes.
Iron
Mean intake estimates indicate iron was a concern for women under 50 years of age, relative to the RDA of 18 mg. Iron needs of women are high until menopause as iron is needed to replace menstruation losses and to provide iron stores to support pregnancy. Iron deficiency and iron deficiency anaemia are common in women of childbearing age.

Sodium and Potassium
The AIs for sodium are 1,500, 1,300, and 1,200 mg for 19-50, 51-70, and 71+ years respectively; the AI for potassium is 4,700 mg for all these age categories.

Folate
Folate was a concern for all age/gender groups especially for those assessed before 1997/1998, when fortification of flour and other grain products with folic acid was undertaken to help prevent neural tube defects in infants and improve intake in the general population. Fortified grains are a staple of the Canadian diet and assessments of dietary intake conducted after fortification show an increased intake of folate as a result of fortification.

The RDA for adults is 400 µg Dietary Folate Equivalents (DFE). DFE factors the greater bioavailability of folic acid from fortified foods.

Seven provinces surveyed in the pre-folate fortification period (NS, QC, SK, AB, PE, NL, NB) and so folate intake was calculated separately. For this group, mean folate intakes were about 200 µg less than the RDA for women and 120-170 µg less for men. After fortification, indicated by weighting ON and BC values, mean folate intakes in women were below the RDA, especially women over 35 years. Men were slightly below or above the RDA.

Pantothenic acid
Pantothenic acid is important for the production of energy from protein, carbohydrate, and fat. Because it is present in virtually all plant and animal foods a deficiency is not likely. However, mean intake data suggest possible dietary insufficiency compared to the AI of 5 mg for adults. Women had mean intakes below the AI and men over 50 years had intakes above but close to the AI.

Zinc
Estimates indicate that zinc intake may be a concern for elderly men. Mean intake of men over 65 years was not much more than the RDA of 11 mg.

Table 1. Nutrients of Concern for Canadian Adults in the 1990s

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Women (18-74 y)</th>
<th>Men (18-74 y)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium</td>
<td>1,900-2,500 mg</td>
<td>1,000-1,500 mg</td>
</tr>
<tr>
<td>Magnesium</td>
<td>400-500 mg</td>
<td>500-600 mg</td>
</tr>
<tr>
<td>Iron</td>
<td>10-15 mg</td>
<td>10-15 mg</td>
</tr>
<tr>
<td>Folate</td>
<td>400-500 µg</td>
<td>400-500 µg</td>
</tr>
<tr>
<td>Pantothenic acid</td>
<td>5-10 mg</td>
<td>5-10 mg</td>
</tr>
<tr>
<td>Potassium</td>
<td>2,200-2,600 mg</td>
<td>2,200-2,600 mg</td>
</tr>
</tbody>
</table>

‡ Mean intake from food less than the corresponding age and gender specific RDA or AI

References

Editor:Wyeth Consumer Healthcare Inc.
If you have any comments about the Whitehall-Robins Report or would like to be added to the mailing list, please write to:
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