

Nutrition and Food Security in Kangiqsujaq, Nunavik

Baseline Survey for the Food Mail Pilot Project

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Executive Summary

Kangiqsujuaq, formerly Wakeham Bay, is a community of about 535 people, located on Hudson Strait in Quebec. Food eligible for shipment under the Food Mail Program is deposited with Canada Post in Val-d'Or, then trucked approximately 850 kilometres to La Grande and flown another 950 kilometres from La Grande to Kangiqsujuaq. There are two grocery stores, the Wakeham Bay Co-operative store and the Northern store owned by the North West Company based in Winnipeg.

The Kangiqsujuaq Food Mail Pilot Project was initiated by Indian and Northern Affairs Canada (INAC) with the cooperation of Health Canada, the Nunavik Regional Board of Health and Social Services and the Corporation of the Northern Village of Kangiqsujuaq. Its aim was to promote healthy eating and improve food security by reducing the rate for shipping "Priority Perishables" (fresh and frozen fruit and vegetables, frozen juice concentrate, most fresh dairy products and eggs) from \$0.80 per kilogram to \$0.30 per kilogram, plus \$0.75 per parcel, on July 1, 2002. The project also included nutrition education, retail training in proper food handling and storage, store labels to identify "Priority Perishables", and periodic food price and quality surveys.

To obtain baseline data required to measure the impact of the pilot project, trained local interviewers administered a household questionnaire to 95 households, 89 of which were Inuit, and a nutrition questionnaire to 77 Inuit women and 6 non-Inuit women aged 15 to 44 in May-June 2002. The household questionnaire asked about food purchasing practices, opinions about the quality, variety and cost of certain foods, reasons for not buying more fresh fruits and vegetables and milk, demographic information and household food security using a modified version of the United States Department of Agriculture Food Security Module. The nutrition questionnaire included a 24-hour diet recall, a food frequency questionnaire and questions on food preparation, health and lifestyle. A second 24-hour recall was completed by 40 Inuit women. Both questionnaires had an excellent participation rate (85% of available households and 80% of available eligible women).

Nutrient intakes were analysed using nutrient values from the 2001 Canadian Nutrient File, with additional information on country foods from published papers by Kuhnlein et al. The C-SIDE software and National Research Council methods were used to analyse the percentage of non-pregnant, non-lactating women with a usual intake below the Estimated Average Requirement for various nutrients. The probability approach was used to estimate the percentage with an inadequate intake of iron. Mean energy and nutrient contributions by food group and Food Mail category were also calculated.

Sixty percent of adults and children were food secure, about one third of adults and children were food insecure without hunger and 7% had experienced hunger in the past 12 months. Food security was a greater problem among adults in families on social assistance and the working poor than among those who were relatively well-off, with more than half of low-income adults classified as food insecure without hunger. About

one third of households were extremely concerned about being able to afford enough food for their family.

Between one half and two thirds of respondents rated the quality of fresh fruits and vegetables and bread as only fair or poor, and 40% rated the quality of milk and eggs as fair or poor. Cost, quality, availability and lack of variety were cited as the major barriers to purchasing more of these foods.

There were a number of important nutrition and health issues. Sixty-three percent of Inuit women rated their health as fair or poor, a level nine times higher than for women of this age in the Canadian population. Almost 80% of all women smoked, while only two out of six pregnant women smoked. Obesity was also prevalent with approximately one quarter of women at high risk of heart disease, diabetes and high blood pressure.

According to the 24-hour diet recall, country food provided only 11% of energy – lower than in previous INAC surveys of Inuit women and lower than that reported for Inuit women in Nunavik in 1992. No organ meats and very little country fat, seal, walrus and muktuk were reported.

Forty-three percent of non-pregnant, non-lactating women had an inadequate intake of vitamin C, 24% of folate, 20% of vitamin B₆ and 87% of magnesium. Mean intakes of calcium and fibre were also much lower than recommended, but intakes of fat (31% of energy) and saturated fat (9.6% of energy) were within nutrition guidelines. There was a high consumption of Foods of Little Nutritional Value, which were an important source of energy (24%), saturated fat (25%) and sugar (59%).

Priority Perishables were not an important part of the diet in this community, although they provided 40% of vitamin A, 23% of calcium, 19% of fibre and 17% of folate. Inuit women were eating an average of only two and a half servings of fruit and vegetables and one fifth of a serving of dairy products. It appears, therefore, that the Food Mail Pilot Project is appropriately focussed and should help to increase the consumption of more nutritious store foods, thereby improving the nutrition of women of child-bearing age as well as the food security situation of Kangiqsujuaq families.

Background

Nutrition and Food Security in Isolated Communities

In the 1992 Santé Québec Health Survey Among the Inuit of Nunavik, women aged 18 to 44 were found to have low intakes of folate, calcium, fibre and magnesium ¹. Similar findings were reported among Inuit women of child-bearing age in Nunavut, the Northwest Territories and Labrador, together with a high consumption of Foods of Little Nutritional Value ^{1 2 3}.

In 1992, almost half of Nunavik women aged 18 to 44 described their health as fair or poor, compared to about 22% of women in Repulse Bay and 38% of women in Pond Inlet ^{4 5}. In all of these studies, Inuit women were more apt to rate their health as fair or poor than women in the general Canadian population ⁶. Fair or poor self-rated health was also more common among low-income Canadians (27%) than among those with high income (5%) ⁶. Self-rated health status was also higher among those who never smoked and among those with a Body Mass Index (BMI) within the healthy range ⁶.

In 1992, the prevalence of obesity (BMI > 30) among Inuit adults in Nunavik was 19% ¹. Kuhnlein also found a higher prevalence of overweight among Inuit women compared to the Canadian population ². It should be noted, however, that obesity was more common among low-income Canadians than among those in middle- or high-income groups ⁶.

Food insecurity has been identified by the Institute of Medicine as a predisposing factor to poor health and nutrition and as a nutrition risk factor for women in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC) ⁷. Food insecurity among school-age children has also been associated with compromised psychosocial functioning ⁸. Food insecurity or insufficiency has been linked to a lower consumption of fruits and vegetables, a lower amount of food in the household and a significant increase in scores indicative of disordered eating patterns with increasing food insecurity ⁹. Compared to food secure individuals in the United States, a higher percentage of food insecure individuals failed to follow the dietary guidelines for vitamin C and a minimum number of servings of fruits and vegetables per day ⁹. Other studies have found that on a given day, women from food-insufficient households were 1.4 times more likely to have energy intakes below 50% of those recommended. Low intakes were also more likely for vitamins A, E, C and B₆, and mean calcium intakes

were only 56% of the recommended allowance for women from food-insufficient households ¹⁰. In Canada, Tarasuk found that low-income women who reported hunger in their household in the past 30 days also had a lower mean intake of energy, vitamin A, folate, iron and magnesium. She concluded that this low level of intake could place these women at risk of nutrient deficiencies ¹¹.

Poor quality and a lack of variety of Nutritious Perishable foods were also identified as concerns by Inuit women in previous Indian and Northern Affairs Canada (INAC) surveys ^{3 5}, and as barriers to the purchase of more fresh fruit and vegetables in the Labrador survey on food quality conducted by INAC ¹².

Since 1991, INAC has introduced a number of changes to the Food Mail Program. These included the application of a uniform postage rate of \$0.80 per kilogram plus \$0.75 per parcel for Nutritious Perishable foods, effective July 1993, and changes to the eligibility criteria, so that all isolated communities became eligible for this subsidy, effective in October 1991. Non-perishable food and other essential goods continued to be shipped at higher rates, and Foods of Little Nutritional Value were excluded. These changes meant that in Nunavik the rates for Nutritious Perishables were increased from approximately \$0.64 per kilogram in 1991 to \$0.80 per kilogram plus \$0.75 per parcel in 1993 and to \$1.00 per kilogram plus \$0.75 per parcel for Non-perishable food in January 1994. In August 1996, certain prepared "Convenience Perishable" foods, such as frozen fried breaded chicken, became ineligible for the subsidy.

In Kangiqsujuaq, shipments of Nutritious Perishable food under the Food Mail Program increased from approximately 188 kilograms per person in 1991-1992 to 244 kilograms per person in 2001-2002 ¹³.

Food Mail Pilot Projects

In order to reduce the cost of nutritious food and promote healthy eating, Health Canada provided funding enabling INAC to carry out a series of Food Mail Pilot Projects in isolated northern communities. This investment was part of the Food Safety and Nutrition Program initiatives announced in the 1999 federal budget.

The Nunavik Regional Board of Health and Social Services (NRBHSS) and the Northern Village of Kangiqsujuaq agreed to participate in this pilot project. Kangiqsujuaq was selected because it was an appropriate size for a pilot project and a baseline survey to be carried out successfully with the funds available. While it is similar in size to Kugaaruk, Nunavut, the location of the first Food Mail Pilot Project, it differs from Kugaaruk in a number of ways. It has both a Co-op and a Northern store, food prices are lower than in Kugaaruk, the Hunter Support Programs in the two communities are quite different, and Kangiqsujuaq has a community freezer for storing country food, which is available to all Inuit in the community.

Effective July 1, 2002, the postage rate for shipping the most important perishable foods (also known as "Priority Perishables") to Kangiqsujuaq was reduced from \$0.80 to \$0.30 per kilogram plus \$0.75 per parcel. Priority Perishables include fresh and frozen fruit and vegetables (excluding French fries and similar potato products), frozen fruit juice concentrate, most fresh dairy products and eggs. The project will also introduce measures to improve retail food quality, provide nutrition education on the use and benefits of these foods, and retail promotion of healthy foods. This joint initiative is supported by INAC, Health Canada, the NRBHSS and Canada Post.

Food Supply System and Community Profile of Kangiqsujuaq

Kangiqsujuaq, formerly Wakeham Bay, is a community of about 535 people, with 110 households and 115 census families, located on Hudson Strait approximately 1,700 kilometres north of Montréal. There are two grocery stores, the Wakeham Bay Co-operative store and the Northern store owned by the North West Company based in Winnipeg. The stores obtain their perishable food from suppliers in Montréal, Val-d'Or and Rouyn-Noranda. La Fédération des Co-opératives du Nouveau-Québec serves as a wholesaler for the local co-op, prepares the orders and arranges for trucking from Baie-d'Urfé to Val-d'Or, the food entry point for Food Mail service to Nunavik communities. Food eligible for shipment under the Food Mail Program is deposited with Canada Post in Val-d'Or, then trucked 856 kilometres to La Grande and flown approximately another 950 kilometres from La Grande to Kangiqsujuaq by Air Inuit. Some food suppliers in Val-d'Or and the Montréal area also ship food directly to individuals in Kangiqsujuaq. Food that is not eligible for shipment under the Food Mail Program would have to be shipped as regular air cargo at much higher rates, either from La Grande or from Montréal via Kuujuaq.

At the time of the survey, fresh, frozen and non-perishable foods were normally received once a week. Most non-perishable food, however, arrives by sealift in the summer.

Kangiqsujuaq's population increased by almost one third (132 people) between 1991 and 2001. In the 2001 Census, 94% of the population identified themselves as Inuit, and 40% of the population was under 15 years of age. While 61% of the population aged 15 and over were employed at the time of the 2001 Census, only 85 out of 325 adults (26%) had worked full-time throughout the previous year, compared to 36% of adults in Canada as a whole who had done so. Education levels were generally low. For example, about half of women aged 20 to 44 had not completed high school. Because of the low levels of full-time employment and education, the median census family income for the year 2000 was \$40,320, compared to about \$55,000 in Canada.¹⁴

Food Costs and Affordability in Kangiqsujuaq

In 1992, a 46-item Northern Food Basket that would feed a family of four for a week cost about 76% more in Kangiqsujuaq than in Ottawa. Between 1991 and 2002, the cost of the Northern Food Basket increased by 21% in Kangiqsujuaq, compared to a 39% increase in Ottawa. At the time of the 2002 survey, Priority Perishables in this basket cost \$95 in Kangiqsujuaq, compared to \$72 in Ottawa. The total cost of the basket was \$228 in Kangiqsujuaq and \$152 in Ottawa. Prices in Kangiqsujuaq at that time were appreciably lower than in Nunavut communities using the Food Mail Program¹³.

Most families in Kangiqsujuaq also rely on country food. Obtaining this food is not without cost to everyone. In Nunavik, however, the Hunter Support Program pays hunters to get country food for the community. This food is stored in a community freezer and is available without cost to land claim beneficiaries who want it.

The lowest prices for selected foods at the time of the nutrition survey in 2002 in Kangiqsujuaq were as follows:

Lean ground beef, per kg	\$8.95	Eggs, large, dozen	\$3.29
Wieners, 450 g	\$4.10	Evaporated milk, whole, 385 mL	\$2.19
Fried chicken pieces, 709 g	\$10.49	Bread, 675 g	\$2.30
Chicken thighs, per kg	\$7.65	Fresh 2% milk, 1 L	\$2.79
Frozen French fries, 1 kg	\$2.10	Cheese, mild cheddar, 227 g	\$4.75
Frozen corn, 1 kg	\$3.95	Flour, 5 kg	\$10.49
Apples, per kg	\$2.67	Lard, 454 g	\$2.67
Bananas, per kg	\$2.88	Pop, 355 mL can	\$1.40 + tax
Potatoes, 2.27 kg bag	\$3.71	Frozen pizza, 736 g	\$9.39
Carrots, 907 g	\$1.43	Frozen orange juice concentrate, 355 mL	\$2.99

To provide an objective measure of food affordability in Kangiqsujuaq at the time of the baseline survey, the after-shelter income of a two-parent family of four, with two children aged 8 and 14, living entirely on income support (social assistance) can be compared with the cost of the Northern Food Basket for a family of this size and type. In May/June 2002, this family would have been eligible to receive the following amounts: basic income support of \$540 (\$797 minus the maximum shelter allowance of \$257 including utilities) for food and clothing, the Credit for Individuals Living in Northern Villages of \$102, the Basic Federal Child Tax Benefit of \$186.17, the National Child Benefit Supplement of \$192.50, the Quebec Family Allowance of \$104.16, the GST Credit of \$52.67 per month (paid quarterly) and the PST Credit of \$26.34 per month (added to basic income support amount), for a total of \$1,203.84. The monthly food cost for this family would be \$986, or 82 percent of their after-shelter income. After purchasing this food basket and paying rent, they would have \$218 left for other purposes.

The average number of social assistance cases in Kangiqsujuaq in 2002 was 18.5 per month. Persons aged 18 and over would be treated as a separate case, even if they lived with parents or other family members. There were 20 social assistance cases in Kangiqsujuaq in July 2002, covering 24 adults and 31 children.

Survey Objectives

1. To evaluate food purchasing patterns and food security status of households in Kangiqsujuaq prior to the implementation of the pilot project on July 1, 2002.

2. To assess nutrient intake and general health status of Inuit women of child-bearing age in Kangiqsujuaq at that time.

Survey Design and Methodology

Sample Selection

Participants were identified through a community list provided by the village. All households were included in the household survey. All women aged 15 to 44, including pregnant and lactating women and non-Inuit women, with the exceptions noted below, were included in the nutrition survey. This population group was selected for the nutrition survey because it is at high risk for nutritional problems, and the health of women of child-bearing age has an important impact on the health of their children and therefore of the community.

For the Nutrition Questionnaire, the following exclusions applied:

- interviewers;
- women within one week of childbirth, most of whom would be outside the community during this time;
- women non-resident in the community (away at school, for example); and
- women who were ill during the entire time of the survey, such that their food consumption was affected. For short duration acute illnesses, interviewers attempted to reschedule the interview upon recovery.

All participants were assigned an identification number to identify the household and individual. An information form in English, French and Inuktitut was provided to all participants and all eligible participants were asked to sign a consent form for each questionnaire. At the completion of the survey, participants were eligible for a \$10 food voucher for each completed questionnaire. The nutritionist, coordinator and mayor participated in a radio interview to explain the purpose of the Food Mail Pilot Project and

of this survey, the date when the new Food Mail rate for Priority Perishables would be introduced, which foods would be included in this special rate and how the results would be handled. We also explained that interviewers had sworn an oath of confidentiality and described the measures we were taking to protect the confidentiality of their responses.

Assessment Tools

Household Questionnaire

The Household Questionnaire was administered to the individual responsible for most of the food purchases. It included questions on the following:

- whether they had purchased selected foods, including certain Priority Perishable foods, Foods of Little Nutritional Value and country food over the previous four weeks;
- where certain foods were usually purchased (Co-op, the Northern store, from the south by Food Mail or air cargo or other);
- perception of the quality of certain Priority Perishable foods;
- perception of the variety and price of fresh fruits and vegetables;
- reasons for not buying more fresh fruit and vegetables and fresh or boxed milk;
- the 18-item U.S. Food Security Survey Module with minor modifications to improve acceptability among the Inuit population. The food security questionnaire developed for the Alberta Northern River Basins Food Consumption Survey was further modified during a similar survey in Kugaaruk, Nunavut, to preface the food security statements with the phrase, "Some families might say." This approach was considered to be less direct and more culturally acceptable to the Inuit. Modifications adopted for the Alberta Northern River Basins Food Consumption Survey and used in the Kugaaruk and Kangiqsujuaq surveys included: (a) instead of asking if the statements were "always true", "sometimes true" or "never true", the respondent was asked if this happened "always", "sometimes" or "never" and (b) changing the term "balanced meals" to "healthy meals". The former modification avoided possible questioning of the respondent's truthfulness in the answers given. The latter modification

acknowledged that “healthy” was more meaningful to the Aboriginal population than “balanced”.

- reasons for being unable to afford enough food;
- action taken when there wasn't enough money to buy food;
- access to country food and school food programs;
- degree of concern over specific social issues (running out of money to buy food, alcohol and drug abuse, the safety of country food, family violence, lack of jobs, and access to country food). This question helped to provide a context within which the perception of the severity of concern over food security could be considered vis-à-vis other social issues.
- socio-demographic factors relating to household size, ethnic status, sources of income, income of households not receiving social assistance, and expenditure on food and other necessities.

Nutrition Questionnaire

The Nutrition Questionnaire included:

- a 24-hour diet recall administered to 83 women (77 Inuit women);
- a second 24-hour recall administered to 40 Inuit women to permit a statistical correction for within-person variation in nutrient intakes;
- a modified Food Frequency Questionnaire covering a total of 95 foods, including country food, Priority Perishable food, Convenience Perishables, selected Non-perishable foods and Foods of Little Nutritional Value. A number of steps were taken to reduce respondent burden on the Food Frequency Questionnaire. Individual food consumption frequency was only asked about fruits and vegetables commonly consumed in Inuit villages. Participants were asked to select the five most frequently eaten fruits and vegetables from a series of photographs. The use of photographs also avoided any misunderstanding which might arise from translation.
- questions on perceived health status, lifestyle (i.e., smoking, pregnancy and lactation status, activity level), medical conditions affecting diet, and anthropometric measurements (height, weight, waist and hip circumference). All participants were also asked to go to the clinic to have their height, weight and

waist and hip measurements taken. Questions relating to perceived health status and smoking were included in order to provide a context within which food security and nutrient intake could be considered. Information on smoking status permitted a more accurate evaluation of the requirement for vitamin C, which is higher for smokers. The cost of cigarettes must also be considered a factor in food insecurity. Perceived health status is a well-recognized indicator of population health and therefore is relevant to the issue of food insecurity and nutrient intake.

Interviewer Training and Data Collection

Interviewers were selected by the local survey coordinator and provided with five days of training by the project nutritionist in survey objectives and methodology, protecting confidentiality and minimizing refusals. Special attention was given to the proper use of food models and the standardized procedure for conducting a 24-hour diet recall. Other topics included reading labels and details of some of the foods sold in the local stores.

Data collection took place over a three-week period in May-June 2002. Questionnaires and response cards (English-Inuktitut and French-Inuktitut) were approved by the village council. Response cards were used for the questions on income, activity level and food security statements. Photographs of fruit and vegetables were used to enable respondents to quickly identify foods purchased or consumed, and package labels were used to clearly distinguish between fruit drink crystals with and without vitamin C, and between fruit juice and fruit drinks. Nutrition Canada graduated food models were used to describe portion size.

Data Analysis

Household data were entered into Excel and then into the R Statistical System for analysis. Means and frequencies were calculated for each question using Excel and Epi Info 2000. Families were divided into three socio-economic groups (Social Assistance, Working Poor and Relatively Well-Off), based on household income and size. The

division into Working Poor and Relatively Well-Off groups was based on the Statistics Canada rural Low Income Cutoff (LICO) numbers applied to reported income ¹⁵.

Food security status was analysed according to socio-economic group using the Fisher Exact Test, which gives exact statistical results for small sample sizes. Twenty-four-hour recall data were entered into the nutrition evaluation program of Micro Gesta Inc. Nutrient data for most foods were based on the Canadian Nutrient File 2001 (CNF) modified to reflect most recent folic acid values. To arrive at the Dietary Folate Equivalents (DFE) for each food, food folate was calculated by subtracting folic acid values from folacin. This value was then added to folic acid multiplied by 1.7 to produce DFEs for each food. Nutrient data for country foods not included in the CNF were based on the published data of Kuhnlein and the Alaska Area Native Health Service ^{16 17 18}. Recipes were adapted from the United States Department of Agriculture (USDA) recipe file using CNF data and published country food values. Foods were categorized into 13 food groups and 6 Food Mail categories.

Nutrient data were then exported into a text file for analysis. In order to determine the percentage of a population whose usual intake of a nutrient is below the Estimated Average Requirement (EAR), it is necessary to estimate the distribution of usual intakes among individuals ¹⁹. The usual intake for a group cannot be determined from 24-hour recall data without calculations that disentangle between-individual and within-individual variation. Because daily intakes of nutrients are generally not normally distributed, a complex set of adjustments and transformations is required.

In the current study, the required adjustments and transformations were performed using the C-SIDE software, which is based on the work of Nusser ²⁰. Specifically, the C-SIDE software was used to:

1. apply a power transformation to make the distribution of the 24-hour recall data more symmetric;
2. make adjustments to the data to account for variations between initial and subsequent 24-hour recalls and the day of the week the interview was conducted;
3. apply a semiparametric transformation to further normalize the data; and
4. estimate the distribution of usual intakes.

This program generates an adjusted mean and median for energy and nutrients. In cases where an EAR is known, and where the distribution of requirements among individuals was known to be symmetric, the percent of women below the EAR for women 19 to 30 was determined using the EAR cut-point method ¹⁹. This percentage is considered to have a usual inadequate intake.

In those instances where the C-SIDE software was unable to transform the data, the U.S. National Research Council (NRC) method was used to calculate usual intakes ²¹. Because this program removes outliers before calculating usual mean intake, it may be more suitable for the analysis of certain nutrients which tend to have an unusual distribution, especially with a small sample size.

Since the distribution of requirements for iron is non-symmetrical, the EAR cut-point method is not appropriate for determining the probability of inadequacy. Therefore, the probability approach was used ¹⁹. In this calculation, distribution percentiles generated by the C-SIDE program for iron were used in conjunction with estimated probabilities of inadequate iron intakes to estimate the percentage of the population below the EAR. These probabilities and ranges were based on data on usual intakes for a mixed population of women using and not using oral contraceptives derived from the Continuing Survey of Food Intakes by Individuals, 1994-1996 ²².

To calculate the simple mean energy and nutrient intake and mean intake by food group and Food Mail category, the first and repeat recalls were averaged for each respondent who completed two recalls and combined with the data from women who completed only one recall. Mean energy and nutrient intakes were then calculated for the population, by food group and Food Mail category.

Linear statistical modelling analysis (i.e. F-tests), Chi-square and Fisher Exact tests were used to examine relationships between socio-economic group and food security versus intake of key nutrients (vitamin A, folate, calcium) from all foods and Priority Perishables, energy intake versus BMI and age, and country food consumption versus age group (15 to 24 and 25 to 44). Due to the small sample size, no adjustments were made for confounding variables. For most analyses, plots were examined graphically in order to identify unusually high or low values.

Methodological Considerations

Food Security Questionnaire

The 1992, 1993 and 1997 INAC nutrition surveys indicated that food security was perceived as a problem by Inuit women of child-bearing age^{3 5}. However, the questions did not assess the severity of the problem.

To date, no instrument has been validated to measure food insecurity among Aboriginal populations that depend in whole, or in part, on hunting or fishing for food. However, the most widely validated tool available to measure food insecurity is the USDA Food Security Survey Module Questionnaire²³. This tool has been validated in a number of annual national surveys in the United States, including the Current Population Survey. The 18-item questionnaire evaluates the severity and prevalence of food insecurity and enables a classification of households by food security status. The score depends on the number of valid affirmative responses to each question. For the entire questionnaire, the questions are arranged (with a few exceptions to improve readability) in increasing degree of food insecurity, reflecting ranges of severity, from a score of 0 to 2, or “food secure”, to a maximum score of 12 to 18, indicating “food insecure with hunger”. The questionnaire builds on the work of Radimer and colleagues at Cornell University who developed a food sufficiency questionnaire to measure food insecurity among low-income women²⁴ and has now been used in a number of national American surveys, in the Northern River Basins Food Consumption Survey, as well as in third-world countries. This measurement methodology has also been used to compare the effects of ethnic/cultural differences on the measurement of food insecurity and hunger²⁵.

According to Mark Nord of the USDA Economic Research Service, the modifications made to the questionnaire to improve cultural acceptability for an Inuit population did not affect the scaling.

It is important to remember that this questionnaire reflects “household” food security status, and not necessarily the status of any individual within the household. It is also based on experiences over the previous 12 months, and may not relate to the income over the previous month or to the nutrient intake of women over the previous 24 hours.

Assessing Usual Intake

The 24-hour recall is the most widely used instrument to evaluate energy and nutrient intake. Estimating the usual intake of a group is complicated by large variations in intake from day to day, between individuals and by season ²⁶, the degree of variation differing among nutrients ^{27 28 29 30}. Individuals also vary in their requirements for energy and nutrients. For example, iron requirements vary widely among women of child-bearing age due to differences in menstrual flow. For most nutrients, an average of three or more 24-hour recalls on non-consecutive days is considered sufficient to produce a reasonably accurate estimate of intake for an individual. In order to produce reasonable results for a group, at least some individuals (a minimum of 40) need to be interviewed at least twice in order to accurately estimate the distribution of usual intakes ²⁰.

The Canadian Recommended Nutrient Intakes (RNIs) and American Recommended Dietary Allowances (RDAs) were set with a safety factor above typical requirements, so that if a group had a mean intake equal to the RNI or RDA, you could be reasonably confident that their usual intake exceeded the individual requirements of most individuals in the group.

The new Dietary Reference Intakes (DRIs) represent a more complex set of values developed for different planning or assessment purposes. With these new values, the RDA is defined as “the average dietary intake level that is sufficient to meet the nutrient requirement of nearly all healthy individuals in a life stage and gender group” ¹⁹. Comparison of the mean intake of a group with the new RDAs and the conclusion that diets are adequate if they meet or exceed the RDA are inappropriate because the prevalence of inadequacy depends on the shape and variation of the “usual” intake distribution, not on mean intake. If group mean intake equals the RDA, there will be a substantial proportion of the group with usual intake less than their requirement ¹⁹.

An estimate of inadequate intakes for a group is now based on the percentage below the EAR (i.e., the median daily intake value that is estimated to meet the requirement of half of the healthy individuals in a life stage and gender group) ¹⁹. The percentage below the EAR may be calculated using a program such as C-SIDE software, which performs the necessary adjustments to estimate the distribution of usual intakes ²⁰.

The establishment of the EAR takes into account the reduction in the risk of chronic degenerative diseases in addition to the prevention of nutrient deficiencies. The EAR can be used to examine the probability that an individual's intake is inadequate. As mentioned above, it can also be used to estimate the prevalence of inadequate intakes within a group. Since the EAR, by definition, only meets the requirements of half of the individuals in a group, it cannot be used as an intake goal for individuals. The RDA, which is calculated from the EAR by taking this value and adding 2 standard deviations, thus exceeding the requirements of 97.5% of the individuals in the group, is the appropriate goal for individuals. The EAR is used to plan for an acceptable prevalence of inadequate intakes within a group.

The 24-hour recall data were collected from women aged 15 to 44. Ideally, the results would be analysed according to three separate age groups (14 to 18, 19 to 30 and 31 to 50) for which EARs have been estimated. However, the small sample size made this impossible. Instead, we selected the EARs for women aged 19 to 30, based on a median age of 26.5. This methodology may result in an under- or overestimate of energy and nutrient requirements, depending on the age of individuals and the respective requirement.

The validity of the 24-hour recall depends on the respondent's memory and ability to recall portion sizes. Furthermore, the validity is affected by certain respondent biases. Respondent errors may include under- or over-reporting and the influence of social desirability. Under-reporting of energy intake appears to affect as many as 25% of dietary records³¹. In a number of studies, BMI has been found to be a predictor of under-reporting^{32 33 34 35 36}, with women tending to under-report more than men^{36 37}. Social desirability also affects under-reporting, especially of macronutrient intake^{33 34 35 38}. Under-reporting of energy intake by social desirability trait was found to be higher among women with less than college education than among those with college education³⁸.

Both the co-operation of the respondent and her ability to accurately recall food consumption are influenced by the interviewer's skill with the instrument. The interviewer must be able to prompt memory, without suggesting an appropriate response. The instruments used to describe portion size play an important role, since the portion size of some foods may be more difficult to estimate than others. Household measures such as cups, spoons, etc., do not allow for slight differences in amounts and they are difficult to use for foods of irregular shape or cooked mixtures which are mounded on a plate. Standardized graduated food models improve the accuracy of recalling portion size by providing a range of choices. For certain nutrients, accurate recall of portion size is critical. For example, since fat is a concentrated source of

energy, a small underestimate in portion size would result in a significant underestimate of energy intake.

Conducting 24-hour recalls in a single season ignores important seasonal differences in the consumption of country food and some store foods as well. Nutrient intake may also vary seasonally, especially for nutrients such as vitamin A, vitamin D, cholesterol and linoleic acid, all of which are concentrated in a few foods.

We have attempted to compare our results with those of the 1992 Santé Québec Health Survey Among the Inuit of Nunavik. However, caution must be exercised in such a comparison, since the survey methodology and the populations differ. The Nunavik survey included a random sample of women aged 18 to 44 from 14 communities along the Hudson and Ungava coasts, including Kangiqsujuaq. The survey was conducted in the fall, and nurses, accompanied by interpreters, conducted the interviews. Therefore, the food consumption pattern and nutrient intake from the 1992 survey may not be typical of women in Kangiqsujuaq.

Finally, the results of a 24-hour recall may suggest areas of concern for the community or specific groups and educational needs, but individual assessment of nutritional status and health would require clinical and biochemical investigation.

Food Frequency Questionnaire

The Food Frequency Questionnaire (FFQ) is generally used in large epidemiological studies as a means of ranking individuals in terms of risk of chronic disease according to their consumption of certain foods, and may provide information on the variety of food consumed over a longer period than a 24-hour recall. However, it has a number of inherent problems, including the respondent's ability to report consumption over the selected time period. Since respondents may have difficulty estimating frequency and portion size over a long period, they tend to overestimate consumption and report their routine or typical diet rather than the specifics of what they ate over the period in question³⁹. Comparison of the Block FFQ and the Harvard FFQ with 24-hour recalls found that both instruments overestimated intakes of protein, calcium, vitamin A and vitamin C. The Harvard questionnaire also overestimated energy intake whereas the Block questionnaire overestimated iron intake⁴⁰. While the FFQ tends to overestimate

food consumption, it does provide information on how frequently foods are consumed over a specific period. For these reasons and to reduce respondent burden, the FFQ used in the current study asked only about the frequency of consumption, not the usual quantities consumed.

The validity of the FFQ could be improved by basing it on a 24-hour recall, if this information were available, and by modifying the format to be more culturally sensitive in terms of the order of foods. Alternatively, the food frequency could be reviewed by local representatives to select the most important foods and the most appropriate order. In this case, the questionnaire was reviewed by local representatives to ensure that the most important foods were included.

Neither the 24-hour recall nor the FFQ, in and of themselves, have the capacity to determine what proportion of a group has an inadequate or excessive energy intake, since both instruments may be affected by under- or over-reporting, and do not take activity level into account. Instead, the BMI, in addition to detailed information on activity level, is used for this purpose.

Inuit and Non-Inuit Respondents

Although there were very few non-Inuit residents in Kangiqsujuaq, they were asked to participate. This was also done in Kugaaruk. However, due to the small number of non-Inuit women, we did not report the results of their 24-hour recall data separately. We also felt that it was more important to provide accurate data on nutrient intake for the Inuit alone, than combined data for the entire community.

For the Household Questionnaire, we decided to include the non-Inuit response to the questions related to food purchasing, since we believed the non-Inuit food purchasing patterns were important to document. We combined Inuit and non-Inuit responses to the questions about perceptions of variety, quality a cost. In reporting the results we did not combine the Inuit and non-Inuit response to the food security questionnaire as we were more concerned with the food security situation of the Inuit, and all of the non-Inuit households were food secure.

Household Survey Results

Household Size and Composition

Household composition is presented in Table 1. The participation rate was 85%. Of the 95 households surveyed, 89 were Inuit (at least one adult was Inuit). There were 255 adults, 80% of whom were Inuit between 18 and 44 years of age. Among Inuit households there was a total of 216 children, and an average of 2.4 children per household. Thirty-five percent of Inuit children were aged 5 or under, 39% were between 6 and 12 years of age and about one quarter were between 13 and 17 years of age.

Table 1. Household composition, Kangiqsujaq, 2002

	All	Inuit
Total number of available households	112	105
Total number of households surveyed	95	89
Refusal rate (%)	15	15
Age of adults by ethnic status	Number	%
Between 18 and 44		
Inuit	205	80
Non-Inuit	6	2
Between 45 and 59		
Inuit	35	14
Non-Inuit	0	0
Between 60 and 64		
Inuit	4	2
Non-Inuit	0	0
Aged 65+		
Inuit	5	2
Non-Inuit	0	0
Total	255	100
Distribution of Inuit children by age group (n=216)	Number	%
5 or under	75	35
6 to 12	85	39
13 to 17	56	26
Average number of Inuit children per household	2.4	

Source and Amount of Income and Expenditure on Food

The major sources of income among Inuit households included a job or business (67% of households), income from the hunter support program (40%) and the sale of crafts (32%) and furs or sealskins (30%) (Table 2, Figure 1). Only 16% of households reported receiving social assistance and 11% Employment Insurance in the past month (Figure 2). Of the 71 households not receiving social assistance, 24% reported an income of \$1500 or less for the past month and 16% an income of \$3000 or more. Fourteen percent of respondents did not know the household income and 25% refused to answer this question. Two thirds reported that their income in the previous month was the same as their usual income. The average weekly food expenditure for Inuit households was \$335 and the median, \$300.

Table 2. Inuit household income and expenditures, Kangiqsujuaq, 2002

Percent households earning money from different sources (n=89)	%
Selling fur or sealskins	30
Selling crafts	32
Job or business	67
A pension	10
From the hunter support program	40
Percent households receiving financial assistance in the past month	%
Employment Insurance (n=87)	11
Social assistance (n=88)	16
Total household income ¹ of households not receiving social assistance in the past 4 weeks (n=71)	%
\$1500 or less	24
\$1501 to \$2000	13
\$2001 to \$3000	8
\$3001 or more	16
Don't know or refuse	39
Reported income compared to usual income (n=68)	%
Same	66
More than usual	12
Less than usual	3
Don't know	19
Average weekly food expenditure	\$335
Median weekly food expenditure	\$300

¹ Income includes take-home pay from a job, money from selling furs, sealskins, carvings or crafts, money from the Hunter Support Program, pensions, net income from running a business and Employment Insurance.

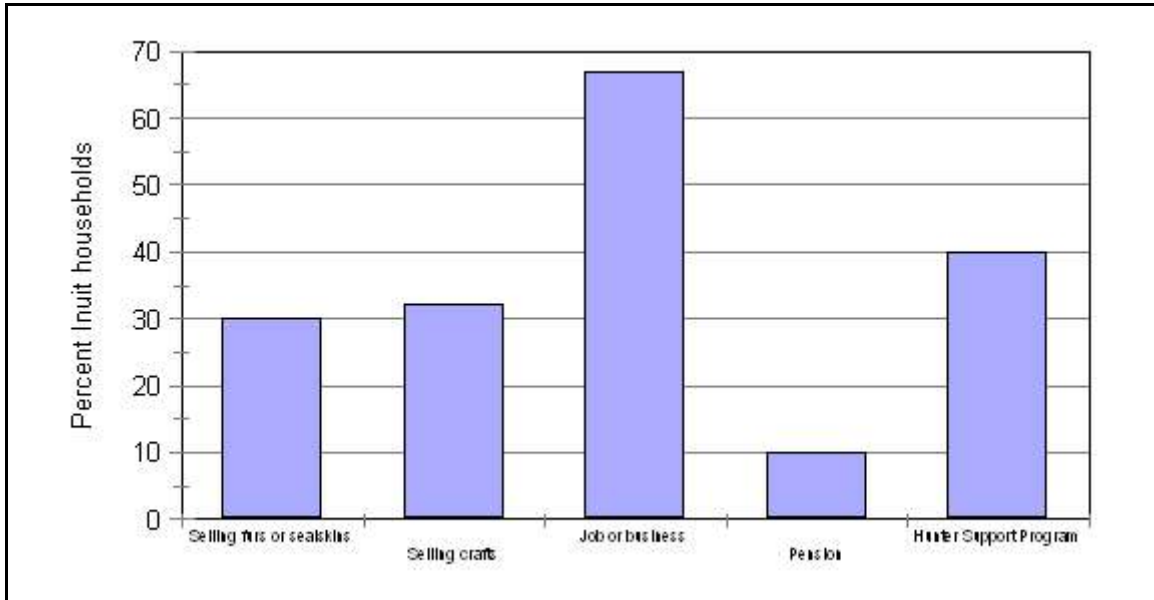


Figure 1 Sources of income, Inuit households, Kangiqsujuaq, 2002

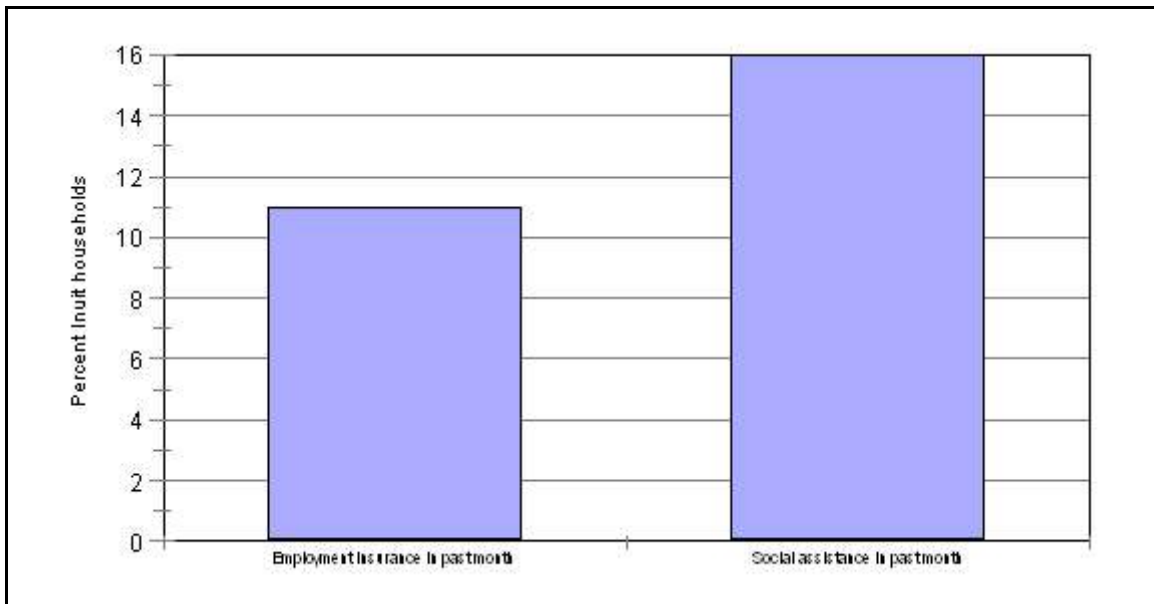


Figure 2 Percent Inuit households receiving financial assistance, Kangiqsujuaq, 2002

Food Security

The extent and severity of household food insecurity was measured with the USDA Food Security Survey Module. The 18-item food security questionnaire asks about conditions, experiences and behaviours characteristic of a wide range of severity of food insecurity and hunger experienced over the past 12 months (see Appendix B). The first two questions reflect uncertainty about having enough food and the experience of running out of food. The remaining items are arranged in increasing order of severity, screening out food secure participants early in the process.

In the general American population, food insecurity follows a progressive scale of severity, such that adults will report doing without before obvious behavioural signs of food insecurity are reported for children. However, in this survey, children were affected by household food insecurity at nearly the same level of severity as were adults. This pattern was also typical (although not as marked) of surveys conducted among other North American Aboriginal groups²⁴. For this reason, the results for the 10-item adult/household scale and the 8-item child scale are presented separately (Table 3).

“Food insecure” or “food insecure without hunger” includes affirmative responses to questions describing anxiety about having adequate money or food to feed the family and perceptions that the food eaten by adults or children was inadequate in quality or quantity. Cutting down on the size of the meal, eating less than you felt you should, not eating for a whole day and being hungry because there wasn’t enough money for food are questions describing the most severe condition, “food insecurity with hunger”.

On the 10-question adult scale, three or more affirmative responses are required for a household to be classified as “food insecure without hunger”. In Kangiqsujuaq, most food insecure households reported a larger number of these conditions. Six or more affirmative responses to adult-referenced questions are required for a household to be classified as “food insecure with hunger”.

Children’s food security status is calculated from the eight questions that ask specifically about food conditions among children in the household. The first three child items, reflect disrupted eating patterns or reduced quality and variety and are classified as “food insecure” or a “have a restricted diet” in this analysis. “Food insecure with hunger” refers to the more severe items on the child scale, namely skipping meals because there wasn’t enough money for food, doing so at in least three months in the past year,

going hungry and not eating for a whole day. Two or more affirmative responses to child-referenced questions are required for a household to be classified as having food insecurity among children, and five or more affirmative responses to be classified as food insecure with hunger.

The prevalence of food insecurity without hunger among adults was 33% (29 households). Seven percent of households (six households) were “food insecure with hunger” (Table 3). On the children’s food security measure (77 households with valid responses), children were food secure in 60% of Inuit households, 34% were food insecure without hunger (reduced quantity, quality or variety), and in 6% of households (five households), children were hungry at times because the household could not afford enough food (Table 3).

Figure 3 presents the food security status of adults and children. In almost half of Inuit households with children, adults and children were food secure. In 22% of households, both adults and children were food insecure without hunger. In only 3% of households, both adults and children were food insecure with hunger (Table 3).

Responses to individual questions by food security status reflect the degree of food insecurity experienced by these households (Table 4). Approximately half of all households had experienced some anxiety about being able to afford enough food. In 16% of households, adults reported cutting the size of their meals or skipping meals, half of households relied on a few kinds of low-cost foods to feed their children and in about one third of households, children were not eating enough because there wasn’t enough money for food.

The questions relating to the frequency of occurrence of these conditions or behaviours provides additional insight into the severity of food insecurity (Table 5). Only 6% of families reported they “often” worried about being able to afford enough food, 4% “often” ran out of money to buy food and 12% “often” relied on few kinds of low-cost foods to feed their children. The more severe conditions, such as adults cutting the size of their meals or skipping meals, affected only 6% of families almost every month. Three percent reported not eating for a whole day almost every month because they were unable to afford enough food. Only one household (1%) reported that children skipped meals almost every month because there wasn’t enough money for food.

Ninety-four percent of households had access to country food most of the time, 46% of households with children under five received breakfast, lunch or snacks at day care, pre-school or kindergarten, and 64% of households with children 6 to 17 received breakfast, lunch or snacks at school (Table 6).

Insufficient income, not the cost of food, was the principal reason given for being unable to afford enough food (Table 6). When faced with this situation, Inuit households resorted to a number of remedies, including asking for more credit (55%), borrowing food or money from friends or family (42%) and getting food from the community freezer (32%) (Table 6). The few families without access to country food reported a lack of transportation, no hunter or fisher in the household and the cost of gas and repairs as the principal reasons (Table 7).

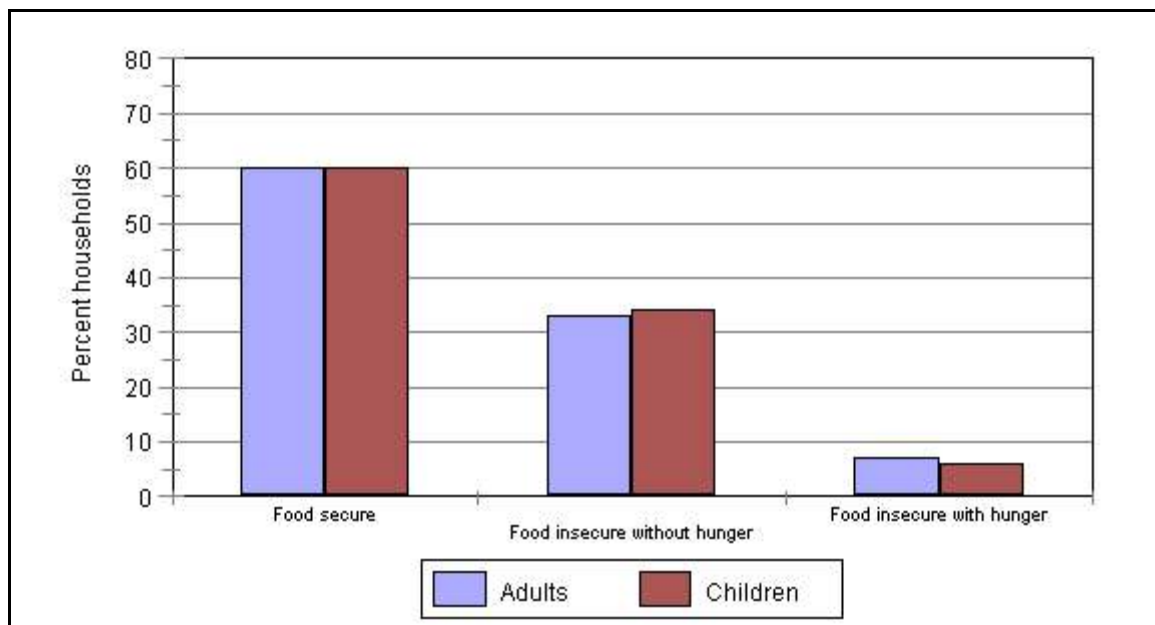


Figure 3 Food security status, Inuit adults and children, Kangiqsujuaq, 2002

Table 3. Food security among Inuit households, Kangiqsujuaq, 2002

	Number	%
Adult food security (n=88)		
Food secure	53	60
Food insecure without hunger	29	33
Food insecure with hunger	6	7
Children's food security among households with children (n=77)		
Food secure	46	60
Food insecurity of children ("reduced quality or variety of children's diets" without hunger)	26	34
Severe food insecurity of children (children hungry at times because household couldn't afford enough food)	5	6
Food security among households with children (n=77)		
Food secure – both adults and children	38	49
Food insecurity without hunger among either adults or children or both	31	40
Food insecure without hunger – both adults and children	17	22
Food insecurity with hunger		
Hunger among either adults or children or both	8	10
Hunger among both adults and children	2	3
Hunger among adults but not children	3	4
Hunger among children but not adults	3	4

Note: Food security was measured using the USDA Food Security Survey Module, modified following cognitive testing among Inuit interviewers. For the purposes of this survey, only Inuit households are included in the analysis. The results were analysed by Mark Nord, Economic Research Service, USDA. For this survey, the 10-item adult/household scale was used to describe conditions among adults and the 8-item children/household scale to describe conditions among children.

Table 4. Responses to items in the food security scale, Inuit households, Kangiqsujuaq, 2002

Scale item	Households affirming item		
	All households (n=89)	Food insecure households without hunger (n=29)	Food insecure households with hunger (n=6)
	<i>Percent</i> ²		
Household items			
Worried food would run out before we got money to buy more	56	90	100
Food bought didn't last, and we didn't have money to get more	56	97	100
Couldn't afford to eat healthy meals	53	90	100
Adult items			
Adults cut the size of meals or skipped meals because there wasn't enough money for food	15	21	100
Respondent ate less than felt he/she should ¹	20	41	100
Adults cut size of meal or skipped meals in three or more months ¹	11	14	100
Respondent hungry but didn't eat because couldn't afford	2	0	33
Respondent lost weight ¹	1	0	17
Adults did not eat for a whole day ¹	6	3	50
Adults did not eat for a whole day in three or more months	4	3	33
	All households (n=77)	Food insecure households without hunger (n=26)	Food insecure households with hunger (n=5)
<i>Percent</i> ²			
Child items (for households with children)			
Relied on few kinds of low-cost foods to feed children ¹	53	96	100
Couldn't feed children healthy meals ¹	30	58	80
Children were not eating enough ¹	34	77	80
Cut the size of children's meals ¹	5	8	40
Children were hungry ¹	5	4	60
Children skipped meals ¹	6	0	100
Children skipped meals in three or more months	5	0	80
Children did not eat for a whole day ¹	3	0	40

¹ The actual wording of the item includes a specific reference to not being able to afford enough food.

² Percentages are based on the number of valid responses to each item. Households without children are excluded from the child-referenced items.

Table 6. Reported reasons for food insecurity and remedial action taken, Inuit households, Kangiqsujuaq, 2002

Reasons for not being able to afford enough food (n=30)	%
Food costs too much	23
Had to pay bills (like hydro, children's clothing, school supplies)	27
Gave money away	10
Not enough income	43
Had to buy hunting, fishing or trapping equipment, supplies or gas	27
Not working	28
Waiting for EI or Social Assistance	17
Gave food away to others in the community	7
Don't know or refuse	7
Action taken by Inuit households when they were unable to afford enough food (n=31)	%
Borrow food or money from friends or family	42
Go hunting or fishing	23
Make an item to sell	3
Do without	10
Get food from the community freezer	32
Ask store manager for more credit	55
Other	6
Percent households where children under 5 received breakfast, lunch or snacks at a day care, pre-school program or kindergarten (n=71)	46
Percent households where children 6 to 17 received breakfast, lunch or snacks at school (n=72)	64

Table 7. Country food access among Inuit households, Kangiqsujuaq, 2002

Percent households with access to country food most of the time (n=89)		94
Reasons why households are unable to get country food (n=8)		
	Number	%
No transportation	3	38
No hunter or fisherman in household	3	38
Hunter or fisher in family is sick/injured	0	0
Hunter or fisher is working	2	25
Gas too expensive	1	13
Repairs too expensive	2	25
Country food not available	2	25
Food not shared in community	0	0
No place to store country food	2	25
No hunting or fishing equipment	0	0
Other	2	25
Total	17	

Note: Households could provide up to 3 reasons.

Food Security and Socio-economic Group

Table 8 shows the breakdown of Inuit families on the basis of socio-economic group. It should be noted, however, that 32 Inuit households could not be classified by socio-economic group because of missing income information.

Table 8. Distribution of respondents by socio-economic group, Inuit households, Kangiqsujuaq, 2002

	%	n
Received social assistance in past month	16	14
Working poor ¹	29	26
Relatively well-off	19	17
Unknown income	36	32
Total	100	89

¹ Working poor families: not on social assistance and family sizes 1, 2, or 3 with monthly income <\$1500; family size 4 or 5 with monthly income <\$2000; and family size 6+ with monthly income <\$3000.

The LICOs are used by Statistics Canada to identify Canadians in “straightened economic circumstances”¹⁵. Strictly speaking, these LICOs are not applicable to Inuit living in the North. They do not take into account the very high price of commercial food and other goods in the North, nor do they consider the very high cost of housing if purchased at market rates. On the other hand, the LICOs do not consider the fact that many individuals in the North have their housing costs subsidized, nor the fact that most families have access to country food. The rural LICOs are used here as a convenient way of producing two income groups of reasonable size.

As illustrated in Figure 4, 94% of adults in relatively well-off families were food secure, compared to 38% of working poor families and 29% of those on social assistance. No adults in relatively well-off families were food insecure without hunger, while 54% of those in working poor families and 64% of those on social assistance experienced this condition. Food insecurity with hunger was experienced by only one adult in relatively well-off families, two among the working poor and one on social assistance (6 to 8% of each group). Adult food security increases from those on social assistance to the working poor to the relatively well-off (Chi-square $p < 0.001$, Fisher Exact Test $p < 0.001$).

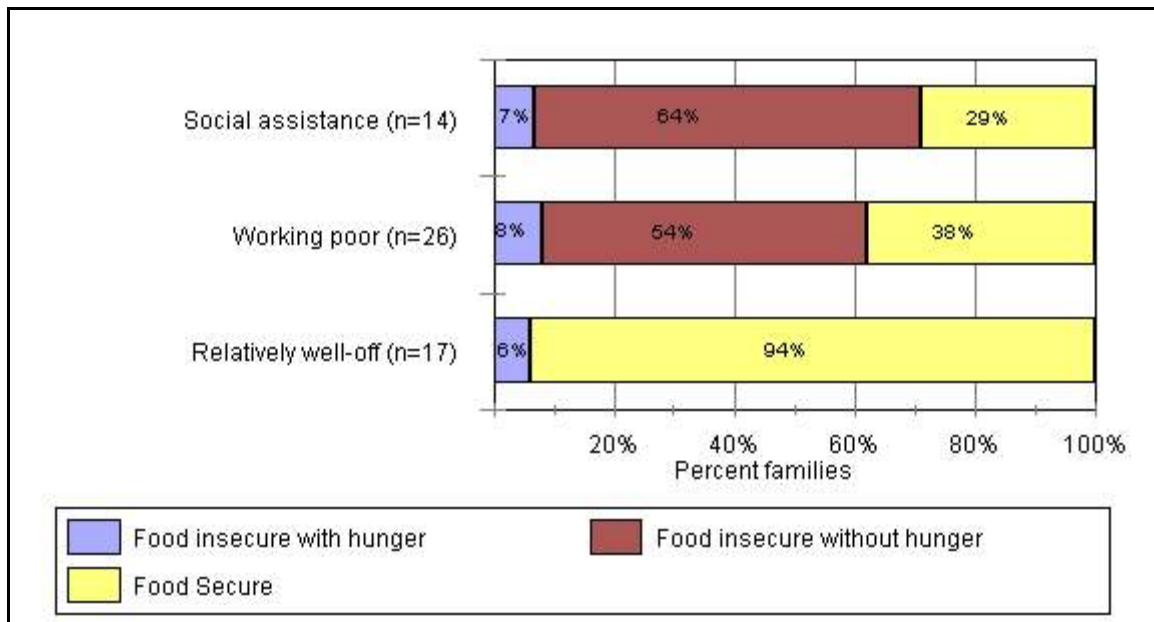


Figure 4 Adult food security by socio-economic group, Inuit households, Kangiqsujuaq, 2002

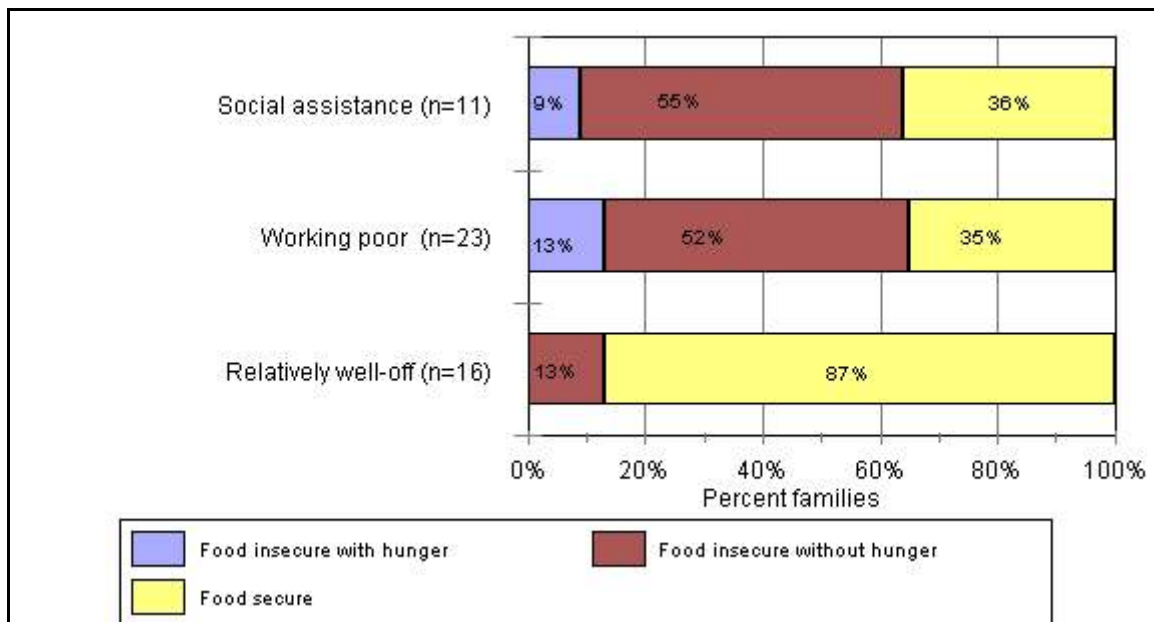


Figure 5 Children's food security by socio-economic group, Inuit households, Kangiqsujuaq, 2002

There was no difference in prevalence of hunger between those on social assistance and the working poor. It is important to keep in mind, however, that the USDA Food Security Survey Module measures the extent and severity food insecurity during any time over the past 12 months, whereas the reported income is based on the previous month.

Child hunger was not reported among relatively well-off families, while children in 9% of families receiving social assistance and 13% of the working poor were “hungry”. However, in over half of families on social assistance and the working poor, children were food insecure without hunger or had a “restricted diet” (Figure 5).

Social Issues of Concern

When asked about the degree of concern over six social issues, the issue of greatest concern was the lack of jobs (75% “extremely concerned”), followed by the safety of Country food (38%) and not enough money for food (31%). About 20% of households were extremely concerned about alcohol and drug abuse and 26% extremely concerned about family violence (Figure 6).

Food Purchasing Practices

Source of food purchases

Inuit households purchased food from both the Co-op and Northern stores, with the Co-op receiving about 60 to 70% of the share. Non-Inuit also shopped in both stores. A few Inuit families purchased food from the south by Food Mail or air cargo. Almost all Inuit households got country food from the community freezer. Only 3% of Inuit families received a sealift order in the past year compared to half of non-Inuit families.

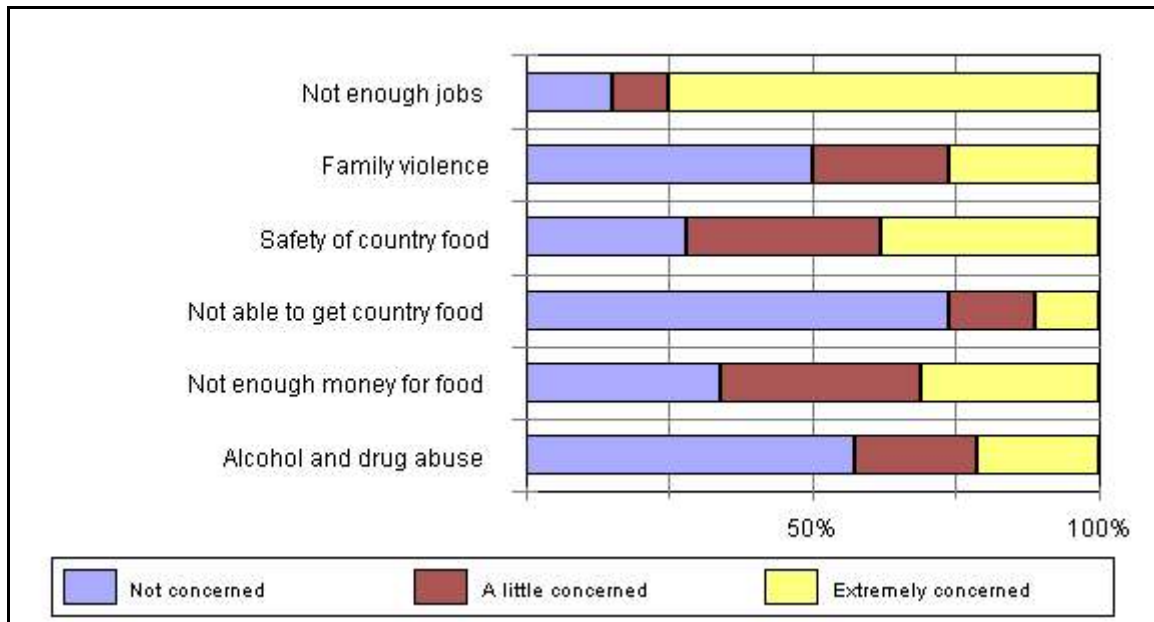


Figure 6 Degree of concern over social issues, Inuit households, Kangiqsujuaq, 2002

Perceptions of quality, variety and cost

Poor quality of fresh fruits and vegetables and fresh milk is clearly an issue in Kangiqsujuaq (Table 9, Figure 7). From 50 to 65% of households rated the quality of apples, oranges, bananas and grapes, lettuce, tomatoes and peppers, carrots, onions, turnips and cabbage, as well as potatoes as poor or fair. Over half of households rated the quality of bread as poor or fair, and about 40% rated eggs and milk as poor or fair.

As Table 9 indicates, about half of households considered the variety of fresh fruit and vegetables available to be only “sometimes” adequate.

Two thirds of households found the price of fresh fruit and vegetables higher than last year.

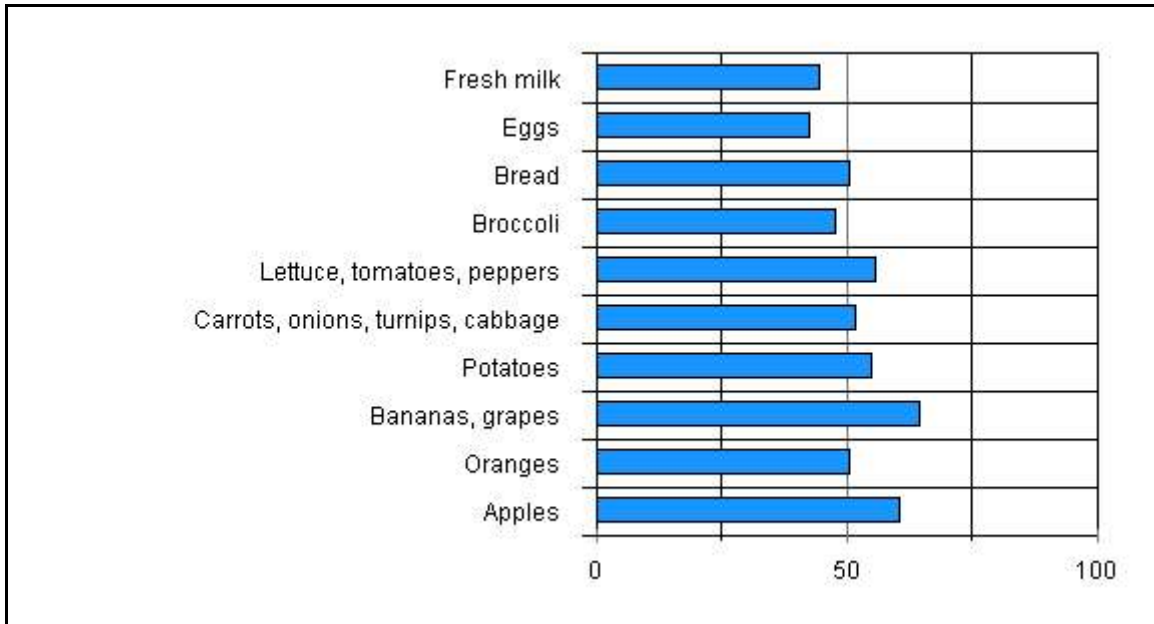


Figure 7 Percent of households rating foods poor or fair, Kangiqsujuaq, 2002

Frequency of food purchases in the past four weeks

The most frequently purchased fruits included apples, oranges, bananas and frozen fruit juice purchased by more than 80% of households. Among fresh and frozen vegetables, the most popular were French fries (85%), carrots (82%), onions (79%), and fresh potatoes (75%). About 80% of households purchased frozen pizza in the past four weeks. The most popular dairy products included cheese, yogurt, ice cream and boxed milk (UHT) (65 to 76% of households). Store meat was purchased by 78% of households.

Almost a third of Inuit households purchased between 6 and 10 kinds of fruit and vegetables in the past four weeks and 59% more than this amount (Table 10). Two thirds of non-Inuit households purchased 6 to 10 kinds of fruit and vegetables and one third more than 10 in the past four weeks.

Table 9. Perceptions of quality, variety and cost of perishable foods, all households, Kangiqsujuaq, 2002

Quality of perishable foods sold in Kangiqsujuaq	n	Poor %	Fair %	Good %	Excellent %	DK %	NA %
Apples	95	14	47	25	10	3	0
Oranges	95	4	47	37	9	1	0
Bananas, grapes	94	29	36	23	9	2	0
Potatoes	93	2	53	33	8	2	2
Carrots, onions, turnips, cabbage	95	5	47	29	16	1	1
Lettuce, tomatoes, peppers	93	14	42	27	5	11	1
Broccoli	95	7	41	29	8	10	3
Bread	95	8	43	40	6	0	2
Eggs	95	5	38	42	13	1	1
Fresh milk	94	6	39	40	12	1	1
Frozen store meat	95	4	45	35	10	3	2
Frozen vegetables	95	2	46	30	9	10	1
Other frozen food	95	0	50	37	7	4	1
Enough variety of fresh fruit and vegetables in Kangiqsujuaq (n=95)		%					
Always		16					
Most of the time		20					
Sometimes		57					
Never		4					
Don't know		3					
Total		100					
Price of fresh fruit and vegetables compared to same time last year (n=95)		%					
Higher		67					
Lower		1					
Same, no change		17					
Don't know		15					
Total		100					

Table 10. Percent of households who purchased fresh fruits and vegetables in the past four weeks, Kangiqsujuaq, 2002

	Inuit (n=88) %	Non-Inuit (n=6) %
Less than 6 fruits and vegetables	11	0
6 to 10 fruits and vegetables	31	67
More than 10 fruits and vegetables	59	33
More than 20 fruits and vegetables	12	0

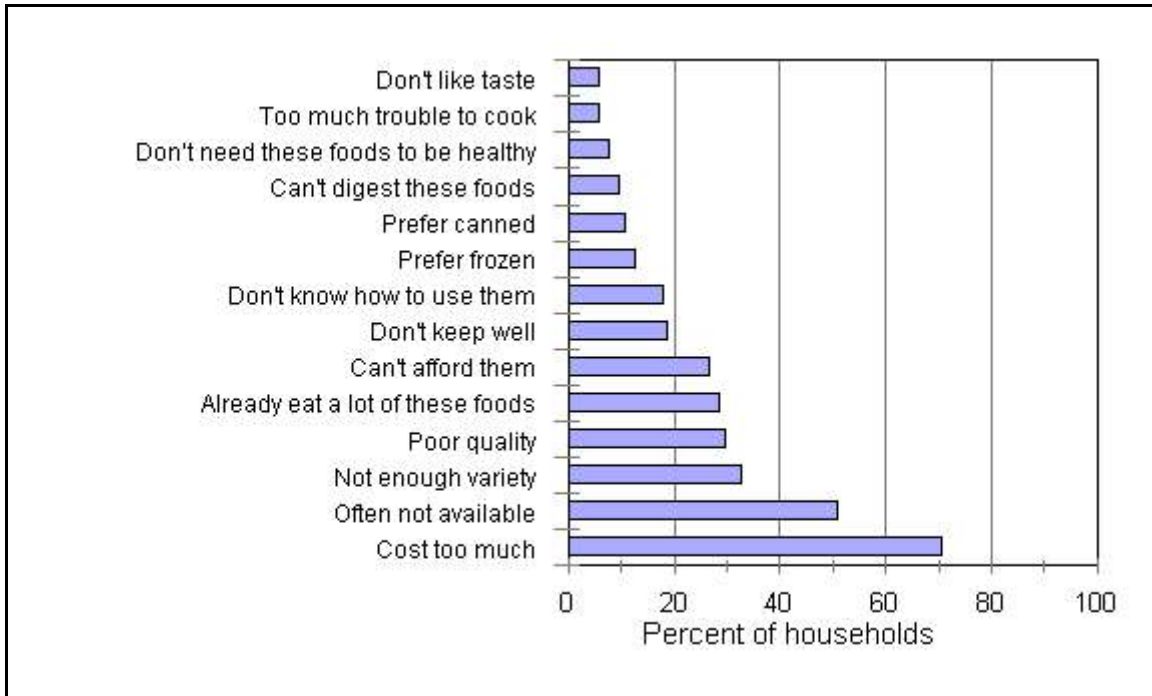


Figure 8 Reasons for not buying more fresh fruit and vegetables, Inuit households, Kangiqsujaq, 2002

For Inuit households, the most important barriers to buying more fruits and vegetables were cost (71%), poor availability (51%), not enough variety (33%), and poor quality (30%) (Figure 8). Twenty-nine percent said they already ate a lot of these foods. Very few respondents cited a greater preference for canned or frozen products, a dislike of the taste, a belief that these foods were unnecessary to good health or a lack of knowledge regarding the preparation of these foods.

The major reasons for not buying more fresh or boxed milk were cost (53%), affordability (26%), availability (30%) and milk being sour (22%). Thirty-seven percent said they already buy a lot of milk. About 20% had difficulty digesting milk and 11% felt that they didn't need milk to be healthy. Very few respondents preferred canned or powdered milk.

Nutrition Survey Results

Respondent Profiles

Eighty-three women aged 15 to 44 participated in the nutrition survey, 77 of whom were Inuit with an average age of 27. Six Inuit women were pregnant and two breastfeeding at the time of the survey.

Food Frequency Questionnaire

According to the Food Frequency Questionnaire, the most frequently consumed country foods, in descending order of importance, in the previous month were ptarmigan, Arctic char, caribou, seal fat or oil, geese and blubber (Figure 9). Small amounts of seafood, seal, and muktuk were also reported. Since no additional country foods were reported in the 24-hour recall, the Food Frequency Questionnaire was obviously sufficiently comprehensive.

Among Inuit women, the most frequently consumed store foods, in descending order of importance, were frozen fruit juice, pop, white bread, frozen fruit drinks, potato chips, apples, coffee, tea, oranges, chocolate bars and bannock (Figure 10). Fresh or boxed milk was reported eleven times in the past month and yogurt, seven times. Baked bannock was reported an average of six times and fried bannock (not deep-fried), ten times in the past month. Unlike the 1992 Santé Québec findings, white bread was more popular than bannock⁴.

As Figure 11 illustrates, fruit juice (fresh and frozen), apples, oranges and bananas were the most popular fruit, reported more than ten times in the past month. The most popular vegetables, in descending order of importance, were frozen French fries, fresh potatoes and onions. Non-Inuit women reported a more frequent consumption of whole wheat bread, and dairy products, less pizza, coffee, pop and white bread, and very little country food.

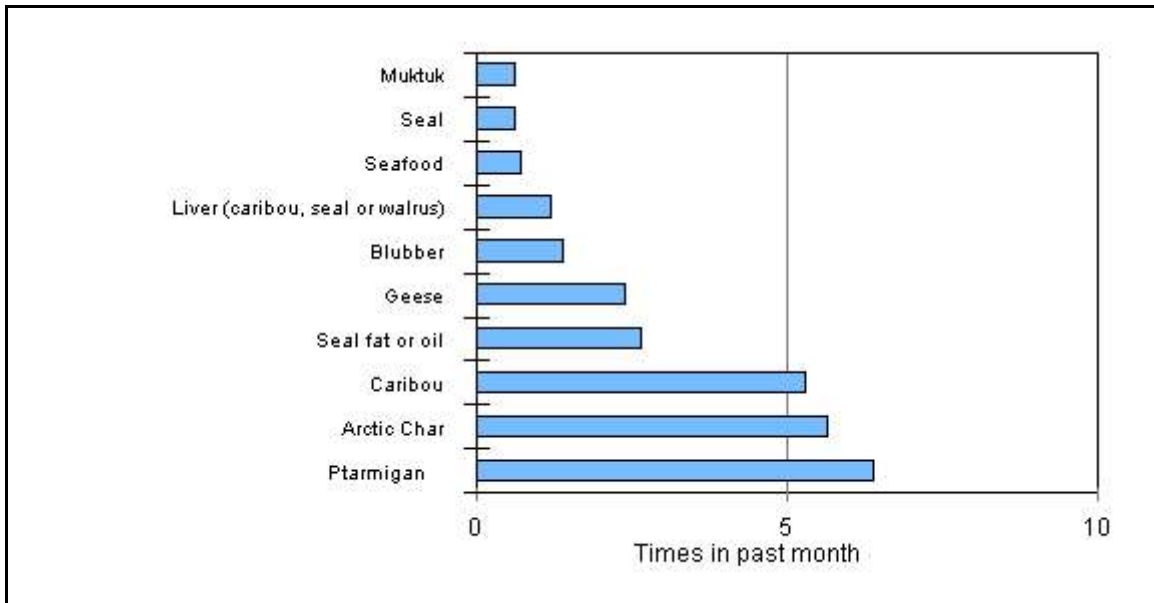


Figure 9 Average number of times country foods were reported eaten in the past month, Inuit women, Kangiqsujaq, 2002

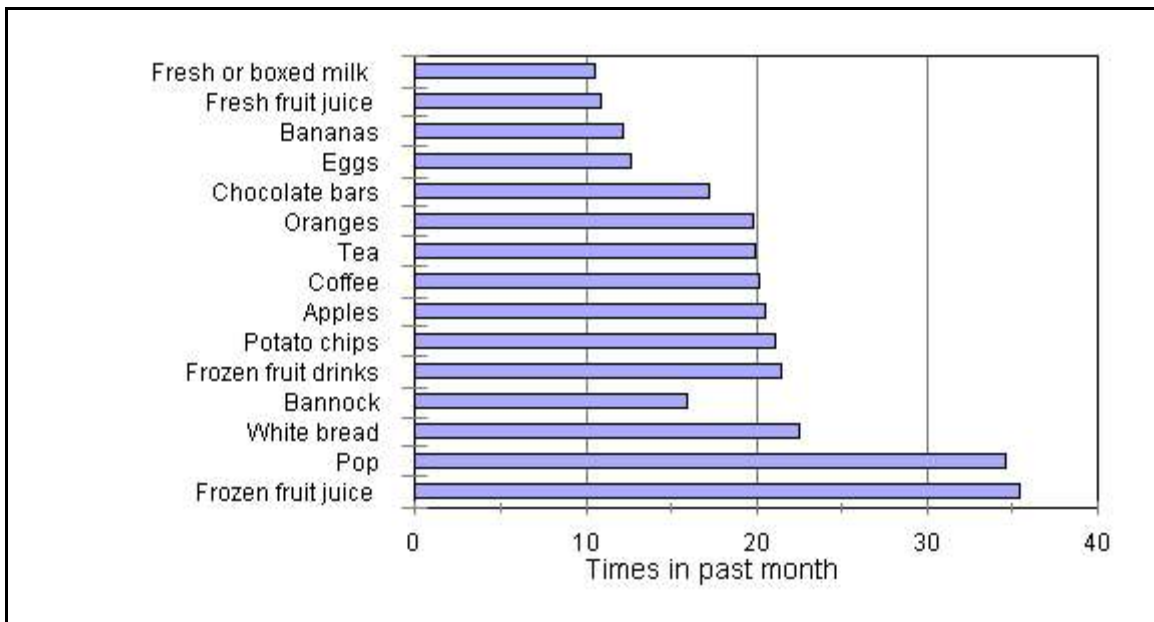


Figure 10 Average number of times store foods were reported consumed in the past month, Inuit women, Kangiqsujaq, 2002

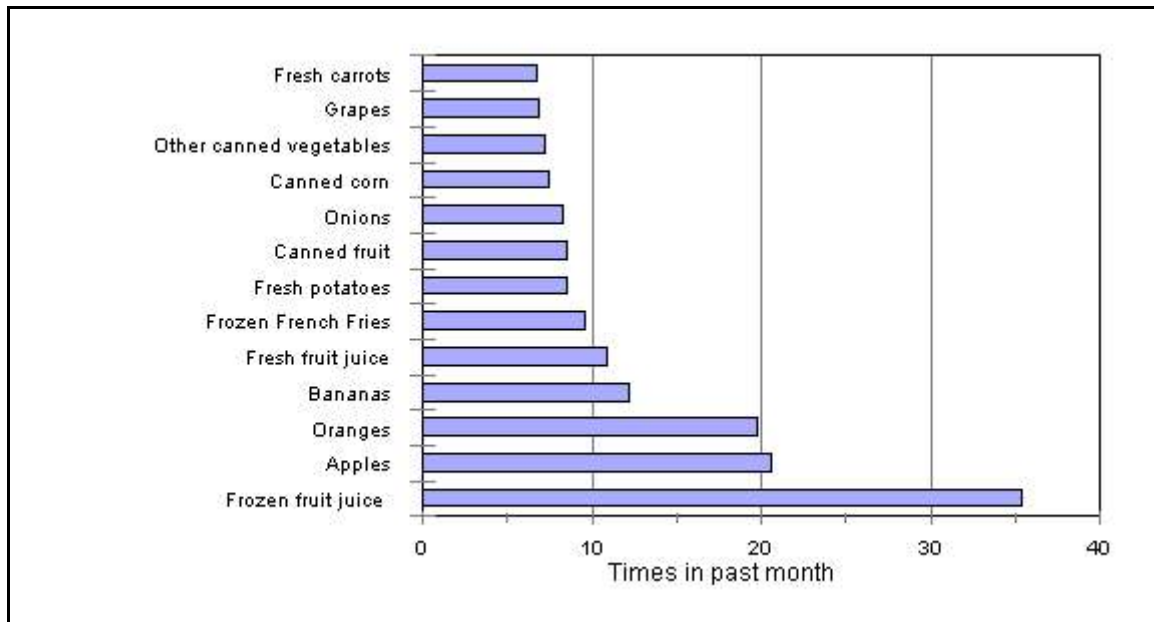


Figure 11 Fruit, juice and vegetables reported most frequently in the past month, Inuit women, Kangiqsujuaq, 2002

Food Preparation Methods

Butter was used as a spread for bannock or bread by more women than margarine (70% versus 23%). Fresh or boxed 2% milk was the most common form of milk used on cereal and in the preparation of mashed potatoes, macaroni and cheese dinner and bannock. However, 38% of women used water to prepare bannock. In coffee, women used either 2% milk or powdered coffee whitener (44% each), while in tea, two thirds used 2% milk and about 20% did not add any milk, cream or whitener. About a third added sugar to coffee and about 40% added sugar to tea. Thirty-eight percent of women do not make bannock and of those who do, about 60% use lard in its preparation. Butter was the preferred fat for frying bannock and fish. It is interesting to note that fried bannock was made on top of the stove with very little fat, rather than deep fried.

Food Consumption Patterns (24-hour recall)

Country food

Among Inuit women, the average consumption of country food was 114 grams per day. No country fat was reported. Country Meat, Birds and Fish accounted for 55% of the total amount of Meat, Poultry and Fish. As Figure 12 indicates, Arctic char and goose were the most important country foods (53 and 46 grams, respectively), followed by ptarmigan (9 grams), and caribou (5 grams). A small amount of seal was also reported. Country food consumption tended to be higher among women 25 to 44 years of age than in younger women ($p=0.19$ for Calories and $p=0.24$ for amount). Plots of the amount of country food and Calories from country food against age shows a wide variation among individuals in the consumption pattern, but a trend toward higher consumption in the older age group. A similar, but somewhat stronger positive relationship between consumption of country food and age has been documented elsewhere^{1 41}.

Dependent variable	Age group	Mean intake	p value
Calories	15 to 24	173	$p=0.19$
	25 to 44	257	
Amount (g)	15 to 24	92	$p=0.24$
	25 to 44	135	

Store foods

Dairy Products

Two percent milk and yogurt were the most important dairy products, a finding supported by the Food Frequency Questionnaire Table 11). Very little canned evaporated milk was reported. The average of all dairy products consumed amounted to approximately one fifth of a serving.

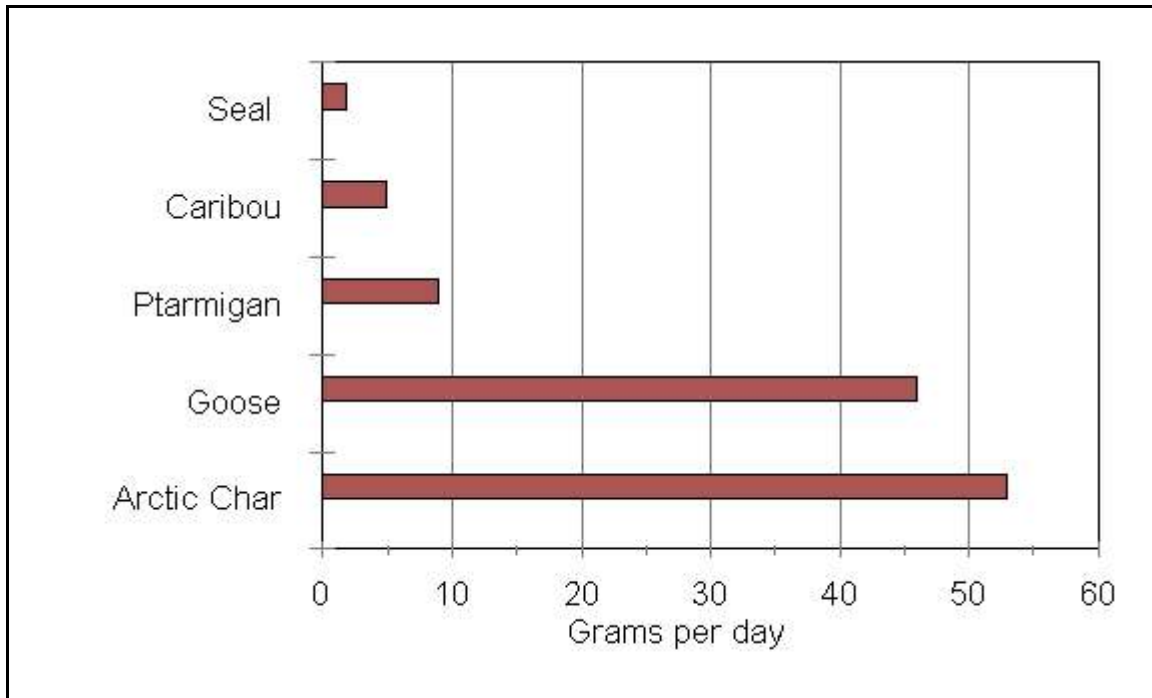


Figure 12 Average consumption (grams) of country foods, 24-hour recall, Inuit women, Kangiqsujuaq, 2002

Table 11. Mean daily amounts of Dairy Products consumed by Inuit women: 24-hour recall, Kangiqsujuaq, 2002

Food Mail category	Food	Amount (grams)
Nutritious Perishable	Ice cream	3
Non-perishable	Milk, evaporated, whole, canned	1
Priority Perishable	Cheese, processed, cheddar	1
	Yogurt	6
	Milk, fluid, 2%	35
Total (all Dairy Products)		48

Note: Includes foods with an average consumption of 1 gram or more.

Store Meat, Poultry and Fish

According to the 24-hour recall, store Meat, Poultry and Fish were less important than country food (93 grams versus 114 grams) (Table 12). One quarter of store Meat, Poultry and Fish was frozen, breaded, fried chicken, while other chicken accounted for 29% and ground beef and pork, 14% each.

Table 12. Mean daily amounts of store Meat, Poultry and Fish consumed by Inuit women: 24-hour recall, Kangiqsujuaq, 2002

Food Mail category	Food	Amount (grams)
Nutritious Perishable	Beef, ground	13
	Pork	13
	Beef	5
	Wieners	3
	Chicken	27
Non-perishable	Luncheon meat, pork, canned	3
Convenience Perishable	Breaded fried chicken	22
Total (all store Meat, Poultry and Fish)		93

Note: Includes foods with an average consumption of more than 1 gram.

Cereal Products

This group includes all pasta except pasta and cheese dinners (e.g., Kraft Dinner), which are included with Miscellaneous Foods. The most important cereal products were instant rice, pasta, and white bread (Table 13). Only small amounts of flour, ready-to-eat and cooked breakfast cereals were reported.

Table 13. Mean daily amounts of Cereal Products consumed by Inuit women: 24-hour recall, Kangiqsujuaq, 2002

Food Mail category	Food	Amount (grams)
Nutritious Perishable	Bread and rolls, white	26
	Oatmeal, cooked	6
Non-perishable	Rice, all types, cooked	46
	Pasta, cooked	32
	Flour	6
	Pilot biscuits and crackers	2
	Cake and pancake mixes, dry	4
	Ready-to-eat breakfast cereals	8
Total (all Cereal Products)		124
Note: Includes foods with an average consumption of more than 1 gram.		

Fruits and Vegetables

The average consumption of fruit and vegetables was about two and a half servings per day compared to the Canadian nutrition recommendations of five to ten servings per day. The most popular foods in this group were frozen fruit juice, apples, fresh orange juice, grape juice (bottled or in Tetra Pak), fresh potatoes and frozen French fried potatoes (Table 14).

Fats and Oils

According to the 24-hour recall, Inuit women consumed an average of five grams of fats and oils. The most commonly consumed fats were margarine (45%) and butter (33%).

Sugar and Sweets

Total average consumption of Non-perishable Sugar and Sweets (excluding Foods of Little Nutritional Value) was 278 grams. This group includes frozen and canned fruit punch, gelatin mix, sugar and fruit drink crystals with vitamin C. Frozen fruit punch, which was eligible for shipment as a Non-perishable food under the Food Mail Program until January 2004, was the most important food in this group, with an average daily consumption of 216 grams (including added water), followed by fruit drinks with vitamin C (canned, bottled or Tetra Pak).

Table 14. Mean daily amounts of Fruits and Vegetables consumed by Inuit women: 24-hour recall, Kangiqsujaq, 2002

Food Group	Food Mail category	Food	Amount (grams)		
Citrus and Tomatoes	Non-perishable	Apple Juice, canned, bottled or Tetra Pak, with vitamin C	10		
		Tomato sauce and paste, canned	3		
		Tomatoes, whole, canned	3		
	Nutritious Perishable	Orange juice, fresh	16		
		Oranges	12		
	Priority Perishable	Grapefruit	2		
		Orange juice, frozen, reconstituted	83		
		Apple juice, frozen, reconstituted	5		
		Other Fruit	Non-Perishable	Grape juice, bottled or Tetra Pak	15
				Fruit (pears, peaches, fruit cocktail), canned	7
Priority Perishable	Apples	24			
	Grape juice, frozen, reconstituted	10			
	Melons	3			
	Bananas	2			
	Kiwifruit	2			
	Grapes	1			
	Potatoes	Nutritious Perishable	Potatoes, French-fried and hash brown, frozen	12	
Non-perishable		Potatoes, instant mashed	1		
Priority Perishable		Potatoes, fresh	14		
Other Vegetables	Non-perishable	Corn, canned	6		
		Vegetable juice, canned	5		
		Other canned vegetables	7		
	Priority Perishable	Caesar salad mix	5		
		Mixed vegetables, frozen	3		
		Onions	6		
		Carrots	4		
		Rutabaga	2		
		Other fresh vegetables	9		
Total (all Fruits and Vegetables)			301		
Note: Includes foods with an average consumption of 1 gram or more.					

Miscellaneous Foods

This group includes Nutritious Perishable foods such as pizza and bottled water, Non-perishable foods like tea, coffee, macaroni and cheese dinner, prepared soup mix, canned soup, canned pasta and beef stew, and Convenience Perishables such as packaged sandwiches and burgers, and frozen dinners containing pasta or fried breaded or battered food. Municipal water, including the water used in coffee, tea and soup, is also included in this group. An average of 679 grams of Miscellaneous Foods were reported, 82% of which was Non-perishable food (Table 15).

Table 15. Mean daily amounts of Miscellaneous Foods consumed by Inuit women: 24-hour recall, Kangiqsujuaq, 2002

Food Mail category	Food	Amount (grams)
Nutritious Perishable	Frozen pizza	44
	Frozen dinners	3
	Water, bottled	28
Non-Perishable	Coffee, brewed	138
	Tea, brewed	220
	Water, municipal	62
	Macaroni and cheese dinner, prepared	35
	Soup mix, prepared	38
	Soup, canned, prepared	25
	Mixed dishes, beef stew, canned	6
	Canned spaghetti sauce with meat	11
	Mixed dishes, corned beef hash	6
	Canned pasta	2
	Frozen fried rice	5
Convenience Perishables	Packaged sandwiches and burgers	24
	Frozen pasta dinners	2
	Frozen dinners with breaded or battered foods	14
Total (all Miscellaneous Foods)		679
Note: Includes foods with an average consumption of more than 1 gram.		

Foods of Little Nutritional Value

A total of 564 grams of Foods of Little Nutritional Value were consumed per day (Table 16). This included an average of approximately 1.3 cans of pop and one third of a chocolate bar. Women reported an average consumption of approximately one half of a small bag of potato chips per day.

Table 16. Mean daily amounts of Foods of Little Nutritional Value consumed by Inuit women: 24-hour recall, Kangiqsujuaq, 2002

Food	Amount (grams)
Cookies	10
Cakes and muffins, fresh or frozen	7
Potato chips	22
Fruit drink crystals, no vitamin C, with water	41
Soft drinks	459
Candies	2
Coffee whitener (non-dairy), powdered	1
Chocolate bars	15
Total (all Foods of Little Nutritional Value)	564
Note: Includes all foods of 1 gram or more.	

Health and Lifestyle of Women

Self-rated health status

Sixty-three percent of Inuit women rated their health as fair or poor (Figure 13), compared to about 50% in the Santé Québec survey of women 18 to 44 in Nunavik in 1992⁴. This was also higher than that reported for Nunavut women aged 15 to 44 as reported in earlier INAC surveys³. By comparison, only 6.9% of Canadian women aged 15 to 44 rated their health at this level in 2000-2001⁴².

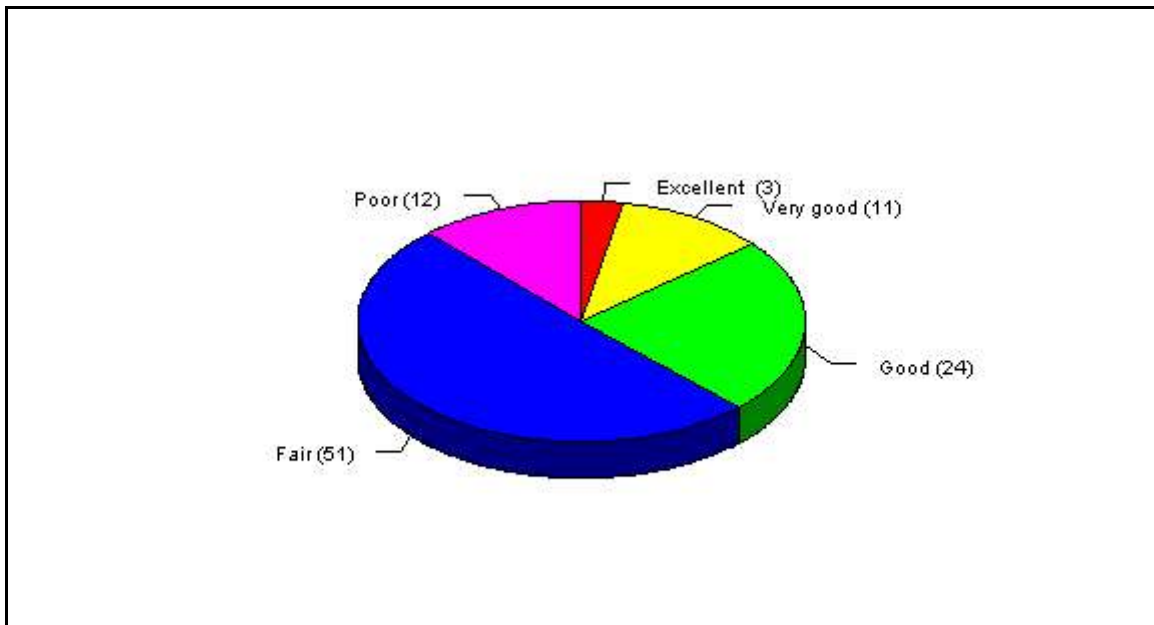


Figure 13 Percent of Inuit women by self-rated health status, Kangiqsujuaq, 2002

As the following tables demonstrate, almost all women who were food insecure rated their health as fair or poor, and there was a significant relationship between food insecurity and self-rated health.

Nutrition and Food Security in Kangiqsujuaq, Nunavik

Health of women	Adult food security			Total
	Food secure	Food insecure	Hungry	
Fair or poor	21	20	4	45
Good, very good or excellent	21	4	3	28
Total	42	24	7	73

Chi-Square p=.03
Fisher exact p=.02

Health of women	Child food security			Total
	Food secure	Food insecure	Hungry	
Poor or fair	19	21	3	43
Good, very good or excellent	20	4	1	25
Total	39	25	4	68

Chi-square p=.01
Fisher exact p=.01

Only 5% of Kangiqsujuaq women reported medical conditions that affected their diet.

Smoking

In 1997, Dr. Stephen Hodgins, Director of Public Health for the NRBHSS, attributed one third of deaths in Nunavik to smoking. He attributed much of the serious infections and death, as well as many developmental problems among Nunavik infants, to second-hand smoke exposure⁴³.

In this survey 79% of Inuit women of child-bearing age smoked, a rate unchanged from 1992 for Nunavik as a whole¹. However, only two out of the six pregnant women smoked (Table 17, Figure 14).

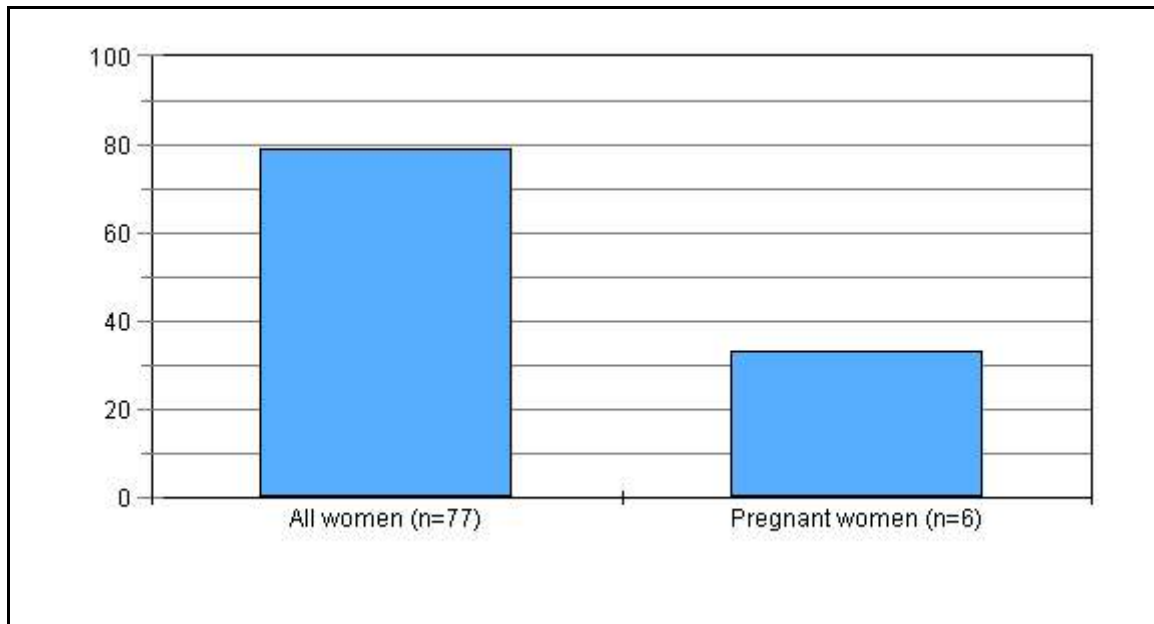


Figure 14 Smoking rate among Inuit women of child-bearing age, Kangiqsujaq, 2002

On average, women started smoking at 13 years of age. Most smoked every day, smoking an average of 10 cigarettes per day (all women) and 5 per day (pregnant women).

Table 17. Smoking, Inuit women, Kangiqsujaq, 2002

Smoking rate	%
All women (n=77)	79
Pregnant women (n=6)	33
Average age women started smoking (n=63)	13
Frequency of smoking among smokers (n=61)	%
Every day	82
Occasionally	18
Total	100
Average number of cigarettes per day	
All women	10
Pregnant women	5

Weight-related health risks

The BMI includes both height and weight and is used to provide an estimate of body fat. It is an indicator of health problems associated with underweight, overweight and obesity. There is a continuous relationship between BMI and the risk of illness and death ⁴⁴.

In Canada, obesity has been increasing among adults in the general population over the past two decades ^{45 46 47}. This condition is also prevalent among Inuit adults, affecting 19% of Nunavik adults in 1992 ¹. According to the Canadian Guidelines for Body Weight Classification in Adults, the classification system established for Canadians in general applies to Inuit populations ⁴⁴. It is important to note that little research has been done to establish the health risks associated with body weight and body fat distribution among Inuit and that some racial/ethnic groups may be more susceptible to health problems associated with obesity than others. However, the 1992 Santé Québec survey found the prevalence of high blood pressure greater among obese Inuit adults ⁴⁸.

Weights and heights were available for a total of 47 non-pregnant Inuit women. Every effort was made to convince the participants to have their weight and height measurements recorded at the clinic. However, due to very poor weather conditions, a lack of babysitters and a general reluctance among participants to be weighed, we were only able to do clinic measurements for 18 women. Many of the women were familiar with their weight. As a measure of overweight in a population, self-reported weights and heights are considered appropriate for adults up to 60 years of age ⁴⁹. Most studies have found that self-reported weights tend to underestimate actual weight and overestimate height and this is especially true among overweight women ^{50 51 52}. This issue has only been examined for the Inuit population by Kuhnlein et al. They found no statistically significant differences between an individual's self-reported weight and their measured weight ². However, the distribution of weights and heights of those who refused to provide these measurements by one method or the other may differ from the distribution of reported measurements.

Half of non-pregnant women were in the healthy weight range of 18.5 to 24.9, and the remainder had a BMI of 25 or more – a level considered to increase the risk of certain chronic diseases, including heart disease, hypertension, type 2 diabetes, insulin resistance, osteoarthritis, some types of cancer and gallbladder disease. Seventeen percent had a BMI of 30.0 to 34.9 (high risk), 4% had a BMI of 35.0 to 39.9 (very high risk) and 2% were at extremely high risk with a BMI over 40 (Figure 15) ⁴⁴.

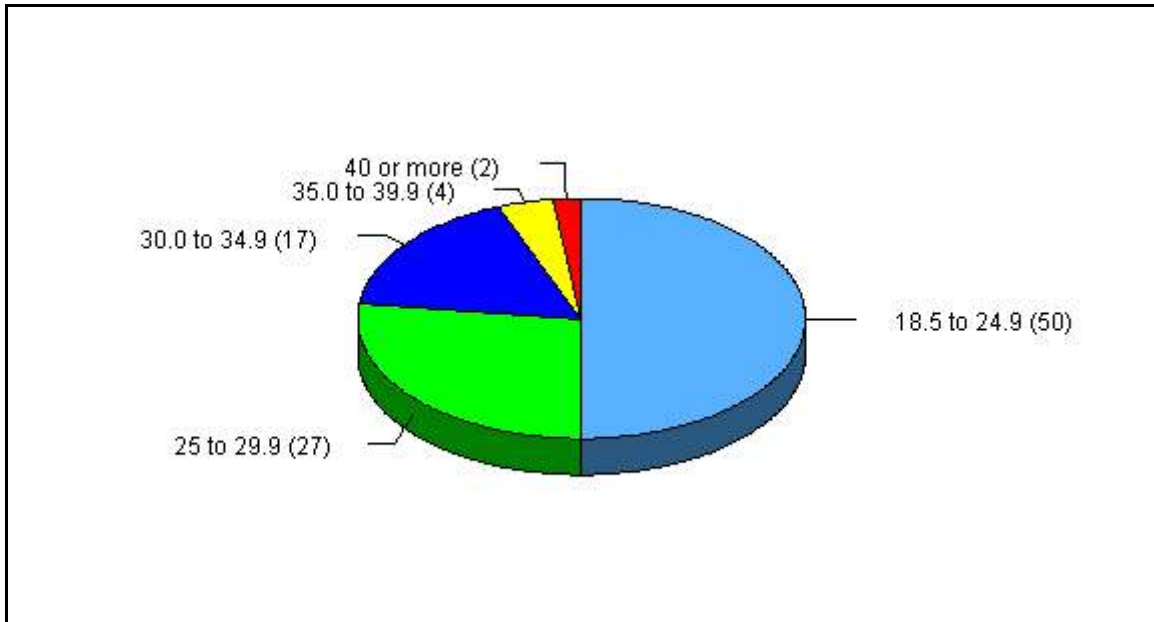


Figure 15 Percent of non-pregnant Inuit women by BMI category, Kangiqsujaq, 2002

Until recently, the waist/hip ratio (WHR) was thought to be of greater significance to the risk for heart disease and diabetes than the BMI, the risk increasing at a WHR of 0.88 or more for women. A high WHR ratio may be related to the “thrifty gene” concept which suggests that people coming from a harsh environment, where food supplies are often scarce, develop an ability to store fat more efficiently. This promotes weight gain and predisposes an individual to insulin resistance. The WHR ratio is strongly correlated with the presence of insulin resistance, and is considered one of the components of the metabolic syndrome (high triglycerides levels, low-density lipoprotein-apoprotein B, uric acid and/or microalbuminuria) so prominent in type 2 diabetes and in cardiovascular disease^{53 54}. Unfortunately, only 18 non-pregnant women had waist-hip measurements taken, so the sample may not be representative. Of these, 28% had a WHR of 0.88 or more.

Waist circumference (WC) is now replacing the WHR as a an indicator of increased health risk associated with obesity⁴⁴. The WC is considered by the World Health Organization (WHO) to be a more practical measure of abdominal fat, which includes under-skin fat and visceral fat (fat around internal organs), is more closely related to health risk than the WHR and is recommended as an adjunct to the BMI for assessing health risks for those with a BMI in the 18.5 to 34.9 range⁵⁵. A large amount of visceral fat is associated with insulin resistance, hyperinsulinemia, glucose intolerance and

hyperlipidemia, all of which are risk factors for type 2 diabetes and cardiovascular disease^{55 56 57 58}. In women, a WC of 80 cm or more is associated with an increased risk for type 2 diabetes and cardiovascular disease. A WC of 88 cm or more is associated with a substantially increased risk of these diseases^{59 60}. In this study, only 16 women with a BMI under 35 agreed to a waist circumference measurement. Nine women had a WC of 80 cm or more, placing them at increased risk and 25% at substantially increased risk of obesity-related diseases such as type 2 diabetes, cardiovascular disease and hypertension.

Activity level

In response to the question on general activity levels, 35% of Inuit women in Kangiqsujuaq were sedentary, 29% were engaged in light activity, 22% were moderately active and 13% very active. Most women spent less than one month on the land in the past year.

Energy and Macronutrient Intake

Energy

Estimating energy requirements is a complex task, since requirements are influenced by a number of factors, including age, sex and activity level. The best way to estimate energy requirements is to consider the BMI in relation to age and sex plus activity level. The questions used in this survey to assess physical activity were very general, and did not provide a precise description of activity patterns. More detailed questions are available based on the number of minutes per day spent on different activities. However, these activities are ones commonly engaged in by southern Canadians and do not include common activities of the Inuit (e.g., hunting, fishing, snowmobiling, picking berries, etc.). Energy requirements are believed to increase by 5% in cold climates, and there can be an additional energy cost (2 to 5%) due to the increased weight of clothing, especially in active individuals^{61 62}.

Means and median energy and macronutrient intake are presented for women who were not pregnant or lactating in Table 18. Mean and median energy intakes were 1954 and

1850 Calories, respectively. Mean energy intake was higher than that reported for all Nunavik women aged 18 to 44 in the Santé Québec survey (1869 Calories) in 1992 ¹.

Table 18. Mean and median energy and macronutrient intake, Inuit women 15 to 44, Kangiqsujaq, 2002

	Not pregnant or lactating (n=70)	
	Mean	Median
Calories	1954	1850
Protein (g)	86	77
Carbohydrate (g)	252	244
Fat (g)	67	64
Trans Fatty Acids (g)	0.7	0.1
Saturated Fatty Acids (g)	20.9	20.0
Polyunsaturated Fatty Acids (g)	12.3	10.6
Cholesterol (mg)	226	182
Total Sugars (g)	95	82
Dietary Fibre (g)	9.1	8.9
Alcohol (g)	1	0
Caffeine (mg)	187	134
% energy distribution		
Protein	18	
Carbohydrate	52	
Fat	31	
Saturated fat	9.6	

BMI was positively related to caloric intake ($p=0.07$), but not to socio-economic group. Caloric intake decreased with age ($p<.001$) and BMI tended to increase with age ($p=0.07$). A higher BMI, in spite of reduced caloric intake, may be evidence of under-reporting of energy intake, although it may also indicate that the reduction in caloric intake among older women has not kept pace with the reductions in energy requirements or activity level.

Mean energy intakes from Food groups are shown in Table 19. Meat, Poultry and Fish provided 24% of energy, almost half of this from country food. Frozen fried breaded chicken accounted for 13% of the energy contribution of this group. Foods of Little

Nutritional Value (mainly pop, potato chips and chocolate bars) contributed an equal amount of energy. Miscellaneous foods, for example, pizza, macaroni and cheese dinner and packaged sandwiches, provided 18% of energy, followed by Cereal Products at 11%.

Table 19 also presents a comparison of mean energy intake with the Santé Québec Health survey for Nunavik women aged 18 to 44 in 1992. While differences in survey methodology, season, sampling and interviewing protocol make it difficult to compare the results with the current study, it is interesting to note the differences in sources of energy. In 2002, women reported more energy from fruits and vegetables, miscellaneous foods (pizza, macaroni and cheese dinner) and Foods of Little Nutritional Value, especially potato chips and soft drinks. These foods, including many prepared foods, seem to have partially replaced country food, cereal products (bread and flour), and non-perishable fats, such as lard, as sources of energy. Of course, it is difficult to know if this observation represents a real change, or whether it indicates an under-reporting of foods on either survey. It is possible that the low consumption of pizza and Foods of Little Nutritional Value in 1992 was due to under-reporting, which might be attributed to a bias created by having nurses rather than local women conduct the 24-hour recalls and the reluctance of respondents to report these foods.

Sources of energy

Protein and carbohydrate accounted for 18% and 52% of energy, respectively (Figure 16). The percentage of energy derived from carbohydrate was well within nutrition guidelines (45 to 65%), and was considerably higher than that reported for Nunavik Inuit women of this age in 1992 (43%)¹. Fat provided 31% of their energy, also within the Acceptable Macronutrient Distribution Range (AMDR) of 20 to 35% of energy. Saturated fat provided 9.6% of energy intake, again within the generally recommended limit (8 to 10% of calories) and lower than that reported in 1992 for all women of this age (10.9%)^{1 63}.

Table 19. Mean energy intake (Calories) from food groups and Food Mail categories, Inuit women 15 to 44, Kangiqsujaq, 2002 and Inuit women 18 to 44, Nunavik, 1992

Food group	Food Mail category	2002		1992*	
		Mean	%	Mean	%
Dairy Products	Priority Perishable	31	1.6		
	Nutritious Perishable	8	0.4	52	2.8
	Non-perishable	1	0.1	10	0.5
Eggs	Priority Perishable	22	1.1	32	1.7
Meat, Poultry, Fish	Nutritious Perishable	173	8.8	185	9.9
	Non-perishable	13	0.7	8	0.4
	Country	218	11.1	370	19.8
	Convenience Perishable	60	3.1	23	1.2
Alternates	Nutritious Perishable			3	0.2
Cereal Products	Nutritious Perishable	67	3.4	118	6.3
	Non-perishable	153	7.8	223	11.9
Fruits, Vegetables	Priority Perishable	100	5.1		
	Nutritious Perishable	31	1.6	104	5.6
	Non-perishable	48	2.5	27	1.4
	Country			3	1.2
Fats, Oils	Nutritious Perishable	31	1.6	52	2.8
	Non-perishable	9	0.4	115	6.2
	Country			36	1.9
Sugar, Sweets	Non-perishable	159	8.1	120	6.4
Miscellaneous	Nutritious Perishable	123	6.3	20	1.1
	Non-perishable	121	6.2	54	2.9
	Convenience Perishable	112	5.7	7	0.4
Foods of Little Nutritional Value		475	24.3	309	16.5
Cereal Products		57	2.9	32	1.7
Potato Chips		115	5.9	75	4.0
Sweets		288	14.7	174	9.3
Miscellaneous		4	0.2	7	0.4
Alcohol		12	0.6	20	1.1
Total		1955	100.0	1869	100.0

* Source: Lawn J. *An Update on Nutrition Surveys in Isolated Northern Communities*. Ottawa: Indian and Northern Affairs Canada, 2002.

Note: In 1992, the category of Nutritious Perishables included Priority Perishables, and Foods of Little Nutritional Value included packaged sandwiches and burgers. The 2002 data included packaged sandwiches and burgers with the Convenience Perishable category.

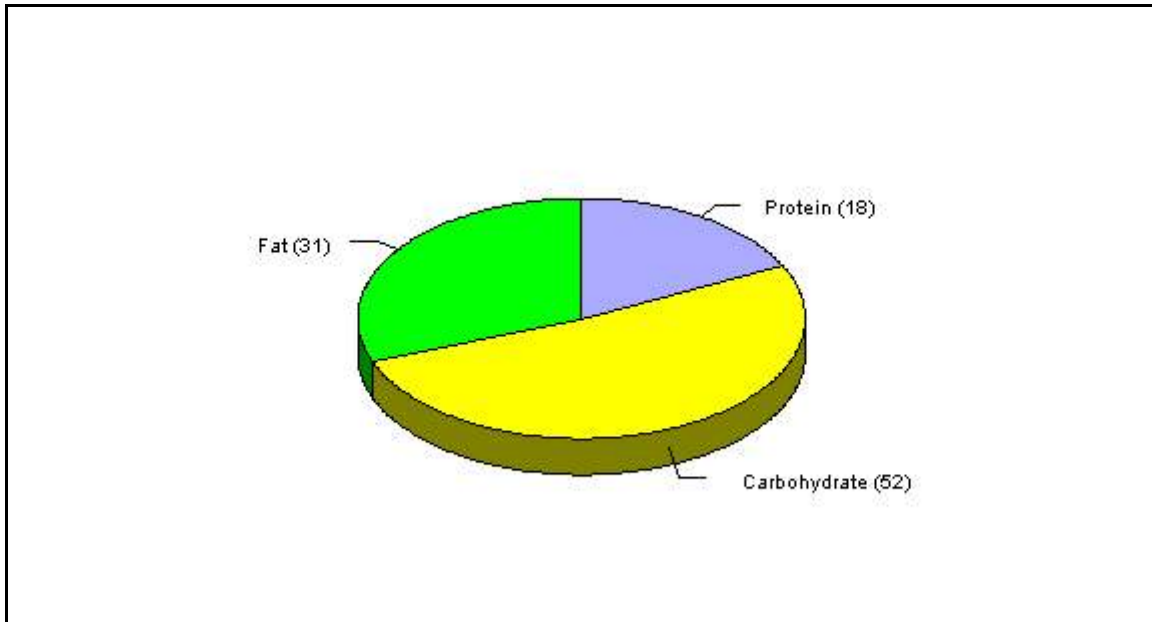


Figure 16 Percent energy from protein, carbohydrate and fat, non-pregnant, non-lactating Inuit women, Kangiqsujuaq, 2002

Protein, carbohydrate and fat

Mean intake of protein was 86 grams, similar to that reported for Nunavik women in 1992¹. Mean intakes of carbohydrate and fat were 252 grams and 67 grams, respectively, and mean saturated fat intake was 20.9 grams. In the 1992 survey of Nunavik women, mean carbohydrate intake was 201 grams and mean fat intake 76 grams¹.

Mean intake of trans fatty acids was 0.6 grams. However, since trans fatty acid data in the CNF are missing for a number of foods, including French fried potatoes, potato chips, crackers and cookies, actual intake would be much higher than this amount. French fries are estimated to contain between 1.72 and 3.38 grams of trans fatty acids per 100 grams⁶⁴. If these values were included, the mean trans fatty acid intake would be between 0.8 grams and 1.0 g per day. Trans fatty acid intake is positively associated with blood total and low-density-lipoprotein (LDL) cholesterol concentration, and therefore with a higher risk of cardiovascular disease⁶³. Some investigators have found trans fatty acids associated with a higher risk of type 2 diabetes⁶⁵.

Mean cholesterol intake was within the recommended range of 300 mg/d or less.

Individuals who are genetically susceptible to obesity are more likely to gain weight on a high-fat diet than those who lack these genes. High intakes of saturated fat, trans fatty acids and cholesterol increase blood total and LDL cholesterol concentrations and therefore the risk of cardiovascular disease. There is some evidence that individuals with a high WHR may respond differently to high-fat diets than those with a normal WHR, depositing more fat in the abdominal area ⁶⁶.

In animal studies, a high-fat (mostly saturated), refined-carbohydrate (sucrose) diet tends to favour obesity and an increase in plasma total cholesterol, LDL cholesterol and triglycerides, while a low-fat, complex carbohydrate diet does the reverse ^{67 68}. The AMDRs for fat are based on evidence indicating a risk for cardiovascular disease at both low intakes of fat and high intakes of carbohydrate and the evidence for increased risk of obesity and obesity-related diseases with high intakes of fat ⁶³. Traditional Inuit diets were very high in protein, and although they may have been just as high in fat as current levels, it is believed that the traditional high-protein and low-carbohydrate intake would favour low levels of LDL cholesterol. The fat consumed in the traditional diet would have contained a higher percentage of omega-3 fatty acids and less saturated fat than is the case today. There is growing evidence that higher intakes of omega-3 fatty acids may provide some protection against cardiovascular disease ⁶³. The traditional Inuit lifestyle, which relied heavily on marine mammals to provide an abundant supply of antioxidants such as vitamin A, vitamin E and selenium, together with a more active lifestyle, less stress, less smoking, and a lower salt intake, may have acted together to protect against heart disease and diabetes ⁶⁹.

Sources of fat and saturated fat

The major sources of fat, in descending order of importance, were potato chips and chocolate bars (23%), store meats (16%), pizza and packaged sandwiches and burgers (Table 20). Country food provided only 13% of fat. Saturated fat came mainly from Foods of Little Nutritional Value (potato chips and chocolate bars) (25%), store meat and poultry (22%), pizza, country food and packaged sandwiches and burgers.

Table 20. Mean fat and saturated fat intake (grams per day) from major sources, Inuit women, Kangiqsujuaq, 2002

Food group	Food Mail category	Fat		Saturated fat	
		Mean	%	Mean	%
Dairy Products	Priority Perishable	1	2	0.9	4
	Perishable	0.5	1	0.3	1
Eggs	Priority Perishable	2	2	0.5	2
Meat, Poultry, Fish	Nutritious Perishable	10	16	3.5	16
	Non-perishable	1	2	0.4	2
	Country	9	13	1.9	9
	Convenience Perishable	3	5	0.8	4
Fruits, Vegetables	Priority Perishable	1	2	0.2	1
	Perishable	1	1	0.2	1
Fats, Oils	Nutritious Perishable	3	5	1.1	5
	Non-perishable	1	1	0.3	1
Miscellaneous	Nutritious Perishable	6	10	2.2	10
	Non-perishable	3	5	1.2	6
	Convenience Perishable	6	9	1.8	8
Foods of Little Nutritional Value		15	23	5.3	25
Total (all sources)		67		21.1	

Fibre

As in other surveys of Inuit women, median total dietary fibre intake was low – only 4.7 grams per 1000 Calories, or a third of the Adequate Intake (AI) for adults 19 years of age and over. In 1992, mean fibre intake for Nunavik women was 3.9 grams per 1000 Calories, so the situation appears to be improved^{1 63}. This low intake is not surprising, given the low consumption of whole grains, fruits and vegetables.

A recent study on the effect of diet on cardiovascular disease, by the Children's Hospital Boston, followed 2909 adolescents over a ten-year period. They found that fibre consumption was a stronger predictor of insulin levels, weight gain and other

cardiovascular risk factors than total fat or saturated fat consumption. They concluded that high-fibre diets may protect against obesity and cardiovascular disease by lowering insulin levels ⁷⁰. After reviewing the evidence of the protective effect of fibre against cardiovascular disease, the DRI Committee concluded that the data are strong enough to make a recommendation for fibre intake and to support the claim that an increased fibre intake appears to benefit both men and women in this respect. The data suggest that an intake of 14 grams per 1000 Calories per day, particularly from cereals, will promote heart health ⁶³.

Caffeine

Mean caffeine intakes were only 187 mg compared to 300 mg for Nunavik women of this age in 1992 ¹. Levels were within Canadian health guidelines for adults and the maximum level of 300 mg per day recommended for women who are planning to become pregnant ⁷¹.

Vitamins

Adjusted mean and median vitamin intakes are presented in Table 21 for women who were not pregnant or lactating. Unfortunately, the sample of pregnant and lactating women was too small to analyse. Figure 17 shows the percentage of women with inadequate intake of certain vitamins. The C-SIDE software was used to estimate the percentage of the population with a usual intake below the EAR for all vitamins except folate. The wide variation in folate intake, combined with the small sample size, made it impossible to use the C-SIDE program to estimate usual intake distribution. We were able, however, to perform this estimate using the Health Canada approach, which is based on the U.S. National Research Council method ²¹.

Table 21. Adjusted mean and median vitamin intake of Inuit women 15 to 44, and percent with inadequate intake, Kangiqsujuaq, 2002

Not pregnant or lactating (n=70)					
		Mean	Median	EAR	% <EAR
Vitamin A	RE	400	361		
Vitamin C (Smokers)	mg	108	102	95	43
Vitamin C (Non-smokers)	mg	108	102	60	11
Thiamin	mg	1.42	1.41	0.9	1
Riboflavin	mg	1.65	1.63	0.9	1
Niacin	NE	39	37	11	0
Vitamin B6	mg	1.42	1.38	1.1	20
Dietary Folate Equivalents	µg	368	361	320	24
Vitamin B12	µg	8.3	7.0	2	3

Note: Means are adjusted by the C-SIDE software program, for all nutrients except Dietary Folate Equivalents. Due to the wide variability of folate intake and the small sample size, the C-SIDE software was unable to produce a normal distribution of intakes. For this reason, the Health Canada approach based on the NRC method was used and was able to produce an estimate of the percentage with an inadequate intake.

Note: The EAR represents the average daily nutrient intake level estimated to meet the requirements of half the healthy individuals in a particular life stage and gender group. The proportion with an intake below the EAR is considered to have a usual inadequate intake.

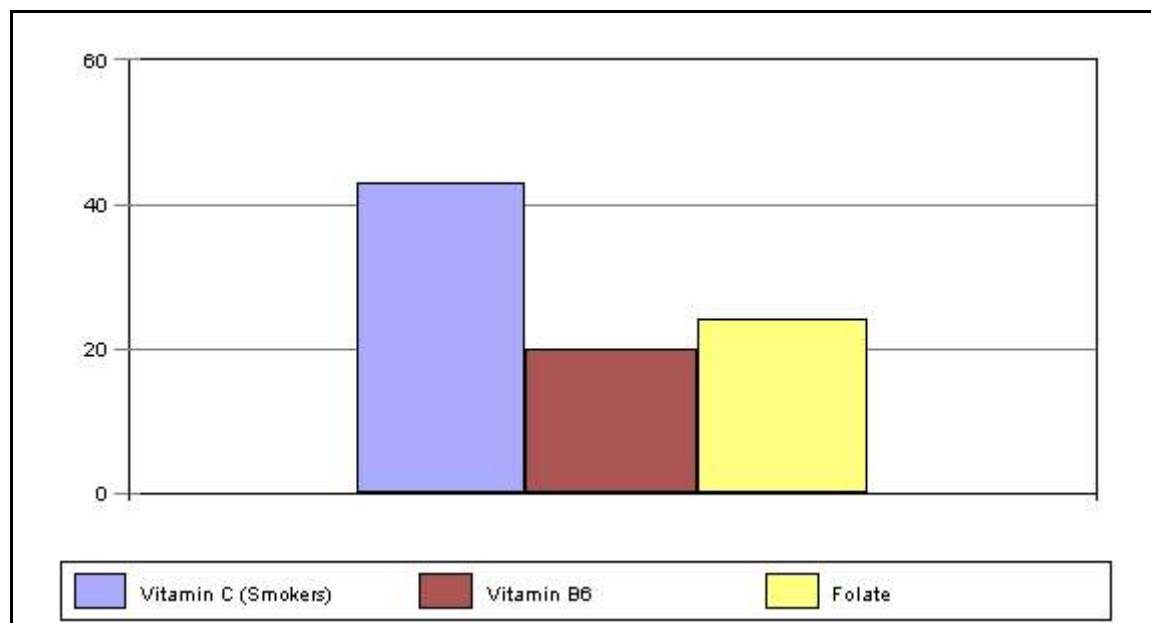


Figure 17 Percent Inuit women (not pregnant or lactating) with inadequate vitamin intakes, Kangiqsujuaq, 2002

Vitamin A

Mean and median intakes of vitamin A for women who were not pregnant or lactating were 400 RE and 361 RE, respectively, compared to a mean of 796 RE for Nunavik women in 1992 ¹.

The EAR for vitamin A is now expressed in Retinol Activity Equivalents rather than Retinol Equivalents. This new measure reflects changes to the conversion factors for carotenoids based on the most recent research ⁷². Unfortunately, since nutrient data for the Retinol Activity Equivalent of foods are not yet available, it was not possible to assess the probability of inadequacy of vitamin A.

Vitamin A is important for normal vision, gene expression and embryonic development and normal immune function. An inadequate intake may result in night blindness, embryonic lung defects, impaired T-cell function and a higher risk of respiratory infections and diarrhea. Vitamin A also interacts with other nutrients including iron. A number of studies suggest that vitamin A deficiency impairs haemoglobin formation, and therefore vitamin A supplementation in combination with iron may be more effective than iron alone in the treatment of anaemia ⁷³.

Preformed vitamin A is obtained from animal foods. It can also be manufactured in the body from provitamin A carotenoids found in dark green or orange fruits and vegetables. The most important traditional Inuit sources of vitamin A (retinol) are seal liver and eyes, narwhal blubber and polar bear fat – foods that were not reported on the 24-hour recall. Store foods rich in vitamin A include beef or pork liver, cheddar cheese, eggs, carrots, squash, frozen mixed vegetables, tomato sauce, butter and margarine.

The major sources of vitamin A in Kangiqsujuaq were fresh and canned carrots, Arctic char, eggs, milk, margarine and butter (Table 22). Other traditional foods (e.g., muktuk, marine mammal fat, and liver) that are rich sources of vitamin A were not being consumed at the time of the survey. It is possible that vitamin A intake would be higher in other seasons when these foods are more available. In 1992, country food provided 361 RE of vitamin A to the diet of women aged 18 to 44 in Nunavik.

Table 22. Mean vitamin A intake (RE per day) from major sources, Inuit women, Kangiqsujuaq, 2002

Food Mail category/Food group	RE	%
Priority Perishables		
Dairy Products	26	6
Eggs	25	6
Vegetables	119	28
Nutritious Perishables		
Fats and Oils	35	8
Miscellaneous	21	5
Non-perishable		
Miscellaneous	36	8
Country food	55	13
Convenience Perishable		
Meat, Poultry, Fish	3	1
Miscellaneous	16	4
Total (all sources)	430	

Vitamin C

Mean and median intakes of vitamin C were 108 mg and 102 mg, respectively. Mean intake was 60% higher than reported in 1992¹. Smoking depletes vitamin C stores in the body, increasing the EAR by approximately 58%. In this study, we present the EAR for smokers and non-smokers, but since the majority of women were smokers, the EAR for smokers is more appropriate. Using this standard, 43% of women had an inadequate intake of vitamin C⁷⁴. The EAR for vitamin C is much higher than that required to prevent a deficiency. Severe vitamin C deficiency is rarely seen in developed countries but is occasionally seen in individuals who eat few fruits and vegetables, among individuals with a restricted diet and in those who abuse alcohol or drugs. A severe deficiency leads to scurvy, a condition involving a breakdown of connective tissue, characterized by inflamed and bleeding gums and impaired wound healing. Individuals made vitamin C deficient, but not scorbutic, showed signs of inflamed gums and fatigue^{75 76}.

Traditional sources of vitamin C included raw meat, caribou stomach and stomach contents, seaweed, berries and wild plants. The richest sources of vitamin C among

store foods include oranges, orange juice, apple juice with added vitamin C, peppers and cabbage. The most important sources of vitamin C in Kangiqsujuaq were frozen and canned orange juice, canned apple juice, fresh and canned vegetables, canned and frozen fruit drinks with vitamin C and potato chips (Table 23).

Table 23. Mean vitamin C intake (mg per day) from major sources, Inuit women, Kangiqsujuaq, 2002

Food Mail category/Food group	mg	%
Priority Perishables		
Fruits and vegetables	52	38
Nutritious Perishables		
Vegetables	6	4
Non-perishable		
Fruits and vegetables	22	16
Sweets	43	31
Miscellaneous	2	1
Foods of Little Nutritional Value	11	8
Total (all sources)	139	

Vitamin B₆

Twenty percent of women who were not pregnant or lactating had an inadequate intake of vitamin B₆. By comparison, data from the Continuing Survey of Food Intake of Individuals in the United States (CSFII 1994-1996) found 15% of non-pregnant, non-lactating women aged 19 to 50, had less than the EAR for vitamin B₆²².

Classic symptoms of vitamin B₆ deficiency include dermatitis, microcytic anaemia, depression and confusion. Low intakes of vitamin B₆ during pregnancy may lead to poor vitamin B₆ status in the infant, resulting in convulsions. The EAR for vitamin B₆ is derived by using biochemical indicator cutoffs that have not been linked to clinical or physiological insufficiency. Clinical symptoms of vitamin B₆ deficiency have only been

observed in controlled studies with very low levels of vitamin B₆, and have never been documented among non-pregnant women at intakes above 0.5 mg. Depletion-repletion studies of healthy women, to determine the intake required to return plasma values to their original state suggest the average requirement of pyridoxine (an indicator of vitamin B₆ status) is less than 1.0 mg per day. However, in order to compensate for the bioavailability of vitamin B₆ in food, the EAR for women 19 to 30 is set at 1.1 mg of vitamin B₆ per day. Vitamin B₆ requirements may possibly be higher for individuals on very-high-protein diets ⁷⁷.

In the traditional Inuit diet, organ meats, dried fish, game and marine mammals, and wild birds are the best sources of vitamin B₆. Among store foods, beef liver, meat, bananas, and highly fortified cereals are good sources. The major sources of vitamin B₆ in Kangiqsujuaq were country food (Arctic char and goose), store meat and poultry and orange juice (Table 24).

Table 24. Mean vitamin B₆ intake (mg per day) from major sources, Inuit women, Kangiqsujuaq, 2002

Food group	Food Mail category	mg	%
Dairy Products	Priority Perishable	0.02	1.4
Eggs	Priority Perishable	0.01	0.7
Meat, Poultry, Fish	Nutritious Perishable	0.20	14.5
	Non-perishable	0.01	0.7
	Convenience Perishable	0.08	5.8
	Country food	0.42	30.4
Fruit, Vegetables	Priority Perishable	0.14	10.1
	Nutritious Perishable (French fries)	0.05	3.6
	Non-perishable	0.08	5.8
Cereal Products	Nutritious Perishable	0.01	0.7
	Non-perishable	0.06	4.3
Miscellaneous	Nutritious Perishable	0.04	2.9
	Non-perishable	0.05	3.6
	Convenience Perishable	0.06	4.3
Foods of Little Nutritional Value		0.12	8.7
Total (all sources)		1.38	

Folate

The DRI Committee examining the requirements for folate recognized that because of limitations in the traditional analytic methods used to estimate the folate content of foods, most nutrient databases underestimate folate intake. Therefore, current folate data may result in an overestimate of the percentage of the population below the EAR⁷⁷. The EAR for folate is expressed as micrograms of Dietary Folate Equivalents (DFEs). This measure acknowledges the greater bioavailability of folic acid added to foods compared to naturally occurring food folate (1 µg DFE = 1 µg of food folate and 1 µg DFE = 0.6 µg of folic acid added to foods). In this study, means and medians have been expressed in DFEs. Folic acid supplementation of flour and pasta is now mandatory in Canada. The folic acid values in the CNF have now been reduced from original estimates based on the assumption that food manufacturers would add the maximum amount of folic acid allowed under the regulations to an estimate using an average amount, the approach used by the USDA.

Twenty-four percent of women who were not pregnant or lactating had intakes below the EAR for folate (Figure 17). Low folate intake (320 µg or less per day) has been associated with elevated plasma homocysteine levels (greater than 14 µmol/L)⁷⁸. When folate supply to the bone marrow becomes restricted enough to interfere with the formation of red blood cells, macrocytic anaemia may develop. If folate intake is inadequate to support the rapid development of new cells in the fetus (especially those of the brain and nervous system) during the first few weeks of pregnancy, this may result in neural tube defects, including spina bifida, in the newborn⁷⁷. Population-based, case control studies of 468 cases with spontaneous abortion and 921 controls found that women with low plasma folate levels were at increased risk of spontaneous abortion⁷⁹. Women who smoke may also be at greater risk for folate deficiency and spontaneous miscarriage, especially if they carry the mutant gene methylenetetrahydrofolate reductase 677IT, which is involved in the metabolism of folate⁸⁰. This suggests that women who smoke would benefit from higher doses of folic acid prior to conception.

Traditional Inuit sources of folate include liver and other organ meats, seaweed, berries and wild plants. Store foods rich in folate include orange juice, sunflower seeds, fortified flour, dark green vegetables, peas and beans. Cereal Products (pasta, rice, bread and flour) provided about one third of total folate intake in Kangiqsujuaq (Table 25). Miscellaneous Foods (macaroni and cheese dinner, pizza and tea) supplied 26%, and fruits and vegetables, mainly frozen and canned orange juice and oranges, 19%.

Table 25. Mean Dietary Folate Equivalent intake (μg per day) from major sources, Inuit women, Kangiqsujuaq, 2002

Food group	Food Mail category	μg	%
Dairy Products	Priority Perishable	2.7	0.7
	Nutritious Perishable	0.2	0.1
Eggs	Priority Perishable	9.3	2.5
Fruit, Vegetables	Priority Perishable	53.3	14.1
	Nutritious Perishable (French fries)	4.3	1.1
	Non-perishable	13.1	3.5
Cereal Products	Nutritious Perishable	28.3	7.5
	Non-perishable	91.9	24.4
Miscellaneous	Nutritious Perishable	19.3	5.1
	Non-perishable	57.6	15.3
	Convenience Perishable	22.8	6.0
Country food		9.0	2.4
Foods of Little Nutritional Value		22.3	5.9
Total (all sources)		377	

Niacin, thiamin, riboflavin and vitamin B₁₂

All women who were not pregnant or lactating had an adequate intake of niacin, and 3% or less had an inadequate intake of thiamin, riboflavin or vitamin B₁₂.

Thiamin is essential for carbohydrate and protein metabolism. The early signs of deficiency include anorexia, weight loss, mental changes such as apathy, decrease in short-term memory, confusion, irritability, muscle weakness and cardiovascular changes such as enlarged heart⁷⁷. Caribou, marine mammals, and dried meat would be rich sources of thiamin. The major store food sources are fortified or enriched or whole grain products such as bread, grains and ready-to-eat cereals. Ham and pork are also rich sources of thiamin.

Riboflavin is involved in a number of metabolic reactions and in energy production. Early signs of deficiency include sore throat, swelling of throat and a glossy tongue ⁷⁷. Again, wild game, marine mammals, fish and liver are excellent sources of riboflavin. The best store food sources are milk, bread and fortified cereals.

Country food, store meat and poultry and breads and cereals were the principal sources of niacin. Thiamin came mainly from non-perishable cereal products, store meat and poultry and country food. The same three sources each provided about one quarter of riboflavin intake.

Only 3% of women had an inadequate intake of vitamin B₁₂. This vitamin is essential for normal blood formation and neurological function. A deficiency results in pernicious anaemia, with symptoms similar to folate deficiency anaemia. Neurological effects of vitamin B₁₂ deficiency include numbness and tingling of extremities, especially in the lower limbs, dizziness, loss of concentration, memory loss, disorientation, dementia, visual disturbances, insomnia, impotency and impaired bowel and bladder control. B₁₂ comes mainly from animal foods, especially red meats, shellfish like mussels, clams, oysters and organ meats, milk and yogurt, and fortified cereals. The major food sources in Kangiqsujuaq were country foods, such as Arctic char and caribou, beef, eggs, milk and pork.

Minerals

Adjusted means and medians and the percentage of women with inadequate intakes of minerals are presented in Table 26.

Magnesium

Eighty-seven per cent of non-pregnant, non-lactating women had an inadequate intake of magnesium.

Inadequate magnesium intake may cause a fall in the calcium concentrations in the blood. Muscle spasms are a clinical feature of emerging magnesium deficiency. More severe deficiency can lead to disturbances in heart rate. Magnesium deficiency may also play a role in the development of osteoporosis ⁸¹.

Among traditional foods, the best sources of magnesium are meats, raw and cooked clams, kelp, netted willow and Arctic willow ¹⁶. Store food sources include dark green leafy vegetables like spinach, whole grains and nuts, with lower amounts in meat, fish and poultry. In Kangiqsujuaq, the major sources of magnesium, in descending order of importance, were store meats, Arctic char, fruits and vegetables such as orange juice and oranges, potato chips, chocolate bars, coffee and tea (Table 27).

Table 26. Adjusted mean and median mineral intake, Inuit women 15 to 44, and percent with inadequate intake, Kangiqsujuaq, 2002

		Not pregnant or lactating (n=70)			% <EAR
		Mean	Median	EAR/AI*	
Calcium	mg	416	461	1000*	
Iron~	mg	15.4	15.1	8.1	7
Magnesium	mg	210	208	255	87
Phosphorus	mg	1070	1051	580	<1
Zinc	mg	8.4	8.2	6.8	24
Copper	µg	1251	1202	700	<1
Manganese	mg	2.40	2.38	1.8*	

Note: Means are adjusted by the C-SIDE software program, for all nutrients except copper, manganese and iron. The distribution of copper and manganese intakes was adjusted by the NRC method.

~ The percentage with an inadequate intake of iron was calculated using probabilities of inadequate intakes for a mixed population of adult women using and not using oral contraceptives.

The EAR represents the average daily nutrient intake level estimated to meet the requirements of half the healthy individuals in a particular life stage and gender group. The proportion with an intake below the EAR is considered to have a usual inadequate intake.

* Adequate Intakes (AI) are presented where EARs are not available. Intakes below the AI cannot automatically be considered inadequate across the population or group.

Table 27. Mean magnesium intake (mg per day) from major sources, Inuit women, Kangiqsujaq, 2002

Food group/Food Mail category	mg	%
Dairy Products		
Priority Perishable	6	3
Nutritious Perishable	1	0.4
Meat, Poultry, Fish		
Nutritious Perishable	15	8
Convenience Perishable	5	3
Country food	20	11
Cereal Products		
Nutritious Perishable	6	3
Non-perishable	14	8
Fruit and vegetables		
Priority Perishable	19	10
Nutritious Perishable	4	2
Non-perishable	11	6
Sweets		
Non-perishable	9	5
Miscellaneous		
Nutritious Perishable	8	4
Non-perishable	27	14
Convenience Perishable	8	4
Foods of Little Nutritional Value	35	18
Total (all sources)	201	

Calcium

For non-pregnant, non-lactating women, mean and median intakes of calcium were 416 mg and 461 mg. At the present time, there is insufficient scientific evidence to set an EAR for calcium. Instead, the Dietary Reference Intake Committee and its Panel on Calcium and Related Nutrients established an Adequate Intake (AI). This intake is considered sufficient to maintain calcium needs, while recognizing that lower intakes may be adequate for many ⁸¹. In this study, mean and median calcium intakes were

less than half of the AI. However, since the AI is not based on requirements, nothing can be said about the proportion of the population with inadequate intakes.

Inadequate calcium intake during the period of bone formation, combined with inadequate exercise, may lead to osteoporosis in later life. All previous studies among Inuit women have documented intakes below recommendations¹. But since calcium requirements vary widely, and absorption is more efficient on a low intake, it is difficult to determine whether current intakes are sufficient. Kuhnlein and coworkers suggest that current nutrient data may underestimate calcium intake in the Baffin Inuit population, which could also be the case here¹⁶. A recent cross-sectional study of 10 Inuit children 5 to 17 years of age examined the effect of a calcium load on the serum calcium and urinary calcium excretion. The results demonstrated that the Inuit had a distribution of vitamin D receptor genotypes similar to that of some Asian populations and significantly different from the white population. This genotype is believed to be an adaptation to a low-calcium diet, enabling a more efficient intestinal absorption of calcium. This genetic difference is believed to enable the Inuit to mineralize their bones and maintain calcium balance with a significantly lower calcium intake than is recommended for the standard American diet. The authors caution that dietary calcium intakes based on the DRIs may result in hypercalciuria and renal damage for this population⁸². However, it is important to recognize the limitations of such a small cross-sectional study, especially with children whose calcium requirements are known to fluctuate. More rigorous research involving longitudinal studies would be necessary to confirm these results.

In a study of Baffin foods, the best sources of calcium were caribou stomach contents, Arctic char skin, whole sculpin with bones, boiled duck, clams, and plants such as kelp, sorrel, netted willow and Arctic willow¹⁶. Among store foods, the best sources are milk, cheese, yogurt and canned salmon and sardines (with the bones). In Kangiqsujuaq, the most important sources of calcium were dairy products, pizza, macaroni and cheese dinner, chocolate bars and packaged sandwiches and burgers (Table 28).

No significant relationships were found between mean intakes of calcium and socio-economic group and food security status.

Table 28. Mean calcium intake (mg per day) from major sources, Inuit women, Kangiqsujaq, 2002

Food group/Food Mail category	mg	%
Dairy Products		
Priority Perishables	65	15
Nutritious Perishable	7	2
Non-perishable	3	1
Cereal Products		
Nutritious Perishable	24	6
Non-perishable	22	5
Sweets		
Non-perishable	18	4
Miscellaneous		
Nutritious Perishable	64	15
Non-perishable	50	12
Convenience Perishable	35	8
Country food	17	4
Foods of Little Nutritional Value	63	15
Total (all sources)	427	

Iron and zinc

Seven percent of non-pregnant, non-lactating women had an inadequate intake of iron. Iron deficiency leads to impaired work performance, anaemia and adverse pregnancy outcomes⁷². The best sources of iron and zinc are red meats, particularly dried narwhal, dried beluga, dried caribou and ringed seal eyes¹⁶. Low iron and zinc intakes among some women may be due to seasonal differences in consumption of country food, reflecting a high consumption of fish and a lower than normal consumption of seal, an excellent source of iron¹⁶.

Twenty-four percent of non-pregnant, non-lactating women had an inadequate intake of zinc. The body has the ability to regulate the excretion of zinc when body stores are low, so zinc deficiency is rare, except in cases of general malnutrition, alcoholism or other diseases which affect its absorption. Impaired growth and a depressed immune function are the most prominent features of mild zinc deficiency.

Zinc is abundant in red meats, certain seafood such as mussels and oysters, and whole grains. In Kangiqsujuaq the major sources of zinc were wild goose, beef, pork and chicken.

Energy and Nutrient Contribution by Food Mail Category

Country food

Although a less important source of energy and nutrients than in 1992, country food was still the most important source of protein (38%), vitamin B₁₂ (73%), niacin (37%) and vitamin B₆ (31%) and iron (38%). It was also an important source of zinc (25%) (Figure 18, Table 29). It was not an important source of fat, vitamin C, folate or calcium. Country food provided only 11% of energy, the lowest percentage reported in any nutrition surveys among the Inuit population in Canada, except for the survey conducted in Kugaaruk in 2001⁸³.

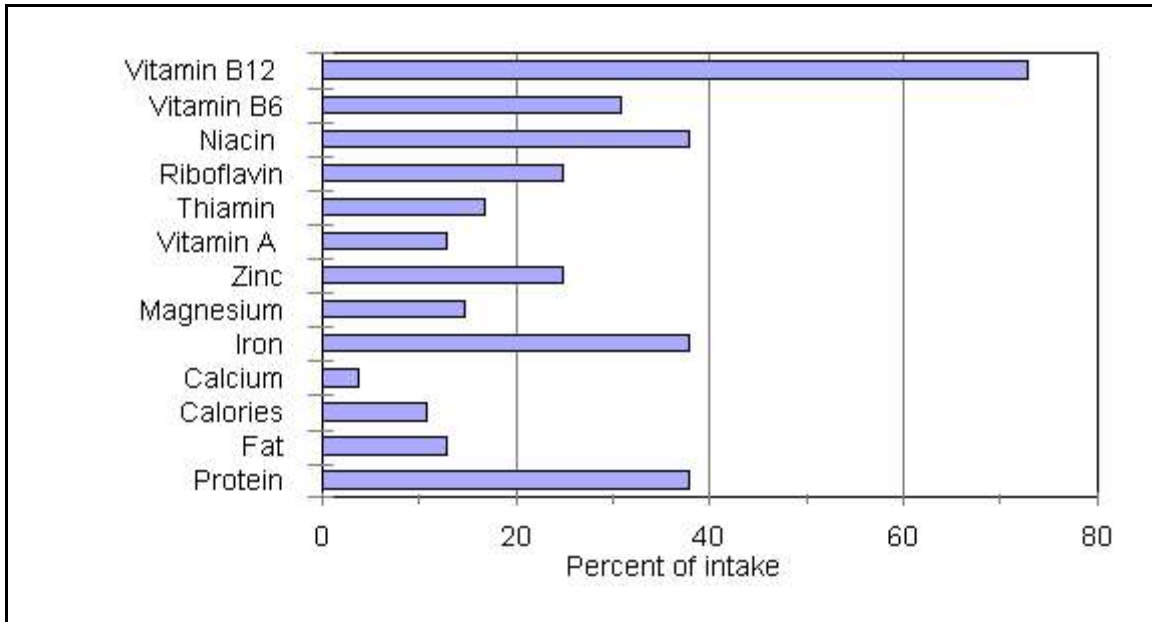


Figure 18 Percent energy and nutrients from country food, Inuit women, Kangiqsujaq, 2002

Priority Perishable foods

The Priority Perishable category includes fresh milk (excluding chocolate milk), UHT milk, buttermilk, cheese, processed cheese, cottage cheese, yogurt, yogurt drinks, powdered milk, fresh vegetables, frozen vegetables (excluding French fries and similar potato products), fresh fruit, frozen fruit, frozen juice concentrate and eggs.

The mean consumption of Priority Perishables was 239 grams (Table 29). These foods provided only 8% of energy, but were the most important source of vitamin A (40%, mainly from carrots), and they provided 23% of calcium, 19% of fibre and 17% of folate. They also provided 23% of cholesterol (Figure 19). T tests were performed to determine if relationships could be found between intakes of calcium, folate and vitamin A from Priority Perishables and socioeconomic group and food security. Perhaps due to the small sample size, we were unable to find any significant differences.

Table 29. Mean daily amount of energy and selected nutrients obtained by Food Mail category, Inuit women, Kangiqsujuaq, 2002

	Country food	Priority Perishable Food	Nutritious Perishable Food	Non- perishable Food	Convenience Perishable Food	Foods of Little Nutritional Value	Total
Amount (g)	113	239	204	1035	67	564	2222
Protein (g)	33	5	25	10	10	4	86
Fat (g)	9	4	23	7	9	15	67
Carbohydrate (g)	0	25	31	101	13	82	251
Calories	218	154	433	503	173	475	1955
Caffeine (mg)	0	0	0	127	0	42	169
Total sugars (g)	0	15	1	21	1	56	94
Dietary fibre (g)	0.0	1.7	1.7	3.4	0.5	1.7	9.1
Calcium (mg)	17	98	109	102	39	63	427
Iron (mg)	5.8	0.6	2.7	4.0	1.1	1.2	15.3
Magnesium (mg)	30	27	34	62	13	35	201
Phosphorus (mg)	306	108	233	147	103	149	1047
Potassium (mg)	165	435	387	637	142	374	2140
Sodium (mg)	69	91	600	1054	357	245	2415
Zinc (mg)	2.2	0.5	2.9	1.8	0.8	0.7	8.9
Copper (µg)	360	112	141	338	49	201	1201
Manganese (mg)	0.0	0.1	0.3	1.3	0.1	0.4	2.2
Vitamin A (RE)	55	170	77	88	20	19	430
Vitamin C (mg)	1	53	7	66	1	11	139
Thiamin (mg)	0.23	0.16	0.40	0.42	0.11	0.08	1.39
Riboflavin (mg)	0.39	0.20	0.35	0.38	0.13	0.11	1.56
Niacin (NE)	13.5	1.8	10.3	5.5	3.0	2.2	36.2
Vitamin B6 (mg)	0.42	0.18	0.30	0.22	0.14	0.12	1.38
Dietary Folate Equivalentents (µg)	9	65	62	190	29	22	377
Vitamin B12 (µg)	4.9	0.4	0.8	0.1	0.3	0.1	6.7
Cholesterol (mg)	80	61	72	12	36	7	269
Trans Fatty Acids (g)	0.0	0.0	0.5	0.0	0.1	0.0	0.6
Saturated Fatty Acids (g)	1.9	1.5	7.5	2.2	2.6	5.3	21.1
Polyunsaturated Fatty Acids (g)	1.5	0.7	3.4	1.3	2.0	3.4	12.3

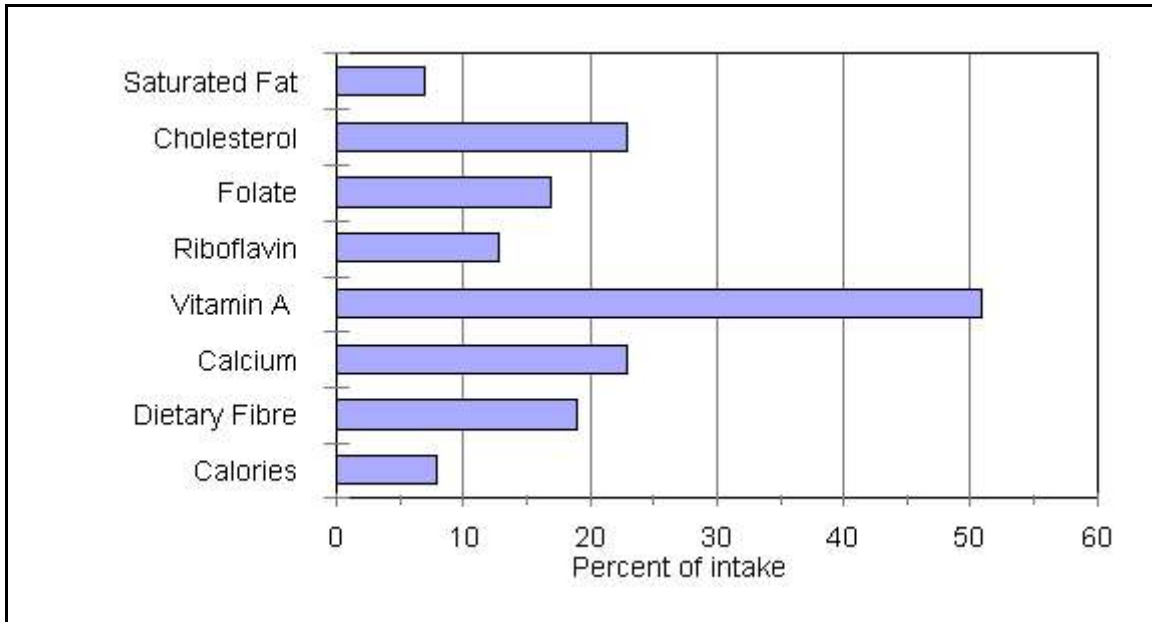


Figure 19 Percent energy and nutrients from Priority Perishable foods, Inuit women Kangiqsujaq, 2002

Nutritious Perishable foods

This category includes store Meat, Poultry and Fish, bread and rolls, frozen French fries, margarine and butter, and pizza. They provided 22% of energy, 34% of fat and 36% of saturated fat (mainly from high-fat meats, margarine and butter, and pizza), 19% of dietary fibre (mainly from French fries), 25% of calcium (pizza), 18% of iron, 32% of zinc (mainly from meat) and 18% of vitamin A (margarine and butter) (Table 29, Figure 20). Nutritious Perishable foods, primarily Meat, Poultry and Fish, were an important source of cholesterol (27%), thiamin (29%), riboflavin (22%) and vitamin B₆ (22%). Margarine was the main source of trans fatty acids, but as noted earlier, the CNF database is incomplete for this nutrient.

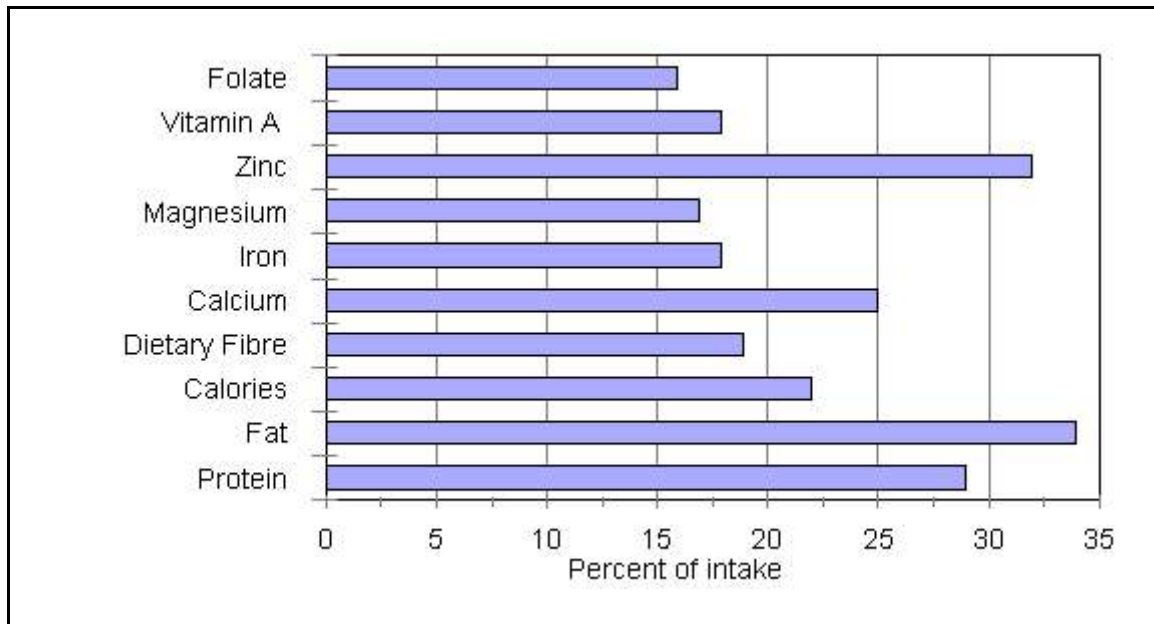


Figure 20 Percent energy and nutrients from Nutritious Perishable foods, Inuit women, Kangiqsujuaq, 2002

Non-perishable foods

Non-perishable foods, such as coffee, tea, fruit drink crystals with vitamin C, soup mixes, flour, rice and pasta, including water added to soup mixes and fruit drink crystals, appear to be a less important source of energy and nutrients than in the 1992 Santé Québec survey of Nunavik women. These foods provided 40% of carbohydrate and about a quarter of energy (Table 29, Figure 21). They provided half of the folate, almost half of vitamin C (mainly from canned and frozen fruit drinks with vitamin C) and 44% of sodium (mostly from salt, soup mixes and canned soup). They were a source of 102 mg of calcium, compared to 133 mg in 1992¹. Calcium came mainly from macaroni and cheese dinner, frozen fruit drinks and baking powder.

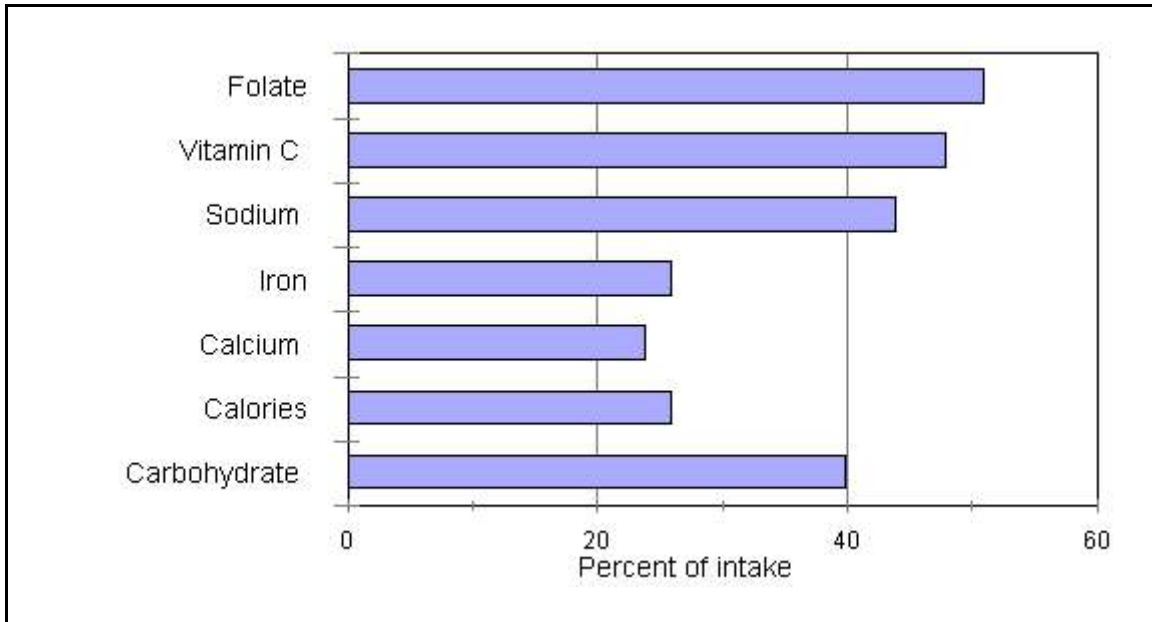


Figure 21 Percent energy and nutrients from Non-perishable foods, Inuit women, Kangiqsujuaq, 2002

Convenience Perishables

This category includes frozen breaded fried chicken and other similar products that are breaded, battered or in pastry, as well as packaged sandwiches and burgers and frozen dinners containing fried chicken. These foods were a more important source of energy and fat than in Nunavik in 1992¹. They provided 14% of fat, 12% of saturated fat, 13% of cholesterol and 9% of calories, but were not an important source of other nutrients (Table 29).

Foods of Little Nutritional Value

This category includes soft drinks, candies, chocolate bars, potato chips, fruit drink crystals without vitamin C, cookies, prepared cakes and coffee whitener. In this report, packaged sandwiches and burgers, which were previously considered as part of this category, were classified as Convenience Perishables.

Compared to Nunavik in 1992, Foods of Little Nutritional Value were a more important source of energy, carbohydrate and fat ¹. In this survey women obtained an average of 475 Calories from Foods of Little Nutritional Value, compared to 309 Calories for Nunavik women aged 18 to 44 in 1992. Mean carbohydrate intake from these foods was 82 grams, compared to 55 grams in 1992, and they provided an average of 15 grams of fat, compared to only 8 grams in the Santé Québec survey. Foods of Little Nutritional Value were a source of 24% of energy, 33% of carbohydrate, 23% of fat and 59% of total sugars, compared to 17% of energy, 27% of carbohydrate and 10% of fat in 1992 (Table 29, Figure 22). They were an important source of saturated fat (25%), and provided 17% of copper, approximately 15% of calcium and phosphorus and 17% of magnesium. However, they supplied only 1 to 9% of B vitamins, 4% of vitamin A and 8% of vitamin C.

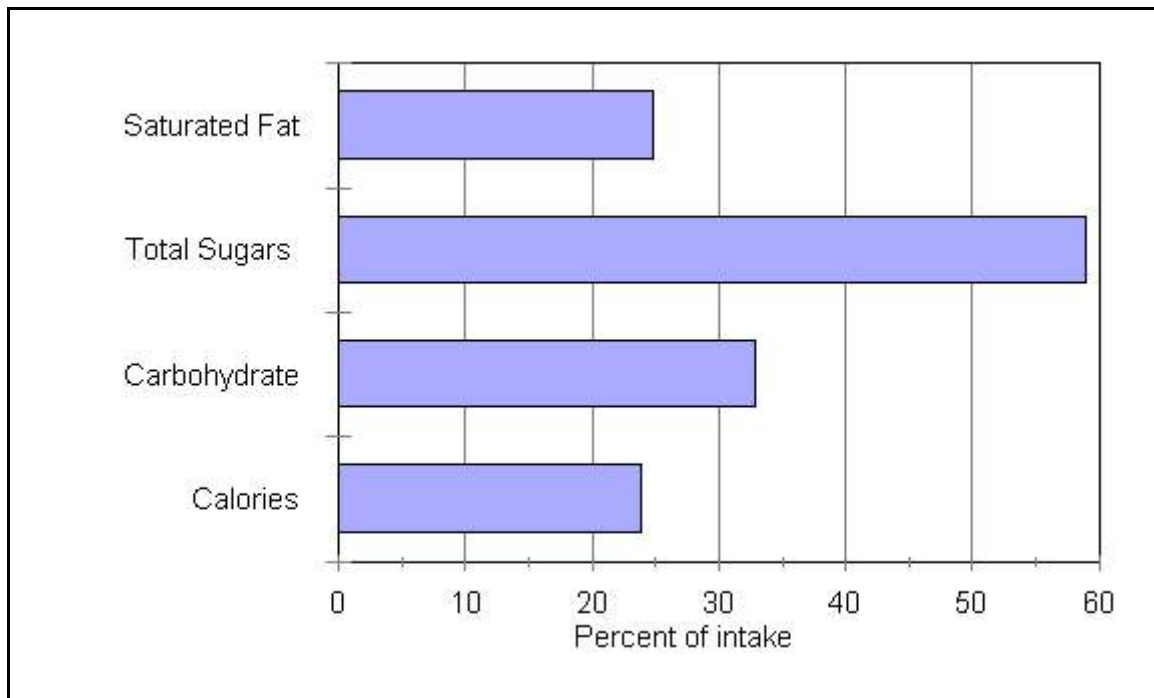


Figure 22 Percent energy and nutrients from Foods of Little Nutritional Value, Inuit women, Kangiqsujuaq, 2002

Discussion

This study was undertaken to provide baseline data for the Food Mail Pilot Project. The findings will enable INAC to evaluate the impact of reducing the cost of Priority Perishable foods and introducing measures to improve their recognition, quality and variety, in addition to a nutrition education program, on the food security of Kangiqsujuaq households and the nutrient intake of women of child-bearing age.

The report highlights a number of nutrition concerns for Kangiqsujuaq residents, and in particular, for women of child-bearing age. According to the BMI, seventeen percent of women appear to be at high risk, and 6% at very high or extremely high risk of obesity-related diseases, such as heart disease and type 2 diabetes. At the same time, the consumption of country food, which has a protective effect against cardiovascular disease, appears to have declined since 1992, thereby increasing susceptibility to these conditions. The reported mean and median energy intake in this survey is not consistent with the prevalence of obesity. It is possible that energy intakes, as well as intakes of macronutrients, such as fat and carbohydrate, may have been under-reported. A sedentary lifestyle also contributes to obesity and obesity-related diseases. This may be an important factor in Kangiqsujuaq, since one third of women said they were usually sedentary. The prevalence of obesity-related diseases such as diabetes, high blood pressure and cardiovascular disease, as well as anaemia, spontaneous abortion and birth defects, will be examined in the Nunavik Health Survey scheduled for the fall 2004.

From 20 to 43% of women had an inadequate intake of vitamin B₆, folate, and vitamin C, 7% an inadequate intake of iron, 24% of zinc, and 87% of magnesium. Health and nutritional status of women are further compromised by smoking, since smoking interferes with the body's ability to use vitamin C and folate. The prevalence of inadequate intakes of vitamin C and folate, in combination with a high smoking rate and a sedentary lifestyle, must be a concern, since it may have a long-term negative impact on the health of women of child-bearing age.

Although we could not calculate the percentage of women with an inadequate intake of vitamin A, mean intake was only about half of that reported for Inuit women in Nunavik in 1992. Inadequate vitamin A intake may play a role in the high rate of infectious diseases, especially those involving the respiratory tract. It may also contribute to iron-deficiency anaemia. While it is not possible to estimate the prevalence of inadequate

calcium intakes, since EARs are not available for this nutrient, the mean intake of women in Kangiqsujuaq was less than half the Adequate Intake for women of this age group.

It is important to bear in mind that EARs are based on the requirements of the general North American population. While the EAR recognizes differences in the distribution of requirements of a diverse population, no information is available on the specific nutrient requirements of the Inuit. Further research is needed to estimate the average nutrient requirements of the Inuit, given their present diet and lifestyle. To complicate matters, the effects of an inadequate intake of certain nutrients on health are often subtle and chronic diseases resulting from inadequate intakes take years to develop.

Although very few women reported medical conditions affecting their diet, 63% rated their health as fair or poor, a rate nine times that of women 15 to 44 in the general Canadian population, and higher than that reported for Nunavik women in the Santé Québec survey of 1992^{4 42}. In Kangiqsujuaq, household food insecurity was associated with poor or fair self-rated health status of women, and almost all women from low-income families rated their health as fair or poor.

The literature suggests that self-rated health status tends to be lower among low-income groups, smokers, and women who are overweight^{6 84 85 86}. We found a significant relationship to socio-economic group, but no relationship to BMI. Due to the high smoking rate, we were unable to examine the influence of smoking. Poor or fair self-rated health status may well be the result of a combination of a number of factors, including an inadequate intake of certain essential vitamins and minerals and a sedentary lifestyle. It is still difficult to understand why the perception of poor health is more prevalent in Kangiqsujuaq than among Inuit women in Nunavut, Labrador and the Northwest Territories. Perhaps there are other factors that explain this phenomenon.

Food security is defined by the American Institute of Nutrition as “access by all people at all times to enough food for an active, healthy life”⁸⁷. They claim that “food security includes at a minimum: (1) the ready availability of nutritionally adequate and safe foods, and (2) an assured ability to acquire acceptable foods in socially acceptable ways (e.g., without resorting to emergency food supplies, scavenging, stealing, or other coping strategies).” Food insecurity is defined as “a limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways”⁸⁷. According to Stephen Hodgins, the Inuit perception of food security is directly related to the ability to afford store food, since its

availability, unlike that of country food, can always be taken for granted⁴³. Food insecurity is the deprivation of a basic need and, in the sense it is used here, it results from a lack of financial resources. Food insecurity is undesirable in and of itself, but it is also a possible precursor to nutritional, health, and developmental problems. In 1996, Canada and other countries at the World Food Summit agreed that “food security exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life”⁸⁸. Unfortunately, the small sample size made it difficult to find statistically significant relationships between food insecurity and nutrient intakes in Kangiqsujuaq.

Food insecurity may be the result of high food costs, insufficient income and a lack of consumer skills, or it may be the indirect effect of alcohol and drug abuse or other factors which reduce available income. In Kangiqsujuaq, socioeconomic group (income in relation to family size) was significantly associated with food insecurity. Certainly, families on social assistance and the working poor are more likely to be food insecure. Food insecurity, with or without hunger, affected adults in 71% of households receiving social assistance and 62% of working poor families. And in 10% of households with children, either adults or children, or both, experienced hunger in the past 12 months. No child hunger was reported in the relatively well-off families but this condition was reported in 10% of families receiving social assistance and working poor families. Food insecurity, and especially hunger, may compromise psychosocial functioning among school-age children as well as their nutrition and health and must therefore be of concern. A high prevalence of food insecurity in conjunction with a high prevalence of obesity might be considered a somewhat questionable finding by some. However, a number of studies have documented this phenomenon among mildly food insecure individuals^{89 90}. The general consensus of council members and other local officials was that, if anything, our findings underestimated the prevalence of food insecurity and that many respondents would be reluctant to admit they were receiving social assistance and to report their income.

At the time of the survey, the weekly cost of the Northern Food Basket for a family of four in Kangiqsujuaq was \$228, 50% higher than in Ottawa. While this is higher than in the south, it is much lower than in most isolated communities in Nunavut, the Northwest Territories or northern Ontario. Twenty-three percent of families who were unable to afford enough food felt that food costs were too high, but 43% considered the problem to be insufficient income.

Forty percent of families received income from the hunter support program, a program unique to Nunavik, whereby hunters are paid to get country food for the community. This food is stored in community freezers and is available to anyone who needs it. This

program might be expected to improve food security, and it may be doing this by providing country food to those who want it and additional income to hunters with which they can purchase store food, although this study did not examine this issue. However, hunters receiving social assistance are penalized if they earn more than a certain threshold, so there is little financial gain for them.

Country food has always been central to Inuit health and well-being and has traditionally provided most of the essential nutrients. The practice of hunting and fishing and the preparation of country food reinforces Inuit values, provides physical exercise and contributes to a feeling of pride and well-being. At the time of the survey, Arctic char, geese and ptarmigan were available from the community freezer, although supplies are lower at that time of year. Hunters were also going out of the community to fish for Arctic char and to hunt geese and ptarmigan. Still, we found a lower consumption of country food by women of child-bearing age than that reported for Nunavik women by Santé Québec in 1992. Also, no organ meats, country fat or muktuk and very little seal were reported on the 24-hour recall. Community members attributed the low consumption of country food to the season rather than to a general decline in consumption. Seasonal differences in country food availability may also be responsible for the difference in consumption between this survey and the 1992 Santé Québec Health Survey Among the Inuit of Nunavik.

There may, however, still have been some decline in consumption in response to the concern over the safety of country food. The level of concern over the safety of country food reinforces the importance of emphasizing the overall health benefits of country food, and promoting ways of combining Priority Perishable store foods with country foods in order to further improve the intake of those essential nutrients now lacking.

The higher consumption of fruits and vegetables than that reported for Nunavik women in 1992 was a positive finding. At the same time, the consumption of soft drinks, fruit drinks, potato chips and chocolate bars was higher than reported in the Santé Québec survey, although the 1992 survey may have underestimated the consumption of these foods. The purchase and consumption of Priority Perishable foods, rich sources of vitamin A, vitamin C and folate, could be improved by lowering the cost and improving the availability, variety and quality. More importantly, from the point of view of nutrition education, few Kangiqsujuaq consumers said they were not buying more fresh fruit and vegetables because they preferred canned, disliked these foods, felt that these foods are not needed to be healthy, or because they did not know how to prepare these products. By lowering the cost of these foods and introducing measures to improve the quality and variety of Priority Perishable foods, the pilot project should remove some of the perceived barriers to their purchase. High cost and poor quality are also seen as

barriers to the purchase of more fresh or boxed milk. However, in an attempt to improve calcium intake, it is important to acknowledge that 20% of women reported difficulty digesting milk and to promote alternative sources of calcium such as lactose-reduced milk, yogurt, cheese and sardines.

Different food choices would better meet the requirements for micronutrients among women of child-bearing age. Vitamin, mineral and fibre intakes could be vastly improved by a few simple changes or substitutions. These could include the following: a greater consumption of country food, replacement of frozen fruit drinks with frozen fruit juice, the use of whole grain breads and cereals instead of white bread and instant white rice and preparation of skinless oven-baked chicken instead of frozen fried chicken. Other changes that would help to improve nutritional status include the promotion of low-fat dairy products, low-fat meats and non-hydrogenated margarine. The nutrition education program being undertaken as part of the pilot project will address some of these issues and encourage more nutritious choices as well as healthier cooking methods.

The pilot project will attempt to improve food security by reducing the cost of Priority Perishable foods. If it also succeeds in reducing the consumption of expensive convenience foods and Foods of Little Nutritional Value, it may indirectly lower food expenditures or improve nutrient intake derived from the same level of expenditure. The pilot project will also provide some training to retail staff and shippers in order to improve marketing and availability of high quality Priority Perishable foods. Special shelf stickers and posters in English, French and Inuktitut will clearly identify the Priority Perishable foods so that consumers will be better able to make healthier food choices.

The nutrition and household surveys have demonstrated that the pilot project is appropriately focussed to address some of the major concerns of this community and, if successful, should help to improve food security and the intake of essential nutrients such as vitamin A, folate, vitamin C, vitamin B₆, calcium, magnesium and fibre.

Finally, it is important to place these findings in perspective. The 24-hour recall and Food Frequency Questionnaire are only representative of a single season. Ideally, this assessment would be conducted in each season before reaching any firm conclusions. Also, nutrition and health status can only be objectively determined by clinical and biochemical investigations. Nevertheless, it is important to bear in mind that poor health behaviours often represent coping strategies by populations under stress. Obesity, smoking, and a perception of poor health status are apt to be more common in societies

where unemployment is rampant and where there has been radical social change. It is also worth noting that other factors, such as the purchase of high-cost convenience foods and Foods of Little Nutritional Value, as well as cigarettes, reduce the amount of money available for nutritious food. While the pilot project will help to reduce prices, improve quality and availability and improve nutrition knowledge and skills, it cannot be expected to completely solve the food security problem or to address all of the underlying problems being experienced by the people of Kangiqsujaq. Major improvements to the situation will require action on many fronts, including the income side, as well as the joint effort of community leaders, health professionals and educators.

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APPENDIX A – NUTRITION QUESTIONNAIRE

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Nutrition Questionnaire
Kangiqsujuaq Food Mail Pilot Project
2002

Note to interviewer: Please enter date and starting time and circle AM or PM:
Day: _____ Month: _____ Starting time: _____ AM / PM

Note to interviewer: Please enter time when the interview is complete and circle AM or PM: _____ AM / PM

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A. 24-Hour Recall

This part of the questionnaire asks about all the foods and drinks you consumed over the past 24 hours. We want to include everything, both country and store foods – and not only meals, but also snacks and beverages. First we will make a list, according to the TIME of day you ate each meal or snack. Then later we will review the list to make sure that nothing is forgotten and to add the amounts of each item. This is easier than you may think at first. From this list we will be able to know if people are getting the energy and nutrients they need for good health.

Let's begin at this time yesterday. Where were you at this time yesterday? *(This helps the person to recall.)* Did you eat or drink anything at this time yesterday? When was the first time after this that you ate or drank something? What did you have? When was the next time you had something to eat or to drink? What did you have? **[LEAVE SPACES BETWEEN FOODS AND TIMES, ESPECIALLY AFTER COFFEE AND TEA SO THAT MILK OR SUGAR CAN BE ADDED ON THE SECOND PASS.]**

(When you have covered 24 hours, then say) Let's go back over this list and add the amounts. I have some measuring cups, spoons, bowls and food models to help estimate the amounts. *(Set out the household measures and the food models.)*

First, you mentioned *(name of food or drink)*. **[ON THE SECOND PASS, ASK FOR MORE DETAIL ABOUT THE DESCRIPTION OF THE FOOD, E.G., What type? Did you add anything to it (e.g. to the coffee, to the bannock, to the cereal, etc.)? What brand?]** Using these measuring cups or food models, how much did you have at *(time)* yesterday? *(Continue until the full 24 hours are covered. Review list to ensure that a full 24 hours are covered, and for a complete description of each food and amount.)* **[DON'T FORGET TO ASK IF THE FOOD WAS CANNED, MADE FROM A MIX OR FROZEN AND TO NOTE "C", "M" OR "F" IN THE SECOND COLUMN.]**

(If homemade food mixtures are reported, ask about the recipe and record on the recipe form at the end.) **USING A SMALL POST-IT, LABEL EACH RECIPE WITH A NUMBER AND AFTER YOU FEEL YOU HAVE A COMPLETE DESCRIPTION OF EVERYTHING CONSUMED DURING THAT 24 HOURS, ASK THE PARTICIPANT TO PROVIDE THE INGREDIENTS AND AMOUNTS (USING THE MODELS OR HOUSEHOLD MEASURES) AND THE NUMBER OF PORTIONS (USING A HOUSEHOLD MEASURE) THE RECIPE MAKES. FOR TOTAL NUMBER OF SERVINGS, USE NUMBER OF PORTIONS AND MODELS (E.G. MAKES 6 MO-XL).**

We also need to know if you take any nutrition supplements and what kind. **[COMPLETE LARGE 24-HOUR RECALL FORM.]**

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B. Food Frequency Questionnaire

Now I would like to ask you about the past month. These questions will only ask about how often you ate or drank certain foods or beverages. This information is important because it provides a better picture of what you usually eat over a longer period.

I will give you a series of cards with a list of foods. Together we will read each list and I will ask you to estimate how often you have consumed these foods or beverages *over the past month*.

- 101 Let's begin with list A. Starting with caribou, did you eat caribou during the past month? *[CHECK YES OR NO. IF NO, GO TO NEXT FOOD.]*
- 102 If YES, how often did you eat caribou over the past month? *[FOR EACH FOOD, ENTER HOW OFTEN THE FOOD IS EATEN (TIMES PER DAY OR WEEK OR MONTH) IN ONE OF THREE COLUMNS.]*

101	Have you eaten any of the foods on this list in the past month?	YES √	NO √	102 IF YES, how often? (Number of times per ...)		
				Day	Week	Month
1	Caribou					
2	Seal meat					
3	Walrus					
4	Beluga meat					
5	Liver from caribou, seal or walrus					
6	Polar bear					
7	Muktuk					
8	Seal fat or oil					
9	Blubber					
10	Rabbit					
11	Ptarmigan					
12	Geese					
13	Ducks					

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101	Have you eaten any of these foods in the past month?	YES √	NO √	102 IF YES, how often? (Number of times per ...)		
				Day	Week	Month
14	Arctic char					
15	Lake trout					
16	Brook trout					
17	Salmon					
18	Grayling					
19	Cod					
20	Whitefish					
21	Other fish (Specify: _____)					
22	Seafood (Specify: _____)					
Now let's look at List B. [SHOW LIST B.]						
23	Baked bannock					
24	Fried bannock					
25	White bread					
26	Whole wheat bread					
27	Eggs					
28	Packaged sandwiches or hamburgers					
29	Canned stew					
30	Processed cheese (e.g., Velveeta, Kraft slices)					
31	Block or grated cheese					
32	Cheez Whiz					
33	Yogurt					
34	Frozen fried breaded chicken					
35	Frozen pizza					
36	Pizza made from mix					
37	Frozen Chinese food					
38	Other frozen meals					
39	Kraft Dinner or other macaroni and cheese dinner					

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101	Can you tell me if you have eaten any of these foods in the past month? And if so, how often? [SHOW LIST C.]	YES √	NO √	102 IF YES, how often? (Number of times per ...)		
				Day	Week	Month
40	Fresh potatoes					
41	Frozen French fries					
42	Instant mashed potatoes					
43	Fresh carrots					
44	Frozen carrots					
45	Canned corn					
46	Other canned vegetables					
47	Canned fruit					
48	Oranges					
49	Apples					
	Now I would like to show you a list of vegetables. From this list can you tell me which 5 vegetables (fresh or frozen) you have eaten most often in the past month? [DO NOT READ THE LIST. SHOW CARD D. CHECK YES FOR THE 5 VEGETABLES THE RESPONDENT SELECTS AND ENTER HOW OFTEN EACH VEGETABLE WAS EATEN IN THE PAST MONTH.]					
50	Green or yellow beans					
51	Broccoli					
52	Cabbage					
53	Cauliflower					
54	Corn					
55	Lettuce					
56	Mixed vegetables, frozen					
57	Mushrooms					
58	Onions					
59	Parsnips					
60	Peas, frozen					
61	Peppers					
62	Salad mix, fresh					
63	Spinach					

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	YES √	NO √	102 IF YES, how often? (Number of times per ...)		
			Day	Week	Month
<i>[CHECK YES FOR THE 5 VEGETABLES THE RESPONDENT SELECTS AND ENTER HOW OFTEN EACH VEGETABLE WAS EATEN IN THE PAST MONTH]</i>					
64					
65					
66					
67					
68					
Now I would like to show you a list of fruit. From this list can you tell me which 5 fruits (fresh or frozen) you have eaten most often in the past month? [DO NOT READ THE LIST. SHOW CARD E. CHECK YES FOR THE 5 FRUITS THE RESPONDENT SELECTS AND ENTER HOW OFTEN EACH FRUIT WAS EATEN IN THE PAST MONTH.]					
69					
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Finally, I would like to ask you about drinks and snack foods. [SHOW LIST F.]		YES √	NO √	102 IF YES, how often? (Number of times per ...)		
				Day	Week	Month
101	Have you eaten any of these foods in the past month?					
83	Tang or other fruit drink crystals with vitamin C					
84	Kool-Aid or other fruit drink crystals - no vitamin C					
85	Sunny Delight					
86	Fresh fruit juice (e.g., Tropicana)					
87	Frozen fruit drinks (punch, lemonade)					
88	Frozen pure fruit juice (e.g., McCains orange juice, apple juice)					
89	Fresh or boxed milk					
90	Chocolate milk					
91	Chocolate bars					
92	Potato chips					
93	Coffee [IF YES, ASK HOW MANY CUPS PER WEEK]				cups	
94	Tea [IF YES, ASK HOW MANY CUPS PER WEEK]				cups	
95	Pop [IF YES, ASK HOW MANY CANS OR LARGE GLASSES PER WEEK]				cans	

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The next few questions are about preparing food in the past month.

103	First, did you usually put anything on bread or bannock? [CIRCLE YES OR NO]	YES	NO
	IF YES, can you tell me which of these you usually use? [CHECK ONE]	√	
a	Hard margarine		
b	Soft margarine		
c	Butter		
d	Lard		
e	Seal fat		

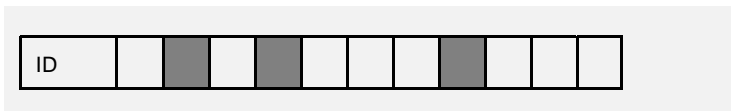
104	In the past month what kind of milk did you usually use on your cereal? [CHECK ONE]	√
a	Fresh or boxed milk	
b	Canned milk	
c	Powdered milk	
d	Didn't use milk	
e	Didn't eat cereal	

105	When you prepared mashed potatoes, what kind of milk did you usually add?	[CHECK ONE]	√
a	Fresh or boxed milk		
b	Canned milk		
c	Powdered milk		
d	Didn't use milk		
e	Didn't eat mashed potatoes		

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106	What do you usually put in your tea and coffee?	<i>[CHECK ONE FROM a TO j. CHECK k IF SUGAR IS USED.]</i>	
		In tea ✓	In coffee ✓
a	Powdered coffee whitener (e.g., Coffeemate, Coffee Delight)		
b	2% milk (fresh or boxed)		
c	Whole milk		
d	1% milk		
e	Skim milk		
f	Canned milk		
g	Powdered milk		
h	Liquid coffee whitener (e.g., Coffee Rich)		
i	Real cream		
j	Don't use milk, cream or coffee whitener		
k	Sugar		
l	Don't drink tea or coffee		

107	In recipes, what kind of milk do you usually use?		<i>[CHECK ONE]</i>		
a.	In bannock	✓	b.	In macaroni and cheese dinner	✓
i	Fresh whole milk		i	Fresh whole milk	
ii	Fresh or boxed 2% milk		ii	Fresh or boxed 2% milk	
iii	Fresh skim or 1% milk		iii	Fresh skim or 1% milk	
iv	Powdered milk		iv	Powdered milk	
v	Evaporated milk, mixed with water		v	Evaporated milk, mixed with water	
vi	Evaporated milk, no water		vi	Evaporated milk, no water	
vii	Don't use milk		vii	Don't use milk	



108 What do you usually use to make baked bannock? [CIRCLE ONE RESPONSE]

- a Lard
- b Margarine
- c Butter
- d Seal Fat
- e Oil (Specify canola, corn, vegetable, etc: _____)
- f Don't make baked bannock

109 If you make baked bannock, what proportion of flour to (name of fat given above) do you use?

_____ cups flour _____ pounds/tablespoons fat

110 What do you usually put in fried bannock? [CIRCLE ONE RESPONSE]

- a Lard
- b Margarine
- c Butter
- d Seal fat
- e Oil (specify canola, corn, vegetable, etc.: _____)
- f Don't make fried bannock



Go to Q113

- g Don't put any fat in it



Go to Q112

111 What proportion of flour to (name of fat given above) do you use to make fried bannock?

_____ cups flour _____ pounds/tablespoons fat

112 What do you fry it in? [CIRCLE ONE RESPONSE]

- a Lard
- b Margarine
- c Butter
- d Seal fat
- e Oil (Specify canola, corn, vegetable, etc.: _____)

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113 What do you usually use to fry meat or fish? [CIRCLE ONE RESPONSE]

- a Lard
- b Margarine
- c Butter
- d Seal fat
- e Oil (Specify canola, corn, vegetable, etc: _____)
- f Don't fry meat or fish

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C. Health and Lifestyle

This section asks a few questions about your health and lifestyle.

200 Compared to other people your age, would you say your health is excellent, very good, good, fair or poor? *[CIRCLE RESPONSE]*

- a excellent
- b very good
- c good
- d fair
- e poor

201 Do you have any medical condition that affects what you eat ? *[CIRCLE RESPONSE]*

- 1 YES
- 2 NO

If YES, please explain _____

202 Are you pregnant at the present time?

- a YES
- b NO →
- c Don't know →
- d Refuse to answer →

Go to Q204

203 How long have you been pregnant? _____ months _____ weeks

204 Are you presently breast-feeding? 1 YES 2 NO

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Next, I would like to ask you some questions about smoking.

205 Have you ever been a regular smoker of cigarettes? *[CIRCLE RESPONSE]*

1 YES

2 NO



Go to Q210

206 How old were you when you started smoking? *[ENTER AGE]* ____ years old

207 At the present time, how often do you smoke cigarettes? *[CIRCLE RESPONSE]*

a every day

b occasionally

c not at all



Go to Q209

208 On the average, how many cigarettes do you smoke a day? *[ENTER NUMBER]*

_____ cigarettes



Go to Q210

209 How long ago did you stop smoking cigarettes?

a Less than 1 year ago *[ENTER NUMBER]:* _____ months

b More than 1 year ago *[ENTER NUMBER]:* _____ years

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The next question is about your current physical exercise.

- 210 Which of the following statements best describes your activities for most days when you are in the community? *[SHOW CARD AND READ LIST. CIRCLE ONE RESPONSE.]*
- a I am usually sitting and do not walk around very much.
 - b I stand or walk around quite a lot, but I do not have to carry or lift things very often.
 - c I usually lift or carry light loads or I have to climb stairs or hills often.
 - d I do heavy work or carry heavy loads.
- 211 In the past year, how much time would you say that you spent on the land (fishing, trapping, hunting)? *[DO NOT READ LIST. CIRCLE ONE RESPONSE.]*
- | | |
|---------------------|----------------------|
| a none | e 4 to 5 months |
| b less than 1 month | f 6 months |
| c 1 month | g more than 6 months |
| d 2 to 3 months | |

D. Demographic Information

To complete the study we need some personal information. Like the entire study, this information is totally confidential.

- 300 First, what ethnic group do you belong to? *[CIRCLE RESPONSE]*
- a Inuit
 - b Other Aboriginal
 - c Non-Aboriginal

ID											
----	--	--	--	--	--	--	--	--	--	--	--

301 What is your date of birth? _____
 MONTH DAY YEAR

302 Age ____ YRS

In order to determine if women in this community are getting the food they need for good health, we need to collect information on height, weight and waist/hip measurements. The nursing staff at the Health Centre have agreed to record this information in order to make sure that the information is as accurate as possible.

303 Would you be willing to go to the Health Centre on _____(date or day) to get your height, weight and waist/hip measurements done? *[CIRCLE RESPONSE]*

1 YES 2 NO

304 IF NO, can you tell me your height and weight?

HEIGHT _____cm OR _____inches

WEIGHT _____kg OR _____pounds

305 Do you usually buy the food for your household?

1 YES



Go to Household Questionnaire

2 NO **THANK YOU VERY MUCH FOR YOUR TIME AND COOPERATION. CAN I SPEAK TO THE PERSON WHO USUALLY BUYS THE FOOD?**

C means canned; M means made from a mix; F means frozen.

RECIPE #1**RECIPE #2**

Name of recipe: _____ Total number of servings _____

Name of recipe: _____ Total number of servings _____

Description of ingredients and cooking method	Quantity
How was it cooked? Circle one of the following: (boil, bake, roast, stew, fry, microwave). For how long? _____ min _____ hours	

Description of ingredients and cooking method	Quantity
How was it cooked? Circle one of the following: (boil, bake, roast, stew, fry, microwave). For how long? _____ min _____ hours	

NOTE: TIME FINISHED: _____ AM / PM

APPENDIX B – HOUSEHOLD QUESTIONNAIRE

House Number							
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Interviewer Number		
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Household Questionnaire

Kangiqsujuaq Food Mail Pilot Project

2002

Note to interviewer: Please enter date and starting time and circle AM or PM:
Day: _____ Month: _____ Starting time: _____ AM / PM

Note to interviewer: Please enter time when the interview is complete and circle AM or PM): _____ AM / PM

House Number							
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[PLEASE NOTE THAT ONLY THE PERSON WHO USUALLY BUYS MOST OF THE FOOD SHOULD COMPLETE THIS QUESTIONNAIRE]

A. HOUSEHOLD COMPOSITION, ACCESS TO COUNTRY FOOD AND COMMUNITY CONCERNS

Let's begin with a few questions about your household.

400 Can you tell me how many Inuit and non-Inuit adults are living in this household?

Age group	1 Can you tell me how many are Inuit?	2 Can you tell me how many are non-Inuit?
a Between the ages of 18 and 44?		
b Between the ages of 45 and 59?		
c Between 60 and 64?		
d And age 65 and over?		

401 Can you tell me how many persons **AGED 17 OR UNDER** live in this house and their ages?
[INDICATE THE NUMBER OF PEOPLE IN EACH AGE GROUP IN THE SECOND ROW OF THE APPROPRIATE COLUMN.]

Age	<1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
No.																		

402 Is your household able to get country food most of the time? *[CIRCLE RESPONSE]*

YES

NO

Don't know

House Number						
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403 **IF YOU CANNOT GET COUNTRY FOOD**, can you tell me why? *[DO NOT READ REASONS. WRITE THE NUMBER OF THE FIRST 3 REASONS IN THE SPACES BELOW. IF NECESSARY, PROMPT BY ASKING "WERE THERE ANY OTHER REASONS?"]*

- | | |
|--|--|
| 1. No transportation | 6. Repairs too expensive |
| 2. No hunter or fisherman in the household | 7. Country food not available |
| 3. Hunter or fisherman in family is sick/
injured | 8. Food is not shared in the community |
| 4. Hunter or fisherman is working, so
doesn't have time to hunt | 9. Have nowhere to store country food |
| 5. Gas too expensive | 10. No hunting or fishing equipment |
| | 11. Other, explain _____
_____ |

Reason 1. _____ Reason 2. _____ Reason 3. _____

404 First, I would like to read a list of events or problems that may affect you and your community. For each one, please tell me if you are not concerned, a little concerned, or extremely concerned about this problem at the present time. *[READ EACH PROBLEM AND CIRCLE 1, 2 OR 3 FOR EACH PROBLEM.]*

	Not concerned	A little concerned	Extremely concerned
a Alcohol or drug abuse	1	2	3
b Not having enough money for food	1	2	3
c Not being able to get country food	1	2	3
d The safety of country food	1	2	3
e Family violence	1	2	3
f Not enough jobs in the community	1	2	3

House Number						
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B. FOOD PURCHASING

Now I would like to talk about where you usually buy your food.

500 Where do you usually buy most of your store meat? From the Coop, from the Northern store, from the south by Food Mail, or from the south by air cargo? *[CHECK ONE. ASK ABOUT EACH FOOD LISTED BELOW. IF RESPONDENT DOES NOT BUY THIS FOOD, CHECK NA.]*

		1 Coop	2 Northern	3 South by Food Mail	4 South by air cargo	5 Other (specify)	6 NA
a	Store meat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b	Fresh fruit	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c	Fresh vegetables	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d	Frozen food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e	Fresh milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

501 Do you ever get country food from the community freezer? 1 YES 2 NO

502 Did you get a sealift order last year? 1 YES 2 NO

House Number							
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Now I would like to talk about the quality of the food SOLD in this community.

503 How would you describe the quality of the following kinds of food sold in your community IN THE PAST 4 WEEKS? Would you say it was poor, fair, good or excellent? [DO NOT READ "DON'T KNOW" OR "NOT AVAILABLE." CHECK IF THIS IS RESPONSE.]

	1 Poor	2 Fair	3 Good	4 Excellent	Don't know	NA
a. Apples	G	G	G	G	G	G
b. Oranges	G	G	G	G	G	G
c. Bananas, grapes	G	G	G	G	G	G
d. Potatoes	G	G	G	G	G	G
e. Carrots, onions, turnips, cabbage	G	G	G	G	G	G
f. Lettuce, tomatoes, peppers	G	G	G	G	G	G
g. Broccoli, cauliflower	G	G	G	G	G	G
h. Bread	G	G	G	G	G	G
i. Eggs	G	G	G	G	G	G
j. Fresh milk	G	G	G	G	G	G
k. Frozen store meat	G	G	G	G	G	G
l. Frozen vegetables	G	G	G	G	G	G
m. Other frozen food	G	G	G	G	G	G

504 Is there enough variety of fresh fruit and vegetables available in Kangiqsujuaq? Always, most of the time, sometimes or never? [DO NOT READ "DON'T KNOW" BUT CHECK IF THIS IS THE RESPONSE.]

G Always G Most of the time G Sometimes G Never G Don't know

House Number

505 Compared to this time last year, have you noticed that the price of fresh fruits and vegetables is higher, lower or the same? *[DO NOT READ "DON'T KNOW." CHECK RESPONSE.]*

G Higher G Lower G Same, no change G Don't know

506 Here is a list of reasons people sometimes give for not buying fresh fruit and vegetables. What is keeping you from buying more of these foods? *[SHOW CARD. READ LIST. CHECK ALL THAT APPLY.]*

- | | |
|--------------------------------|--|
| G They cost too much | G Don't like the taste |
| G Poor quality | G Too much trouble to cook them |
| G Not enough variety | G Don't need these foods to be healthy |
| G Often not available | G Already eat a lot of these foods |
| G Don't know how to use them | G Can't digest these foods |
| G They don't keep well at home | G Can't afford them |
| G Prefer canned products | G Prefer frozen products |
| G Another reason: _____ | |

507 Here is a list of reasons people sometimes give for not buying fresh or boxed milk. What is keeping you from buying more milk? *[SHOW CARD. READ LIST. CHECK ALL THAT APPLY.]*

- | | |
|----------------------------------|--|
| G It costs too much | G Don't like the taste |
| G It's sometimes sour or bad | G Don't need milk to be healthy |
| G Often not available | G Already buy a lot of milk |
| G Have difficulty digesting milk | G Can't afford it |
| G Prefer canned evaporated milk | G It's often past the "best before" date |
| G Prefer powdered milk | G Prefer cheese or yogurt |
| G Another reason: _____ | |

House Number

Now I would like to ask you about WHICH foods you have purchased IN THE PAST 4 WEEKS.

508 First, can you tell me which of the following foods have you bought IN THE PAST 4 WEEKS?
[SHOW PICTURES OR CARD, READ LIST AND CHECK ALL THAT APPLY.]

- Fresh fruit:
- G Apples
 - G Oranges
 - G Bananas
 - G Grapes
 - G Berries
 - G Kiwi
 - G Plums
 - G Cantaloupe/
Honeydew melon
 - G Grapefruit
 - G Watermelon
 - G Other (specify) _____
- Fresh vegetables:
- G Lettuce
 - G Broccoli
 - G Tomatoes
 - G Cauliflower
 - G Turnips
 - G Cabbage
 - G Onions
 - G Peppers
 - G Carrots
 - G Potatoes
 - G Cucumber
 - G Celery
 - G Squash
 - G Spinach
 - G Mushrooms
- Milk products:
- G Fresh milk
 - G Boxed milk
 - G Cheese
 - G Yogurt
 - G Ice cream
 - G Powdered milk
 - G Canned evaporated milk
- Frozen food:
- G Store meat
 - G Frozen pizza
 - G Frozen meals
 - G French fries
 - G Frozen mixed vegetables
 - G Other frozen vegetables
 - G Frozen fruit drinks (e.g., lemonade, fruit punch)
 - G Frozen pure fruit juice (e.g., McCain's orange juice or apple juice)

C. FOOD SECURITY

This section asks questions about being able to afford food for your household. Some of the questions are very personal and may be difficult for you to answer. However, this information will help community and health leaders to have a better understanding of problems facing families in this community and to design better programs to help. Like the rest of the questionnaire, this information is strictly confidential and no names will be released to the community or government. You are free to refuse to answer any question, but your answers may be able to help others in Kangiqsujaq and other Inuit communities.

I would like to read a series of statements that describe the experience of some families. I will also give you a card, so that you can read the statement and decide if it describes your experience.

House Number

The first statements are about the food eaten in your household in the last 12 months and **whether you were able to afford the food you need**. For each of these statements, please tell me whether this happened often, sometimes or never for your household in the last 12 months. [GIVE FOOD SECURITY CARD TO RESPONDENT SO THAT THEY CAN READ EACH STATEMENT.]

600 Some families might say, **“We worried whether our food would run out before we got money to buy more.”** In the last 12 months, did that happen often, sometimes, or never for your household ?

- a Often []
- b Sometimes []
- c Never []
- d Don't know or refused []

601 Some families might say, **“The food that we bought just didn't last, and we didn't have money to get more.”** In the last 12 months did that happen often, sometimes, or never for your household?

- a Often []
- b Sometimes []
- c Never []
- d Don't know or refused []

602 Some families might say, **“We couldn't afford to eat healthy meals.”** In the last 12 months did this happen often, sometimes, or never for your household?

- a Often []
- b Sometimes []
- c Never []
- d Don't know or refused []

[IF CHILDREN UNDER 18 IN HOUSEHOLD, ASK Q603 AND Q604; OTHERWISE SKIP TO 1ST LEVEL SCREEN]

603 Some families might say, **“We could only feed our children less expensive foods because we were running out of money to buy food.”** In the last 12 months did this happen often, sometimes, or never for your household?

- a Often []
- b Sometimes []
- c Never []
- d Don't know or refused []

604 Some families might say, **“We couldn't feed our children a healthy meal, because we couldn't afford that.”** In the last 12 months, did that happen often, sometimes, or never for your household?

- a Often []
- b Sometimes []
- c Never []
- d Don't know or refused []

[1ST LEVEL SCREEN (SCREENER FOR STAGE 2): IF THE RESPONDENT ANSWERS “OFTEN” OR “SOMETIMES” TO ANY ONE OF QUESTIONS 600 TO 604, THEN CONTINUE TO STAGE 2; OTHERWISE SKIP TO Q620.]

House Number						
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STAGE 2: [IF CHILDREN UNDER 18 IN HOUSEHOLD, ASK Q605; IF NOT, SKIP TO Q606.]

605 Some families might say, “**The children were not eating enough because we just couldn’t afford enough food.**” In the last 12 months, did this happen often, sometimes, or never for your household?

- a Often []
- b Sometimes []
- c Never []
- d Don’t know or refused []

606 Since this time last year, did you or other adults in your household ever cut the size of your meals or skip meals because there wasn’t enough money for food?

- a YES []
- b NO []
- c Don’t know []



Go to Q608

607 **[IF YES ABOVE, ASK]** How often did this happen...almost every month, some months but not every month, or in only 1 or 2 months?

- a Almost every month []
- b Some months but not every month []
- c Only 1 or 2 months []
- d Don’t know []

608 In the last 12 months, did you ever eat less than you felt you should because there wasn’t enough money to buy food?

- a YES []
- b NO []
- c Don’t know []

609 In the last 12 months, were you ever hungry but didn’t eat because you couldn’t afford enough food?

- a YES []
- b NO []
- c Don’t know []

610 In the last 12 months, did you lose weight because you didn’t have enough money for food?

- a YES []
- b NO []
- c Don’t know []

2ND LEVEL SCREEN (SCREENER FOR STAGE 3): IF RESPONDENT ANSWERED YES TO ANY OF ABOVE QUESTIONS, THEN CONTINUE TO STAGE 3; OTHERWISE GO TO Q620.]

House Number

STAGE 3:

611 In the last 12 months, did you or other adults in your household ever not eat for a whole day because there wasn't enough money for food?

a YES []

b NO []

c Don't know []



Skip Q612

612 **[IF YES ABOVE, ASK]** How often did this happen ...almost every month, some months but not every month, or only in 1 or 2 months?

a Almost every month []

b Some months but not every month []

c Only 1 or 2 months []

d Don't know []

[IF CHILDREN UNDER 18 IN HOUSEHOLD, ASK Q613 TO Q617; OTHERWISE SKIP TO Q618.]

The next questions are about persons living in the household who are *under 18 years of age*.

613 In the last 12 months, did you ever cut the size of their meals because there wasn't enough money for food?

a YES []

b NO []

c Don't know []

614 In the last 12 months, did any of the children ever skip meals because there wasn't enough money for food?

a YES []

b NO []

c Don't know []



Go to Q616

615 **[IF YES ABOVE, ASK]** How often did this happen...almost every month, some months but not every month, or in only 1 or 2 months?

a Almost every month []

b Some months but not every month []

c In only 1 or 2 months []

d Don't know []

House Number

616 In the last 12 months, were the children ever hungry but you just couldn't afford more food?

- a YES []
- b NO []
- c Don't know []

617 In the last 12 months, did your children ever not eat for a whole day because there wasn't enough money for food?

- a YES []
- b NO []
- c Don't know []

[ASK Q618 IF RESPONDENT ANSWERED YES TO ANY OF QUESTIONS 605 TO 617. OTHERWISE GO TO Q620.]

618 I would like to ask you about why your household was unable to afford enough food. Can you tell me the main reason? *[DO NOT READ REASONS. WRITE NUMBER OF FIRST 3 REASONS IN THE SPACES BELOW. IF NECESSARY, PROMPT BY ASKING, "WERE THERE ANY OTHER REASONS?"]*

- a. Not working
- b. Waiting for EI (Employment insurance) or social assistance
- c. Not enough income
- d. Spent money on medicine
- e. Gave money away
- f. Gave food away to others in the community
- g. Had to buy hunting, fishing or trapping equipment, supplies or gas
- h. Had to pay bills (like hydro, children's clothing, school supplies)
- i. Spent money gambling
- j. Food costs too much
- k. Don't know or refuse
- l. Other, explain _____

Reason 1. _____ Reason 2. _____ Reason 3. _____

House Number							
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[ASK Q619 IF RESPONDENT ANSWERED YES TO ANY OF QUESTIONS 605 to 617. OTHERWISE GO TO Q620.]

619 When your household was unable to afford enough food, what did you do?
 [DO NOT READ CATEGORIES. WRITE NUMBER OF FIRST THREE ACTIONS IN SPACES BELOW.]

- a. Ask for more social assistance (welfare/income support)
- b. Ask store manager for more credit
- c. Borrow food or money for food from friends or family
- d. Go hunting or fishing
- e. Ask help from CHR, nurse or doctor
- f. Do without
- g. Make an item to sell
- h. Get food from the community freezer
- i. Other, explain _____

Action 1. _____ Action 2. _____ Action 3. _____

[IF CHILDREN 5 OR UNDER IN THE HOUSEHOLD, ASK Q620; OTHERWISE GO TO Q621.]

620 During the past month, did any of the children in this household receive breakfast, lunch or snacks at day care, a pre-school program or kindergarten? [CIRCLE RESPONSE]

- a YES
- b NO
- c Don't know

[IF CHILDREN BETWEEN 6 AND 17 IN THE HOUSEHOLD, ASK Q621; OTHERWISE GO TO SECTION D.]

621 During the past month, did any of the children in this household receive breakfast, lunch or snacks at school? [CIRCLE RESPONSE]

- a YES
- b NO
- c Don't know

House Number

Finally, to complete the questionnaire, we need to ask a few questions about household income and expenses.

D. EMPLOYMENT, INCOME AND EXPENSES

700 Can you tell me how many members of your household presently:

- a Earn money from selling furs or sealskins? _____
- b Earn money from selling crafts (e.g., carvings, sewing, jewelry, etc.) _____
- c Have a job or business? _____
- d Receive a pension? _____
- e Earn money as a hunter under the Hunter Support Program to provide country food to the community freezer? _____

701 In the past month, did anyone in your household receive money from Employment Insurance (EI or UI)? *[CIRCLE RESPONSE]*

- 1 YES 2 NO 3 Don't know

702 In the past month, did anyone in your household receive social assistance (welfare/income support)? *[CIRCLE RESPONSE]*

1 YES



Go to Q704

2 NO

3 Don't know

House Number							
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703 Can you tell me APPROXIMATELY the **total amount of money received in the past 4 weeks** by **ALL** household members from all sources (e.g. take-home pay from a job, money from selling furs, sealskins, carvings or crafts, money from the Hunter Support Program, pensions, net income from running a business and Employment Insurance)? *[SHOW CARD TO PARTICIPANT TO REMIND HIM/HER OF DIFFERENT SOURCES OF INCOME AND ASK IF HE/SHE CAN TELL YOU ABOUT HOW MUCH INCOME WAS RECEIVED FOR THE PAST 4 WEEKS. CIRCLE THE CATEGORY WHICH BEST DESCRIBES THIS AMOUNT. DO NOT INCLUDE CHILD TAX BENEFITS.]*

- | | |
|---------------------|---------------------|
| a. No income | f. \$4001 to \$5000 |
| b. \$1500 or less | g. \$5001 to \$6000 |
| c. \$1501 to \$2000 | h. Over \$6000 |
| d. \$2001 to \$3000 | i. Don't know |
| e. \$3001 to \$4000 | j. Refuse to answer |

704 Was your income last month the same as other months? *[CIRCLE RESPONSE]*

- a YES
- b NO, more than usual
- c NO, less than usual
- d Don't know

705 Can you tell me approximately how much your household usually spends **in an average week** on food (including food purchased from grocery stores and restaurants)? \$_____

706 Last month approximately how much did you pay for rent, mortgage, electricity, heating fuel, gas, water and sewage, garbage collection, skidoo parts and oil, bullets, naphtha and clothing material?

\$_____

The survey is now complete.

Thank you for your cooperation.