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EVALUATION OF EASTERN JAMES BAY CREE WOMEN'S DIETS

A Thesis

Presented to

The Faculty of Graduate Studies and Research

of McGill University

by

©Treena Wasonti:io Delormier

In partial fulfillment of requirements

for the degree of

Master of Science

Autumn 1995

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RESUME

Une enquête sur les apports nutritionnels et les habitudes alimentaires a été entreprise auprès de femmes Crie des communautés de Wemindji et Eastmain, Québec. Des données ont été recueillies à l'aide de rappels de 24-heures et d'un questionnaire sur la fréquence d'aliments traditionnels consommés, avec des femmes de trois groupes d'âge en deux saisons. L'age a eu un effet sur la quantité moyenne d'aliments traditionnels consommée ($p<0.0001$). La quantité d'aliments traditionnels consommée ainsi que la diversité variaient selon les saisons. L'ensemble des femmes avait un apport énergétique inférieur à ce qui est recommandé. Cependant, on a observé que 94% des femmes excédaient de plus de 2/3 l'apport nutritionnel recommandé (ARN) en protéine, et 80% des femmes excédaient de plus de 2/3 le ARN en fer. Quarante-quatre pourcent de femmes ont un apport en calcium de moins de 1/2 le ARN. À l'exception des aînées, la moyenne de la consommation totale de matières grasses était équivalente à au moins 30% de l'apport énergétique total. La plupart des femmes interrogées déplorent qu'il y ait une baisse de la consommation d'aliments traditionnels et aimeraient que les membres de la communauté en consomment plus souvent.

ABSTRACT

Food use and nutrient intake were studied with Cree women of Wemindji and Eastmain, Quebec. Twenty-four hour recalls and food frequency questionnaires were used among three age groups of women and in two seasons. Age had an effect on the mean amount of traditional food consumed ($p<0.0001$). Species and amounts of traditional food consumed varied by season. Ninety-four percent of women exceeded 2/3 of the recommended nutrient intake (RNI) for protein and 80% exceeded 2/3 of the RNI for iron, despite lower than recommended reported energy intakes. Calcium intakes of less than 1/2 the RNI were reported by 44% of women. Mean total fat intake reported by young and middle adults was greater than 30% of total energy. Qualitative inquiry into changing food use revealed that most women agree that traditional food use has declined for a variety of reasons, and that community residents should use more traditional food.

ACKNOWLEDGEMENTS

The communities of Wemindji and Eastmain and the women who participated in the dietary survey are acknowledged for the valuable information they contributed. Irene Mistacheesick was instrumental in the development of this project. Her guidance and knowledge were greatly appreciated. Pauline Langdon, Florence Cheezo, David Visitor and Denis Cheezo are recognized for their significant input and involvement. Thank You to all the friends in Wemindji and Eastmain.

The Centre for Nutrition and the Environment of Indigenous Peoples (CINE), its staff and students provided an excellent and stimulating environment to accomplish the objectives of this research. The following CINE people are recognized for their input on this endeavor: Dr. Harriet Kuhnlein, thesis advisor, for the encouragement to pursue a master's degree, Dr. Olivier Receveur for his generous donation of time on various aspects throughout the project, and Marjolaine Boulay for her immense contributions to data management and analysis. Mary Trifonopoulos is acknowledged as a friend who made this project an illuminating experience.

The thesis committee members, Dr. Tom Kosatsky and Alan Penn are thanked for their input.

The Cree Board of Health and Social Services of James Bay (CBHSSJB) are thanked for partial financial support of this project and for the interest and support displayed throughout.

Finally, to all my family and friends who provided support and encouragement throughout; Nia:wen ko:wa.

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I. INTRODUCTION

The Eastern James Bay Cree have experienced relatively recent changes in lifestyle due to socio-cultural, political and environmental factors. The impact of these changes has affected diet, traditional food use and nutrition. The extent to which diet has changed has scarcely been examined, however the role of diet in the observed patterns of health and disease are recognized (Young, 1994; Thouez, 1989). Of particular concern is the decreased use of traditional food by children and the younger generation, changing fish consumption patterns due to methylmercury contamination, and increased prevalence of obesity, diabetes, cardiovascular disease, among others.

Central to these issues, are questions about the current diet and food consumption patterns of the Cree. In order to address these questions it is necessary to develop appropriate methods for a dietary investigation. Dynamics of both market and traditional food systems must be addressed, including varied use of foods by season, by different age groups and in different settings. In addition, the nutrient contributions of market and traditional food must be considered for a clearer understanding of the roles they play in diet and nutrition.

Varying opinions on food, diet and nutrition exist in any culture. The relatively rapid changes which have taken place, and which continue to shape the contemporary Cree lifestyle, have resulted in different levels of knowledge and experience in this area. By pursuing the wisdom from different generations on these topics, and combining it with dietary information, a clearer picture of diet in transition may be obtained. Blending qualitative data collection techniques with methods lending themselves to quantification has been recognized as a powerful tool, and is recommended especially in dietary research with different cultures.

In this research initiative, Cree women from the community of Wemindji and elder women from Eastmain, a close and similar Cree community, were invited to participate in a dietary study. Women were asked to participate because of the significant role they play in selecting and preparing food to the family. From a nutritional point of

view women's dietary needs are difficult to meet, due to increased needs of certain nutrients, depending on stage of the life cycle, and the energy requirements with which to accommodate nutrient needs. However while women's diet can be indicative of the status of diets of other members of the population they cannot be substituted for actual inquiry.

The dietary survey was conducted in two seasons: one of high and one of low traditional food use as identified by community members. Interviews were conducted in the community and in bush camp settings (hunting camp) when possible. Dietary interviews were designed with and conducted by members in both communities. Advice from community members on the best way to study the Cree diet was incorporated to the greatest extent possible.

II. LITERATURE REVIEW

1. Dietary patterns of the Eastern James Bay Cree

1.1 The Eastern James Bay Cree

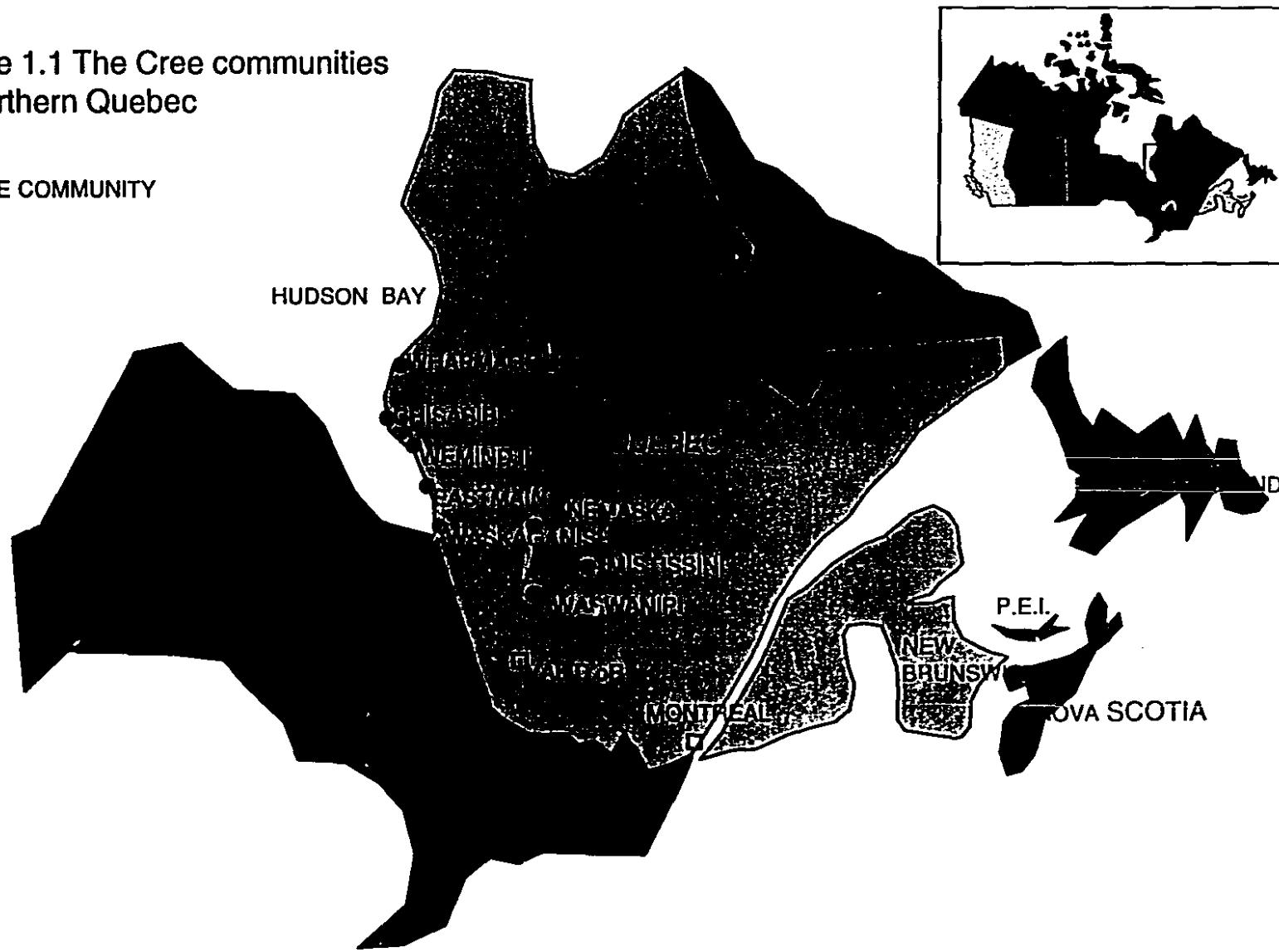
Archaeological records document the pre-contact period of the Eastern James Bay Cree and demonstrate that the first inhabitants in the area had been there for at least 5000 years (Bobbish-Atkinson, 1990). It is likely that the Aboriginal peoples living there in the contact period are culturally and biologically linked to these first inhabitants (Feit, 1969). However, due to a lack ethnohistorical records there are few data on aboriginal demography in the area before or at contact (Feit, 1969).

Hudson Bay Company records tell of the first encounter between Europeans and the Cree at Rupert's House. Toward the end of his winter stay at Rupert's Bay (presently known as Waskaganish) in 1611, Henry Hudson traded furs for European goods with a Cree hunter (Preston, 1981). From 1670 to 1675 expeditions were made north and south of Rupert's House, thus contacting Cree along the coast. In the 18th century, trading posts were established along the coast and further inland. From 1600-1850, the Cree lived largely in the same manner as they had before the arrival of the Europeans. However they did incorporate European trade goods into their existing technologies. The fur trade continues to the present (Berkes and Farkas, 1978).

The turn of the century marked a difficult period for Aboriginal peoples, including the James Bay Cree, due to the low availability of important food species (caribou and beaver) and fur species (marten and beaver). At this time epidemic diseases took their toll on many Cree families. The situation did not improve when fur prices crashed in the 1940's, creating further difficulty for the Cree to access market food and other resources. The Cree began to spend more time in settlements where they previously only met for short summer gatherings and to trade. Responsible in part for this change was compulsory schooling and other governmental policies (Robinson, 1985; Berkes and Farkas, 1978).

Today, the Eastern James Bay Cree Nation, or the Cree Nation, refers to the Cree as those related by ancestral and consanguineal ties who live in one of the nine Cree communities (figure 1.1) (Adelson, 1992). The affiliation of Cree beyond the village level is a relatively new phenomenon resulting from the need for "a stable, cohesive unit that can react to issues and events surrounding the control and development of the natural resources of Northern Quebec" (Adelson, 1992). The Cree formed a union that would represent their collective concerns and voice when proposed hydroelectric development threatened destruction of their land and way of life.

Figure 1.1 The Cree communities in Northern Quebec



1.2 Pre-contact diet

There is no written record of the pre-contact diet of the Eastern James Bay Cree. However it is known that the Cree were subsistence hunters who got their food from the local environment. According to Schaefer (1977) one can assume that the traditional diet consisted of meat, fish and fat, similar to that of the Inuit (in Berkes and Farkas, 1978). The earliest records that provide information on the diet are those kept by the Hudson's Bay Company. The local land and environment provided the Cree with species that were important for survival. Large game included caribou, moose and to a lesser extent black bear and polar bear. Black bear was used for religious purposes more often than for subsistence (Tanner, 1976) and polar bear was available in the more northern areas. Marine mammals found in more northern areas and on the coast were seal and beluga. Important fur-bearing and food animals included beaver, otter, lynx, marten and hare, the most important being beaver and hare. Fish were the most dependable food resource, and were eaten year round. Fish species included whitefish, cisco, trout, sturgeon and pike and likely included sucker, burbot, and walleye. Geese, ducks, rock and willow ptarmigan were noted bird species. Wild berries and other plants such as Labrador tea and pine needles were used. At first contact with Europeans in the early 1600`s, the Cree were in good health, which indicated, in general, that the pre-contact diet was adequate in providing the Cree with the nutrition necessary for health.(Morantz, 1983; Preston, 1981; JBNQNHRC, 1982; Weinstein, 1976; Berkes and Farkas, 1978).

1.3 Post-contact diet

According to the accounts of the explorers and fur traders of the seventeenth century the first contact between the Europeans and the Cree of James Bay occurred in 1611. From 1670 to 1675 expeditions were made north and south of Rupert`s House. At this time food, such as flour, lard, sugar, baking powder and tea were among those traded. However, market food became a trade item in coastal areas only around 1838, and later

on in inland areas where transportation was limited. During the 1700's to the 1850s store food was not a subsistence resource (Morantz, 1983). It was not until the late 1800's, that the Cree who lived inland began to use non-traditional food in their diet due to the scarcity of traditional food resources.

The Cree living on the coast had been using market food for a longer period since they lived closer and were involved more with the trading posts. This dependence on market food continued until the middle of this century. Schooling, governmental assistance and policy encouraged staying in the settlement near trading camps and further influenced the use of market food.

The Income Security Program (ISP), which was established as part of the James Bay Northern Quebec Agreement (JBNQA), guarantees full-time hunters a yearly cash income and an allowance for days spent hunting. The ISP was implemented in order to strengthen the hunting economy by providing hunting families with the means to cover the money costs of hunting, trapping, and fishing. The positive impacts of this innovative program encompasses the use of traditional food (Salisbury, 1986).

Today the diet is made up of both market and traditional food. All communities have access to at least one grocery store. Hunting and trapping is still a way of life for at least one third of the population, and more are involved with hunting and trapping on part-time basis. Traditional food holds a strong cultural identity for the Cree. This is reflected in all aspects of its use from hunting and trapping, food sharing, feasts and food preparation (Delormier, 1993).

1.4 The annual cycle of Cree traditional food harvest

Harvesting patterns of traditional food vary among the Cree of Eastern James Bay. Factors contributing to this variation include, geographic location, important harvested species, employment opportunities, and social traditions in the different communities (Scott and Feit, 1992). Very little information on harvesting patterns of the past exists, but it suggests that patterns have not been altered greatly from the last few hundred years (Rogers, 1963).

Differences in harvesting patterns between Inland communities (Nemaska, Misstissini, Waswanipi) and Coastal communities (Whapmagoostui, Chisasibi, Wemindji, Eastmain, Waskaganish) have been distinguished due to obvious geographical factors. In general, trapping is done from September to March, hunting takes place from April to October, while fishing takes place mainly in summer but is conducted year round to supplement other sources of food (Cree Trappers Association, Chisasibi, 1989).

An inland hunting family will leave for their trapline between August and October. Some families may return to the settlement for Christmas while others remain on their trapline until March, and some as late as June. During the summer period, fishing camps are set up near the settlement or some people will set nets on lakes at the settlement. A Coastal hunting family will have a slightly different cycle. Spring and fall goose camps are important, intensive harvesting periods. Winter trapping is pursued and summer coastal fishing is another important harvesting period.

1.5 Wemindji and the annual cycle of harvest

Wemindji is located on the Eastern coast of James Bay, at the mouth of the Maquatau River. The community was established at this location in 1959. Prior to this the people of Wemindji lived on an island at the mouth of the Old Factory River, south of the current location. The population of Wemindji is about 900.

In 1995 a permanent, year-round access road was completed, connecting the community to the highway built for the purpose of accessing hydro-electric installations

from the south. Before the access road, there was a winter road, otherwise Wemindji was accessible by air.

Wemindji residents can purchase market food from one commercial franchise, a cooperative grocery store, and 2 restaurants. Individuals can also place orders for perishable and non-perishable food items from Val d'Or on a weekly basis. Traditional food is an important part of the diet, culture and well-being of the Cree (Adelson, 1992). Exemplifying this is the extended food sharing networks that operate in the community ensuring a supply of traditional food to the majority of members. There are families who pursue hunting, fishing and trapping as a full time occupation, and who receive monetary support from the Income Security Program for such activities. There is a summer subsidized fishing programs in Wemindji that supply fish, with low-methylmercury content, to the community.

The contemporary annual cycle of traditional food harvest of Wemindji is described here since it was the community where factors affecting traditional food use were studied. The annual cycle demonstrates the dynamics involved in harvesting traditional food resources.

In Wemindji hunters may have their traplines along the coast while other's are further inland, even-though Wemindji is located on the coast. The fall goose hunt, winter hunting-trapping, spring goose hunt and summer fishing have been described as four important harvesting periods (Scott and Feit, 1992). The summer fishery may not be as intensive, but is an important time in the annual cycle.

The Fall Goose Hunt: Canada Goose is the primary species hunted. Their fall migration brings them into the area in late August and continues until late October. Some families stay in fall goose camps along the coast, while others hunt from the community. Duck hunting, fishing for cisco and speckled trout, and on occasion, a bear may be hunted and adds to the goose hunt. After this time hunters return to the community to prepare to travel to their winter camps. Hunters with inland traplines leave the community during the goose hunting period.

Winter Hunting and Trapping: As with the goose hunt, some hunters hunt and trap from the community if their trapline is close by. Beaver trapping begins and proceeds until the

rivers and lakes start to freeze, around mid-November. Seal hunting also takes place in the bay, from canoes, before freeze-up. When the ice is thick enough to walk upon beaver trapping resumes and carries on through to March. Fishing for cisco, whitefish, speckled trout, and suckers on rivers and lakes is carried out in the late fall period and gill net fishing on lakes near encampments continues throughout the winter (Weinstein and Penn, 1987). During this winter hunting/trapping period, other fur animals such as marten, lynx, and fox are harvested largely for their fur. Rabbit, ptarmigan, grouse and porcupine may also be taken. Caribou and moose are also hunted at this time. By March, most people have traveled back to the settlement. Inland harvesters also return over great distances, which is made possible by snow mobile, ski plane or truck if the camp is near the road.

Spring Goose Hunt Trips to spring goose camps take place in mid-April, and the geese begin to fly into the area by the second to last week in April. This hunting period lasts for about one month and involves a larger number of families staying in goose camps in contrast to the fall goose hunt. Hook and line fishing through the ice for speckled trout is also done at this time. A holiday period of three weeks is given to school children and some full-time employees to participate in the goose hunt. Other water fowl, fish, and muskrat are also taken. People begin to return to the community by canoe once there is open water along the coast of the bay, or they may charter a plane if they must return before then.

The summer coastal fishery: Once there is open water, summer coastal fishing begins for whitefish, speckled trout and cisco that are returning from the rivers into the bay. Mid-summer fishing is comparatively poor, but intensifies in August when fish head back toward the rivers. Since 1989 subsidized fishing camps have operated with the purpose of providing fish with low methylmercury content to the community of Wemindji (Lessard,1993). Since this time the utilization of the summer coastal fishery has declined for many families in the community (Delormier, 1993). In addition to the summer coastal fishery, some fisherman will angle on nearby lakes for lake trout and pike (Scott, 1983; Scott and Feit, 1992; Cree Trappers Association, 1989).

1.6 Nutrition research with the James Bay Cree

The first nutrition study of the James Bay area was done in the 1940's, and recorded deficiencies of vitamin A, riboflavin, vitamin C, and calcium in the diet (Vivian et al., 1948). This study also coincided with a period of low availability of traditional food, and were likely not reflective of less stressful times for the Cree (Farkas and Berkes, 1978).

In an attempt to gather information on the nutrition of the Cree, early efforts were made to calculate the potential availability of nutrients from food. Farkas (1974) calculated potential available nutrients from the traditional food gathered and market food brought into the bush by 5 family groups. The five groups represented 20 adults, 2 children and 2 infants. The potential macronutrient availability, as percentage of energy, from the inventory was 25% carbohydrate, 26% protein, and 49% fat. Further to this, all carbohydrate came from market food, 79% of protein and 83% fat was from traditional food sources. Some micronutrients calculated were 53% of potential calcium intake and 77% of potential iron intake (for two family groups) from traditional food. The data are limited by the lack of nutrient composition for traditional food, by the rough inventory method used, and the small sample size. However, they do highlight the importance of traditional food as source of nutrition.

Once data on harvests of traditional food became available for 7 Cree communities, potential nutrient availability was calculated. Farkas and Berkes (1978) used the data from harvest year 1974\75 to demonstrate that the mean wild meat available per consumption unit (C.U.) (adult= 1 C.U., child= 1/3C.U., adolescent= 2/3 C.U.) could furnish 689 kilocalories/day and 114 grams of protein/day. This would represent 25 % of energy requirements and 100% of protein requirements (Berkes and Farkas, 1978). These data are limited by assumptions that each Cree person has the same amount of traditional food available to him/her, and also by the limited nutrient composition data available. However, they confirm the importance of traditional food in the diet.

The James Bay and Northern Quebec Native Harvesting Research Committee, documented harvests from 8 Cree communities for the period 1974-75 to 1979-78. From

the total weight of traditional food gathered by each community, they estimated food available for consumption. This estimate did not include plant foods. The mean intake per C.U. (adult= 1 C.U., child= 1/3C.U., adolescent= 2/3 C.U.) was 0.41 kg of wild meat per day. The range of mean intakes per C.U. between communities ranged from 0.32 kg/day to 0.58/day kg. No attempt was made to assign energy or nutrient values. (JBNQNHRC, 1982).

In 1975, Health and Welfare Canada published the Nutrition Canada Indian Survey. Nutritional status was assessed using clinical, dietary and biochemical measures in 29 aboriginal communities across Canada. One of the communities included in the sample was the James Bay coastal community of Fort George. However, all the data were pooled and the results cannot be used to describe the situation in Fort George, or in any one aboriginal community. The data were regionalized into "remote from", and "close to" urban centers, which did allowed comparisons to be made between regions and with the national sample data. Most northern communities, including Fort George, were placed in the "remote from" urban centre region (Nutrition Canada, 1975).

A study of nutritional status was done on 80 percent of Cree adults from the communities of Misstissini, Waswanipi and Great Whale during the summer of 1978 (Hoffer et al.,1981). Nonfasting venous blood was drawn to determine serum iron, transferrin saturation, total protein, ascorbic acid, vitamin A, vitamin E and folic acid. One urine sample was taken to determine thiamin excretion. Results were compared with the Nutrition Canada survey (Health and Welfare Canada,1975). In general results were found to be consistent with the Nutrition Canada Indian survey. Notable inconsistencies were a higher prevalence of low serum vitamin A concentrations in the Cree than for the sample of Indians identified as living in remote areas. Low ascorbic acid concentrations were found for the Cree, which was similar to Indians living in remote regions.

Serological indicators of nutritional status were again studied as part of a research effort looking at epidemiological, socio-cultural and health aspects of the James Bay Cree (Thouez et al., 1989). Blood samples were evaluated for serum albumin, plasma creatinine, blood urea nitrogen, serum calcium, serum iron, total protein and zinc. The results included calculating the percent at risk as defined by cutoff values and by a

percentile method (>80%ile or <20%ile). The authors noted that the proportion of Cree at risk for zinc deficiency was high. Also shown, but not discussed by the authors, was that women were at higher risk than men for having low serum albumin, which reflected protein status, and for low serum iron.

More recent dietary studies have focused on gathering data on eating habits as they relate to lifestyle of the James Bay Cree. A study on food habits in Chisasibi revealed that less than half the population ate fruits and/or vegetables daily, almost half of school children skipped breakfast and one quarter of children went to the restaurant each day. The positive aspects of the diet included the wide availability of traditional food and the popularity of cooked breakfast cereal (Robinson, 1985).

A pilot study on the eating habits of Cree school children was conducted in Eastmain and Chisasibi (Bernard and Lavallée, 1993). Dietary data gathered using the 24 hour recall were compared to the recommended number of servings suggested by Canada's Food Guide. It was found that children in the 9-11 year age group met or surpassed the number of servings recommended for each food group, while adolescents 12 years and older did not meet the suggested number of servings of milk products, and fruits and vegetables. This failure of meeting recommended levels suggested to the authors that there is a potential for low intakes of calcium and other nutrients (Bernard et al., 1995).

The 1991 Santé Québec Health Survey of the James Bay Cree looked at qualitative aspects of the diet, and collected quantitative data with the 24 hour recall. The quantitative data have not yet been presented. Available reports on qualitative analysis related to meal preparation, individual eating habits and factors influencing eating behavior. The data suggest that consumption of vegetables may be low (Daveluy et al., 1994).

1.7 Nutrients of concern in diets

Dietary intake studies have been done in Canada with different groups of Indigenous peoples. Table 1.1 summarizes the nutrients that were studied for which there

exist recommended levels of intake. Also shown are the nutrients for which there was evidence suggestive of inadequate levels of intake. Although a few studies looked at intakes for children, only information on adult intakes are shown.

Table 1.1 Summary of nutrients studied in diets of Canadian Aboriginal Peoples

Author / year	Sample	nutrients under study	nutrients of concern
Kuhnlein (1984)	Nuxalk women 19-49 yrs.	protein, vitamins A, D, C and E, thiamin, riboflavin, niacin, pyridoxine, cyanocobalbamin, folate, Ca, P, Mg, Fe, Zn, I	vitamin E, Ca, folate vitamins A, D, Fe, vitamin C
Sevenhuysen and Bogert-O'Brien (1987)	Northern Manitoba women 18 + yrs	protein, vitamins A and C, thiamin, riboflavin, niacin, Ca, Fe	Ca, Fe, vitamins A and C
Kuhnlein (1989) unpublished	Broughton Island Inuit women 20 - 40 yrs	protein, vitamin A, Fe, Cu, Zn, Ca, P, Mg	vitamin A, Ca
Wein et al. (1991)	Cree, Chipewyan, Metis Wood Buffalo National park, Northern, Canada women 13 + yrs men 13 + yrs	protein, vitamins A, D and C, thiamin niacin, riboflavin, folate, Ca, Fe, P	vitamin A, Ca, vitamin D, folate - all Fe - women vitamin C - men
Kuhnlein (1991) unpublished	Dene/Metis - NWT women 20 - 40	protein, vitamin A, Fe, Cu, Zn, Ca, P, Mg	vitamin A, Ca,
Wein et al. (1993)	Northern Alberta mothers/caregivers	protein, vitamins A, D, C, B_6 and B_{12}, folate, thiamin, preformed niacin, riboflavin, Ca, P, K, Fe, Zn	Ca, folate, vitamin A, Zn, vitamin D
Campbell et al. (1994)	Cree, Northern Manitoba women 16 - 74 yrs men 56 - 74 yrs	protein, vitamins A and C, thiamin, riboflavin, niacin, folate, Ca, Fe	vitamin A, Ca - all Fe, folate -young women vitamin C, folate, thiamin - elders

In general two techniques were used to evaluate the adequacy of intakes. The first and most applied technique compared the group mean, or in one case the median, to the Recommended Nutrient Intakes (RNI) for Canadians. Since the actuai RNI for most nutrients is set at the determined mean requirement plus two standard deviations, the requirement generally overestimates the actual need of most of the population (Beaton, 1985). Therefore an arbitrary proportion of the RNI, usually two thirds or one half, is used to compare observed nutrient intakes. Two of the studies presented used the

probability approach, which is a more reliable method of determining nutrient inadequacy. It determines the prevalence of inadequate intakes for specific nutrients (NRC, 1986).

For each study vitamin A and calcium were determined to be consumed in inadequate levels for the subjects that were interviewed. For women, iron and folate intakes levels appear to be inadequate, as was shown in 4 of the 7 studies presented. Vitamin C and, to a lesser extent vitamin D are nutrients for which intakes among Canadian Indigenous peoples may be inadequate.

It is important to note that in interpreting nutrient intakes from dietary intake data, nutrient composition databases that include foods consumed in the diets under study are required. It has been mentioned with respect to interpreting vitamin A and folate intakes that inadequacies exist in analytical methods used to determine food composition data (Campbell et al., 1994). Moreover, many gaps exist in nutrient composition databases with respect to data for traditional foods that are consumed by the Indigenous peoples whose diets have been evaluated.

Wide individual variation in vitamin A intake make it difficult to determine the usual level of intake in the population at the individual level. Therefore, probabilities of inadequate intakes of vitamin A, need to be interpreted carefully. Nevertheless, the consistent findings of the risk of inadequate intake cannot be taken lightly. In the Nutrition Canada Indian survey (1975) dietary intakes of vitamin A tended to be lower than those in the national sample and serum vitamin A levels tended to be lower for Indians; however, no samples were classified as indicating high risk.

Calcium intakes were also observed to be lower in every age category for the Indian sample when compared to the national sample in the Nutrition Canada Indian survey. Children under 5 and men from 20 to 40 years were the only groups considered to have adequate intakes.

In the Nutrition Canada Indian survey, intakes of iron for the Indian women were similar to the national sample of women, which were marginal and close to inadequate. Vitamin C intakes were lower than the national and considered at risk for Indian adults. Lower vitamin C intake levels were observed consistently among Indians living in the

remote regions defined by Nutrition Canada. Folate levels of intake were not determined in this survey due to the lack of data of its content in foods.

As noted previously, no data are presently available on nutrient intakes for the Cree living in Eastern James Bay. Biochemical indicators of nutritional status in the Cree have shown high prevalence of low serum vitamin A concentrations, low serum ascorbic acid concentrations, a high proportion of at risk for zinc deficiency, and women at higher risk than men for iron deficiency (Hoffer et al., 1981; Thouez et al., 1989).

2. Dietary change and nutrition

2.1 Dietary change and nutrition

"Change is a fundamental characteristic in human societies, as it is in all nature" (Pelto and Vargas, 1992). In studying nutrition and culture, the effect of change on nutritional status and health is a key issue. Unfortunately, negative consequences on health and growth resulting in the change from hunter-gatherer societies to settled lifestyles and food ways is the documented pattern.

Delocalization, a principal feature of contemporary change, can be used to describe the main elements of "modernization" which, simply put, is the shift of local autonomy to dependence on an external system of resource allocation and political power. With respect to diet, food systems and nutrition, delocalization describes the increased dependence on commercially available food sources and a shift away from local food sources. Although delocalization has resulted in adequate diet for some, it has also provided excessive and poor diets for others (Pelto and Vargas, 1992).

2.2 Dietary change and North American Aboriginal Peoples

The diet and nutrition of a people develop from adaptation to the particular environment in which they live. Original diets of North American Aboriginal Peoples consisted of game, fish, wild plants as well as cultivated plants. Of course, diets of different groups varied with the local and regional conditions and food resources available (Young, 1994).

Diet and nutrition are susceptible to change when social, cultural, economic and environmental transformations occur. For example, in the Canadian arctic and subarctic, traditional food is still an important part of the diet for the Inuit and subarctic Indian groups. However, original dietary patterns have been altered in a relatively short period of

time which began with the arrival of the explorers, and was followed by fur traders, missionaries, and government officials (Young, 1988).

Dietary research with Canadian Aboriginal Peoples has examined the effects of socio-cultural, political and economic change on the traditional food system, diets and food use. These studies focus on the diets and food use of different age or generational groups. Younger generations, in general, consume more market food than their parents or grandparents (Berkes and Farkas, 1978); likewise among adults, the elder generation tends to consume more traditional food than the younger adults. Data on food use from 1 Baffin Inuit community and 2 Sahtú Dene/Métis communities clearly showed that older individuals consumed more total traditional food than younger individuals (Kuhnlein, 1995). In three generations of Nuxalk women who were interviewed about traditional food use through their lifetime, the trend was for elder women "grandmothers" to use less traditional food than previously, and for younger women to be using less traditional food than elders (Kuhnlein, 1992a). These women also displayed differences in taste appreciation across age groups, with the "grandmothers" having moderate taste appreciation for traditional seafood and "mothers" and "daughters" displaying polar taste preferences (Kuhnlein, 1989a). Wein studied the food consumption pattern of Cree, Chipewyan and Métis living in Wood Buffalo National Park. She looked at three generational groups: adolescents and young adults (13-24 years), middle adults (25-49 years) and older adults (50-86 years). She demonstrated that young people consumed traditional food less frequently and in smaller amounts than their elders. The older adults consumed more fish than the other two age groups. Moreover, adolescents and young adults had a lower percent energy from protein and a higher percent of energy as carbohydrate when compared to the middle and older adults, demonstrating generational differences in patterns of food use (Wein et al., 1991b). One explanation for this trend may be that young people have been introduced to a wider variety of market food during their formative years (Wein et al., 1991a). Other factors proposed as contributors to changing patterns of food use among generations include formal education, wider social contact networks with non-Native people, and media. Other factors driving dietary

change include legislation restricting the use of natural resources such as land, water, and forests that provide food resources and legislation on harvesting different species of wildlife (Kuhnlein, 1989; Kuhnlein, 1992a).

Most recently, a variety of development projects have been initiated to exploit the natural resources in the North. Industrial development in the North often results in wide reaching and significant changes for people who depend on local resources for much of their livelihood and food resources (Young, 1988). In northern Manitoba, a Native community was affected by the construction of a huge hydro-electric development which involved the diversion of the Churchill River and the flooding of over 1,500 square kilometers. The project's impact on diet involved decreased consumption of wild game and fish, increased consumption of market food, and increased consumption of low nutrient value food. In addition, the combination of the high cost imported foods, and insufficient income from employment or social assistance negatively impacted on the nutritional value of the diet (Waldram, 1985).

2.3 Dietary change and the Eastern James Bay Cree

The Eastern James Bay Cree have witnessed the relatively rapid transformation in their way of life, beginning in the 1940's with the introduction of governmental assistance in the form of education, health, settlements and other policies. Thirty years later, in 1970, the Quebec Government announced the James Bay Hydro Project, which proposed the flooding of important Cree hunting and trapping lands.

At the end of 1975 the James Bay Northern Quebec agreement was signed which, among other things, entitled the Cree control of health, education, and local government. The Income Security Program was developed in order to strengthen the hunting economy, by guaranteeing hunters a minimum cash income (Salisbury, 1986). However the impacts of the hydro development project on the diet and nutrition of the James Bay Cree, among other things, has only begun to be understood.

The effect of hydro-electric development has impacted the Cree, through multitude of complex changes brought about by the James Bay Northern Quebec

Agreement. Moreover, the finding of methylmercury in fish caught from areas flooded by hydro-electric development has directly jeopardized a cornerstone of the traditional diet for a large majority of the Cree in Northern Quebec.

Issues of methylmercury and the James Bay Cree arose in the 1970's, even before the flooding of Cree lands, when high levels of methylmercury were found in fish coming from waters in the James Bay territory. Reasons proposed for this included waters contaminated with mercury from a pulp and paper plant, mining and a high concentration of mercury in the basement rock found in the region (Penn and Weinstein, 1987). Methlymercury in fish came to the forefront in the mid 1980's when predatory fish from reservoirs were found to contain methlymercury at levels of concern for the health of people who consumed the fish. For a people whose traditional food staple is fish, methylmercury posed a serious threat to a reliable and valuable food resource. The potential negative consequences on the diet and food resources related to the contaminated fish were clear. Hence, a comprehensive program was developed with the goal of monitoring methylmercury exposure and advising people on fish consumption, while maintaining the nutritional, cultural and economic benefits of fish consumption (Penn and Weinstein, 1987). This approach included hair sampling for methylmercury in "at risk" groups, information and education on methylmercury and fish through, video, printed media, radio and Cree community health representatives who coordinated the multi-media "Mercury Program". The effectiveness of the program has been evaluated and socio-cultural impacts of methylmercury addressed by examining people's knowledge, changing perceptions and behavior, in light of the advisory and information provided through the Mercury Program (Caron and Belanger, 1992). The effectiveness of the mercury program and impact of methylmercury has been found to vary between communities, families and individuals.

The general conclusions were that the impact of methylmercury on consumption practices of fish varies between communities due to geographical location of communities and traplines (Chisasibi, Wemindji and Eastmain are three communities who are most widely affected by the flooding). Also there is variation in consumption patterns between families and individuals. Some people have chosen to ignore advisories

on fish consumption while others have completely abandoned fish consumption. For the most part it seems that people have decreased consumption of fish that pose higher risk (Caron and Belanger, 1992).

The Mercury program still operates and although the issue of methylmercury is less important as a community issue compared to 10 years ago, there are new issues. These issues concern diet, culture, nutrition and health and are either directly or indirectly related to industrial and other recent developments in Northern Quebec (Delormier, personal observation).

3. Dietary assessment

3.1 Methods

3.1.1 Nutritional assessment surveys

Nutritional assessment is defined by the World Health Organization (WHO) as "the interpretation of information obtained from dietary, biochemical, anthropometric and clinical studies". Dietary intake methods are usually employed first to assess nutritional status before using biochemical or clinical methods. A nutrition assessment survey may be used to establish baseline nutritional data and determine nutritional status on a particular population group (Gibson, 1990).

The objective of the dietary survey will determine which methods are appropriate for assessing food consumption. Other factors influencing the choice of methods include whether data on national, household or individual level are needed, the nutrients that are under study, the characteristics of the population (such as literacy and motivation) and the time frame of the survey (Gibson 1990).

In general dietary intake methods can be classified by the kinds of data they yield. Quantitative methods yield data on quantities of food consumed, while qualitative methods offer descriptive information on the diet (Gibson, 1990).

3.1.2 The 24 hour recall interview

The 24 hour recall is the dietary intake tool used most widely in large nutrition surveys (Witschi, 1990). The practical advantages are that it is simple to perform, requires little time to complete, has minimum respondent burden and is applicable to most target groups from a variety of backgrounds (Cameron and Van Staveren, 1988). This method requires a subject or their caretaker to recall all food and beverages consumed over a twenty-four hour period. Detailed information on food, such as

quantities consumed, brand names and cooking methods, are recorded by an interviewer who is trained in obtaining dietary intake data. The success of this method depends on the interviewer's skill and the respondent's memory and capacity to accurately estimate and communicate the amounts of food consumed.

The single 24 hour recall is appropriate for measuring dietary intake for a group of subjects, and therefore lends itself to studies where differences between group means are to be compared either longitudinally or cross-sectionally (Bingham and Nelson, 1991). The validity of mean nutrient intakes based on the 24 hour recall has been measured by comparing it against weighed food records, a technique where an individual records the weight of all food consumed in a 24 hour period. Validity has been assessed for a large variety of samples, including adults, children and elders, although results have not been consistent, 24 hour recalls tend to underestimate group intakes. The magnitude of underestimation depends on the nutrient of interest. The reliability or repeatability of this method is generally good (Bingham and Nelson, 1991).

The 24 hour recall method has been used successfully in research on diets of Aboriginal peoples in Northern Canada (Campbell et al., 1994; Kuhnlein et al, 1995a (in press); Kuhnlein et al., 1995 (in press); Wein et al., 1991b; Wein et al., 1993; Wein, 1995). In all of these nutrition studies one of the main objectives was to obtain dietary and nutrient intake information. The population groups studied included children, adults and elders.

With respect to the Eastern James Bay Cree in Northern Québec, dietary research on eating habits of Cree school children employed the single 24 hour recall. (Bernard et al., 1995). As part of the Santé Québec health survey of the James Bay Cree that took place in 1991, the single 24 hour recall was used with adults, over fifteen years of age (Lavallée and Guyon, 1992).

3.1.3 Food frequency questionnaire

A food frequency questionnaire is designed to gauge how often a predetermined food set is eaten over a specific time period. It contains a food list and asks the

respondent to recall with what frequency, in number of occasions per day, week, month etc. each food was consumed. Quantities of food may or may not be asked, and will depend on objectives of the food frequency data. The food list will depend on the objective of the study; in epidemiological studies a few food items containing specific nutrients may be of interest. Frequency of food use may be used to classify people on their levels of consumption of certain kinds of food (Gibson, 1990). Since the food frequency yields qualitative information over a relatively longer period of time, it provides insight on usual food consumption patterns (Willett, 1990). The food frequency poses a low respondent burden (provided the food list is short) and can be used with more quantitative methods like the 24 hour recall to provide additional food consumption data (Gibson, 1990).

Reliability of food frequency data has been studied by comparing other methods at a different period in time and calculating correlation coefficients for food or nutrients. In general correlation between methods has been better for foods than for nutrients (Willett, 1990).

The food frequency method has been used with Aboriginal peoples in Northern Canada to assess the patterns of household traditional food use (Kuhnlein and Soueida, 1992b; Kuhnlein et al., 1994; Wein et al., 1991b; Wein et al., 1992b; Wein, 1995a). The purpose of the food frequency questionnaire data in these studies was to assess the influence of season or time of the year on the consumption of different species of traditional food.

3.1.4 Nutrient database for traditional food

Assessing nutrient intakes from quantitative dietary intake methods is calculated using food composition databases. Values in food composition databases often represent the average composition of a particular food on a year-round nationwide basis. (Gibson, 1990). Food composition databases should be comprised of food items that are representative of food consumed by the population under study. For Aboriginal peoples, like the Cree of Eastern James Bay, who maintain a diet that includes species of plants

and animals coming from the local land and environment, published databases may not contain appropriate values.

A preliminary review of published values for Cree traditional food revealed the following limitations. The most important limitation to the published values is the paucity of information regarding the food sample that was analyzed. This makes it difficult to determine the suitability of nutrient information. Information on wild meats that would be useful include the age and gender, the season in which it was caught, the part of the animal that was sampled and from which geographic region. Information on samples that is needed comprise the number of samples that were analyzed to determined nutrient values and the analytical techniques used. Food items that are not found in tables, for example Canada goose and bear liver are another limitation. In one case, nutrient values for Canada goose were actually substituted from domestic goose. Cooking methods used to prepare traditional food, for example boiled fish and fire roasted goose, would also make nutrient composition values more appropriate. Due to the need for specific data on traditional food, it is almost necessary to create a nutrient database to adequately reflect the traditional food system.

3.2 Dietary methods in cross cultural settings

"Culture refers to shared symbols and their meanings prevailing in any society or part of society. These symbols and their meanings include ideas about facts, ideas about desirable goals, and ideas about how people should or should not act" (Curtis and Lambert, 1990). When anticipating research in a cross-cultural setting it is appropriate for a researcher to attempt to understand and respect the symbols and meanings surrounding their research issues.

Conducting nutrition surveys in cross cultural settings involves taking certain factors into consideration. Nutrition researchers need to be aware of their models, assumptions and value systems when designing and undertaking dietary research. (Cassidy, 1994). Culturally sensitive dietary research recognizes that the goals and objectives of the research may not be of direct interest of the respondents. If the

individual is targeted for research, this may pose a problem if respondents place value on the household or group. Furthermore, research tools applied in a cross-cultural setting should contain few words, be respondent driven and flexible in order to decrease the likelihood of bias. Communication between respondent and researcher, and the potential for language bias, must also be addressed. If the language of the two are different translation issues and training of interviewers must be addressed. Moreover an understanding of language by respondents, regarding food and the research topics, must be pursued by researchers to avoid misunderstandings. The process of collecting dietary data, most importantly asking question about eating habits, in itself may be culturally unacceptable, and alternate ways of collecting such information should be sought.

Guidelines have been proposed for conducting cross cultural research. According to Henderson (1993) one should place themselves in the cultural setting to have the opportunity to be open, to listen and to hear. The general idea is to get a taste of the culture and learn to appreciate cultural differences and dynamic processes. Incorporating culture in each step of the research process by consulting with key informants will facilitate cross cultural research. Using appropriate methodologies and research instruments applies for any research process.

3.3 Qualitative techniques used in nutrition research

Qualitative research can be described as the study of meanings, concepts, symbols and descriptions of things (Berg, 1988). Patton (1990) describes it as understanding people in whatever settings and under whatever circumstances one encounters them. When developing methods for a dietary study it is suggested to begin with qualitative research.

> The essential reason for beginning research with qualitative approaches is that [it helps researchers] position themselves to be open, to listen and to hear. In short, using qualitative methods helps researchers avoid imposing their values on others. (Cassidy, 1994).

Traditional approaches in research could be divided as quantitative or statistically based, and qualitative, generating data on how a group of people think, feel, and act (Carey, 1993). In his discussion on incorporating culture into public health, Carey emphasized that "linking methods is a means to capitalize on the strengths of both approaches so as to better incorporate culture into public policy and program". Linking of quantitative and qualitative methods has also been taking place in nutrition research as researchers realize that food habit research is tied in closely to culture (Cassidy 1994). Therefore, learning about meanings of food can greatly assist the design of a research study, collecting data, and interpreting the results, particularly in cross-cultural settings.

The technique of focus groups has been used in nutrition research to design and evaluate nutrition education and nutrition education materials (Lytle-Trenkner and Achterberg, 1991; Crockett et al., 1990; Stewart et al., 1993; McCarthy et al., 1992). A focus group aims to gather information from a representative group of people of the target population. Focus group participants are guided through a discussion on a particular topic by a moderator who is trained in group dynamics and interviews. The data resulting from the focus group is valued for its richness and effectiveness as determinants of interests and needs of target populations.

In a manual designed to assess rapidly the dietary status of vitamin A, and sources of vitamin A in the food system of a community the technique of field notes and key informant or community consultant interviews is recommended (Blum et al., in press). Field notes are primary data from informant interviews and observations from the research community. Notes are continually taken on relevant events and are reviewed daily to expand with necessary details. Key informant interviews involve discussions with community members who are considered experts in the topic being studied. These techniques provide necessary preliminary information before beginning food consumption research, and will help in the interpretation of results, as well as assist in the planning of any intervention. These techniques are used along with quantitative methods, either simultaneously or sequentially.

3.4 Sources of variability in food and nutrient intake

Differences in food and nutrient intakes can be explained by a variety of factors. Individuals differ from each other in what they eat and this is often called inter-subject variation, while day to day intake differs for each individual which can be called intra-subject variation. In addition, age and sex are described as noted components in inter-subject differences. Day-of-the-week effects and seasonal effects have been demonstrated on nutrient intakes.

3.4.1 Season effects on traditional food use

In industrialized countries seasonal effects have been shown to have little impact on energy intakes while the contrary has been demonstrated in less industrialized countries (Kim et al., 1984; Sempos et al., 1984; Gibson, 1990). Specific nutrients such as vitamin A, vitamin C, iron, and fat appear to show seasonal variation in both industrial and non-industrialized countries (Gibson, 1990).

The effect of season on food consumption patterns has been studied in Aboriginal peoples in Canada. The groups studied consumed traditional foods that came from the local land and environment whose availability varied with seasons. The seasonal pattern of household frequency of traditional food use was demonstrated for native Canadians living in the Sub-arctic (Wein et al., 1991a) and the Arctic (Wein et al., 1992). Ranking the total weight of traditional food used by individuals from twenty-four hour recall data displayed seasonal variation in Dene and the Inuit dietary intakes (Kuhnlein, 1989b; Kuhnlein, 1991). For the Inuit of Broughton Island, it was demonstrated that not only did food use vary for seasons but it also varied in two different years (Kuhnlein, 1989b).

The seasonal effect on the use of traditional food has also been documented in harvest studies for the Cree (JBNQNHRC, 1982) and in preliminary work on James Bay Cree traditional food use (Delormier, 1993). Recently, Kuhnlein et al. (1995a (in press)) demonstrated that dietary nutrients for the Sahtú Dene/Métis vary by season. However seasonal differences in nutrient intake were not observed for Cree, Chipewyan and Métis

living in Wood Buffalo National park (Wein et al., 1991b). Further to the consideration of seasonal variation in nutrient intakes, it has been suggested to consider nutrient adequacy by season when evaluating diet and nutritional status of Indigenous Peoples (Kuhnlein et al., 1995a (in press)).

3.4.2 Generation effects on traditional food use

In Canada, northern Aboriginal peoples have experienced a great change in their way of life in a matter of decades. For the Cree in Quebec the sedentary way of life that began in the 1940's has become the contemporary way of life. Among many components of lifestyle, these changes have greatly impacted the traditional diet. An increased use in market foods with a concomitant decrease in traditional food is the trend observed, and the Eastern James Bay Cree are no exception (Thouez et al, 1990). However these trends vary with generational group, in that younger generations, in general, consume more market food than their parents or grandparents (Berkes and Farkas, 1978). Please see refer to section 2.2 of the literature review.

3.4.3 Community and bush camp effect on traditional food use

The Eastern James Bay Cree, like many other northern Native Peoples, pursue traditional hunting, trapping and gathering activities to this day. Although, the extent of these pursuits vary, they are still an integral part of contemporary lifestyle. For the Cree such activities usually involve traveling to a "bush camp" also known as "going in the bush". Some people may go "in the bush" from the community and return the same day, while others will plan an extended stay at one of their bush camps. Although, the diets of the Cree while in a bush camp have not been documented, it is assumed that people consume more wild game, birds and fish than those in the community (Robinson et al., 1994).

III. PURPOSE

4. Objectives

In light of the transitions the Cree are experiencing in their lifestyle, there is a concern for current nutrition, diet and food use and its role in health. The current diet of the Cree, which is comprised of traditional and market food, is to a large extent responsible for the patterns of health and disease observed (Daveluy et al., 1994). However very little information exists on current dietary patterns of the Cree.

The specific objectives of this study were:

1. Using qualitative inquiry and dietary methodology from the literature, to develop a protocol for a dietary survey appropriate for James Bay Cree women.

2. To collect and evaluate dietary data for two seasons with adult women from three age groups, in the community and in bush camps (traditional food harvesting camps).

3. To compile a database of nutrient composition for Cree traditional food from the literature and other sources.

4. To investigate perceptions on the changing Cree diet with respect to the amount and kinds of traditional food women are eating.

5. Hypotheses

The hypotheses examined in this study are:

1. Dietary intake differs across generations of adult women in the amount and frequency of traditional food used and in the nutrients contributed from market and traditional food.

2. There are season differences in the species and amounts of traditional food used.

3. Community and bush diets differ in amounts and frequency of traditional food used.

4. Market food contributes more fat to the diet than does traditional food.

6. Overview of the research project

Initial research was conducted prior to the dietary survey carried out in this study, during the summers of 1991, 1992 and 1993. Research involved qualitative inquiry into the traditional and market food systems of the Eastern James Bay Cree in Mistissini, Chisasibi, Wemindji and Eastmain.

Members from these communities expressed interest, encouragement and support for a dietary investigation that would include dietary evaluation and consider factors affecting traditional food use. The project was proposed to and approved in the fall of 1993, by the Table on Community Health Programming and Research of the Cree Board of Health and Social Services of James Bay. Final funding for the proposed project was approved by the Ministry of Health and Social Services (Quebec), in March of 1994. The representatives from the communities of Wemindji and Eastmain had agreed to participate in the research, once the project was approved.

The first data collection period took place during July, 1994 and the second collection was from mid-January to mid-February, 1995. Both periods were supervised by the author. Data were managed and analyzed at the Center for Nutrition and the Environment (CINE), McGill University.

Reporting of research results to the communities involved, as outlined in the Research Agreement (appendix 1) is an important objective of the overall research project to be realized. This is planned for spring of 1996.

IV. METHODS

7. Ethics approval and research agreement

Approval for the research proposal was obtained from the Human Ethics Review Committee of Macdonald Campus, McGill University. Further to these requirements, a research agreement was signed between those responsible for the research and the communities participating in the research, through a council representative. A copy of the research agreement is included in Appendix 1. Participants in the dietary study, signed an informed consent form that was read to them, prior to beginning the dietary interview.

8. Dietary assessment

8.1 Qualitative techniques

When conducting dietary research in a cross-cultural setting, beginning the research process with qualitative data searching can offer the researcher the opportunity to be open, listen and hear (Cassidy, 1994). Fieldwork in the participating communities was carried out prior to the actual research protocol and consisted of a variety of qualitative techniques. Participant/observation, informal, key-informant interviews, focus groups and field notes were the approaches used. Participant/observation took place during the summers of 1991, 1992 and 1993 and the broad objectives of these visits were to gather information on the Cree food system. Topics researched included food sharing, food preparation methods, and the annual cycle of harvest of traditional Cree food. The technique of field notes involved recording all events, knowledge and information regarding diet, nutrition and related topics to the dietary study. A focus group was used to gather opinions, attitudes and knowledge from a homogenous group of people on a topic. Such a group was conducted with four people from Wemindji who were knowledgeable about hunting and fishing. Informal, key-informant interviews were conducted with the

following community consultants; members of the Cree Trappers Association, Community Health Representatives, Band Councilors, community researchers, Public Health Officers and community members. Qualitative approaches provided valuable insight into the traditional and market food system, the people and the community and complemented the methods and tools that were used in this study. (Delormier et al., 1995)

8.2 Sampling of study participants

Adult women from Wemindji and all elder women (over 60 years of age) from Eastmain were selected to participate in the research study. Elder women from Eastmain were selected in order to increase the number of elders included in the study. Eastmain was chosen since it has many characteristics in common with Wemindji. Lists of members for the communities of Wemindji and Eastmain were obtained from the health centre or the band office. These list the government registered Aboriginal people in the community. In Wemindji, using the available list, a community map and the assistance of the community health representative (CHR), all eligible women were identified and were placed in one of three age groups. Participants were then randomly selected from each age group. Pregnant and lactating women were included in the study, of those eventually interviewed, six were known to be pregnant or lactating. The stage of pregnancy was not recorded. Employment status was not requested from participants.

Sample size was determined beginning with the limited number of women in the over 60 age group. It is reasonable to assume sampling 70% of the total population, which was 30 elders in this case. To determine the number of women needed in the other two age groups the following equation was used (Cole, 1991):

$$n = (r + 1)\sigma^2(Z_{\alpha/2}+Z_{\beta})^2 / rd^2$$

and so:

$$d = \sqrt{(r + 1)\sigma^2(Z_{\alpha/2}+Z_{\beta})^2 / rn}$$

n= the number of women in the smallest sample group (n=30)

r= the number of women in the larger group for each women in the smallest group (r=1.9)
σ = the standard deviation of the variable calcium (222mg)
α = the type I error level selected (0.05)
ß = the type II error level selected (0.20)
d = the minimum magnitude of difference between groups to be detected (145mg)

Manipulation of the equation involved determining fixed values of **r** and solving the equation for **d**, then determining if the magnitude of detectable difference in calcium between age groups was reasonable. Calcium was the nutrient of those studied here that had the largest expected σ. The expected variation of calcium was derived from nutrient intake studies of aboriginal women living in Canadian sub-arctic regions. The number of women needed in each of the other two age groups 20 - 40 years and 41-60 years, was determined to be 57.

8.3 Interviewer training

Seven members from the community of Wemindji and Eastmain were trained to conduct the dietary interviews. This technique was chosen over using a translator and professionally trained nutritionist since the first language in these communities, and the language used most widely, is Cree. It also offered other advantages, such as participants feeling at ease with the interviewing process, removing some of the cross-cultural interviewer bias and involving community members actively in research. This techniques has been used successfully in other dietary studies done with Canadian Aboriginal peoples (Campbell et al., 1994; Kuhnlein, 1984; Wein et al, 1991).

Each interviewer participated in a two day training workshop given by the author, on dietary interviewing techniques. The workshop included theoretical as well as practical application of these standardized techniques and incorporated input by workshop participants. The interviewer's initial interviews were supervised by the author. All subsequent interview questionnaires were checked for completeness as soon as possible after the interview was conducted.

8.4 Data collection period

Data was collected during two different seasons that were chosen to reflect periods of high and low traditional food use. The first collection period and the period of high traditional food use was during the month of July, 1994. The second collection took place from mid-January to mid February, 1995. In each season an attempt was made to contact as many women as possible who were staying in camps along the coast.

8.5 Dietary interview

The dietary interview was guided by a three part dietary assessment questionnaire (appendix 2 and 3). It consisted of one 24 hour recall, a food frequency of traditional food use and a household questionnaire. Information on age, whether pregnant or breastfeeding, and date of the interview was recorded for each participant. All interviews were conducted in the participant's home.

8.5.1 24 hour recall interview

The 24 hour recall consisted of the interviewer prompting the participant to recall all food, beverages, and vitamin supplements consumed in the previous 24 hour period. Details on the kinds of food eaten, brand names and cooking methods as well as the quantities eaten are recorded. To aid in participant's recall, interviewers used household measures (cups, bowls, spoons, and a ruler) and asked questions or "probes" to acquire details that are usually forgotten, such as condiments, snacks and sugar added to beverages. Finally, the respondent was asked whether the day recalled was a usual day, and this was noted on the recall. Day of the week was recorded in order to ensure that all days of the week were proportionately represented. Once the recall was complete it was read back to the participant to ensure that it was complete.

With respect to traditional food use, the 24 hour recall recorded food items that were eaten frequently and by more participants during the interview period. For

decription of traditional food items that were eaten less frequently and by fewer women, the food frequency questionnaire was employed.

8.5.2 Food frequency questionnaire

The food frequency of traditional food use questionnaire was completed with each participant. It required the respondent to recall the frequency, in number of occasions per week, that traditional food was eaten in the three months prior to the interview. Based on consultation and observation, the measurement of frequency, in times per week, was judged to be the best measure of patterns of traditional food use in the community.The list of traditional foods on the food frequency list reflected the seasonality of traditional foods, however it was designed to include foods that may have been preserved by freezing or other methods for latter use. Photographs of fish and bird species were used to aid in identification of these foods. Information on the seasonal patterns of traditional food use was gathered from key informant interviews and a focus group meeting during the planning of the study. The final food frequency questionnaire was approved by two women in the community who are familiar with traditional food use. This questionnaire qualitatively described most, if not all traditional food used for the three month period covered. Unlike the 24 hour recall, a more complete list of traditional foods was described for the two, seasonally different, three month periods. A semi-quantitative questionnaire was not used due to the great variability existing in portion sizes of traditional food.

8.5.3 Household hunting questionnaire

This questionnaire differed for the two seasons of data collection. The respondent was asked the number of people who fished, and who hunted in the household. In addition, they were asked to report how much time they and the three people who hunt or fish the most in the household, spent in the bush. For the first data collection period the

respondent was asked to recall for twelve months prior, (July 1993-June 1994). For the second data collection period, they were asked to recall for the time they spent in the bush between data collection periods (July 1994-December 1994). Information was recorded on a calendar, and calendars were used to aid in recall. In total, information on time spent hunting or fishing was gathered for 18 consecutive months.

During the first data collection, respondents were asked two open-ended questions on changing patterns of traditional food use. Open-ended, also called unstructured questions, do not limit the respondent to a set of responses. Rather the participant volunteers the information that they feel answers the question. In season 2 information gained from these two questions were formulated into a list of reasons for changing traditional food use. Participants were asked if they agreed, disagreed or did not know for each of the stated reason. Further to this they were asked two open-ended questions on the importance of traditional food use.

8.6 Food composition databases

8.6.1 Cree traditional food

In order to assess the appropriateness of existing food composition databases for assessing nutrient intakes of the Cree, a database of published values of Cree traditional food was constructed (Appendix 4). Using information from a variety of sources, including ethnographic literature, harvest studies and research about the James Bay Cree, a list of traditional food was compiled. Nutrient values from published sources of food composition data corresponding to the traditional food were compiled. A gap of information existed on some important traditional foods, such as Canada Goose. Therefore, efforts were made to provide missing information by conducting nutrient composition analysis and seeking unpublished food composition data that were representative of the food the Cree reported. The traditional food database used for nutrient analysis did not contain missing values for the nutrients under study.

8.6.2 UCB mini-list

A food composition database from the University of California, Berkeley (Murphy, 1989) called the minilist, has been used in studies with Canadian Aboriginals (Appavoo, 1990) and was evaluated as appropriate for market food consumed by the Cree. The minilist used is based primarily on the USDA Handbook 8 (USDA, 1976-87) with modifications for fortified Canadian market foods (Appavoo, 1990). The database did not have missing values for the nutrients under study.

8.7 Data management and analysis

Market foods from the 24-hour recalls were assigned codes corresponding with the database for nutrient content from the University of California, Berkeley (UCB-

minilist, Dr. S. Murphy, 1989). Cree traditional foods were given codes corresponding to the database developed for nutrient analysis of Cree foods. The traditional food database incorporated published values and results of nutrient analysis on Cree traditional foods. Coding was completed by the author in the field in order to gather relevant details on food items needed for coding. The codes, weight and related information were entered into the Epi-Info software (Epi-Info, Version 6, 1994). Data from the food frequency questionnaire, and the household questionnaire was also entered into the Epi-Info software program. The responses from the open-ended questions were typed using a word processing software.

All statistical analysis was performed on the PC-SAS (Statistical Analysis Systems for Personal Computers, Version 6.03, SAS Institute, 1989) statistical software. For the purpose of descriptive statistics, means and standard deviations and percentages were calculated for nutrient intakes and food sources of certain nutrients from the 24-hour recall data. Data were looked at by age group and/or season. Effects due to age group variables were estimated using the general linear model procedure and evaluated with t-tests or multiple comparison tests (SAS, 1985). Patterns of traditional food use were described from the food frequency questionnaire employing mean frequency of food use. Qualitative data were analyzed, by systematically categorizing common themes. (Whyte, 1985; Bogden, 1975).

V. RESULTS AND DISCUSSION

9. Dietary intakes - 24 hour recall data analysis

9.1 Energy intake

Table 9.1 shows the mean daily energy and nutrient intake by season and age group. The energy intakes appear to be low when compared to average requirements of energy for women (Health and Welfare Canada, 1990). However the mean energy intake for combined seasons (table 9.2) compares similarly to other dietary intake studies of northern, Canadian aboriginal women from different cultural groups (Wein, 1995; Wein et al., 1991; 1993; Campbell et al., 1994; Sevenhuysen and Bogert-O'Brien, 1994).

To compare energy intakes with Recommended Nutrient Intakes (RNI's) for Canadians (HWC, 1990) individual intakes were compared with percentages of the RNI for corresponding age groups. In this manner, individual intakes were related to 4 different proportional categories of the RNI (table 9.3). For energy, 60% of women interviewed reported energy intakes above two thirds of the RNI, while 14% of women reported energy intake below 50% of the RNI.

The RNI's for energy are based on the average energy requirements for the population. Hence intakes lower or higher than the average do not necessarily indicate inadequate or adequate energy intakes. However, the risk of inadequate individual intakes rises as the mean of a group's energy intake, departs downward from the RNI (Health and Welfare Canada, 1990).

Although not tested statistically, the trend appeared for winter mean energy intakes to be lower than summer energy intakes for all age groups. Of particular importance is the middle adult age group who displayed a larger (≅500kcal) decrease in mean energy intake from summer to winter, than did the young adults or the elder adults.

Low energy intakes are a concern in dietary studies, since they may indicate low intakes of other nutrients. Another concern is the completeness of the dietary recall and

Table 9.1 Mean daily energy and nutrient intake by age group and season 24 hour recall interview

Nutrient	[1] Summer 1994 n=53 20 - 40 YEARS mean ± s.d.	n=49 41 - 60 YEARS mean ± s.d.	n=30 OVER 60 YEARS mean ± s.d.
energy, kcal	1965 ± 751	1914 ± 620	1354 ± 622
carbohydrate, g	196 ± 81	163 ± 69	108 ± 72
protein, g	99 ± 61	122 ± 62	115 ± 64
fat, g	86 ± 40	84 ± 29	49 ± 30
iron, mg	17 ± 10	19 ± 12	11 ± 7
calcium, mg	461 ± 297	557 ± 398	404 ± 357

Nutrient	[2] Winter 1995 n=36 20 - 40 YEARS mean ± s.d.	n=33 41 - 60 YEARS mean ± s.d.	n=18 OVER 60 YEARS mean ± s.d.
energy, kcal	1783 ± 759	1413 ± 680	1170 ± 570
carbohydrate, g	206 ± 91	141 ± 79	113 ± 57
protein, g	86 ± 49	91 ± 54	90 ± 55
fat, g	69 ± 40	53 ± 32	39 ± 29
iron, mg	15 ± 9	15 ± 9	15 ± 9
calcium, mg	512 ± 279	465 ± 314	364 ± 223

[1]summer 1994: July

[2]winter 1995: mid-January - mid-February

Table 9.2 Mean daily energy and nutrient intake by age group 24 hour recall interview

Nutrient	n=89 20 - 40 YEARS mean ± s.d.	n=82 41 - 60 YEARS mean ± s.d.	n=48 OVER 60 YEARS mean ± s.d.
energy, kcal	1897 ± 763	1730 ± 713	1312 ± 654
carbohydrate, g	200 ± 85	154 ± 73	110 ± 66
protein, g	94 ± 56	110 ± 61	108 ± 63
fat, g	80 ± 42	73 ± 38	47 ± 34
iron, mg	16 ± 10	17 ± 11	13 ± 8
calcium, mg	482 ± 289	520 ± 367	390 ± 315

Table 9.3 Comparison of individual intakes to recommended nutrient intake (RNI) all intakes (n=219): 24 hour recall

nutrient	Comparison of intake to % of RNI							
	<50%		50 to 66%		66% -100%		>100%	
	n=	%	n=	%	n=	%	n=	%
energy	30	14%	34	16%	74	34%	81	37%
protein	5	2%	8	4%	32	15%	174	79%
calcium	96	44%	36	16%	39	18%	48	22%
iron	23	11%	20	9%	38	17%	138	63%

[1] Nutrition Recommendations: the Report of the Scientific Review (Health and Welfare Canada,

whether there has been general or systematic underreporting of food or beverage items. The success of the 24 hour recall depends on the skill of the interview and the memory, motivation and ability of respondent to estimate food quantities consumed.

Cree interviewers underwent a two day workshop in interviewing techniques given by the author. Standard techniques of interviewing were discussed and practiced, and interviewers were supervised on the first interviews to ensure appropriate methods. Each interview questionnaire was checked for completeness, and when necessary, interviewers were asked to acquire additional information needed to complete a recall. Overall the interviewers displayed proficient interviewing techniques.

Self-reported records of dietary intake tended to underestimate food consumption when compared to energy expenditure in studies investigating validity (Mertz et al., 1991; Black et al., 1993). In addition, the 24 hour recall tended to underestimate group intakes, as documented from validation studies with a variety of sample age groups (Bingham and Nelson, 1991). It is not possible to assess the adequacy of energy intakes from dietary intake data alone, information on energy expenditure or anthropometric measurements is required.

Overweight persons may tend to underreport food intakes (Gibson, 1990). According to a recent survey investigating Cree health it was found that 29.8% of women were overweight (body mass index (BMI) between 25 an 29.99) and 56.9% were obese(BMI>30)(Daveluy et al., 1994). This represents an estimate of 86.7% of Cree women who are overweight. It was also reported that 38% of women aged 15 years and

over had stated that they were trying to lose weight. It is noteworthy that a Cree women, with experience in health care and using the 24 hour recall method, remarked that some overweight women may feel uncomfortable telling people what they ate, particularly if the interviewer was not overweight. Therefore, if there were respondent "underreporting" bias of this sort, the results overall may have been significant considering the prevalence of overweight in the community.

Another concern regarding energy intakes was lower reported mean energy intake for the winter season. Conducting dietary studies in periods of high and low traditional food use accounts for possible seasonal variation (Wein, 1995). Dietary studies conducted in more than one season with northern aboriginal women have not demonstrated seasonal differences in reported energy intakes (Campbell et al., 1994; Wein, 1995; Kuhnlein et al., 1995a (in press). Explanations for observed seasonal differences in mean intakes in this study are that, possibly winter energy intake was lower or there was bias in the recording or reporting of food intake during the winter. The same interviewer training protocol was followed by the interviewers (who were different from summer interviewers) trained in the winter, and the same steps were taken to ensure complete recalls by the author. In addition, efforts were made to test for interviewer effects accounting for differences in reported intakes. However these attempts did not reveal effects accountable to the interviewer.

All mean macronutrient intakes reported were lower in winter (table 9.1). Mean protein intakes were lower, particularly for the two older age groups and mean fat intake was notably lower for all age groups.

After comparing lists of market and traditional food use by season and age group, obvious differences in food reporting between seasons were investigated. The amount of traditional food reported in each season expressed as grams per women was less in winter (149g) than in summer (210g). Lower traditional food use can theoretically account for the some of the differences in mean energy, protein and fat intakes observed. Alcohol was reported on only one dietary recall. Respondent bias has been noted in relation to reported alcohol consumption (National Research Council, 1986).

It is difficult to conclude on what accounted for the lower observed winter intakes. Anecdotal evidence from Cree women suggests that in the settled community there is less physical activity done in winter than in summer. (Delormier, personal communication). Lower energy intakes of obese people have been found to reflect lower physical activity (Young and Sevenhuysen, 1989).

In the national Nutrition Canada Indian survey (Dept. of National Health and Welfare, 1975), energy intakes for adult Indian women were lower than the national sample. The median intake for Indian women aged 20-39 was 1933 kcal, women aged 40-54 had very similar energy intakes and elder women's median energy intake was 1479 kcal. A recent national survey, the Third National Health and Nutrition Examination (NHANES III) was done by the National Centre for Health Statistics (NCHS) in the United States for 1989 to 1991. Although these are American data, multi-ethnic, national (representing entire United States population) sample comparisons are different from comparisons to data from rather homogenous populations. In national surveys the sample size is selected to represent a country, hence the large sample size allows a more precise estimate of the true mean energy intake for the population. Mean energy intakes for NHANES III and for this study are categorized by age group decades in table 9.4. Energy intakes combined for both seasons from this study compare closely with the NHANES results, except for the over 60 age group whose energy intakes are low by comparison. Therefore energy intake data reported from large national surveys is subject to underreporting (Mertz et al., 1991) as it possibly was in this relatively small survey.

9.2 Nutrient intakes

Protein, carbohydrate and fat were macronutrients and calcium and iron were mineral nutrients examined in the present analysis. Of these nutrients, RNI's exist for protein, calcium and iron. Table 9.3 compares intakes to RNI proportional categories.

RNI's for nutrients, unlike RNI's for energy, are set to at a level to meet the needs of most people in a characteristic group. Therefore, 100% of the RNI exceeds the actual needs of most individuals. (HWC, 1990). Two thirds of the RNI is a proportion frequently used as a cutoff to gain an understanding of the proportion of individuals at

risk of inadequate intake. Using 2/3 of the RNI reduces the overestimation of the prevalence of inadequate intake (Gibson, 1990). Assessing the prevalence of inadequate intakes more reliably, involves applying the laws of probability to predict the number of individuals in a group who are at risk. This approach takes into account the nutrient requirements, the distribution of requirements for each nutrient, and the distribution of usual intakes. For the objectives of this research, comparisons with the RNI were chosen, to evaluate nutrient intakes (Gibson, 1990) .

Table 9.4 Comparison of NHANES III* mean energy intakes by women to energy intakes from women in the present study

age group	NHANES III daily energy intakes mean±s.e.	age group	James Bay Cree women daily energy intakes mean±s.d.
20-29	1957± 34	20-40	1897 ± 763
30-39	1883 ± 35		
40-49	1764 ± 34	41-60	1730 ± 713
50-59	1629 ± 38		
60-69	1578 ± 37	over 60	1312 ± 654
70-79	1435 ± 32		
over 80	1329 ± 35		

*(McDowell et al., 1994)

Ninety-four percent of women reported protein intakes that exceeded 2/3 of the RNI, and 79% of women's intakes exceeded the RNI. Only 2% of women reported protein intakes less than 50% of the RNI. The mean protein intake by age group is in table 9.2. Compared to some studies of Arctic and Subarctic aboriginal women the mean intakes for protein reported here were consistently higher (Wein, 1995; Wein et al., 1993; 1991; Campbell et al., 1994; Sevenhuysen and Bogert-O'Brien, 1994). Kuhnlein et al. reported the highest protein intakes of 143±87g for Arctic, Sahtú Dene/Metis women 20 to 40 years of age (1995a, in press). Otherwise the highest reported intakes are around 72g, for northern aboriginal women.

Iron intakes for 80% of women interviewed exceeded 2/3 the RNI and 63% exceeded the RNI. Only 4% of iron intakes fell below 50% of the RNI. Comparing iron intakes to reports from arctic and sub-arctic women, Cree women consistently reported

higher intakes, except when compared to Kuhnlein et al., who reported intakes of 22±15 mg for Arctic women aged 20-40 years (1995a, in press).

Of calcium intakes, 44% of intakes fell below half the RNI level, while 40% were above two thirds of the RNI. Calcium intakes were similar to those reported from studies of aboriginal women (Wein, 1995; Wein et al., 1993; 1991; Campbell et al., 1994; Sevenhuysen and Bogert-O'Brien,1994; Kuhnlein et al., 1995 (in press)). Sixty percent of women did not reach 2/3 the RNI for calcium which indicates that an important proportion of woman may be at risk for inadequate intake levels. This concern for intake levels of calcium has been expressed in the other studies with northern aboriginal women. Traditional food sources of calcium are dried fish with small bones and skin, soups and stews simmered with bones (Kuhnlein et al., 1995 (in press); Campbell et al., 1994). These are presently being consumed by Cree women but not in the amounts needed for favorable calcium intake levels. In this study, smoked whitefish and fresh whitefish were traditional foods consumed relatively frequently in summer, however they provided only 5.2% of all calcium reported.

There is no RNI for carbohydrate; rather it is recommended for the general Canadian population to obtain 50% to 60% of energy from carbohydrates. In table 9.5 the mean percent of energy fat, carbohydrate and protein is displayed by age group. The mean percent of energy from carbohydrate among age groups was 37%, 37%, and 30% for the young, middle and elder age group respectively.

Table 9.5 Mean percent of energy from fat, carbohydrate, protein for all women interviewed in both seasons (n=219): 24 hour recall interview

nutrient	20 - 40 years (%) mean ± s.d.	41 - 60 years (%) mean ± s.d.	over 60 years (%) mean ± s.d.
fat	37 ± 9	37 ± 9	30 ± 11
carbohydrate	43 ± 11	37 ± 13	35 ± 15
protein	20 ± 8	25 ± 9	34 ± 12

Fat, like carbohydrate, is recommended as a percentage of total energy. Thirty percent of energy from total fat is recommended for Canadians. The percent of energy from fat for each of the three age groups was 43%, 37%, and 35% for young, middle and elder age groups respectively.

9.3 Food sources of nutrients

The series of tables, table 9.6 to table 9.11 shows the top twenty sources of energy, protein, carbohydrate, fat, calcium and iron, by season. Seasonal variation resulted mainly from use of different traditional foods. Market food items tended to be stable across seasons. Canada goose was the top source of energy in summer providing 11% of energy, while bannock and bread combined consistently provided about 15% of energy in both seasons (table 9.6).

The top three protein sources (table 9.7) in both seasons were traditional foods: moose, beaver and rabbit in winter and Canada goose, smoked whitefish and fresh whitefish in summer. Chicken, ground beef and eggs were the top market sources of protein in both seasons, combined they provided about 15% of protein reported.

The top 3 sources of iron (table 9.8) in winter were moose, rabbit and beaver. Combined they provided approximately 31% of iron while in summer, Canada goose as the top source contributed 34% of iron. White, enriched, bread and bannock were the top market food items providing about 13 % of iron in both seasons.

The top calcium food source (table 9.9) in both seasons was 2% milk providing around 25 % of calcium. Only two traditional food items, rabbit and whitefish, together provided 3.9% calcium in winter. Smoked whitefish and whitefish were the only two traditional food items in summer top twenty, combined they furnished 5.3% of calcium reported.

The top four sources of carbohydrate (table 9.10) in both seasons in the same order were white bread, bannock, sugar/candy, and french fries. The items in both seasons were similar. Only one traditional food, Canada goose, was a carbohydrate source and provided 1.2% of carbohydrate. Unsweetened tea was a carbohydrate source in the top twenty. Although tea contains small amounts of carbohydrate (1g/250ml of beverage), consumption in relatively large quantities resulted in it appearing on the top twenty list. Tea is often taken with sugar, which appears third on the list. The carbohydrate composition of Canada goose used in this study was determined indirectly, by calculating

Table 9.6 Top 20 sources of energy, from all interviews 24 hour recall interview (n=219)

rank	[1] Winter 1995		[2] Summer 1994	
	food	% kcal	food	% kcal
1	bannock	8.5	Canada goose	11
2	bread, white, enr.	7.7	bannock	7.6
3	french fries	6.8	bread, white, enr.	6.8
4	sugar, candy	3.5	whitefish, smoked	4.7
5	moose, flesh	3.5	french fries	4.4
6	eggs	3.3	whitefish, flesh	4
7	chicken	3.1	eggs	3.3
8	ground beef, regular	3.1	chicken	3.3
9	macaroni and cheese	3.1	ground beef, regular	2.9
10	spaghetti/macaroni, enr.	2.9	sugar, candy	2.8
11	potatoes	2.9	potatoes	2.7
12	rice, white, polished enr.	2.7	milk, 2%	2.7
13	beef, 30% fat	2.7	lard	2.5
14	milk, 2%	2.7	margarine	2.2
15	beaver, flesh	2.3	spaghetti/macaroni, enr.	1.8
16	Canada goose	2.3	pork chops, lean pork	1.8
17	margarine	2.2	frankfurters, lunch meat	1.5
18	rabbit, flesh	2.2	rice, white, polished enr.	1.5
19	all fruit drinks/ades	2	oil, canola	1.2
20	pork chops, lean pork	2	apple/grape juice	1.2

[1] Winter 1995 - mid-January - mid-February

[2] Summer 1994 - July

Table 9.7 Top 20 sources of protein, from all interviews 24 hour recall interview (n=219)

rank	[1] Winter 1995		[2] Summer 1994	
	food	% protein	food	% protein
1	moose, flesh	13.1	Canada goose	19.1
2	beaver, flesh	8.3	whitefish, smoked	12.5
3	rabbit, flesh	8	whitefish, flesh	12
4	chicken	5.9	chicken	6
5	whitefish, flesh	4.9	eggs	4.4
6	eggs	4.6	ground beef, regular	3.9
7	caribou, flesh	4.6	bread, white, enr.	3.6
8	ground beef, regular	4.4	pork chops, lean pork	3.3
9	bread, white, enr.	4.3	milk, 2%	3.1
10	Canada goose, flesh	4.2	bannock	2.7
11	pork chops, lean pork	3.5	moose, flesh	1.9
12	beef, 30% fat	3.3	corned beef, canned	1.8
13	milk, 2%	3.3	bear, flesh	1.4
14	bannock	3.2	sturgeon	1.2
15	macaroni and cheese	2.1	pike	1.1
16	spaghetti/macaroni, enr.	1.7	halibut	1.1
17	french fries	1.5	trout	1.1
18	turkey, flesh	1.4	caribou, flesh	1.1
19	pizza, frz., mix, with cheese	1.3	spaghetti/macaroni, enr.	1
20	beef, 15 % fat	1.3	whitefish, intestine	1

[1] Winter 1995 - mid-January - mid-February

[2] Summer 1994 - July

Table 9.8 Top 20 sources of iron, from all interviews 24 hour recall interview (n=219)

rank	[1] Winter 1995		[2] Summer 1994	
	food	% Iron	food	% Iron
1	moose, flesh	11.5	Canada goose, flesh	34.2
2	rabbit, flesh	10.3	bread, white, enr.	6.9
3	beaver, flesh	8.9	bannock	5.6
4	bread, white, enr.	7.4	whitefish, smoked	3.7
5	Canada goose, flesh	6.6	wheat breakfast cereals	3.3
6	bannock	5.9	eggs	2.8
7	wheat breakfast cereals	4.3	ground beef, regular	2.6
8	caribou, flesh	3.9	spaghetti/macaroni, enr.	2.5
9	spaghetti/macaroni, enr.	3.7	chicken	2.3
10	rice, white, polished, enr.	3.3	corn flakes, ready-to-eat cereals	2.1
11	ground beef, regular	2.6	rice, white, polished, enr.	1.9
12	eggs	2.6	whitefish, flesh	1.9
13	beef, 30% fat	2.3	moose, flesh	1.9
14	pizza, frz., mix, with cheese	2	coffee	1.3
15	chicken	2	Snow goose, flesh	1.3
16	french fries	1.8	french fries	1.2
17	coffee	1.6	bear, liver	1.2
18	ptarmigan, flesh	1.6	apple juice	1.2
19	macaroni and cheese	1.2	pork chops, lean pork	1.1
20	gravy	1.1	caribou, flesh	1

[1] Winter 1995 - mid-January - mid-February

[2] Summer 1994 - July

Table 9.9 Top 20 sources of calcium, from all interviews 24 hour recall interview (n=219)

rank	[1] Winter 1995		[2] Summer 1994	
	food	% calcium	food	% calcium
1	milk, 2%	22.2	milk, 2%	25.7
2	bannock	17.8	bannock	18.1
3	macaroni and cheese	8.5	bread, white, enr.	7.9
4	bread, white, enr.	7.9	eggs	4
5	pizza, frz., mix, with cheese	5.9	tea	3.4
6	tea	3.8	evaporated milk, canned	2.9
7	eggs	3.5	whitefish, smoked	2.3
8	rabbit, flesh	3.2	whitefish, flesh	2
9	evaporated milk, canned	2.9	cocoa, hot chocolate	2
10	cocoa, hot chocolate	1.7	processed cheese	1.9
11	potatoes	1.6	potatoes	1.9
12	wheat breakfast cereal	1.5	pizza, frz., mix, with cheese	1.7
13	coffee	1.5	ice cream, 10% b.f.	1.7
14	french fries	1.3	coffee	1.3
15	processed cheese	1.3	cheese, cheddar, swiss,	1.3
16	cheese, cheddar, swiss,	0.8	wheat breakfast cereal	1.3
17	chicken	0.7	milk, whole	1.2
18	whitefish, flesh	0.7	creamed soups	1.2
19	cheese, mozzarella, cottage	0.6	french fries	1
20	creamed soups	0.6	chicken	0.8

[1] Winter 1995 - mid-January - mid-February

[2] Summer 1994 - July

Table 9.10 Top 20 sources of carbohydrate, from all 24 hour recall interview (n=219)

rank	[1] Winter 1995 food	% carbo-hydrate	[2] Summer 1994 food	% carbo-hydrate
1	bread, white, enr.	13.6	bread, white, enr.	14.1
2	bannock	12.8	bannock	13.4
3	sugar, candy	8.6	sugar, candy	8
4	french fries	8	french fries	6.1
5	rice, white, polished, enr.	5.7	potatoes	5.6
6	spaghetti/macaroni, enr.	5.5	spaghetti/macaroni, enr.	4.1
7	potatoes	5.3	rice, white, polished, enr.	3.7
8	all fruit drinks/ades	5	apple/grape juice	3.4
9	macaroni and cheese	2.7	milk, 2%	2.9
10	pizza, frz., mix, with cheese	2.7	all fruit drinks/ades	2.6
11	milk, 2%	2.5	soft drinks, cola and others	2.2
12	wheat breakfast cereals	2.3	wheat breakfast cereals	2
13	soft drinks, cola and others	1.9	wheat flour enr.	1.5
14	orange juice	1.7	cookies, assorted	1.4
15	apple/grape juice	1.3	cocoa, hot chocolate	1.4
16	cookies, jelly filled biscuits	1.2	Canada goose	1.4
17	cocoa, hot chocolate	1.2	corn flakes, ready to eat cereal	1.3
18	tea	1.1	cake, coffee cake, banana	1.3
19	cake, coffee cake, banana	1	cooked oatmeal	1.3
20	cooked oatmeal	1	tea	1

[1] Winter 1995 - mid-January - mid-February [2] Summer 1994 - July

[2] Summer 1994 - July

Table 9.11 Top 20 sources of fat, from all interviews 24 hour recall interview (n=219)

rank	[1] Winter 1995		[2] Summer 1994	
	food	% fat	food	% fat
1	french fries	9.6	Canada goose	14.3
2	margarine	6.8	lard	6.5
3	bannock	6.6	margarine	5.8
4	eggs	6.1	french fries	5.4
5	ground beef, regular	5.9	eggs	5.4
6	beef, 30% fat	5.7	bannock	5.1
7	chicken	4.5	ground beef, regular	4.9
8	frankfurters, lunch meat	4.4	chicken	4.1
9	macaroni and cheese	4.3	whitefish, smoked	3.8
10	lard	3.7	canola oil	3.3
11	Canada goose	3.4	frankfurters, lunch meat	3.3
12	canola oil	3.3	goose grease	2.7
13	pork chop, pork, lean	2.6	pork chop, pork, lean	2.3
14	milk 2%	2.6	milk 2%	2.3
15	bacon	2.5	whitefish	2.2
16	bread, white, enr.	2.5	bread, white, enr.	1.9
17	[3]potatoes	1.6	salad dressing, mayo-type	1.7
18	salad dressing, mayo-type	1.6	[3]potatoes	1.6
19	butter	1.6	butter	1.6
20	pizza, frz., mix, with cheese	1.5	corned beef, canned	1.4

[1] Winter 1995 - mid-January - mid-February [2] Summer 1994 - July

[3] includes mashed potatoes prepared with fat

the difference of the sample weight and combined weight of moisture, protein and fat. The actual carbohydrate content may be slightly overestimated, and therefore consumed in the reported quantities, Canada goose appeared on the top twenty list.

9.4 Dietary fat intake from market and traditional food

It was of interest to look specifically at sources of fat in the diet. Anecdotal evidence suggested that some Cree were concerned that they consumed too much fat. Nutrition information on fat that is available to the Cree originates from a variety of sources including popular media, community and individual health programs, and focuses on total fat. Very little distinction is made between fats from market food sources and fats from traditional food sources. Fats from game animals and birds, and fish likely have different types of fat profiles than those of market food. Furthermore, information on fat consumption by the Cree is scant; the amount of fat being consumed is not clear, and the sources of dietary fat are even less known.

9.4.1 Food sources of fat

Table 9.11 shows the top twenty food sources of fat, by season for all women interviewed. In winter, the eleventh ranked and only traditional food, Canada goose, provided 3.4% of fat. The total fat contributed by the remaining market food items on the top twenty list was 77.4%. In summer, Canada goose was the number one source of all fat reported, furnishing 14.3%. Other traditional food items smoked whitefish and goose grease. Combined, the traditional foods provided 23% of reported fat intake while market sources provided 56.6%. French fries, margarine, bannock and eggs were market food items consistently in the top five food sources of fat in both seasons. Beaver, which is characteristically a fatty food did not appear in the top twenty, although it was reported in grams per women at levels similar to smoked whitefish, which is ranked ninth in summer. Examination of the nutrient composition database reveals a total fat composition of 1.3 g/100g of beaver. Analysis of beaver for the database used, likely attempted to determine

nutrient composition of the meat portion only. Hence it is possible that the fat contribution from beaver was underestimated here. Rabbit, another food consumed in similar quantities to beaver did not appear on the list, but this food is a very lean meat.

9.4.2 Dietary intake of fat

Data used in the following analyses included women who reported both traditional and market food on 24 hour recalls. Table 9.12 shows mean dietary fat intakes, in grams, from market and traditional food sources, by age group and season. For women who ate both market and traditional food, market foods were the main source of fat. The mean intake of fat from market food sources was similar across seasons, for each age group. There was a trend for older age groups to have a lower mean fat intake from market food. Mean fat intakes from traditional food were different across seasons, with mean fat intakes being noticeably lower in the winter (refer to discussion on energy intakes). A trend for mean intakes of fat from traditional sources across age groups was less evident.

Table 9.12 Mean fat intake (g) from market and traditional food sources women who reported both food sources (n=132): 24 hour recall

source and season	20-40 years (g) mean ± s.d.	41-60 years (g) mean ± s.d.	over 60 years (g) mean ± s.d.
	n=10	n=21	n=14
Market source (winter)	60 ± 42	45 ± 33	29 ± 21
Traditional source (winter)	13 ± 5	8 ± 1	6 ± 1
	n=24	n=38	n=25
Market source (summer)	60 ± 28	55 ± 29	24 ± 20
Traditional source (summer	34 ± 5	36 ± 5	23 ± 5

Table 9.13 displays the mean percent of total fat from both food sources, by season and age group. The mean percent of fat from market food was higher in the winter season for all age groups. It was approximately 20% higher for the young adults and the middle adults and 30% higher for the elders. As for traditional sources of dietary fat there was an increase in the proportion of fat in the summer and a decrease in the winter. In the summer, when the higher proportion of traditional fat was consumed, the elder age group's proportion from either source was around 50%. Young adults and middle adults,

maintained about one third from traditional food sources. In winter the proportion of fat from market food sources were similar across age groups at approximately 80%.

Table 9.13 Mean percent of fat from market and traditional food sources women who reported both food sources (n=132): 24 hour recall

source and season	20-40 years (%) mean ± s.d.	41-60 years (%) mean ± s.d.	over 60 years (%) mean ± s.d.
	n=10	n=21	n=14
Market source (winter)	80 ± 17	82 ± 14	78 ± 17
Traditional source (winter)	20 ± 17	18 ± 14	22 ± 17
	n=24	n=38	n=25
Market source (summer)	64 ± 20	63 ± 27	47 ± 28
Traditional source (summer)	36 ± 20	37 ± 27	53 ± 28

Table 9.14 shows nutrient density for fat in grams/1000 kcal of either market or traditional food sources, by season and age group. Market food sources had a higher fat density than traditional food sources in both seasons. In both seasons, nutrient density for market sources of fat among age groups was similar, except for elders in summer when the nutrient density for market fat sources were lower in general. For traditional sources of fat, nutrient densities were lower in the winter for all age groups. The fat density from traditional sources was very similar across age groups, by season.

Table 9.14 Mean fat intake (grams/1000 kcal) from market and traditional food sources women who reported both food sources (n=132): 24 hour recall interview

source and season	20-40 years (g/1000kcal) mean ± s.d.	41-60 years (g/1000kcal) mean ± s.d.	over 60 years (g/1000kcal) mean ± s.d.
	n=10	n=21	n=14
Market source (winter)	26 ± 12	27 ± 9	24 ± 14
Traditional source (winter)	6 ± 7	6 ± 5	5 ± 3
	n=24	n=38	n=25
Market source (summer)	28 ± 9	28 ± 14	15 ± 11
Traditional source (summer)	16 ± 9	17 ± 14	18 ± 12

Market sources provided the majority of fat reported from women's diets. Seasonal differences in market and traditional fat sources must be interpreted with caution, since the reported energy intake was lower in winter for reasons not entirely clear. From mean fat intakes and percentages of fat from both sources, traditional food sources provided more fat in summer than in winter. This is due to the greater amounts of traditional food reported per woman in the summer. Mean fat intake expressed per 1000

kilocalories demonstrated that fat density of market food is similar across seasons and age groups, except for elders in summer. Perhaps the higher availability of traditional food in the summer resulted in elders preferentially obtaining more fat from traditional sources, which would explain the lower market fat density. Traditional fat density was lower in winter, which could be explained by the lower amounts of traditional food consumed per woman.

Any concerns about total fat intake, specifically excess dietary fat, must address the sources of fat in the diet. A relatively small proportion of total fat can be attributed to traditional food sources. Market foods overall were the greatest contributors of total fat. The top market food sources of fat were present consistently in both seasons. Canada goose in summer was the top contributor of total fat for all women. However, the fatty acid profile of this traditional food has not been determined, and like other wild foods, may contribute favorable ratios of polyunsaturated to saturated fatty acids (Appavoo et al., 1991). Until nutrient composition data are more complete for Cree traditional food, the known and potential benefits of these foods must be considered against potential risks (for example high total fat) of consuming them. Efforts to reduce total dietary fat intake should focus on market sources, which are generally nutrient poor.

10. Food use - 24 hour recall and food frequency data

10.1 Season factors and food use

10.1.1 Species differences in seasons

Seasonal differences were examined from 24 hour recall and food frequency data. Recalls were collected during summer, (July, 1994) and during winter, (mid- January to mid-February, 1995). The food frequency questionnaire periods defined in this survey were three months, including "spring" which covered April to June 1994 and "fall" which covered October to December 1994.

From the 24 hour recall interviews the traditional food species reported, the number of mentions of traditional food and the gram weight of traditional food per woman (gram/woman) were tabulated (table10.1) There were differences in the number of species reported and the species that were mentioned in each season. The number of women interviewed in each season varied. There were more women interviewed in the summer (n=132) than in the winter (n=87). This could explain, in part, the decreased variety of traditional food items consumed, since fewer women interviewed would decrease likelihood of the number of species mentioned. Despite this, traditional food species were differentially reported in each season. Canada goose and whitefish (fresh and smoked) were the important species reported in summer. The average daily gram amount reported on the recall, including all women interviewed, was 70g/woman (Canada goose) and 84 g/woman (whitefish, smoked and fresh). In addition, the number of mentions for these two species comprised over 50% of all traditional food reported. In winter, rabbit, beaver, moose and whitefish were the important species. The weight in grams per woman interviewed, were 28 g/woman (rabbit), 28 g/woman (beaver), 33 g/woman (moose) and 21g/woman (whitefish, fresh). These four species comprised over 65% of all traditional food mentioned. Seasonal availability of species explain the differences observed in the species reported in dietary recalls. Although, spring goose

Table 10.1 Number of mentions and average amount of traditional food by season: 24 hour recall interview

Summer 1994 n=132				Winter 1995 n=87			
traditional food	g/woman	number of mentions	% of all mentions	traditional food	g/woman	number of mentions	% of all mentions
Canada goose, flesh	70	52	30.8	rabbit, flesh	28	18	25.4
whitefish, flesh	63	32	18.9	beaver, flesh	28	13	18.3
whitefish, smoked	21	19	11.2	moose, flesh	33	11	15.5
goose, grease	2	14	8.3	caribou, flesh	15	10	14.1
whitefish, eggs	trace	10	5.9	Canada goose, flesh	12	7	9.9
whitefish, intestine	8	6	3.6	whitefish, flesh	21	7	9.9
bear, flesh	7	5	3	bear, flesh	1	1	1.4
whitefish, liver	1	5	3	lake trout, flesh	5	1	1.4
caribou, flesh	4	4	2.4	partridge, flesh	3	1	1.4
lake trout, flesh	6	4	2.4	walleye, flesh	3	1	1.4
moose, flesh	6	4	2.4	whitefish, eggs	trace	1	1.4
sturgeon, flesh	7	3	1.8				
pike, flesh	6	2	1.2				
snow goose, flesh	3	2	1.2				
bear, grease	trace	1	0.6				
bear, liver	1	1	0.6				
black scoter, flesh	2	1	0.6				
rabbit, flesh	1	1	0.6				
cisco, smoked	1	1	0.6				
trout, smoked	1	1	0.6				
snow goose, grease	0.1	1	0.6				
total	210	169	100	total	149	71	100

averages determined for all women interviewed, by

hunts were finished by summer, the preservation of geese by freezing ensured a supply for the summer. Winter data collection coincided with the season when rabbit and beaver were trapped and when moose were hunted.

Using food frequency questionnaire data, the percent of women who reported consuming specific traditional food species was calculated (table 10.2 and figure10.1). Some species have a strong seasonal presence, explainable in part by seasonal availability, while others do not.

Looking at fish species, sturgeon, walleye, sucker and burbot showed the most obvious seasonal presence. Sturgeon, walleye and sucker were reported only in spring while burbot was almost entirely reported in the fall. Approximately 20% more women reported consuming pike in the fall, than in the spring. The percent of women consuming

whitefish, speckled trout, cisco and lake trout showed small seasonal differences (<12% difference) between seasons.

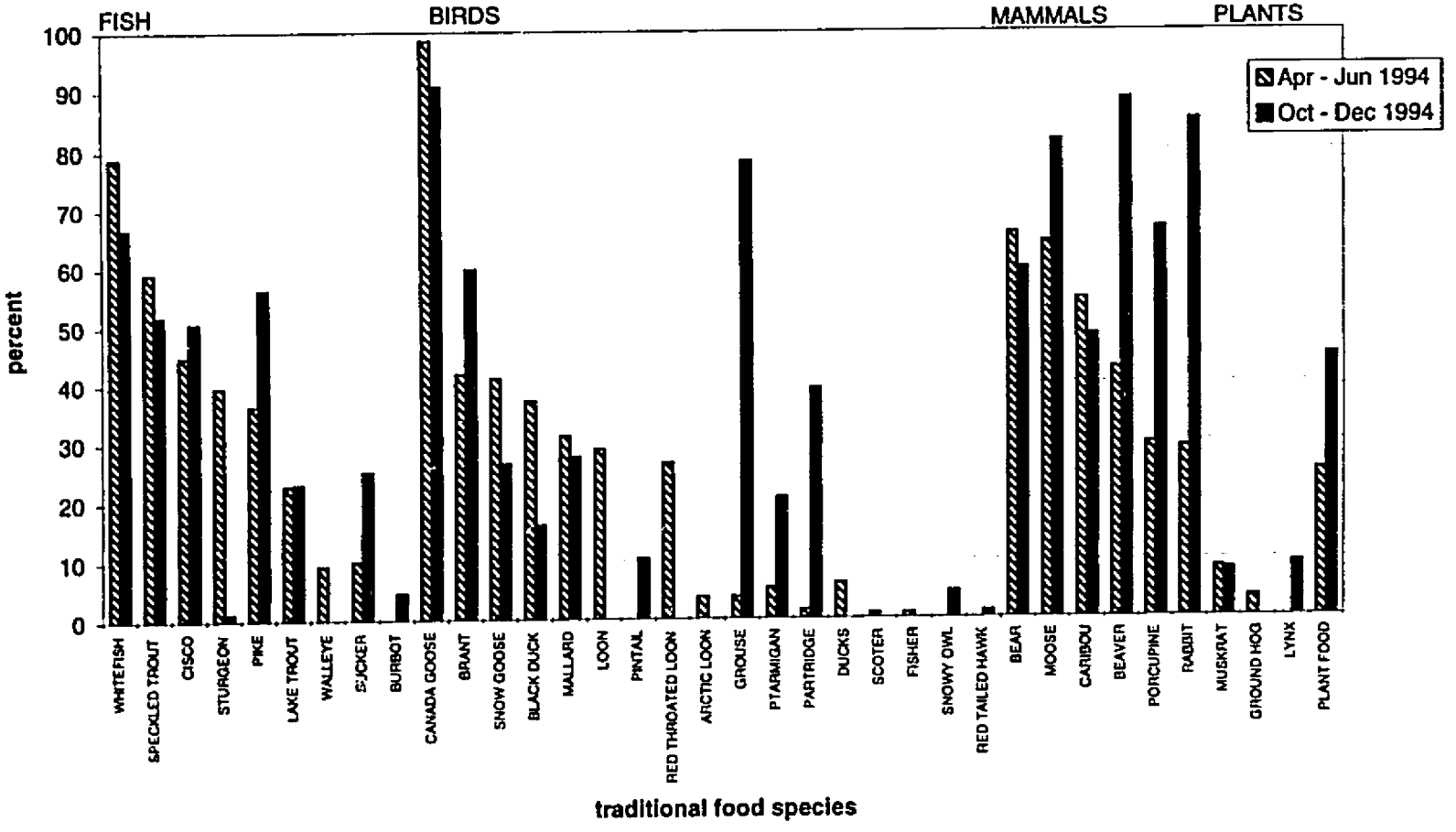
The most complex seasonal differences were demonstrated for bird species. Included are geese, ducks, loons, other game birds, owls and hawks. The biggest seasonal differences were demonstrated by species that were consumed primarily in one season. In spring, loon (common), red-throated loon, and arctic loon were reported by 29%, 27% and 4% of women respectively, but by no one in fall. In general, duck species were reported by more women in the spring season than in the fall. Species reported in spring and not in fall were, scoter, fischer, and "ducks" which included unidentified species that the respondents volunteered for "other birds" not included on the questionnaire. Pintail was reported in the fall (10%) but not in spring. Mallard showed no seasonal difference in the percent of women reporting its consumption, while black duck was reported by 20 percent more women in the spring. Grouse, ptarmigan and partridge were reported primarily in the fall season by 78%, 21% and 39% of women respectively, and by less than 5% of women in the spring, reflecting availability of these species. Snowy owl and red-tailed hawk were reported by a small percentage of women, 5% and 1% respectively, in fall. Canada goose, snow goose and brant goose showed less obvious seasonal differences, and this was due in part to goose hunts in both periods covered by the food frequency questionnaire. It was found that women expressed preferences for certain bird

Table 10.2 Percent of women who reported consuming food species by season: food frequency interview

April - June 1994	%	[1]n=	October - December 1994	%	[2]n=
Canada goose	98.5	130	Canada goose	90.8	79
whitefish	78.8	104	beaver	88.5	77
bear	65.9	87	rabbit	85.1	74
moose	64.4	85	moose	81.6	71
speckled trout	59.1	78	grouse	78.2	68
caribou	54.6	72	whitefish	66.7	58
cisco	44.7	59	porcupine	66.7	58
beaver	42.4	56	brant	59.8	52
brant	41.7	55	bear	59.8	52
snow goose	40.9	54	pike	56.3	49
sturgeon	39.4	52	speckled trout	51.7	45
black duck	37.1	49	cisco	50.6	44
pike	36.4	48	caribou	48.3	42
mallard	31.1	41	[3]plant food	44.8	39
porcupine	29.6	39	partridge	39.1	34
rabbit	28.8	38	mallard	27.6	24
loon	28.8	38	snow goose	26.4	23
red-throated loon	26.5	35	sucker	25.2	22
[3]plant food	25.0	33	lake trout	23.0	20
lake trout	22.7	30	ptarmigan	20.7	18
sucker	9.9	13	black duck	16.1	14
walleye	9.1	12	pintail	10.3	9
muskrat	8.3	11	lynx	9.2	8
[4]ducks	6.1	8	muskrat	8.1	7
ptarmigan	5.3	7	burbot	4.6	4
arctic loon	3.8	5	snowy owl	4.6	4
grouse	3.8	5	red tailed hawk	1.1	1
ground hog	3.8	5	sturgeon	1.1	1
partridge	1.5	2			
scoter	0.8	1			
fisher	0.8	1			

[1] total n=132
[2] total n=87
[3] plant food=includes 6 berry species and Labrador tea
[4] ducks=species unidentified

Figure 10.1 Percent of women who reported consuming traditional food species by season food frequency interview



species, particularly duck and loons, at specific times. Food preferences in addition to seasonal availability influence the consumption of bird species (Delormier, 1993).

There were less obvious seasonal difference in the number of women reporting caribou, moose and bear on the food frequency questionnaire. Moose showed the biggest seasonal difference (15%) between seasons. Bear, which can be harvested in fall or spring, is a highly regarded species. The consumption of bear by a large proportion of women in both seasons reflected its wide sharing network rather than a large harvest.

For small mammals, the largest differences in the percent of women consuming these species between seasons were for beaver, rabbit, and porcupine. In fall, the percent of women who consumed beaver, rabbit and porcupine was 89%, 85% and 67% respectively, compared to the spring which was 42%, 29% and 30%. A small percentage of women (4%) reported ground hog in the summer only and (9.2%) reported lynx in the fall only.

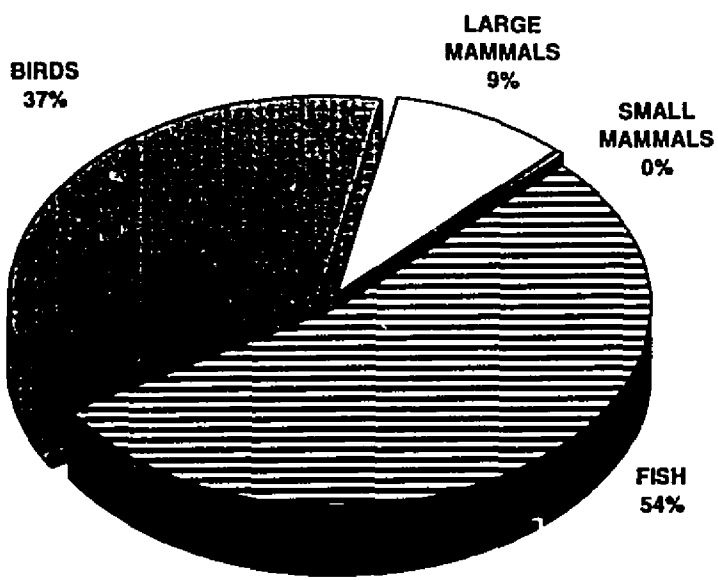
For plant food, which comprised six berry species and Labrador tea, 20% more women reported consumption in the fall, reflecting availability, than in spring, reflecting preserved species.

10.1.2 Season effect and the amounts of traditional food used.

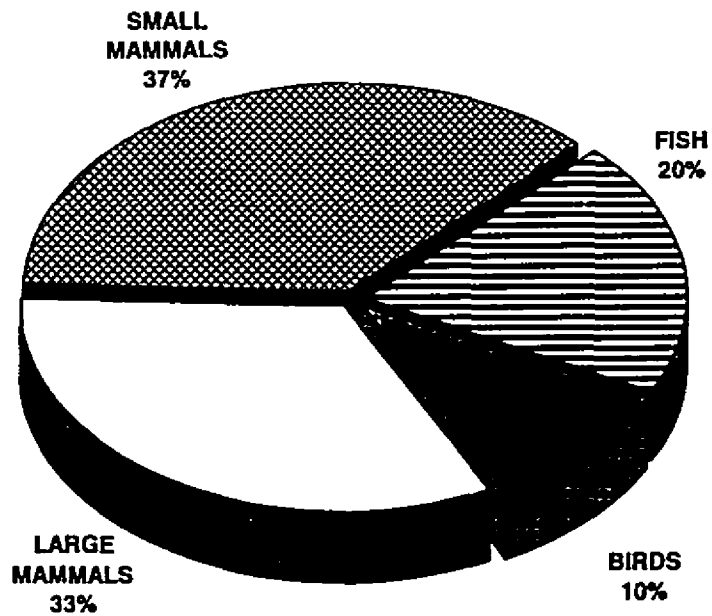
A global look at the differences in the amounts of each species consumed between seasons was done using 24 hour recall data. Each species was categorized into either fish, birds, small mammals, large mammals or plants. The sum weight for each food species was calculated by category and expressed as a percentage of the total traditional food weight in each season (figure 10.2). The seasonal differences in food category were obvious. In summer there was an emphasis on fish and birds species and the winter demonstrated an emphasis on large and small mammals. Plant foods were not reported on the 24-hour recall.

Table 10.3 shows the top twenty foods ranked by mean frequency from the food frequency questionnaire. These twenty food items show the greatest mean frequency

Figure 10.2 Percent of total traditional food weight contributed by traditional food category by season: 24 hour recall interview



Summer 1994



Winter 1995

Table 10.3 Top twenty food items listed in descending order of mean frequency by season: food frequency interview

April - June 1994 n=132 traditional food	freq (times/week) mean± s.d.	October - December 1994 n=87 traditional food	freq (times/week) mean± s.d.
Canada goose flesh	3.2 ± 2.1	rabbit, flesh	2.2 ± 2.1
whitefish, flesh	1.4 ± 1.7	moose, flesh	1.4 ± 1.9
Canada goose, heart	1.2 ± 1.9	beaver, flesh	1.4 ± 1.7
Canada goose, grease	1.0 ± 1.6	whitefish, flesh	1.3 ± 1.8
caribou, flesh	1.0 ± 1.5	Canada goose, flesh	1.0 ± 1.3
Canada goose, gizzard	0.9 ± 1.3	cisco, flesh	1.0 ± 1.7
Canada goose, wings	0.9 ± 1.3	pike, flesh	0.8 ± 1.5
Canada goose, head	0.9 ± 1.2	brant, flesh	0.8 ± 1.4
moose, flesh	0.8 ± 1.2	bear, flesh	0.6 ± 1.1
speckled trout, flesh	0.7 ± 1.1	caribou, flesh	0.6 ± 1.3
brant, flesh	0.6 ± 1.3	speckled trout, flesh	0.6 ± 1.3
bear, flesh	0.6 ± 1.0	cranberries	0.5 ± 1.1
whitefish, smoked	0.6 ± 1.2	porcupine, flesh	0.5 ± 1.0
cisco, flesh	0.6 ± 1.1	whitefish, smoked	0.5 ± 1.1
Canada goose, liver	0.5 ± 1.3	Canada goose, head	0.4 ± 0.9
black duck, flesh	0.5 ± 1.0	Canada goose, wings	0.4 ± 0.9
pike, flesh	0.5 ± 1.1	Canada goose, gizzard	0.4 ± 0.9
Canada goose, feet	0.4 ± 1.0	Canada goose, grease	0.4 ± 0.8
rabbit, flesh	0.4 ± 1.0	lake trout, flesh	0.3 ± 1.0
cisco, smoked	0.3 ± 1.0	cisco, smoked	0.3 ± 0.9

values. After approximately 14 food items, the mean frequencies drop to less than 0.5 times per week.

For species that were reported in both seasons, the mean frequencies differed. Canada goose flesh, the food consumed by the largest proportion of women in both seasons, showed a mean frequency of consumption of 3.2 times/week in spring compared with 1.0 times/week in the fall. Although there are spring and fall goose hunts, it is known that more people participate in the spring goose hunt than the fall goose hunt. Rabbit (flesh) is the food eaten with the highest frequency in fall at 2.2 times/week compared to 0.4 times per week in spring. Moose (flesh) was consumed on average 1.4 times/week in spring compared to 0.84 times in fall. Beaver (flesh) was consumed on average 1.4 times per week in fall and 0.3 (not in table) in spring. Caribou (flesh) was eaten two times more frequently in the spring, 1.0 time/week compared to 0.6 times in the fall. Cisco (flesh) and pike (flesh) showed differences in the mean frequency of consumption between seasons. The mean frequency of cisco in spring is 0.6 times/week and 1.0 times/week in fall; pike's mean frequency of consumption in spring was 0.5 times/week and 0 .8 times/week in fall. Among plant species, cranberries were the only food to appear on a top twenty list with a mean frequency of 0.5 times/week in fall.

Even-though the same species appeared in both seasons there were differences in the amounts and frequency with which they were consumed. This demonstrated that even-though some species were preserved, for the most part species availability strongly influenced the traditional food consumed in different seasons.

Dietary studies on traditional food use cannot ignore the influence of seasons on the amounts and types of traditional food used. In this study, interviews were conducted in seasons of varied food use, as suggested by community members, to gain an appreciation for the influence of season on use of traditional food use. Other dietary studies with aboriginal peoples in the north have demonstrated varied use of traditional foods by season (Kuhnlein et al., 1995a (in press); Kuhnlein et al., 1995 (in press); Wein et al., 1991a).

10.2 Age factors affecting food use

10.2.1 Age differences in the number of women who consume traditional food

Research with the Cree and other northern Native Peoples has demonstrated differential use of traditional food according to age. The trend observed is that the elders, in general, eat more traditional food. From the 24 hour recall interviews the number of women who ate traditional food and market food and not solely market food was examined. The number of women who reported consuming traditional food on the interview is shown by age group in table 10.4. There was a statistically significant association between age group and the number of consumers of traditional food in that age group ($p<0.001$). The trend was for the higher numbers of women who reported traditional food to be in the elders group, followed by the middle adult group and then the young adult group.

Table 10.4 The number of women who consumed traditional food by season and age group: 24 hour recall interviews

age group (years)	summer 1994			
	[1] # traditional food consumers	%	[2] # market food consumers	%
20-40 (n=53)	24	45	29	55
40-60 (n=49)	38	78	11	22
over 60 (n=30)	25	83	5	17

age group (years)	winter 1995			
	[1] # traditional food consumers	%	[2] # market food consumers	%
20-40 (n=36)	10	28	26	72
40-60 (n=33)	21	64	12	36
over 60 (n=18)	14	78	4	22

[1] # traditional food consumers refers to women who reported traditional food

[2] # market food consumers refers to women who reported only market food

* association between age group and number of women $p<0.001$ (Mantel-Haenzel chi-square)

The number of women who consumed specific species of traditional food was determined from the food frequency interview. For each specific species the respondent was asked whether or not the food was consumed over the three month period prior to the interview. The percentage of women in each age group who reported eating that species was calculated. The results are shown in figure 10.3 for the period of April to June, 1994, and in figure 10.4 for the period of October to December, 1994. The figure shows varying proportions of women who reported consumption by species, in each age group.

In the fish species category the two elder age groups had more consumers of fish than the young adult age group. Except for whitefish in spring, less than 50 percent of the young adult age group reported consuming fish.

For bird species consumed, the trend was again for a higher percentage of consumers in the middle adult and elders group, and a lower percentage in the young adult group. Canada goose was the most popular species with almost all women (> 85 %) consuming Canada goose in both seasons. In spring more elders (over 60 years) were consumers of snow goose (67%), and black duck (63%), while the middle adult age group (40-60) years had the most consumers (59%) of brant. Apart from Canada goose, less than 50 % of young adults consumed any of the other bird species. In fall the three age groups had similar proportions of women consuming Canada goose (86%-96%), partridge (36%-42%), and ptarmigan (17%-22%), while the two elder groups shared similar proportions of women consumers for all bird species.

Consumption of bear occurred among age groups in both seasons. In spring, the percentage of women consumers in the young, middle and elder adult groups were 42%, 76% and 87% respectively, and in fall they were 42%, 67%, 83%. Age trends for moose and caribou were less consistent. In spring, women in the middle and elder age groups reported moose in the highest proportions, while in fall only the middle adults reported moose in the highest proportions, and elders reported moose in proportions similar to the young adults (≅ 78%). In spring the middle age group reported caribou in the highest proportions, the two other groups reported similar percentages. However in fall the young and middle adults reported the highest and in similar proportions for caribou. The middle adults in general were the highest consumers of large mammals. The young and elder age

Figure 10.3 Percent of women who reported consuming traditional food in each age group
Food Frequency
April - June 1994

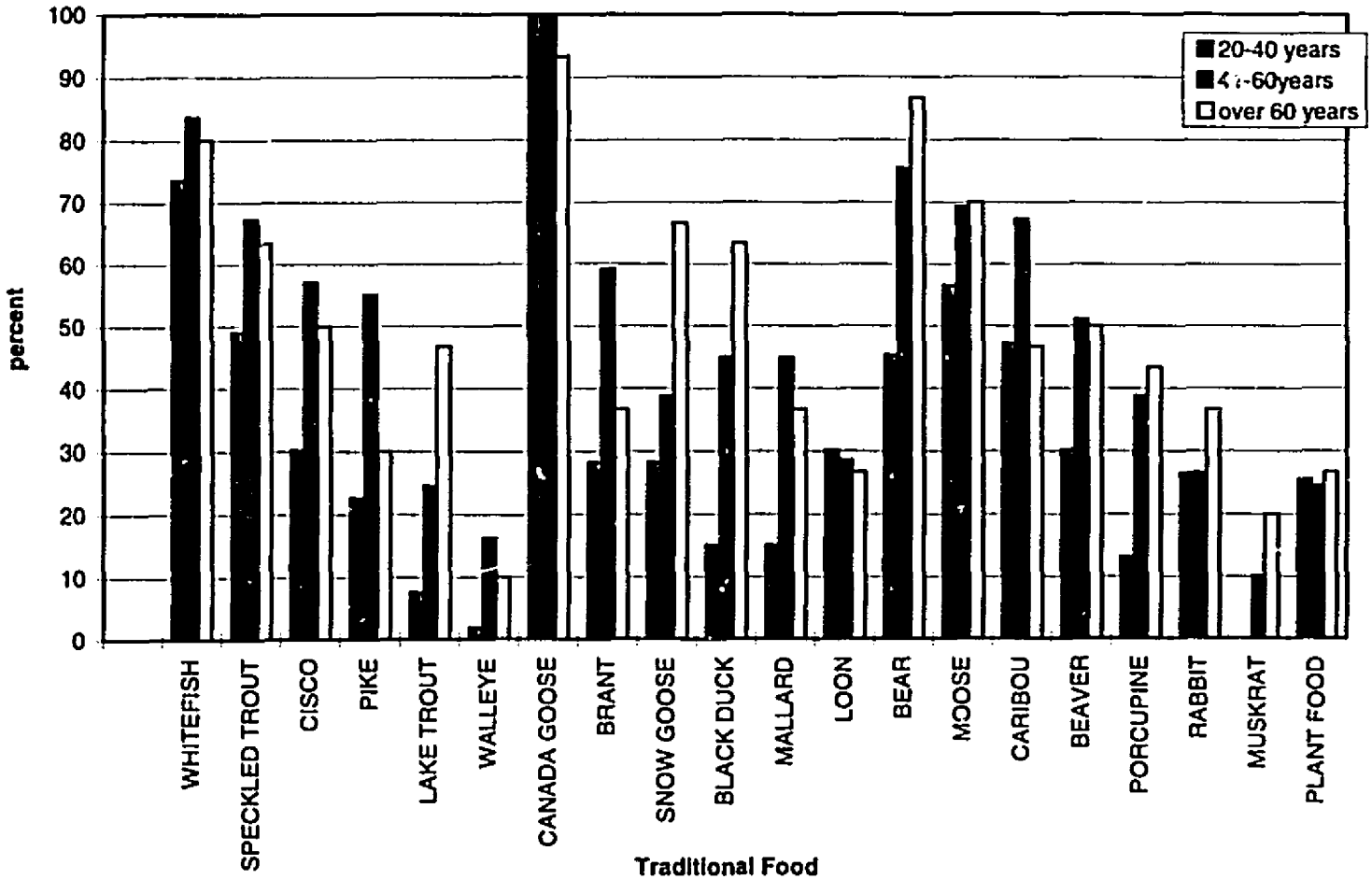
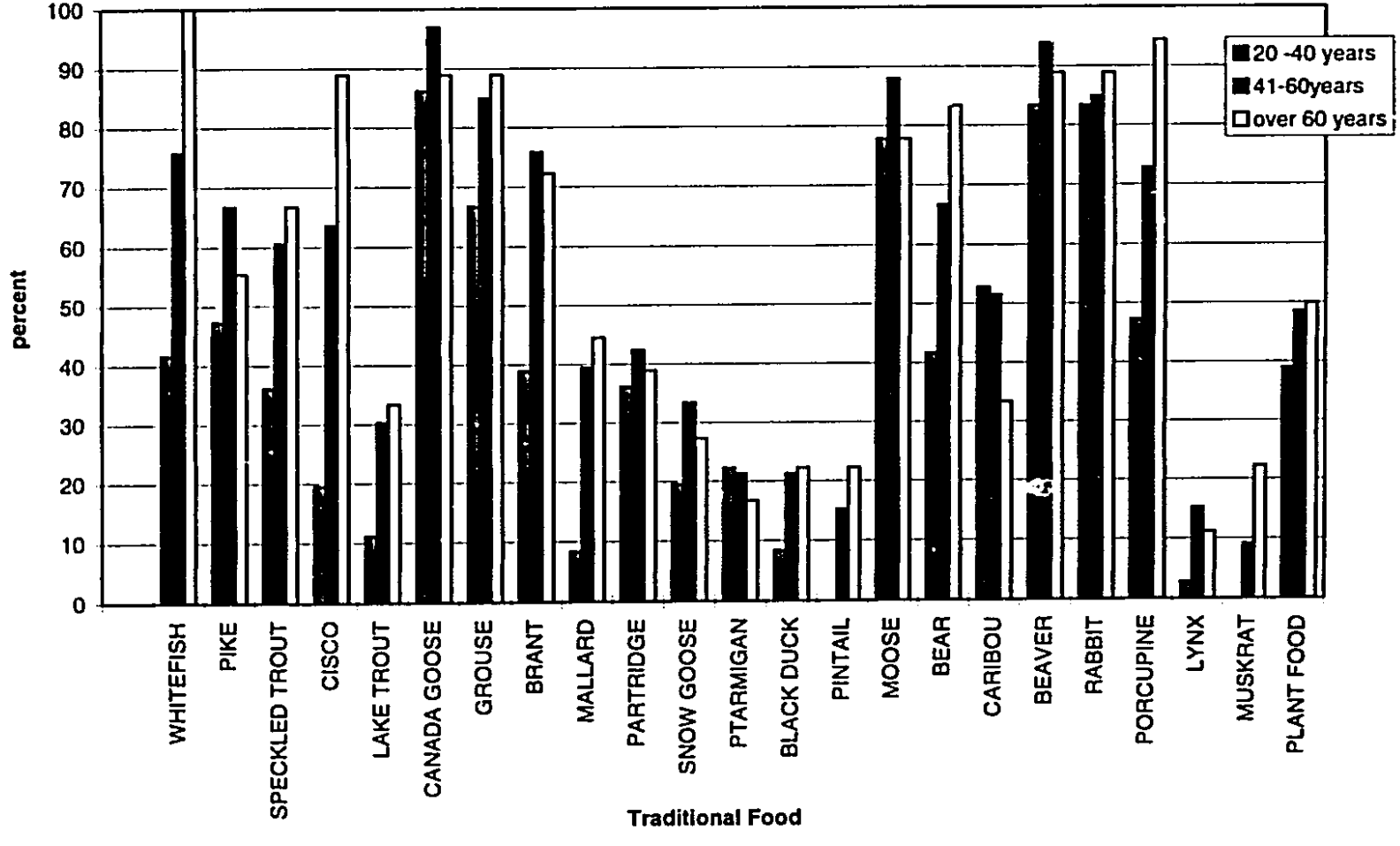


Figure 10.4 Percent of women who reported consuming traditional food in each age group
Food frequency
October - December 1994



groups varied in the proportion of women reporting large animals, however the differences between age groups were not greater than 25%.

Small mammals included, rabbit, beaver, porcupine, muskrat, lynx. In spring the middle adults and elders reported the highest percentage of use of beaver (51% and 50% respectively), porcupine (39% and 43% respectively) and muskrat (10% and 20%) consumers. For these three species the percent of young adult consumers was 30% and less, and no one consumed muskrat. In fall, the availability of small mammals increased and the proportion of consumers of rabbit and beaver was over 80 percent and similar for all age groups. Porcupine was reported by 47% of young adults consumers, 73% of middle adults and 94% of elders, showing a trend across age groups. No young adults reported consuming muskrat in either season. It was reported in small proportions by the other age groups

Plant food included mainly berries. In the fall period more women in each age group reported plant foods than in spring. In spring approximately 25% of women in each age group consumed this food. In fall 39% of young adults were plant food consumers. This was less than the other two age groups who had about 50% of women consuming plant food. Plant foods, particularly the species of berries are available fresh only in the fall.

Fish showed the most consistent age trends in both seasons, having more consumers in middle and elder adult age groups. Specific species such as bear, porcupine, muskrat, whitefish and cisco demonstrated the greatest percentage of consumers among the elders. In general the middle age group and the elder tended to be more alike with respect to percentage of consumers while the young age group tended to differ with noticeably less consumers of traditional food in the majority of categories.

10.2.2 Age differences in the amount of traditional food used

Table 10.5 displays the expected mean daily intake of traditional food in grams, consumed by age group. Expected mean describes the amount of traditional food reported per woman, eventhough all women did not report consuming traditional food. Differences

in the mean amount of traditional food consumed among age groups was examined with two way analysis of variance (ANOVA). Two way ANOVA allowed the model to include energy intake, and thus correct the model for differential energy intakes due to age. The effect of age was found to be statistically significant ($p<0.0001$). The differences in mean amounts of traditional food consumed, showed that the young adult group differed from both the middle adults and the elders. However, the mean amount among the two senior age groups did not differ. There were age differences when the amount of traditional food, expressed for all women in an age group, was considered.

Table 10.5 Expected daily intake of traditional food (grams), by age 24 hour recall interview- summer 1994 and winter 1995 (n=219)

age group (years)	[1] n=	mean ± s.d. (g)
20-40	89	[a] 117 ± 191
41-60	82	[b] 227 ± 241
over 60	48	[b] 241 ± 201

[1] n= includes all women interviewed

[a] pairs with different letters are significantly different, *(p<0.05)*

Looking only at women who reported traditional food on the 24 hour recall and following the same analysis, we see that there was no age effect (Table 10.6). This indicates that when women ate traditional food the amount, or daily serving size, that they ate did not differ among age groups, however as a group the young adults consumed less traditional food than the other age groups.

Table 10.6 Average daily intake of traditional food (grams), by age group 24 hour recall interview - summer 1994 and winter 1995 (n=132)

age group (years)	[1] n=	mean ± s.d. (g)
20-40	34	[a] 307 ± 194
41-60	59	[a] 315 ± 230
over 60	39	[a] 296 ± 182

[1] n= includes only women who were consumers of traditional food

[a] pairs with different letters are significantly different, *(p<0.05)*

The amount in grams of traditional food consumed per 1000 kilocalories was calculated by age group and is shown in table 10.7. Expressing traditional food in this manner, rather than absolute amounts, accounted for the higher energy needs and food

intakes of young adults. For both seasons the mean weight of traditional food reported by traditional food consumers was highest among the elders and lowest for the young adult age group. The age trend observed for traditional food "density", meant that elders consumed more traditional food, followed by middle adults, then young adults, when differences in energy intake were accounted for.

Table 10.7 Mean weight of traditional food consumed per 1000 kcal by age 24 hour recall interview - summer 1994 and winter 1995 (n=132)

age group (years)	[1] n=	traditional food g /1000kcal mean ± s.d.
20 - 40	34	[a] 152 ± 90
41 - 60	59	[a] 177 ± 108
over 60	39	[b] 249 ± 126

[1] n=number of consumers of traditional food

[a] pairs with different letters are significantly different, $p<0.05$

Depending on how amount is expressed, and the diets that are considered (recalls with traditional food versus all recalls) the presence and extent of the age trend varied. It was evident that the young adults did not eat as much traditional food as the middle or elder adults.

10.2.3 Age differences in the frequency of traditional food consumption

The number of occasions when traditional food was consumed was examined from the 24 hour recall data. The expected mean number of servings was determined by summing the total number of occasions reported by age group and calculating the mean number of servings by all the women in that age group. Not all women reported traditional food consumption. The results are shown in table 10.8. Differences among age groups the mean number of servings consumed was examined with one way ANOVA. The effect of age was found to be statistically significant ($p< 0.0001$). As with expected daily intake, young adults differed from the two other age groups, but the two senior age groups did not differ, in the mean number of occasions with which they reported traditional food.

Table 10.8 Expected mean number of servings of traditional food consumed by age group, 24 hour recall interview summer 1994 and winter 1995 (n=219)

age group (years)	[1] n=	mean ± s.d. (g)
20-40	89	[a].6 ± .9
41-60	82	[b]1.3 ± 1.3
over 60	48	[b]1.6 ± 1.5

[1] n= includes (all women interviewed)

[a] pairs with different letters are significantly different, $p<0.05$

Food frequency interviews allowed a qualitative look at the frequency of consumption of traditional food among different age groups. Mean frequencies (in occasions/week) were calculated for each traditional food on the frequency questionnaire. These are shown in tables 10.9 and 10.10. In general the middle adults reported the highest frequency of consumption of most traditional food, followed by the elder age group and lastly, the young adults. This trend held for both seasons.

Mean frequencies were summed by traditional food category (fish, birds, large mammals, small mammals, plants) and a percentage was calculated from the total of all traditional food mean frequencies. The percent of all mean frequencies contributed by food category is depicted in figures 10.5 and 10.6 The fish species category had the strongest age trend in both seasons, with an increase in percent of the fish category as the age group increased. For bird species the reverse was evident in the spring season, but not in the fall season (no trend evident). Small mammals as a food category showed no age trend in the spring, but they did in fall when young adults had the highest percentage and the elders had the lowest percentage of all the total mean frequencies.

Table10.9a Mean frequency of traditional food use by age group
food frequency interview
April - June 1994

food	20-40 years n=53 mean ± s.d.	41-60years n=49 mean ± s.d.	over 60 years n=30 mean ± s.d.
CANADA GOOSE			
flesh	3.3 ± 2.1	3.6 ± 2.0	2.5 ± 2.2
dried	0.1 ± 0.2	0.2 ± 0.5	0.2 ± 0.4
grease	1.0 ± 1.8	1.3 ± 1.7	0.4 ± 0.9
head	0.9 ± 1.4	1.0 ± 1.2	0.6 ± 1.0
wings	0.9 ± 1.3	1.1 ± 1.4	0.6 ± 1.0
gizzard	0.8 ± 1.2	1.3 ± 1.6	0.4 ± 0.8
heart	1.2 ± 1.8	1.6 ± 2.2	0.4 ± 1.0
liver	0.3 ± 1.1	0.7 ± 1.7	0.3 ± 0.8
WHITEFISH			
flesh	1 ± 2	1 ± 1	2 ± 2
smoked	0 ± 1	1 ± 1	1 ± 1
eggs	0 ± 1	0 ± 0	0 ± 1
liver	0 ± 1	0 ± 1	0
BEAR			
flesh	0 ± 1	1 ± 1	1 ± 1
MOOSE			
flesh	1 ± 1	0 ± 1	1 ± 1
SPECKLED TROUT			
flesh	0 ± 1	1 ± 1	1 ± 1
smoked	0 ± 0	0 ± 1	1 ± 1
eggs	0	0	0
liver	0	0	0
CARIBOU			
flesh	1 ± 1	1 ± 2	1 ± 1
CISCO			
flesh	0 ± 1	1 ± 1	0 ± 1
smoked	0 ± 1	1 ± 1	0 ± 1
eggs	0 ± 0	0 ± 0	0 ± 1
liver	0 ± 1	0 ± 0	0
BEAVER			
flesh	0 ± 1	0 ± 1	0 ± 1
smoked	0 ± 0	0 ± 0	0
tail	0 ± 1	0 ± 0	0 ± 0
feet	0 ± 1	0 ± 0	0 ± 0
BRANT			
flesh	0 ± 1	1 ± 2	0 ± 1
smoked	0 ± 0	0	0
SNOW GOOSE			
flesh	0 ± 0	1 ± 1	0 ± 0
grease	0 ± 0	0 ± 1	0 ± 0
dried	0	0	0

Table 10.9b Mean frequency of traditional food use by age group (cont'd)
food frequency interview
April - June 1994

food	20-40 years mean	s.d.	41-60years mean	s.d.	over 60 years mean	s.d.
BLACK DUCK						
flesh	0.1	± 0.4	0.5	± 1.1	1.0	± 1.4
smoked	0		0.0	± 0.0	0	
PIKE						
flesh	0.2	± 0.6	0.9	± 1.5	0.3	± 0.8
smoked	0		0		0	
eggs	0.1	± 0.6	0.1	± 0.6	0.1	± 0.3
liver	0		0		0	
MALLARD						
flesh	0.1	± 0.3	0.4	± 0.9	0.5	± 1.1
smoked	0		0		0	
PORCUPINE						
flesh	0.1	± 0.3	0.2	± 0.4	0.1	± 0.1
smoked	0		0		0	
RABBIT						
flesh	0.3	± 0.9	0.3	± 0.9	0.5	± 1.2
smoked	0.0	± 0.0	0		0	
LOON						
flesh	0.2	± 0.6	0.3	± 1.0	0.1	± 0.4
smoked	0		0		0	
PLANT FOOD						
blueberries	0.2	± 0.8	0.2	± 0.6	0.1	± 0.3
strawberries	0		0		0	
raspberries	0.0	± 0.0	0.0	± 0.0	0.0	± 0.0
cranberries	0.1	± 0.4	0.3	± 1.0	0.2	± 0.8
bakeapple berries	0		0.0	± 0.0	0.1	± 0.3
goose berries	0		0.0	± 0.2	0	
LAKE TROUT						
flesh	0.0	± 0.2	0.4	± 1.1	0.3	± 0.5
smoked	0		0.0	± 0.0	0	
eggs	0		0		0	
liver	0		0		0	
WALLEYE						
flesh	0.0	± 0.0	0.2	± 0.5	0.2	± 0.7
smoked	0		0		0	
liver	0		0		0.0	± 0.0
eggs	0		0.0	± 0.2	0	
MUSKRAT						
flesh	0		0		0	
MARTEN						
flesh	0		0		0	
smoked	0		0		0	

Table 10.10a Mean frequency of traditional food use by age group
food frequency interview
October - December 1994

food	20-40 years n=36 mean ± s.d.	41-60years n=33 mean ± s.d.	over 60 years n=18 mean ± s.d.
CANADA GOOSE			
flesh	0.8 ± 0.9	1.5 ± 1.7	0.7 ± 0.7
dried	0.0 ± 0.1	0.0 ± 0.1	0.1 ± 0.1
salted	0	0.0 ± 0.1	0
grease	0.3 ± 0.8	0.4 ± 0.8	0.4 ± 1.0
head	0.1 ± 0.4	0.7 ± 1.2	0.6 ± 1.0
wings	0.1 ± 0.4	0.6 ± 1.2	0.6 ± 1.0
intestine	0.0 ± 0.1	0.3 ± 1.0	0.1 ± 0.1
BEAVER			
flesh	1.2 ± 1.6	1.6 ± 1.6	1.4 ± 1.9
smoked	0.2 ± 0.4	0.3 ± 1.0	1.9 ± 0.5
tail	0.1 ± 0.3	0.4 ± 0.8	0.1 ± 0.1
feet	0.1 ± 0.4	0.4 ± 0.8	0.1 ± 0.0
liver	0.1 ± 0.4	0.3 ± 0.5	0.0 ± 0.1
intestine	0.3 ± 1.1	0.2 ± 0.4	0.2 ± 0.4
RABBIT			
flesh	2.0 ± 2.0	2.7 ± 2.3	1.8 ± 1.9
smoked	0.0 ± 0.3	0.0 ± 0.1	0
MOOSE			
flesh	1.9 ± 1.7	1.6 ± 1.0	1.6 ± 2.1
marrow	0	0.0 ± 0.1	0.4 ± 1.5
intestine	0	0.0 ± 0.1	0.1 ± 0.4
GROUSE			
flesh	1.2 ± 1.6	1.8 ± 2.0	2.0 ± 2.1
smoked	0	0	0
gizzard	0.5 ± 1.0	1.5 ± 2.0	1.6 ± 2.1
heart	0.6 ± 1.2	1.0 ± 1.7	1.1 ± 2.0
WHITEFISH			
flesh	0.5 ± 1.2	1.7 ± 2.1	2.0 ± 1.9
smoked	0.1 ± 0.7	0.6 ± 1.2	0.8 ± 1.3
guts	0.0 ± 0.1	0.7 ± 1.6	0.4 ± 1.0
eggs	0.0 ± 0.1	0.6 ± 1.5	0.1 ± 0.4
PORCUPINE			
flesh	0.2 ± 0.5	0.8 ± 1.4	0.5 ± 1.0
smoked	0	0	0
BRANT			
flesh	0.5 ± 1.2	1.3 ± 1.9	0.4 ± 0.5
smoked	0	0.2 ± 0.7	0.0 ± 0.1

Table 10.10b Mean frequency of traditional food use by age group (cont'd)
food frequency interview
October - December 1994

food	20-40 years mean ± s.d.	41-60years mean ± s.d.	over 60 years mean ± s.d.
BEAR			
flesh	0.4 ± 1.0	0.8 ± 1.3	0.7 ± 0.7
liver	0.0 ± 0.1	0.1 ± 0.4	0.0 ± 0.1
intestine	0.1 ± 0.3	0.3 ± 0.8	0.2 ± 0.5
hand	0.0 ± 0.0	0.1 ± 0.4	0.1 ± 0.4
PIKE			
flesh	0.6 ± 1.2	1.3 ± 1.8	0.5 ± 1.0
smoked	0	0.0 ± 0.0	0
guts	0.0 ± 0.0	0.1 ± 0.3	0
eggs	0.0 ± 0.0	0.0 ± 0.1	0.0 ± 0.1
SPECKLED TROUT			
flesh	0.5 ± 1.4	0.5 ± 0.8	0.9 ± 1.7
smoked	0.0 ± 0.3	0.1 ± 0.3	0
guts	0	0	0
eggs	0	0	0
CISCO			
flesh	0.2 ± 0.7	1.3 ± 1.9	2.2 ± 2.2
smoked	0	0.5 ± 1.2	0.4 ± 1.0
guts	0.0 ± 0.1	0.5 ± 1.0	0.3 ± 0.6
eggs	0.0 ± 0.0	0.3 ± 0.8	0.3 ± 0.6
CARIBOU			
flesh	0.6 ± 1.3	0.7 ± 1.5	0.4 ± 1.0
marrow	0.0 ± 0.3	0.1 ± 0.3	0
intestine	0	0.0 ± 0.0	0.8 ± 0.4
PLANT FOOD			
blueberries	0.1 ± 0.4	0.3 ± 1.0	0.3 ± 0.9
strawberries	0.0 ± 0.1	0.0 ± 0.1	0.0 ± 0.1
raspberries	0.0 ± 0.0	0.0 ± 0.1	0
cranberries	0.5 ± 1.0	0.5 ± 1.2	0.7 ± 1.3
bakeapple berries	0	0	0
goose berries	0	0.0 ± 0.0	0
PARTRIDGE			
flesh	0.3 ± 0.7	0.5 ± 1.2	0.2 ± 0.5
smoked	0	0	0
MALLARD			
flesh	0.1 ± 0.4	0.3 ± 0.8	0.1 ± 0.1
smoked	0.0 ± 0.0	0.1 ± 0.3	0
SNOW GOOSE			
flesh	0.1 ± 0.4	0.2 ± 0.4	0.1 ± 0.1
dried	0	0.0 ± 0.0	0.0 ± 0.0
grease	0.0 ± 0.0	0.0 ± 0.1	0.0 ± 0.1

Table 10.10c Mean frequency of traditional food use by age group (cont'd)
food frequency interview
October - December 1994

food	20-40 years mean ± s.d.	41-60years mean ± s.d.	over 60 years mean ± s.d.
LAKE TROUT			
flesh	0.1 ± 0.7	0.5 ± 1.2	0.3 ± 0.9
smoked	0	0.0 ± 0.1	0
guts	0	0	0.0 ± 0.1
eggs	0	0	0.0 ± 0.1
PTARMIGAN			
flesh	0.2 ± 0.4	0.2 ± 0.8	0.0 ± 0.1
smoked	0	0	0
BLACK DUCK			
flesh	0.1 ± 0.3	0.1 ± 0.4	0.1 ± 0.4
smoked	0	0.0 ± 0.0	0
PINTAIL			
flesh	0	0.2 ± 0.7	0.1 ± 0.4
smoked	0	0.1 ± 0.3	0
LYNX			
flesh	0.0 ± 0.0	0.2 ± 0.4	0.1 ± 0.3
MUSKRAT			
flesh	0	0.2 ± 0.1	0.0 ± 0.1

Figure 10.5 Food category as a percent of total summed mean frequencies by age group food frequency questionnaire April - June 1994

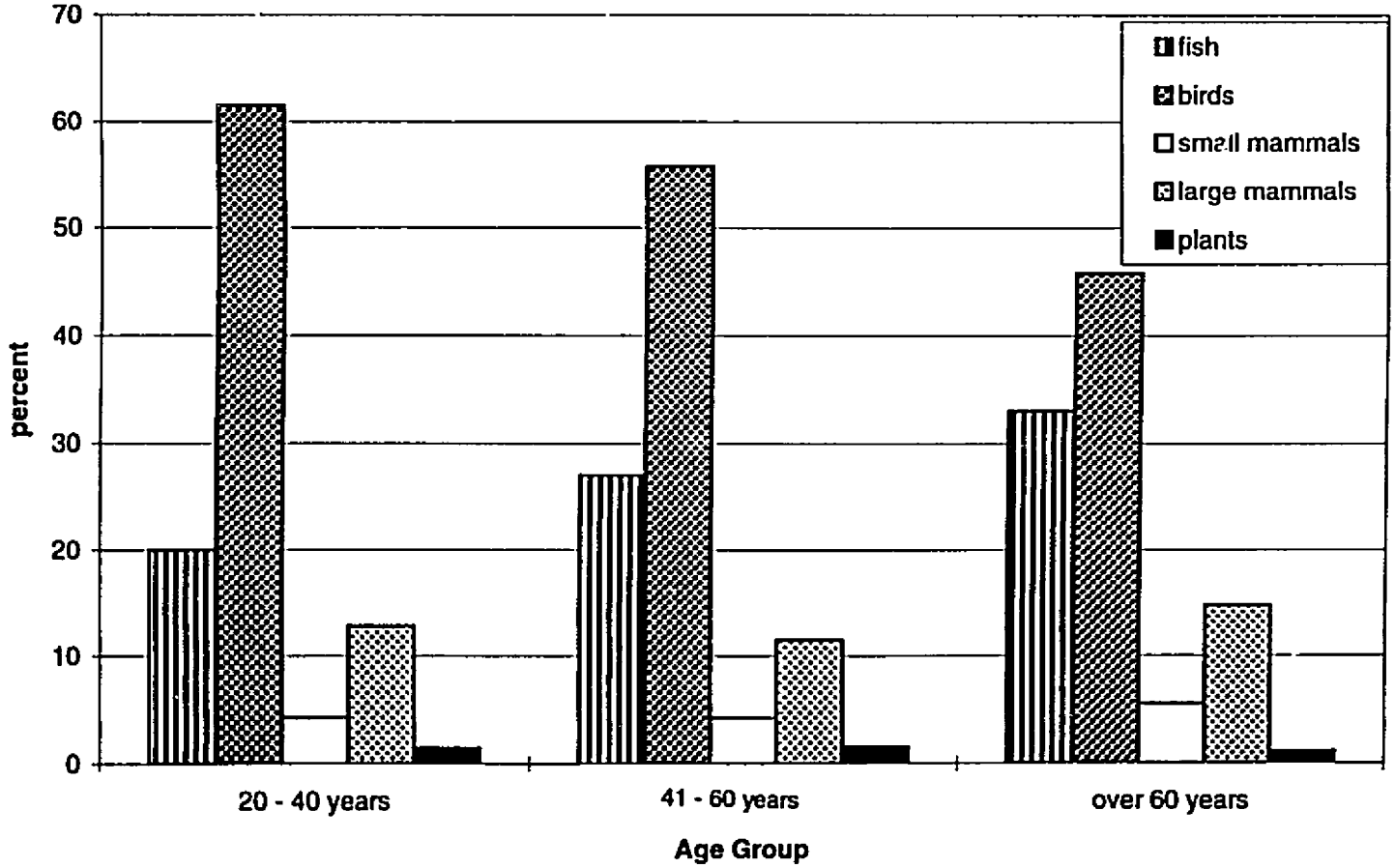
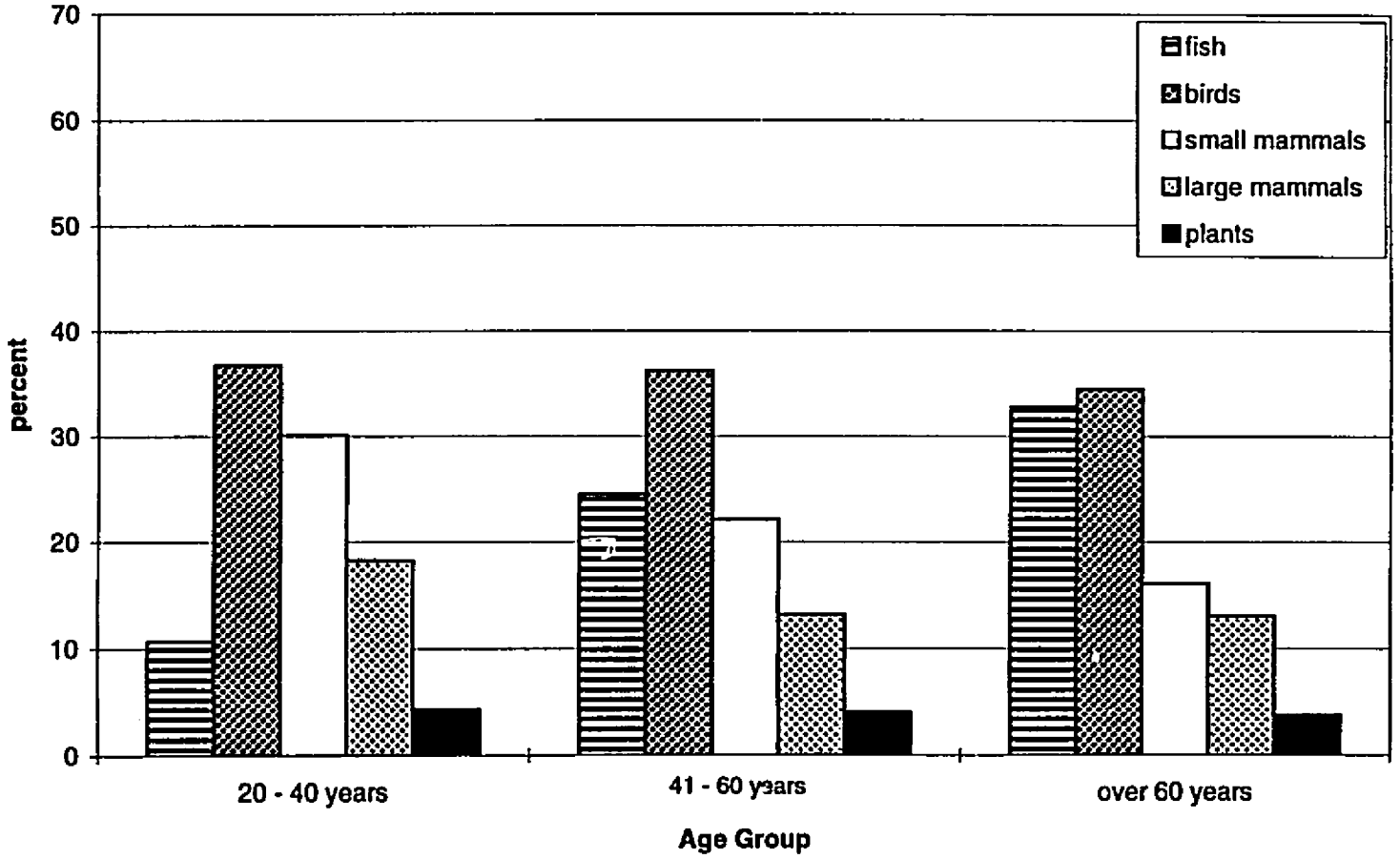


Figure 10.6 Food category as a percent of total summed mean frequencies by age group food frequency interview October - December 1994



10.2.4 Age differences in traditional and market sources of energy and nutrients

The hypothesis that a difference existed in the percentage of energy and nutrients from market and traditional food sources was investigated. The mean percent of energy, carbohydrate, protein, fat, calcium and iron contributed from market food and traditional food was computed. The means are shown in tables 10.11 and 10.12 along with the results of the t-test used to determine if the means were statistically significantly different from each other, for energy and each nutrient in each age group. A probability level of 0.001 was used to determine statistical significance since 36 paired t-tests were done (0.05/36=0.001). This eliminated exaggerated detection of significant differences due to chance alone.

There was a statistically significant difference in the mean percent of energy and nutrients from both sources for energy and all the nutrients tested for the young adult group in both seasons. For the middle adults the results of the t-test were consistent for both seasons, with the mean differences being statistically significant for energy, carbohydrate, fat and calcium, but there was no difference in the mean protein and mean iron mean percentages from both sources. The elder adults did not have consistent results for both seasons. In summer, only mean percent of carbohydrate and calcium from market and traditional food sources were statistically significantly different. In winter mean percent energy, carbohydrate, fat and calcium from market and traditional food were different.

The young adults obtained more energy and nutrients (those examined in this study) from market food. Middle adults obtained more energy, carbohydrate, fat and calcium from market food, but the amount of traditional food they ate, provided protein and iron in amounts that were not different from market food contributions. For the elders the situation differed by season likely because they consumed more traditional food in the summer. In summer market food contributed more calcium and carbohydrate, but there was no difference in energy, protein, fat and iron contributed from either food source. The only differences in contributions from either source was for iron and protein

Table 10.11 Mean percent energy and nutrients from traditional and market by age group 24 hour recall interview

summer 1994

nutrient	20-40 yrs (n=53) mean ± s.d.			41-60yrs (n=49) mean ± s.d.			over 60 (n=30) mean ± s.d.		
	market	traditional		market	traditional		market	traditional	
energy	85 ± 20	15 ± 20	**	70 ± 25	30 ± 25	**	60 ± 28	40 ± 28	NS
carb.	98 ± 3	2 ± 3	**	96 ± 7	4 ± 7	**	95 ± 18	5 ± 12	**
protein	72 ± 35	28 ± 35	**	47 ± 33	53 ± 33	NS	35 ± 36	65 ± 36	NS
fat	85 ± 20	15 ± 20	**	69 ± 30	31 ± 30	**	57 ± 33	43 ± 33	NS
iron	72 ± 36	28 ± 36	**	60 ± 33	40 ± 33	NS	52 ± 35	48 ± 35	NS
calcium	96 ± 9	4 ± 9	**	90 ± 12	10 ± 12	**	85 ± 18	15 ± 18	**

*p<0.001; paired t-test
**p<0.0001; paired t-test

Table 10.12 Mean percent energy from traditional and market food by age group 24 hour recall interview

winter 1995

nutrient	20-40 yrs (n=36) mean ± s.d.			41-60yrs (n=33) mean ± s.d.			over 60 (n=18) mean ± s.d.		
	market	traditional		market	traditional		market	traditional	
energy	93 ± 14	7 ± 14	**	82 ± 18	18 ± 18	**	75 ± 16	25 ± 16	**
carb.	100 ± 1	0 ± 1	**	100 ± 2	0 ± 2	**	100 ± 1	0 ± 1	**
protein	84 ± 29	16 ± 29	**	58 ± 36	42 ± 36	NS	46 ± 32	54 ± 32	NS
fat	95 ± 13	5 ± 13	**	88 ± 15	12 ± 15	**	82 ± 18	18 ± 18	**
iron	85 ± 27	15 ± 27	**	62 ± 34	38 ± 34	NS	50 ± 30	50 ± 30	NS
calcium	96 ± 11	4 ± 11	**	94 ± 11	6 ± 11	**	83 ± 18	17 ± 18	**

*p<0.001; paired t-test
**p<0.0001; paired t-test

in winter, meaning that the traditional food eaten provided these nutrients in proportion not different from market food. However the amount of traditional food consumed contributed less energy and fat than in the summer.

Tables 10.13 and 10.14 shows the mean of the differences between the percent of energy nutrient coming from market food and traditional food (% of market - % of traditional) by age group and season. For this analysis only women who were interviewed in both seasons were included. The mean differences were statistically significantly different among age groups. For both seasons the mean differences in carbohydrate from market and traditional food was not statistically significant among age groups. When considering that market food is the source of nearly all dietary carbohydrate the mean difference should be close to the same for all age groups. The mean differences for energy and protein were statistically significantly different when comparing the young adults with the other two age groups in both seasons. However the mean difference for fat was significant between the young adult age group and the elders, but not for the middle adults compared with the other two, again for both seasons. Statistically significant mean differences among age groups were not consistent across season for calcium and iron. The mean difference between the sources of iron was not statistically significantly different among all age groups in the summer but was in the winter, among the young adults compared with the two other age groups. With respect to calcium there was a statistically significant difference in mean differences between the young adult age group and the elders for both seasons, but the middle adults did not differ from either of the other age groups in summer and in winter the middle adults were different from the elders but not the young adults.

With respect to age group differences when comparing differences in proportions of energy and nutrients from the two food sources we see that the middle age group is more like the elder age group, particularly for mean differences in energy and protein form market and traditional food sources. The young adult group differed from the elders in the proportion of almost all nutrients obtained from both food sources, except

Table 10.13 Mean differences in percent of energy and nutrients from market food and traditional food, by age group
24 hour recall interview (women interviewed in both seasons (n=80))
summer 1994

nutrient	20-40 yrs (n=33) mean ± s.d. (%mkt - %trad)	41-60yrs (n=32) mean ± s.d. (%mkt - %trad)	over 60 (n=15) mean ± s.d. (%mkt - %trad)
energy	70 ± 40[a]	40 ± 51[b]	19 ± 55[b]
carbohydrate	97 ± 5[a]	93 ± 15[a]	91 ± 23[a]
protein	43 ± 70[a]	-6 ± 66[b]	-30 ± 72[b]
fat	70 ± 40[a]	38 ± 61[ab]	14 ± 66[b]
calcium	92 ± 17[a]	80 ± 25[a]	69 ± 35[a]
iron	44 ± 71[a]	21 ± 68[ab]	3 ± 70[b]

[a b ab]means with the same letter across rows are not statistically significant

Table 10.14 Mean differences in percent of nutrients from market food and traditional food, by age
24 hour recall interview (women interviewed in both seasons (n=80))
winter 1995

nutrient	20-40 yrs (n=33) mean ± s.d. (%mkt - %trad)	41-60yrs (n=32) mean ± s.d. (%mkt - %trad)	over 60 (n=15) mean ± s.d. (%mkt - %trad)
energy	86 ± 28[a]	64 ± 36[a]	50 ± 33[b]
carbohydrate	100 ± 2[a]	99 ± 3[a]	100 ± 1[a]
protein	67 ± 59[a]	16 ± 72[b]	-9 ± 64[b]
fat	89 ± 25[a]	77 ± 29[ab]	63 ± 36[b]
calcium	93 ± 22[a]	87 ± 21[b]	66 ± 35[b]
iron	69 ± 55[a]	25 ± 68[a]	-1 ± 60[b]

[a b ab]means with the same letter across rows are not statistically significant

carbohydrate and calcium which was contributed primarily from market sources in the contemporary diet.

Repeated measures analysis of variance (ANOVA) was applied to test for an effect of age on the mean differences in the percent of energy and nutrients from market and traditional food sources (Girden, 1992). Repeated measures were used since the women included in this analysis were those who were interviewed in both seasons. This would represent the most conservative approach for detecting an effect of age. Table 10.15 displays the results of the analysis of variance. The effect of age was statistically significant for energy, protein, fat, iron and calcium but not for carbohydrate. As stated earlier the source of carbohydrate in the diet was almost entirely market food, therefore there would be little age effect on the mean difference in percent of energy and nutrients. This analysis emphasizes that the differential use of food by age groups translated into differential contribution of nutrients by market and traditional sources of nutrients.

Table 10.15 Effect of age group on the mean difference in percent of energy and nutrients (% market - % traditional food)
Repeated measures analysis of variance: 24 hour recall interviews (n=160)

nutrient	effect of age between subject	effect of season within subject	interaction age*season
energy	**	**	NS
carbohydrate	NS	**	NS
protein	**	*	NS
fat	**	**	NS
iron	**	NS	NS
calcium	**	NS	NS

*p<0.05
**p<0.01
NS not statistically significant
[1] repeated measures analysis includes the 80 women interviewed in both seasons

10.3 Food use in bush camp settings

A bush camp is a place where temporary (and more recently permanent) dwellings are set up to accommodate the family or families who pursue traditional food harvesting activities. This is also referred to as "going in the bush". Diets consumed in a bush camp

are suspected to be different from those consumed in the community settlement. It is assumed that more traditional food is consumed in the bush camp.

In this study an attempt was made in both seasons to interview as many women as possible who were at camps. Of the 219 completed dietary interviews, 11 were recorded for diets consumed in a bush setting. Of the 11, 10 were completed in summer and only one in the winter. The 10 interviews done in summer represented women who were at subsidized fishing camps (except for 2, done in Eastmain), where participants are employed to fish for the community. Winter bush camp interviews were difficult to complete because people left for their camps, due to ice conditions, later than expected. Women from three age groups were interviewed in the bush. There were 4 young adults (3 in summer, 1 in winter), 1 in the middle adult group, and six in the elders group.

There were seven individuals (2 young adults, 1 middle adult and 4 elders) who were interviewed in the bush in the summer and in the community for the winter season. These 14 interviews were examined for qualitative differences with respect to age differences, seasonal differences and differences due to the camp or community setting. Original dietary recalls were looked at side by side. The number of occasions when traditional food was consumed in the bush (summer) was greater: 9 occasions versus 7 occasions in the community. However, the elders (n=4) reported the majority of these occasions. It should be noted that summer marked the higher period of traditional food consumption and the elder age groups tend to prefer to eat more traditional food. Therefore, it was not possible to attribute different characteristics of the bush camp diet, independent of age and season effects.

Initially, how diet differed among two locations (camp and community), was the objective. However, the low numbers of women who were in bush camps at this time did not allow enough dietary records to do meaningful analysis or a statistical analysis. The attempt to study bush camp diets, brought to light the need for a separate dietary assessment method specifically designed for the bush camp setting and the respective food system dynamics, described further here.

The time of year when the majority of people are in bush camps is at spring goose break. At goose break, children are let out of school for three weeks and full time

employees are given time off or save vacation time for the break. It was not possible to execute dietary study during goose break because of time and resource limitations. Intensive goose camps are likely to be different from camps that are set up for extended stays in the bush.

The bush camp dietary interviews in this study were done in four fishing camps during the summer. Although, 11 recalls were completed this did not represent women at 11 different camps. Similarities in diets from women in the same camp are likely, since meals are often prepared together, for members of different family groups and extended family. A study on diets in the bush would have to take into consideration the participants in camps and the variation in diets due to different camp setting.

It would be important to consider how women, who participate in bush camps, may be different from women who do not participate. In this study comparing the same woman's reported intake in two different settings was an attempt to perhaps reveal differences due to location. But it did not attempt to examine dietary differences of women who may not participate in bush camps, which is likely to offer important insights.

Dietary studies should consider season effect, effects due to age and dynamics of the food systems, and dynamics of the camp setting, some of which were outlined here.

11. Changing food use - qualitative data

The data described here were generated from a variety of questions designed to investigate women's perceptions of changing traditional food use. Open-ended questions were used that did not limit responses but allowed respondents to answer in the way they felt appropriate. During the first data collection period two open-ended questions were asked. The questions asked were, "What has changed in the amounts and types of traditional food you ate since you were a young adult (20 years of age)?" and "What are the causes or reasons for the changes in your diet (you just mentioned) in the amounts and types of traditional food you eat?" The questions were translated to Cree and then back-translated to English to assure that their initial meaning was maintained.

Responses were entered into a word processor, arranged into age groups by decade, and examined for common themes in responses. The five general responses to the first question were; 1. a decrease in use of traditional food 2. an increase in use of traditional food 3. no change in use of traditional food 4. no comment and 5. other. The results by decade age groups are shown in table 11.1.

Table 11.1 Percent of women's responses categorized, by age group by response category: open ended questionnaire

What has changed in the amounts and types of traditional food you ate as a young adult?	response: decrease in traditional food	response: increase in traditional food	response: no change	response: no comment	response: other
Age group (n=129)	(%) of responses				
20-29 years (n=26)	31	8	31	26	4
30-39 years (n=23)	52	13	13	17	4
40-49 years (n=30)	33	13	33	3	17 (10 [1]d.k)
50-59 years (n=21)	62	10	14	5	10
60-69 years (n=16)	56	13	13	0	31 (25 [2]b.c)
70-89 years (n=13)	62	0	8	0	31 (15 [3]s.c)

[1] d.k.=do not know

[2] b.c.=big change no direction specified

[3] s.c.=some changes no direction specified

After 50 years of age over 55% of women reported a decrease in traditional food use. In other age groups, one third of the women in the 20-29, and 40-49 age group had

experienced a decrease in traditional food use, while this was 52% in the 30-39 age group.

The responses of increased use of traditional food were a small percentage, in general. The most common reason given (Question 2) was that as young adults, little or no access to traditional food was used. Thus by comparison, any traditional food use was an increase.

The "no change" category was less obvious to conclude on, since reasons given for no change were vague or none were given at all.

The second question generated a variety of different insights for women's observed changes in traditional food use. The majority of responses from the first question described decreased use of traditional food. These reasons were examined more closely. Recurring reasons were narrowed to 11 themes and were formulated into a question used in the second data collection.

During the second data collection respondents were read the statement "Many people feel that the community is using less traditional food now than in the 1940's. Do you agree or disagree with the following reasons why traditional food has decreased for the community". The option to respond "don't know" was also given. The reasons presented included the 11 recurring themes and two additional reasons formulated by the author, these were "people have lost their taste for traditional food" and "people don't like traditional food any more". The two extra questions were designed to provoke negative responses and break the pattern of women responding affirmatively. The responses are summarized in table 11.2.

When examining the responses from all women, a high percentage agreed with the reasons given, in doing so they confirmed the interpretation of the data from the first data collection. The two questions formulated by the author received the lowest percentage of "agree" responses. However, approximately 2/3 of women agreed that "people have lost their taste for traditional food" while less than half agreed that "people do not like traditional food any more". The wording of "people have lost taste for traditional food" was vague and open to different interpretations, much more than "people don't like traditional food any more", which was more direct.

Table 11.2 Reasons for decreased use of traditional food breakdown of "agree", "disagree" and "don't know" responses in percentage of women (n=87)

Reason for decreased use of traditional food	agree (%)	disagree (%)	do not know (%)
Less time spent in the bush	71	5	24
Methylmercury issues/hydro dams	68	6	26
General contamination	69	5	26
Noise due to motors	86	5	9
Forest fires	68	8	24
Easy access to market food	84	8	8
Children prefer eating market food	87	7	6
Problems digesting fat	82	5	14
The hunt is not as great	83	5	13
People do not use traditional cooking methods	82	5	14
Less sharing of traditional food	84	5	12
People have lost taste for traditional food	67	16	17
People do not like traditional food anymore	47	30	23

Table 11.3 shows the responses by age group. In general, the two older age groups responded in similar percentages. The 20-40 age group responded differently, which was evidenced by the proportion of agree and "don't know" responses. A lower percentage of young adults agreed with the reasons given, and a higher percentage responded that they did not know if decreased food use was attributable to the reasons presented.

Seven reasons received greater than 80% of agree responses from all women. The top reason (87%) was "children prefer eating market food". All age groups agreed in similar proportions. The second ranked reason was "noise due to motors scares animals away" (86%). Considering responses by age group, nearly all the women in the middle adult and elder age groups agreed, while only 72% of young adults agreed. Eighty-four percent of women agreed that "easy access to market food" and "less sharing of traditional food" was an explanation for decreased use of traditional food. By age group, all responded in similar proportions to "easy access to market food", but for "less sharing..." nearly all women in the older two age groups agreed, but only 72% of the young adults agreed. Eighty-three percent of all women agreed that "the hunt is not as great", and again nearly all women in the older age groups agreed in similar percentages, while 67% of young adults agreed. Tied at 82% of all women having agreed, were the

Table 11.3 Reasons for decreased use of traditional food
breakdown of responses in percentage of women, by age group

Reason for decreased use of traditional food	Agree			Disagree			Don't know		
	20-40 (%) n=36	41-60 (%) n=33	over 60 (%) n=18	20-40 (%) n=36	41-60 (%) n=33	over 60 (%) n=18	20-40 (%) n=36	41-60 (%) n=33	over 60 (%) n=18
Less time spent in the bush	61	76	83	3	3	11	36	21	6
Methylmercury issues/hydro dams	50	82	78	6	6	6	44	12	17
General contamination	44	85	89	6	3	6	50	12	6
Noise due to motors	72	97	94	6	3	6	22	3	0
Forest fires	39	85	94	8	9	6	53	6	0
Easy access to market food	81	85	89	8	9	6	11	6	6
Children prefer eating market food	83	91	89	14	9	6	3	0	6
Problems digesting fat	78	82	89	6	18	11	17	0	0
The hunt is not as great	67	94	94	6	3	6	28	3	0
People do not use taditional cooking methods	69	94	83	6	6	6	25	0	6
Less sharing of traditional food	72	91	94	6	3	6	22	6	0
People have lost taste for traditional food	53	76	78	19	12	17	28	12	6
People do not like traditional food anymore	31	52	72	33	33	17	36	15	11

reasons "people do not use traditional cooking methods" and "problems with digesting fat". While similar proportions of women across all age groups agreed with "problems digesting fat" however for the statement "...traditional cooking methods" there was the trend for the more mature age groups to agree in higher proportions than the young adults.

The highest percentage of disagree responses were for the reasons that "people have lost their taste for.." and "do not like traditional food anymore". While these two reasons were not derived from initial data collected, it is noteworthy that they were an important focus of opinion.

The proportions of "don't know" responses were highest for the young adult group. The middle adult group had fewer responses in this category and differed little in their "don't know" responses when compared to the elders.

The different pattern of responses observed from the young adult group, in particular the high percentage of "don't know" responses, encouraged a closer look at the characteristics of the reasons offered. To first evaluate then agree or disagree with some of the reasons required experience and knowledge on the traditional way of life. These reasons (called A) included "less time spent in the bush", "less sharing of bush food", "people not using traditional cooking methods", "hunt is not as great", "forest fires", "noise due to motors". These reasons were likely to be better evaluated by the older women. Other reasons (called B) were present situations and conditions that all women could evaluate based on their experience. These reasons were, "easy access to market food", "children prefer eating market food", and "problems digesting fatty food". Then, there were the reasons that were relatively new concepts to all ages in this cultural group (called C) such as "methylmercury issues/hydro dams" and "general contamination". Following from this view, it was observed that the young adult age group either agreed or disagreed with the three "B" reasons and gave "don't know" responses less often. For the "A" and "C" reasons, the "don't know" response proportion were comparatively higher.

The two "C" type reasons had higher proportions of "don't know" responses for the older age groups but not for the "A" and "B" types. This was not surprising, assuming that women with more experience and knowledge would be more sure in their responses

to "A" and "B" but less sure for the reasons carrying relatively new concepts of methylmercury, hydro dams etc..

When asked if the respondent thought that the community should use more traditional food 78% of all women agreed, 2% disagreed and 20% didn't know (table 11.4). Respondents were asked to comment on which traditional food in particular they felt the community should use more. Responses are in table 11.5. Not everyone commented, and some women gave more than one comment. The most common comment was that all kinds of traditional food should be eaten. Of a specific type of food that the community should eat more, fish received the most mentions. Of interest was that reasons given to eat more traditional food were "market food cost money" and "traditional food is better". Others offered that the community should eat more traditional food, provided "it is not contaminated" and "it is not scarce". There was a mention that "especially elders need traditional food" which was a common theme expressed with respect to sharing traditional food in previous work with the Cree (Delormier, 1993).

From these data it was apparent that a significant proportion of women believed that a variety of reasons are accountable for decreased use of traditional food. There were differences in the strength of opinion expressed by age group, judging by the number of "don't know" responses given, especially by the younger groups. It is important to note that elders are known and sought out for their knowledge and experience and traditional ways. "The elders will give you as much [information] as they can, they welcome you any time(I.M.)". It is possible that younger adults would not feel comfortable giving opinions of such things as changes in the traditional diet if they felt that elders would know better. In any case there were differences in the strength of opinions held by different age groups, on the topic of changing diets.

Table 11.4 Responses to the question; "Do you think the community should use more traditional food?" responses by all women, by age group

	all women	20-40 years	41-60 years	over 60 years
		n=36	n=33	n=18
	%	%	%	%
agree	78	64	88	89
disagree	2	0	3	6
don't know	20	36	9	6

Table 11.5 Number of comments offered from all women on the "Which traditional food in particular?" (Should people eat more of)

comment	number
more of all kinds of trad. food	32
more fish	12
more birds	6
more animals	3
rabbit	7
moose	3
caribou	2
partridge	2
goose	2
beaver	2
berries	3
market food cost money	5
traditional food is better	5
if it is not contaminated	3
if it is not scarce	1
especially elders need trad. food	1
fish doesn't taste good	1
animals are scarce since the dams	1

VI. SUMMARY AND CONCLUSIONS

Energy and nutrient intakes in this study were found to be similar to diets previously reported for sub-arctic and arctic women. Energy intakes were suspect to underreporting. Protein and iron intakes were adequate judging the large proportion of women who met and exceeded the Recommended Nutrient Intake levels. Calcium intakes were a concern for inadequate intake since 44% of women reported intakes of less than 50% of recommended levels. Micronutrients, such as vitamin C and vitamin A, have been a concern for inadequate intake previously and need to be assessed in order to evaluate nutrient adequacy more completely.

Food sources of energy, iron, protein and fat demonstrated that traditional food sources were important contributors of these nutrients. Market sources of these nutrients were more numerous and stable across seasons. Fat intake was high (37% of energy) among young adults and middle adults; these two age groups obtained the majority of fat from market sources. Elders' fat intake was acceptable, and they tended to obtain more fat from traditional sources, although the main source was market food. Future nutrition education efforts related to fat should focus on the contribution of total fat from market food with special attention to women from 20 to 60 years of age.

Age differences in traditional and market food use were found to exist between young adults compared to middle adults and elders. However the middle adult age group tended to use traditional food more frequently, while the elders consumed more traditional food when differences in energy and food intake were accounted for.

There were seasonal differences in the amount of traditional food consumed and food species consumed. It is possible that these differences contributed to the differences observed in seasonal nutrient intakes patterns. However this could not be determined from the present investigation.

The diets in bush camps were likely to be different from diets consumed in the community. However, due to the small number of women at summer fishing camps and the delayed departure by residents for winter bush camps this study was not able to determine dietary differences. The attempt to examine potential differences underscored

the importance for a separate approach to appropriately consider factors affecting food use unique to the bush diet.

Women's perceptions on causes for changing use of traditional food in the community were influenced by the experience and knowledge one held on these topics. In general all women tended to agree on reasons for decreased use of traditional food and that the community should use more traditional food. The strength of opinions differed among age groups. Younger generations responded neutrally more often than elders. Elders, recognized by the community as experts in traditional ways, expressed their opinion, and expanded on their opinion with comments, more often.

Areas for further research

1. Future studies of dietary evaluation with adults, in particular adult women, should emphasize the validation of energy intake assessed by the 24 hour recall. Future dietary evaluation could apply the probability approach to nutrient evaluation with respect to recommended levels of intake.

2. Assessing and collecting anthropometric data together with dietary information could enhance the understanding of reported energy intakes. Further to this, examining diets of specific groups, such as women who are frequent consumers of traditional food (as assessed by food frequency data), or women who spent extended periods of time in the bush, could expand information on patterns of traditional food use.

3. Due to the unique nature of diets consumed in bush camp settings, a separate approach to examine bush camp diets should be developed.

4. Explanations for observed differences in seasonal nutrient intakes should be addressed, particularly in light of the fact that almost all dietary investigation with the Cree to date have taken place during the summer.

5. The database for nutrient composition needs to be improved for traditional foods of the James Bay Cree, especially for food consumed by an important part of the population. Food items should reflect the food preparation and cooking methods applied by the Cree.

VII. REFERENCES

Adelson, N. Being Alive Well: Indigenous belief as opposition among the Whapmagoostui Cree. Unpublished Ph.D. thesis, McGill University, 1992.

Appavoo, D. Lipids and Toxaphene in the food system of the Sahtú (Hareskin) Dene-Metis. Unpublished M.Sc. Thesis, McGill University, 1990.

Appavoo, D.M., Kubow, S., Kuhnlein, H.V. Lipid composition of Indigenous foods eaten by Sahtú (Hareskin) Dene-Metis of the Northwest Territories. J. Food Comp. Anal. 4:107-119, 1991.

Beaton, G.H. Uses and limitations of the use of the Recommended Dietary Allowances for evaluating dietary intake data. Am. J. Clin. Nutr. 41:155-164, 1985.

Berg, B.L. Qualitative research methods for the Social Sciences. Allyn and Bacon: Toronto, 1989.

Bernard, L. and Lavallée, C. Eating habits of Cree schoolchildren: a pilot study. Community Health Department, Montreal General Hospital, 1993.

Bernard, L., Lavallée, C., Gray-Donald, K., Delisle, H. Overweight in Cree schoolchildren and adolescents associated with diet, low physical activity, and high television viewing. J. Am. Diet. Assoc. 95:800-802, 1995.

Bingham, S.A. and Nelson, M. Assessment of food consumption and nutrient intake. In: Margetts, B.M., Nelson, M., eds. Design concepts in Nutritional Epidemiology. Oxford University Press: New York, 1991.

Black, A.E., Prentice, A.M., Goldberg, G.R., Jebb, S.A., Bingham, S.A., Livingstone, B.E., Coward, W.A. Measurements of total energy expenditure provide insights into the validity of dietary measures of energy intake. J. Am. Diet. Assoc. 93(5):572-579, 1993.

Blum, L., Pelto, P., Pelto, G., Kuhnlein, H.V. Community assessment of natural food sources of vitamin A: guidelines for ethnographic studies. International Nutrition Foundation for Developing Countries, 1995 (in press).

Bobbish-Atkinson, H. Who are the Cree and where did they come from? In: Bobbish-Atkinson, H., Magonet, G. eds. The James Bay Experience: a guide for health professionals working among the Crees of Northern Quebec. Dept. of Health and Social Services, Communications Branch, Quebec, 1990.

Bogdan, R. Personal documents and unstructured interviewing. In: Introduction to qualitative research methods: a phenomenological approach to the social sciences. Wiley: New York, 1975.

Cameron, M.E., Van Staveren, W.A. Manual on methodology for food consumption studies. Oxford University Press: New York, 1988.

Campbell, M. L., Diamant, R.M.F., Macpherson, B.D., Grunau, M., Halladay, J. Energy and nutrient intakes of men (56-74 years) and women (16-74) in three Northern Manitoba Cree communities. J. Can. Diet. Assoc. 55(4):167-174, 1994.

Campbell, M.L., Diamant, R., Margaret, G., Halladay, J. Surveys in Aboriginal communities: methodological considerations. Can. Home Econ. J. 44(3):118-122, 1994.

Carey, J.M. Linking qualitative and quantitative methods: integrating cultural factors in public health. Quantitative Health Research 3(3):298-318, 1993.

Caron, H. and Belanger, S. Évaluation du programme de surveillance de l'exposition au mercure méthylique auprès de la population Crie de la Baie James. Version préliminaire du rapport analytique, 1992.

Cassidy, C.M. Walk a mile in my shoes: culturally sensitive food-habit research. Am. J. Clin. Nutr. 59(suppl):190S-197S, 1994.

Cole T.J. Sampling, study size, and power. In: Margetts, B.M., Nelson, M. eds. Design concepts in Nutritional Epidemiology.Oxford University Press: New York, 1991.

Cree Trappers Association. Cree Trappers Speak. James Bay Cree Cultural Education Centre, Chisasibi, Quebec, 1989.

Crockett, S.J., Heller, K.E., Merkel, J.M., Peterson, J.M. Assessing beliefs of older rural Americans about nutrition education: use of the focus group approach. J. Am. Diet. Assoc. 90(4):563-567, 1990.

Curtis, J.E., Lambert, R.D. Culture. In: Hagedorn, R. ed. Sociology. 4th ed. Holt, Rinehart and Winston of Canada Ltd.: Toronto, 1990.

Daveluy, C., Lavalleé, C., Clarkson, M., and Robinson, E. A health profile of the Cree: report of the Santé Québec Health Survey of the James Bay Cree 1991. Ministère de la Santé et des Services Sociaux, Government of Québec, 1994.

Dean, A.G., Dean, J.A., Coulombier, D., Brendel, K.A., Smith, D.C., Burton, A.H., Dicker, R.C., Sullivan, K., Fagan. R.F., Arner, T.G. Epi-Info, Version 6: a word-processing, database, and statistics program for epidemiology on microcomputers. Centers for Disease Control and Prevention, Atlanta, Georgia, U.S.A., 1994.

Delormier, T. Traditional food of the James Bay Cree: observations from Chisasibi and Mistissini for summer 1992, McGill University, 1993.

Delormier, T., Kuhnlein, H.V., Mistacheesick, I. Collecting dietary data with the Eastern James Bay Cree - meaningful methods. Paper presented at the 3rd International Conference on Diabetes and Aboriginal Peoples. Winnipeg, Canada,1995.

Farkas, C.S. A discussion and analysis of potential food intake and nutritive value of Waswanipi Cree Indians diet. Prepared for the Grand Council of the Crees, Montreal, 1974 (unpub).

Farkas, C.S., and Berkes, F. Eastern James Bay Cree Indians: changing patterns of wild food use and nutrition. Ecol. Food. Nutr. 7:155-172, 1978.

Feit, H.A. Mistassini hunters of the Boreal Forest: ecosystem dynamics and multiple subsistence patterns. Unpublished Ph.D. thesis, McGill University, 1969.

Gibson, R.S. Principles of Nutritional Assessment. Oxford University Press: New York, 1990.

Girden, E.R. ANOVA repeated measures. Sage: Newbury Park, Ca., 1992.

Health and Welfare Canada. Nutrition Canada Indian Survey. Ottawa, Bureau of Nutritional Sciences, 1975.

Health and Welfare Canada. Nutrition Recommendations: the report of the Scientific Review Committee. Ottawa, Supply and Services, Canada, 1990.

Henderson, D.J., Sampselle, C., Beeton, D. Cross-cultural adaptation of health related quality of life measures: literature review and proposed guidelines. J. Clin. Epidemiol. 46(12):1417-32, 1993.

Hoffer, J., Ruedy, J., Verdier, P. Nutritional Status of Quebec Indians. Am. J. Clin. Nutr. 34:2784-2789, 1981.

James Bay and Northern Quebec Native Harvesting Research Committee. The wealth of the land: wildlife harvests by the James Bay Cree, 1972-73 to 1978-79. James Bay and Northern Quebec Native Harvesting Research Committee, Quebec City, 1982.

Kim, W., Kelsay, J.L., Judd, J.T., Marshall, M.W., Mertz, W., Prather, E.S. Evaluation of long-term dietary intakes of adults consuming self-selected diets. Am. J. Clin. Nutr. 40:1327-1332, 1984.

Kuhnlein, H.V. and Soueida, R. Use and nutrient composition of traditional Baffin Inuit foods. J. Food Comp. Anal. 5:112-126, 1992b.

Kuhnlein, H.V. Benefits and risks of traditional food for Indigenous Peoples: focus on dietary intakes of Arctic men. Can. J. Physiol. Pharmacol. 73:765-771, 1995.

Kuhnlein, H.V. Change in the use of traditional foods by the Nuxalk Native People of British Columbia. Ecol. Food. Nutr. 7:155-172, 1992(a).

Kuhnlein, H.V. Dietary evaluation of food, nutrients, and contaminants in Fort Good Hope and Colville Lake, Northwest Territories, Final Report, 1991.

Kuhnlein, H.V. Factors influencing use of traditional foods among the Nuxalk people. J. Can. Diet. Assoc. 50(2):102-106, 1989a.

Kuhnlein, H.V. Nutritional and toxicological components of Inuit diets in Broughton Island, Northwest Territories. Contract Report, Yellowknife, NWT: Dept of Health, 1989b.

Kuhnlein, H.V. Traditional and contemporary Nuxalk foods. Nutr. Res. 4:789-809, 1984.

Kuhnlein, H.V., Appavoo, D., Morrison, N., Soueida, R., Pierrot, P. Use and nutrient composition of traditional Sahtú (Hareskin) Dene/Métis foods. J. Food Comp. Anal. 7:144-157, 1994.

Kuhnlein, H.V., Receveur, O., Morrison, N.E., Appavoo, D.M., Soueida, R., Pierrot, P. Dietary nutrients of Sahtu Dene/Metis vary by food source, season and age. 1995a (in press).

Kuhnlein, H.V., Soueida, R., Receveur, O. Baffin Inuit food use by age, gender and season. 1995b (in press).

Lavallée, C. and Guyon, L. The Santé Québec Cree and Inuit Surveys, Québec, Canada. Arct. Med. Res. 52:26-29, 1993.

Lessard, M. Coastal fisheries project. Report of the James Bay Mercury Committee, 1993.

Lytle-Trenkner, L. and Achterberg, C.L. Use of focus groups in evaluating nutrition education materials. J. Am. Diet. Assoc. 91(12):1577-1581, 1991.

McCarthy, P.R., Lansing, D. L., Hartman, T.J., Himes, J.H. What works best for worksite cholesterol education? answers from targeted focus groups. J. Am. Diet. Assoc. 92(8):978-980, 1992.

McDowell, M.A., Briefel, R.R., Alaimo, K., Bischof, A., Caughman, C.R., Carroll, M.D., Loria, C.M., Johnson, C.L. Energy and macronutrient intakes of persons ages 2 months and over in the United States: Third National Health and Nutrition Examination Survey, phase 1, 1988-91. Advance Data 255:1-25, 1994.

Mertz, W., Tsui, J.C., Judd, J.T., Reiser, S., Hallfrisch, J., Morris, E.R., Steele, P.D., Lashley, E. What are people really eating? The relation between energy intake derived from estimated diet records and intake determined to maintain body weight. Am. J. Clin. Nutr. 54:291-295, 1991.

Morantz, T. An ethnohistoric study of Eastern James Bay Cree social organization, 1700 - 1850. National Museum of Man Mercury Series. National Museums of Canada, Ottawa, 1983.

Murphy, S. UCB-minilist, University of California, Berkeley, 1989.

National Research Council. Nutrient adequacy: assessment using food consumption surveys. National Academy Press: Washington, D.C., 1986.

Patton, M.Q. Qualitative evaluation and research methods. Sage Publications: Newbury Park, CA, 1990.

Pelto, P.H. and Vargas L.A. Introducton: dietary change and nutrition. Ecol. Food. Nutr. 27:159-161, 1992.

Penn, A. and Weinstein, M. Mercury and the Chisasibi fishery. Report prepared for the Cree Regional Authority. Montreal, 92 p., 1987.

Preston, R.J. East Main Cree. In Sturtevant, W.C. Ed. Handbook of North American Indians, No.6, Subarctic. Smithsonian Institution, Washington, pp.196-206, 1981.

Robinson, E. Health of the James Bay Cree. Community Health Department, Montreal General Hospital, 1985.

Robinson, E.J., Gebre, Y., Pickering, J.L., Petawabano, B., Superville, B., Lavallee, C. Effect of bush living on aboriginal Canadian type II diabetics of the Eastern James Bay Region (unpub), 1994.

Rogers, E.S. The hunting group - hunting territory complex among the Mistassini Indians. National Museum of Canada. Bulletin No.195. Department of Northern Affaires and National Resources, Ottawa, 1963.

Salisbury, R.F. A Homeland for the Cree: Regional Development in James Bay 1971-1981. Queen's University Press: Montreal, 1986.

SAS Institute Inc. SAS/STAT Guide for Personal Computers. 6th ed. SAS Institute Inc.: Cary, NC., 1985.

Schaefer, O. Changing dietary patterns in the Canadian North: health, social and economic consequences. J. Can. Diet. Assoc. 38(1):17-25, 1977.

Scott, C.H. The semiotics of material life among Wemindji Cree hunters. Unpublished M.A. thesis, McGill University, 1983.

Scott, C.H., Feit, H.A. The Income Security Program for Cree Hunters and Trappers: ecological, social and economic effects. McGill University, Montreal, 1992.

Sempos, C.T., Johnson, N.E., Smith, E.L., Gilligan, C. A two-year dietary study of middle-aged women: repeated dietary records as a measure of usual intake. J. Am. Diet. Assoc. 84(9):1008-1013, 1984.

Sevenhuysen, P. and Bogert-O'Brien, L.A. Nutrient intake of women and schoolchildren in Northern Manitoba Native communities. J. Can. Diet. Assoc. 48(2):89-94, 1987.

Stewart, B., Olson, D., Goody, C., Tinsley A., Amos, R., Betts, N., Georgiou, C., Hoerr, S., Ivaturi, R., Voichick, J. Converting focus group data on food choices into a quantitative instrument. J. Nutr. Ed. 26(1):34-36, 1994.

Tanner, A. Bringing home animals; religious ideology and mode of production of Mistassini Cree hunters. University of Toronto Press: Toronto, 1976.

Thouez, J.P., Ekoé, J.M., Foggin, P.M., Verdy, M., Nadeau, M., Laroche, P., Rannou, A., Ghadirian, P. Obesity, hypertension, hyperuricemia and Diabetes Mellitus among the Cree and Inuit of Northern Québec. Arc. Med. Res. 49:180-188, 1990.

Thouez, J.P., Rannou, A., Foggin, P. The other face of development: Native population, health status and indicators of malnutrition - the case of the Cree and Inuit of Northern Quebec. Soc. Sci. Med. 29(8): 965-974, 1989.

Vivian, R.P, McMillan, C., Moore, P.E., Robertson, E.C., Sebrell, W.H., Tisdall, F.F., McIntosh, W.G. The nutrition and health of the James Bay Indian. Can. Med. Assoc. J 59(6):505-518, 1948.

Waldram, J.B. Hydroelectric development and dietary delocalization in Northern Maitoba, Canada. Human Organization. 44(1):41-49, 1985.

Wein, E.E. Nutrient intakes of First Nations Peoples in four Yukon communities. Nutr. Res. 15(8):1105-1119, 1995b.

Wein, E.E., Freeman, M.M.R. Frequency of traditional food use by three Yukon first Nations living in four communities. Arctic 48(2):161-171, 1995a.

Wein, E.E., Freeman, M.M.R. Inuvialuit food use and food preferences in Aklavik, Northwest Territories, Canada. Arct. Med. Res. 51:159-172, 1992.

Wein, E.E., Gee, M.I., Hawrysh, Z.J. Nutrient intakes of Native Mothers and school children in Northern Alberta. J. Can. Diet. Assoc. 54(1):42-47, 1993.

Wein, E.E., Sabry, J.H. and Evers, F.T. Food consumption patterns and use of country foods by Native Canadians near Wood Buffalo National Park, Canada. Arctic 44(3):196-205, 1991a.

Wein, E.E., Sabry, J.H. and Evers, F.T. Nutrient intakes of Native Canadians near Wood Buffalo National Park. Nutr. Res. 11:5-13, 1991b.

Weinstein, M. What the land provides: an examination of the Fort George subsistence economy and the possible consequences on it of the James Bay hydroelectric project. Report of the Fort George resource use and subsistence economy study, Grand Council of Crees of Quebec, Montreal, Quebec, 1976.

Whyte, W.F. Recording, indexing, and evaluating interview data. In: Learning from the field: a guide from experience. Sage: Beverly Hills, Ca., 1984.

Witschi, J.C. Short-Term Dietary Recall and Recording Methods. In: Willett, W. ed. Nutritional Epidemiology. Oxford University Press: New York, 1990.

Young, T.K. Chronic Diseases Among Canadian Indians: towards an epidemiology of culture change. Arc. Med. Res. 47(suppl.):434-441, 1988.

Young, T.K. The Health of Native Americans: towards a biocultural epidemiology. Oxford University Press: New York, 1994.

Young, T.K., Sevenhuysen, G. Obesity in Northern Canadian Indians: patterns, determinants and consequences. Am. J. Clin. Nutr. 49:786-93, 1989.

VIII. APPENDICES

1. Research agreement

CINE
Centre for Nutrition and the Environment of Indigenous Peoples

In concert with Indigenous Peoples, CINE will undertake community-based research and education related to traditional food systems. The empirical knowledge of the environment inherent in indigenous societies will be incorporated in all of its efforts.

Assembly of First Nations
Council for Yukon Indians
Dene Nation
Inuit Circumpolar Conference
Inuit Tapirisat of Canada
Metis Nation of the NWT

Host:
Mohawk Council of Kahnawake
P.O. Box 720
Kahnawake Qc, J0L 1B0

McGill
Macdonald Campus of McGill University

21,111 Lakeshore
Ste-Anne-de-Bellevue, Qc
Canada H9X 3V9

Tel: 514 398-7744
Fax: 514 398-7437

RESEARCH AGREEMENT

"Methods for collecting dietary data from the Eastern James Bay Cree"

The researchers, as named, and the community of Wemindji and agree to conduct the named research project with the following understandings[1]:

1. The purpose of this research project, as discussed with and understood by the participating Cree communities.

- To improve the understanding of how food practices convey different benefits or risks from a nutrients point of view and also culturally and economically.

- To establish a baseline dietary intake against which future dietary studies could be compared to assess changes in food intake.

- To identify food/nutrition related concerns and potential food/nutritional problems in the community.

2. The scope of this research project (that is, what issue, events, or activities are to be involved, and the degree of participation by community residents), as discussed with and understood by Crees in this community, is:

The issues in this project are nutritional and will be addressed through organizational meetings with community members and dietary interviews of a sample of adult women which will be conducted in summer 1994 and in winter 1995 as well.

Community members who will participate as respondents will volunteer approximately one hour to participate in the interview.

---

[1]This agreement follows the guidelines of the Dene/Métis model agreement published in: B. Masuzumi and S. Quirk. A participatory research process for Dene/Métis communities: exploring community-based research concerns for Aboriginal Northerners. Dene Tracking, September 1993.

3. Methods to be used, as agreed by the researchers and the community, are:

Members of the community will be employed by the project to conduct dietary interviews of adult women randomly selected during the summer season. The same women will be able to participate in interviews in the winter season in order to compare seasonal differences.

The dietary interview takes approximately one hour to administer, is confidential and voluntary. Questions are asked about the frequency of traditional food consumption, the dietary intake in the day preceding the interview, and a series of questions on the family and cultural attributes of traditional foods.

4. Community training and participation, as agreed, is to include:

Three community members will attend the training workshop in July, 1994, a 2-day training session in dietary interview methodology.

The interviewers will learn techniques common to any survey's methodology as well as techniques specific to this particular project.

The development of this project is based on sincere communication between community members and researchers. All efforts will be made to incorporate and address local concerns and recommendations at each step of the project.

At the end of the project, the researchers will participate in community meetings to discuss the results of the analysis with community members.

5. Information collected is to be shared, distributed, and stored in these agreed ways:

The data collected is confidential and no name is attached to a record. Copies will be kept at CINE where the data will be converted to an electronic form. The data will be kept on diskettes at the Band office and at CINE. The researchers and CINE will be available to answer questions and assist community members should community members decide to use this data for different purposes, beyond the objectives of this particular project.

A final report will be distributed after approval from the community members.

6. Informed consent of individual participants is to be obtained in these agreed ways.

The consent form (copy attached) will be read by the interviewer to the respondent. A copy of the consent form will be left with the respondent where the addresses of each researcher can be used at any time, should the respondent wish to contact the researchers for additional information.

7. The names of participants and the community are to be protected in these agreed ways:

As mentioned on the consent form, the interviews are confidential. In no instance will the name of a respondent be attached to a record.

8. Project progress will be communicated to the community in these agreed ways:

In summer, 1995, the results of the project conducted during the preceding summer will be presented to participating communities. The researchers will travel to the communities and hold public community meetings to this effect. Similarly, public community meetings will be held in the summer, 1995, in all participating communities to report on the overall project results.

Each researcher will also be available during the course of the project to address particular questions that may arise.

9. Communication with the media and other parties (including funding agencies) outside the named researchers and the community will be handled in these agreed ways:

For any public communication on project progress and findings, the researchers will be aware of their responsibilities and commitments to the welfare of the communities involved.

FUNDING, BENEFITS, & COMMITMENTS

Funding

The main researchers have acquired funding and other forms of support for this research project from:

Cree Board of Health and
Social Services of James Bay
Contact: Richard St. Jean
Chisasibi
(819) 855-2844

National Science and Engineering Research Council
Contact: Dr. Harriet V. Kuhnlein
Centre for Nutrition and the
Environment of Indigenous People
21,111 Lakeshore Rd.
Ste. Anne de Bellevue Qc
H3K 2R7
(514) 398-7544

The funding agency has imposed the following criteria, disclosures, limitations, and reporting responsibilities on the main researchers.

No limitations have been imposed on this project. The researchers must report the project progress to the funding agency twice/year.

Benefits

The main researchers wish to use this research project for benefit in these ways (for instance, by publishing the report and articles about it):

The researchers will publish a final report to the funding agency in 1995. Scientific presentations in peer-reviewed conferences and publications will be made. The final report will be reviewed by community members prior to publication. Scientific presentations and articles engage only the responsibility of the researchers.

Benefits likely to be gained by the community through this research project are:

- Educational
The community researcher, who will work as interviewer, will be trained in conducting surveys.

- Informational
The community at large, by focusing on its dietary practices, will learn about the health and cultural attributes of food practices. The information generated by this project will assist individuals in making informed decisions as to their diets, and food practices. The data generated by this project will be kept in the community, should it be used in the future to address new questions or compare changes in dietary practices.

- Financial
The community member(s) employed as interviewer will be compensated at the rate of $10.00 per completed interview per person.

Commitments

The community's commitment to the researchers is to:

- Recommend capable and reliable community members to collaborate/be employed in this project.

- Keep informed on the project progress, and help in leading the project toward meaningful results.

2. Questionnaire for summer, 1994

EASTERN JAMES BAY CREE
INFORMED CONSENT FORM

The purpose of our work is to find out the kinds and amounts of foods eaten by the people of Wemindji. We will then be able to know how much good nutrition is in the diet of the Cree people here.

At the end of this study the leaders of this project hope to be able to advise the people of Wemindji and the other Cree communities how to keep a healthy diet for their families. A full report will be given to the councils. The researchers will return to the community to do this.

If you would like to help, this interview will take about one hour of your time to answer questions about the food you eat. All information will be confidential and never publicly attached to your name. Number codes will be used on all forms.

This study is being done by McGill University and the Centre for Nutrition and the Environment of Indigenous Peoples with the Cree Regional Authority.

At any time you can refuse to answer any or all of the questions and ask us to leave.

Treena Delormier who is in the community for this study or the (CHR, PHO, band manager) will answer any question you may have about nutrition and this study.

Do we have your permission to begin?

Research Supervisors:

Dr. Harriet V. Kuhnlein
Centre for Nutrition and the
Environment of Indigenous Peoples (CINE)
Macdonald campus, McGill University
21.111 Lakeshore Road
Anne-de-Bellevue, Quebec, H9X 1C0
Tel:(514) 398-7544 Fax:(514) 398-1020

Treena Delormier
CINE
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Tel:(514) 398-7544 Fax:(514) 398-1020

Alan Penn
Cree Regional Authority
Grand Council of Crees of Quebec
1 Place Ville Marie
Montreal, Quebec
H3B 3N6
Tel:(514) 861-5537

David Visitor
Wemindji Band Council
Wemindji Qc
Tel:(819) 978-0265

Denis Cheezo
Eastmain Band Council
Eastmain, Qc
(819) 977-0211

(This copy to be given to the respondent)

Record Form

Do we have your permission to begin? YES NO

If no, reason why not:

_____

_____

_____

Date:_____

Interviewer:_____

Respondent's signature:_____

Respondent's name:_____

House Number:_____

Community:_____

Interviewer, once you gave the copy of the consent form to the respondent, please initial this form:_____(your initials). This means that you have read the consent form to the respondent in a language that the respondent, to the best of your knowledge, understood, and that you have provided the respondent a written copy in English.

COLLECTING DIETARY DATA FOR THE EASTERN JAMES BAY CREE

I. FREQUENCY OF TRADITIONAL FOOD USE

Community:_____ Household Number:_____ Individual Number:_____

Pregnant: YES NO Breastfeeding an Infant: YES NO

Respondent's ID # _____

Age-group: 20-40___ 41-60___ Over 60___

Interviewer's name:_____ Date:_____

Interviewer, please read to the respondent:

This questionnaires concerns traditional food:

Traditional food is food that is coming from the local land and environment (animals, fish, birds, wild plants...)

For the last spring season that is for the months of April - May - June, please recall as exactly as you can, how many days a week you personally ate the following food:

Treena Delormier
Dr. Harriet V. Kuhnlein
CINE McGill
Macdonald Campus
21,111 Lakeshore
Ste-Anne-de-Bellevue, Qc.
H9X 3V9

ID#_____

FISH

	Eaten how many days a week				
Whitefish (atihkimaakw):	6-7	3-5	1-2	<1	never
flesh					
cooked (fresh or frozen)	—	—	—	—	—
smoked/dried	—	—	—	—	—
parts/organs					
liver	—	—	—	—	—
eggs	—	—	—	—	—
other part (name)					
_____	—	—	—	—	—
_____	—	—	—	—	—
Cisco (nuutimiiwaasuu):					
flesh					
cooked (fresh or frozen)	—	—	—	—	—
smoked/dried	—	—	—	—	—
parts/organs					
liver	—	—	—	—	—
eggs	—	—	—	—	—
other part (name)					
_____	—	—	—	—	—
_____	—	—	—	—	—
Speckled Trout (maasimaakuus):					
flesh					
cooked (fresh or frozen)	—	—	—	—	—
smoked/dried	—	—	—	—	—
parts/organs					
liver	—	—	—	—	—
eggs	—	—	—	—	—
other part (name)					
_____	—	—	—	—	—
_____	—	—	—	—	—
Pike (chinushaau):					
flesh					
cooked (fresh or frozen)	—	—	—	—	—
smoked/dried	—	—	—	—	—
parts/organs					
liver	—	—	—	—	—
eggs	—	—	—	—	—
other part (name)					
_____	—	—	—	—	—
_____	—	—	—	—	—

ID#_____

	Eaten how many days a week				
	6-7	3-5	1-2	<1	never
Lake Trout (kuklmaau):					
flesh					
cooked (fresh or frozen)	___	___	___	___	___
smoked/dried	___	___	___	___	___
parts/organs					
liver	___	___	___	___	___
eggs	___	___	___	___	___
other part (name)					
_____	___	___	___	___	___
_____	___	___	___	___	___
Walleye (ukaau)					
flesh					
cooked (fresh or frozen)	___	___	___	___	___
smoked/dried	___	___	___	___	___
parts/organs					
liver	___	___	___	___	___
eggs	___	___	___	___	___
other parts (name)					
_____	___	___	___	___	___
_____	___	___	___	___	___
Other fish: (name/parts/organs)					
_____	___	___	___	___	___
_____	___	___	___	___	___
_____	___	___	___	___	___
_____	___	___	___	___	___
Canada Goose (nisk):					
flesh					
fresh or frozen	___	___	___	___	___
dried (piyaasuumaashtaakw)	___	___	___	___	___
grease (piyaasuupimii)	___	___	___	___	___
head	___	___	___	___	___
wings	___	___	___	___	___
gizzard	___	___	___	___	___
heart	___	___	___	___	___
liver	___	___	___	___	___
organs/parts (name)					
_____	___	___	___	___	___
_____	___	___	___	___	___

ID#_____

	Eaten how many days a week 6-7	3-5	1-2	<1	never
Snow Goose (waahwaau):					
flesh					
fresh or frozen	—	—	—	—	—
dried/smoked	—	—	—	—	—
grease	—	—	—	—	—
other parts/organs (name)					
_____	—	—	—	—	—
_____	—	—	—	—	—
Loon (mwaakw)					
flesh					
fresh or frozen	—	—	—	—	—
dried/smoked	—	—	—	—	—
other parts/organs (name)					
_____	—	—	—	—	—
_____	—	—	—	—	—
Brant (iwaabuwaau)					
flesh					
fresh or frozen	—	—	—	—	—
dried/smoked	—	—	—	—	—
other parts/organs (name)					
_____	—	—	—	—	—
_____	—	—	—	—	—
Black Duck (mikihtaaship):					
flesh					
fresh or frozen	—	—	—	—	—
dried smoked	—	—	—	—	—
other parts/organs (name)					
_____	—	—	—	—	—
_____	—	—	—	—	—
Mallard:					
flesh					
fresh or frozen	—	—	—	—	—
dried smoked	—	—	—	—	—
organs/parts (name)					
_____	—	—	—	—	—
_____	—	—	—	—	—
Other Birds:					
name/parts/organs					
_____	—	—	—	—	—
_____	—	—	—	—	—
_____	—	—	—	—	—

ID#_____

	Eaten how many days a week				
	6-7	3-5	1-2	<1	never
Caribou (adihkw)					
flesh					
fresh or frozen					
other organs/parts (name)					
_____					
_____					
_____					
_____					
_____					
_____					
Moose (muus)					
flesh					
fresh or frozen					
other organs/parts (name)					
_____					
_____					
_____					
_____					
_____					
_____					
Bear (chishaayaakw)					
flesh					
fresh or frozen					
other organs/parts (name)					
_____					
_____					
_____					
_____					
_____					
_____					
Beaver (amiskw)					
flesh					
cooked(fresh or frozen)					
smoked/dried					
parts					
tail					
feet					
other organs/parts (name)					
_____					
_____					
_____					

ID#_____

	Eaten how many days a week 6-7	3-5	1-2	<1	never
Rabbit (waapush):					
flesh					
cooked(fresh or frozen)	—	—	—	—	—
smoked/dried	—	—	—	—	—
other organs/parts (name)					
_____	—	—	—	—	—
_____	—	—	—	—	—
_____	—	—	—	—	—
Porcupine (kaakw):					
flesh					
cooked(fresh or frozen)	—	—	—	—	—
smoked/dried	—	—	—	—	—
other organs/parts					
_____	—	—	—	—	—
_____	—	—	—	—	—
_____	—	—	—	—	—
Muskrat (uchishkw):					
flesh					
cooked(fresh or frozen)	—	—	—	—	—
smoked/dried	—	—	—	—	—
organs/parts					
_____	—	—	—	—	—
_____	—	—	—	—	—
_____	—	—	—	—	—
Marten (waapishtaan):					
flesh					
cooked(fresh or frozen)	—	—	—	—	—
smoked/dried	—	—	—	—	—
organs/parts					
_____	—	—	—	—	—
_____	—	—	—	—	—
_____	—	—	—	—	—
Other animals:					
name/parts					
_____	—	—	—	—	—
_____	—	—	—	—	—
_____	—	—	—	—	—

ID#_____

Plant Food:		Eaten how many days a week				
		6-7	3-5	1-2	<1	never
blueberries	iiyiminh	—	—	—	—	—
strawberries	utaahiiminich	—	—	—	—	—
raspberries	ayuuskinich	—	—	—	—	—
cranberries	wiisichiminh	—	—	—	—	—
bakeapple berries	shikutaauh	—	—	—	—	—
gooseberries	shaapuminich	—	—	—	—	—
Labrador tea						
other (kutihch)						
_____		—	—	—	—	—
_____		—	—	—	—	—
_____		—	—	—	—	—

II. INDIVIDUAL FOOD INTAKE
24-HOUR RECALL

Community:_____ Household Number:_____ Individual Number:_____

Pregnant: YES NO Breastfeeding an infant: YES NO

Respondents ID#_____

Age-group: 20-40___ 41-60___ over 60___

Interviewer's name_____ Date:_____

Interviewer, please read to the respondent:
Please, recall as exactly as possible what you ate yesterday,_____(write which day of the week). from the time you first woke up.

Time	Food Name	How Prepared/Ingredients	Amount

Time	Food Name	How Prepared/Ingredients	Amount

Did you take a vitamin/mineral supplement yesterday? YES NO

Was yesterday a usual day? YES NO

Interviewer did you ask about: lard; milk and sugar in drinks; butter and syrup or jam, alcohol; juice (kind); food eaten away from home (at friends, restaurant, snack bar, school); any other food?

Treena Delormie
Dr. Harriet V. Kuhnlein
CINE, McGill
Macdonald Campus
21,111 Lakeshore
Ste-Anne-de-Bellevue, Qc

COLLECTING DIETARY DATA FOR THE EASTERN JAMES BAY CREE

III. DEMOGRAPHIC INFORMATION

Community:_____ Household Number:_____ Individual Number:_____

Pregnant: YES NO Breastfeeding an Infant: YES NO

Respondent's ID # _____

Age-group:20-40___41-60___Over 60___

Interviewer's name:_____ Date:_____

Interviewer, please read to the respondent:

This questionnaire concerns traditional food: traditional food is food that is coming from the local land and environment (animals. fish. birds. wild plants...)

1. How many people hunt in this household:_____

2. How many people fish in this household:_____

Treena Delormier
Dr.Harriet V. Kuhnlein
CINE. McGill
Macdonald Campus
21.111 Lakeshore
Ste-Anne-de-Bellevue.Qc H9X3V9

3. We would like to know how the amount of time that is spent staying at a camp, in the bush, is related to traditional food use.

Working on the table below with the respondent, record the number of weeks that were spent staying at a camp, in the bush, by the respondent. Start from July 1993 to June 1994. This does not include short (weekend or day) hunting/fishing trips.

Then, record the number of weeks that were spent staying at a camp, in the bush, by the three people who do the most hunting and fishing in this household.

NUMBER OF WEEKS SPENT STAYING AT A CAMP IN THE BUSH

	93						94					
month of the year	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
by the respondent?												
by hunter/fisherman												
by hunter/fisherman												
by hunter/fisherman												

4. For number of short (weekend or day) hunting/fishing trips taken from July 1993 to June 1994 by the respondent and the three people who do the most hunting/fishing, please record this below in the table.

NUMBER OF SHORT (WEEKEND OR DAY) HUNTING/ FISHING TRIPS

year	93						94					
month of the year	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
by the respondent?												
by hunter/fisherman												
by hunter/fisherman												
by hunter/fisherman												

Comments about the time spent in the bush when volunteered by respondent:

5a. What has changed in the amount and types of traditional food you ate since you were a young adult (20 years of age) ?

5b. What are the causes or reasons for the changes in your diet you just mentioned. in the amounts and types of traditional food you eat?

This is the end of the questionnaire.

Thank you for your time and participation.

3. Questionnaire for winter, 1995

EASTERN JAMES BAY CREE
INFORMED CONSENT FORM

The purpose of our work is to find out the kinds and amounts of foods eaten by the people of Wemindji. We will then be able to know how much good nutrition is in the diet of the Cree people here.

At the end of this study the leaders of this project hope to be able to advise the people of Wemindji and the other Cree communities how to keep a healthy diet for their families. A full report will be given to the councils. The researchers will return to the community to do this.

If you would like to help, this interview will take about one hour of your time to answer questions about the food you eat. All information will be confidential and never publicly attached to your name. Number codes will be used on all forms.

This study is being done by McGill University and the Centre for Nutrition and the Environment of Indigenous Peoples with the Cree Regional Authority.

You may stop the interview at anytime, if you do not want to continue.

Treena Delormier who is in the community for this study or David Visitor (Wemindji) or Denis Cheezo (Eastmain) will answer any question you may have about and this study.

Do we have your permission to begin?

Research Supervisors:

Dr. Harriet V. Kuhnlein
Centre for Nutrition and the
Environment of Indigenous Peoples (CINE)
Macdonald campus, McGill University
21,111 Lakeshore Road
Anne-de-Bellevue, Quebec, H9X 1C0
Tel:(514) 398-7544 Fax:(514) 398-1020

David Visitor
Wemindji Band Council
Wemindji Qc
Tel:(819) 978-0265

Treena Delormier
CINE
Macdonald campus, McGill University
21,111 Lakeshore Road
Ste. Anne-de-Bellevue, Quebec, H9X 1C0
Tel:(514) 398-7544 Fax:(514) 398-1020

Denis Cheezo
Eastmain Band Council
Eastmain, Qc
(819) 977-0211

Alan Penn
Cree Regional Authority
Grand Council of Crees of Quebec
1 Place Ville Marie
Montreal, Quebec
H3B 3N6
Tel:(514) 861-5837

(This copy to be given to the respondent)

Record Form

Do we have your permission to begin? YES NO

If no, reason why not:

_____
_____
_____

Date:_____

Interviewer:_____

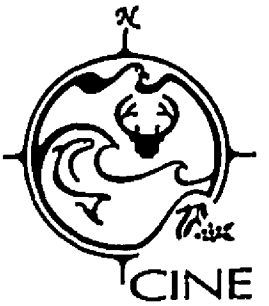
Respondent's signature:_____

Respondent's name:_____

House Number:_____

Community:_____

Interviewer, once you gave the copy of the consent form to the respondent, please initial this form:_____(your initials). This means that you have read the consent form to the respondent in a language that the respondent, to the best of your knowledge, understood, and that you have provided the respondent a written copy in English.



COLLECTING DIETARY DATA FOR THE EASTERN JAMES BAY CREE

I. FREQUENCY OF TRADITIONAL FOOD USE

Community:_____ Household Number:_____ Individual Number:_____

Pregnant: YES NO Breastfeeding an Infant: YES NO

Respondent's ID # _____ Interview done in bush camp: YES NO

Age-group: 20-40___ 41-60___ Over 60___ Date of Birth: / /

Interviewer's name:_____ Date:_____

Interviewer, please read to the respondent:

This questionnaires concerns traditional food:

Traditional food is food that is coming from the local land and environment (animals, fish, birds, wild plants...)

For the last autumn/fall season that is for the months of October-November-December, please recall as exactly as you can, how many days a week you personally ate the following food:

Treena Delormier
Dr. Harriet V. Kuhnlein
CINE McGill
Macdonald Campus
21,111 Lakeshore
Ste-Anne-de-Bellevue, Qc.
H9X 3V9
January 1995

ID#_____

FISH

	Eaten how many days a week				
Whitefish (atihkimaakw): Yes No	6-7	3-5	1-2	<1	never
flesh					
cooked (fresh or frozen)	___	___	___	___	___
smoked/dried	___	___	___	___	___
parts/organs					
guts	___	___	___	___	___
eggs	___	___	___	___	___
other part (name)					
_____	___	___	___	___	___
_____	___	___	___	___	___
Cisco (nuutimiiwaasuu): Yes No					
flesh					
cooked (fresh or frozen)	___	___	___	___	___
smoked/dried	___	___	___	___	___
parts/organs					
guts	___	___	___	___	___
eggs	___	___	___	___	___
other part (name)					
_____	___	___	___	___	___
_____	___	___	___	___	___
Speckled Trout (maasimaakuus): Yes No					
flesh					
cooked (fresh or frozen)	___	___	___	___	___
smoked/dried	___	___	___	___	___
parts/organs					
guts	___	___	___	___	___
eggs	___	___	___	___	___
other part (name)					
_____	___	___	___	___	___
_____	___	___	___	___	___
Pike (chinushaau): Yes No					
flesh					
cooked (fresh or frozen)	___	___	___	___	___
smoked/dried	___	___	___	___	___
parts/organs					
guts	___	___	___	___	___
eggs	___	___	___	___	___
other part (name)					
_____	___	___	___	___	___
_____	___	___	___	___	___

ID#_____

	Eaten how many days a week 6-7	3-5	1-2	<1	never
Lake Trout (kuklmaau): Yes No					
flesh					
cooked (fresh or frozen)	—	—	—	—	—
smoked/dried	—	—	—	—	—
parts/organs					
guts	—	—	—	—	—
eggs	—	—	—	—	—
other part (name)					
_____	—	—	—	—	—
_____	—	—	—	—	—
Other fish: (name/parts/organs)					
_____	—	—	—	—	—
_____	—	—	—	—	—
_____	—	—	—	—	—
_____	—	—	—	—	—
Canada Goose (nisk): Yes No					
flesh					
fresh or frozen	—	—	—	—	—
dried (piyaasuumaashtaakw)	—	—	—	—	—
salted goose	—	—	—	—	—
grease (piyaasuupimii)	—	—	—	—	—
head	—	—	—	—	—
wings	—	—	—	—	—
feet	—	—	—	—	—
gizzard	—	—	—	—	—
heart	—	—	—	—	—
liver	—	—	—	—	—
intestine	—	—	—	—	—
organs/parts (name)					
_____	—	—	—	—	—
_____	—	—	—	—	—
Snow Goose (waahwaau): Yes No					
flesh					
fresh or frozen	—	—	—	—	—
dried/smoked	—	—	—	—	—
grease	—	—	—	—	—
other parts/organs (name)					
_____	—	—	—	—	—
_____	—	—	—	—	—
_____	—	—	—	—	—

ID#_____

	Eaten how many days a week				
	6-7	3-5	1-2	<1	never

Brant (iwaabuwaau): Yes No

flesh					
fresh or frozen	___	___	___	___	___
dried/smoked	___	___	___	___	___
other parts/organs (name)					
_____	___	___	___	___	___
_____	___	___	___	___	___

Black Duck (mikihtaaship): Yes No

flesh					
fresh or frozen	___	___	___	___	___
dried smoked	___	___	___	___	___
other parts/organs (name)					
_____	___	___	___	___	___
_____	___	___	___	___	___

Mallard: (mikihtaaship): Yes No

flesh					
fresh or frozen	___	___	___	___	___
dried smoked	___	___	___	___	___
organs/parts (name)					
_____	___	___	___	___	___
_____	___	___	___	___	___

Pintail Duck: (uminikw): Yes No

flesh					
fresh or frozen	___	___	___	___	___
dried smoked	___	___	___	___	___
organs/parts (name)					
_____	___	___	___	___	___
_____	___	___	___	___	___

Ptarmigan: (waapihyaau): Yes No

flesh					
fresh or frozen	___	___	___	___	___
dried smoked	___	___	___	___	___
organs/parts (name)					
_____	___	___	___	___	___
_____	___	___	___	___	___

ID#_____

	Eaten how many days a week				
	6-7	3-5	1-2	<1	never

Partridge: (piyaau): Yes No

flesh					
fresh or frozen	___	___	___	___	___
dried smoked	___	___	___	___	___
organs/parts (name)					
_____	___	___	___	___	___
_____	___	___	___	___	___

Spruce Grouse: (mishtikuhyaau): Yes No

flesh					
fresh or frozen	___	___	___	___	___
dried smoked	___	___	___	___	___
gizzard	___	___	___	___	___
heart	___	___	___	___	___
organs/parts (name)					
_____	___	___	___	___	___
_____	___	___	___	___	___

Other Birds: Yes No

name/parts/organs					
_____	___	___	___	___	___
_____	___	___	___	___	___
_____	___	___	___	___	___

Caribou (adihkw): Yes No

flesh					
fresh or frozen	___	___	___	___	___
marrow	___	___	___	___	___
intestine	___	___	___	___	___
other organs/parts (name)					
_____	___	___	___	___	___
_____	___	___	___	___	___
_____	___	___	___	___	___
_____	___	___	___	___	___
_____	___	___	___	___	___
_____	___	___	___	___	___

ID#_____

	Eaten how many days a week				
	6-7	3-5	1-2	<1	never
Moose (muus): Yes No					
flesh					
fresh or frozen	___	___	___	___	___
marrow	___	___	___	___	___
intestine	___	___	___	___	___
other organs/parts (name)					
_____	___	___	___	___	___
_____	___	___	___	___	___
_____	___	___	___	___	___
_____	___	___	___	___	___
_____	___	___	___	___	___
_____	___	___	___	___	___
Bear (chishaayaakw): Yes No					
flesh					
fresh or frozen	___	___	___	___	___
parts					
liver	___	___	___	___	___
intestines	___	___	___	___	___
hands/feet	___	___	___	___	___
other organs/parts (name)					
_____	___	___	___	___	___
_____	___	___	___	___	___
_____	___	___	___	___	___
_____	___	___	___	___	___
_____	___	___	___	___	___
_____	___	___	___	___	___
Beaver (amiskw): Yes No					
flesh					
cooked(fresh or frozen)	___	___	___	___	___
smoked/dried	___	___	___	___	___
parts					
tail	___	___	___	___	___
feet	___	___	___	___	___
liver	___	___	___	___	___
intestine	___	___	___	___	___
other organs/parts (name)					
_____	___	___	___	___	___
_____	___	___	___	___	___
_____	___	___	___	___	___

ID#_____

	Yes	No	Eaten how many days a week 6-7	3-5	1-2	<1	never
Rabbit (waapush):							
flesh							
cooked(fresh or frozen)			___	___	___	___	___
smoked/dried			___	___	___	___	___
other organs/parts (name)							
_____			___	___	___	___	___
_____			___	___	___	___	___
_____			___	___	___	___	___
Porcupine (kaakw):							
flesh							
cooked(fresh or frozen)			___	___	___	___	___
smoked/dried			___	___	___	___	___
other organs/parts							
_____			___	___	___	___	___
_____			___	___	___	___	___
_____			___	___	___	___	___
Muskrat (uchishkw):							
flesh							
cooked(fresh or frozen)			___	___	___	___	___
other organs/parts							
_____			___	___	___	___	___
Lynx (bishuu):							
flesh							
cooked(fresh or frozen)			___	___	___	___	___
other organs/parts							
_____			___	___	___	___	___
Other animals:							
name/parts							
_____			___	___	___	___	___
_____			___	___	___	___	___
_____			___	___	___	___	___

ID#_____

Plant Food:	Yes No	Eaten how many days a week: 6-7	3-5	1-2	<1	never
blueberries	iiyiminh					
strawberries	utaahiiminich					
raspberries	ayuuskinich					
cranberries	wiisichiminh					
bakeapple berries	shikutaauh					
gooseberries	shaapuminich					
Labrador tea	kaachaapukw					
other (kutihch)						
_____						
_____						
_____						

COLLECTING DIETARY DATA FOR THE EASTERN JAMES BAY CREE

II. INDIVIDUAL FOOD INTAKE 24-HOUR RECALL

Community:_____ Household Number:_____ Individual Number:_____

Pregnant: YES NO Breastfeeding an infant: YES NO

Respondents ID#_____ Interview done in bush camp: YES NO

Age-group: 20-40____ 41-60____ over 60____ Date of Birth: / /

Interviewer's name_____ Date:_____

Interviewer, please read to the respondent:
Please, recall as exactly as possible what you ate yesterday,_____(write which day of the week), from the time you first woke up.

Time	Food Name	How Prepared/Ingredients	Amount

Time	Food Name	How Prepared/Ingredients	Amount

Did you take a vitamin/mineral supplement yesterday? YES NO

Was yesterday a usual day? YES NO

Interviewer did you ask about: lard; milk and sugar in drinks; butter, margarine (especially the quantity) and syrup or jam, alcohol; juice (kind); food eaten away from home (at friends, restaurant, snack bar, school); any other food?

Treena Delormier
Dr. Harriet V. Kuhnlein
CINE, McGill
Macdonald Campus
21,111 Lakeshore
Ste-Anne-de-Bellevue, Qc
H9X 3V9
January 1995

COLLECTING DIETARY DATA FOR THE EASTERN JAMES BAY CREE

III. HUNTING INFORMATION

Community:_____ Household Number:_____ Individual Number:_____

Pregnant: YES NO Breastfeeding an Infant: YES NO

Respondent's ID # _____ Interview done in bush camp: YES NO

Age-group:20-40____41-60____Over 60____ Date of Birth: / /

Interviewer's name:_____ Date:_____

Interviewer, please read to the respondent:

This questionnaire concerns traditional food: traditional food is food that is coming from the local land and environment (animals, fish, birds, wild plants...)

1. How many people hunt in this household:_____

2. How many people fish in this household:_____

Treena Delormier
Dr.Harriet V. Kuhnlein
CINE, McGill
Macdonald Campus
21,111 Lakeshore
Ste-Anne-de-Bellevue,Qc H9X3V9
January 1995

3. We would like to know how the amount of time that is spent staying at a camp, in the bush, is related to traditional food use.

Working on the table below with the respondent, record the number of weeks that were spent staying at a camp, in the bush, by the respondent. Start from July 1994 to Dec 1994. This does not include short (1, 2 or 3 days) hunting/fishing trips.

Then, record the number of weeks that were spent staying at a camp, in the bush, by the three people who do the most hunting and fishing in this household.

NUMBER OF WEEKS SPENT STAYING AT A CAMP IN THE BUSH

year	94					
month of the year	Jul	Aug	Sep	Oct	Nov	Dec
by the respondent?						
by hunter/fishers						
by hunter/fishers						
by hunter/fishers						

Comments:_____

_____

_____

4. For number of short (1, 2 or 3 day) hunting/fishing trips taken from July 1994 to December 1994 by the respondent and the three people who do the most hunting/fishing, please record this below in the table. Note: you are recording the number of short trips. (more than a three day trip should be considered as 1 week).

NUMBER OF SHORT (WEEKEND OR DAY) HUNTING/ FISHING TRIPS

year	94					
month of the year	Jul	Aug	Sep	Oct	Nov	Dec
by the respondent?						
by hunter/fishers						
by hunter/fishers						
by hunter/fishers						

Comments:_____

_____

_____

5. Many people feel that the community is using less traditional food now than since the 1940's.
Do you agree or disagree with the following reasons why traditional food has decreased for the community.

	agree	disagree	don't know
1. less time spent in the bush	o	o	o
2. concerns for dams/mercury issues	o	o	o
3. concerns for general contamination	o	o	o
4. noise pollution (noise from motors, planes, snowmobile etc.)affects wildlife	o	o	o
5. too many forest fires	o	o	o
6. easy access to store bought food	o	o	o
7. children prefer eating store bought food	o	o	o
8. some people have difficulty digesting fatty food	o	o	o
9. animals/birds/fish are scarce ie. hunt is not as great.	o	o	o
10. people do not use traditional cooking methods as much these days	o	o	o
11. there is less sharing of traditional food	o	o	o
12. people lose their taste for traditional food when they are away a lot	o	o	o
13. people don't like traditional food anymore	o	o	o

Are there other reasons that were not mentioned here? If yes, please add them here.

_____

_____

_____

_____

6. Do you think the community should use more traditional food?

agree o disagree o don't know o

Which foods in particular? (animals? birds? fish? plants?)

Interviewer, please remember to write down any comments.

7. Traditional food is healthy food. Apart from being good food what does it mean to you as EEYOU (Cree) to have your traditional food to eat.

This is the end of the questionnaire. Thank you for your time and participation.

4. Table of published nutrient values for Cree traditional food

Table of published nutrient values for Cree traditional foods

part 1 (4 pages)

foodname	refer	moisture	protein	CHO	fat	PUFA	SFA	energy	Fe	Zn	Cu	Ca	P	Mg	Na	K	vit A
	ence	(g)	(g)	(g)	(g)	(g)	(g)	(kcal)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	RE
beaver, meat, raw	b	71	24.05	0	4.8	0		146	6.9			15	237	25	51	348	
beaver, meat, flesh	q	69.95	26.8	0	4.8								237				270
beaver, meat, roasted	b	67.01	27.33	0	5.45			166	7.84			17	229	23	46	316	
beaver, meat, roasted	c	56.1	29.12	0	13.62			248									
muskrat, meat, raw	b	69.35	20.76		8.1			162				25	220	22	82	276	
muskrat, meat, roasted	b	65.17	23.59	0	9.2			184				28	212	20	75	251	
muskrat, meat, roasted	c	67.71	27.36	0	4.12			153									
rabbit, cooked stewed	b	61.37	32.02	0	3.51			173	4.85			18	240	31	45	343	
rabbit, wild, raw	b	74.51	21.79	0	2.32			114	3.2			12	226	29	50	378	
hare, raw	k	73.3	23.8		2.7			148									
average hare, wild	d	73.3	21.6	0	3.01			124	2.4			9.05	220		50	400	
game meat, bear, cooked	b	53.55	32.42	0	13.39			259	10.73			5	170				
game, meat, bear raw	b	71.2	20.1	0	8.3			161	6.65			3	151				
american black bear, flesh	q	71.2	20.1		8.3				7.2				162				260
caribou, meat, roasted	b	62.43	29.77	0	4.42	0.62	1.7	167	6.17	5.26	0.263	22	233	27	60	310	
caribou, meat, raw	b	71.45	22.63	0	3.36	0.47	1.29	127	4.69	4	0.222	17	208	[illegible]	57	295	
caribou, meat, boiled	q	70.3	23.9		4.7												
caribou, meat, dried	g	28	42	0	30			451	5.5			23				23	
caribou, liver	q	71.4	15	6.8	5.9				15.7			4	282				28800IU
caribou, stomach, contents, raw	q	78.3	5.1	12.3	2.2				5.8			47	209				3400IU
caribou, stomach, contents, raw	g	82.3	4.4		1.1			89	5.5			46.7					340
moose, meat, roasted	b	67.83	29.27	0	0.97	0.31	0.29	134	4.22	3.68	0.079	6	176	24	69	334	
moose, meat, raw	b	75.55	22.24		0.74	0.24	0.22	102	3.21	2.8	0.07	5	158	23	65	317	
moose, meat, flesh	q	73.1	24.5		1.85				5			12	214				310IU
moose, liver	q	73.5			4.3								429				96000IU
polar bear meat	k	73.2	23.8		2.6			148									
polar, bear, meat	s	76.5	21.3	1.2	1	0.2	0.3	100.6	2			7			80		50
polar bear, flesh	q								5.9								
polar bear meat, boiled	g	72	25	0	3			135	0			15					0
bearded seal, meat	k	71.8	26.4		1.2			150									
bearde seal meat, middle fat	s	66	24	0	10	2.3	1.7	188.3	10			10			80		130ug

foodname	refer	moisture	protein	CHO	fat	PUFA	SFA	energy	Fe	Zn	Cu	Ca	P	Mg	Na	K	vit A
	ence	(g)	(g)	(g)	(g)	(g)	(g)	(kcal)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	RE
bearded seal, liver	k	72.3	22.8		2.1			161									
bearded seal, liver	s	69.8	23.3	2	4.9	1	1.9	147	20			20			80		120000ug
ringed seal, meat	k	67.2	30.7		0.9			178									
ringed seal, meat lean	s	73.3	21.7		5	1.2	0.9	133.6	10			26			80		100ug
ringed seal liver	k	70.8	23.9		2.9			167									
ringed seal, liver	s	63.1	28.5	2	6.4	1.3	2.5	182	20			26			80		7000ug
white whale	k	69	27		4.1			173									
blueberries	g	85	tr	15	tr			62	1.3			15					10
blueberries	c	84.6	0.7	14.1	0.4			57	0.17	11	0.607	6.2	10.3	4.8	6.2	88.9	10.3
blueberries	i	85	0.7	14	tr	0	0	56	0.2			60			6	89	9.8
blackberries	g	86	1	13	tr			58	0.92			31					20
blackberries	c	85.7	0.7	12.7	0.4			51	0.57	0.27	0.14	31.9	21	19	0	196	16.6
blackberries	i	86	0.7	12.5	tr	0	0	52	0.6			32.2			0	196	16
currants, black	g	88	tr	12	tr			54	1			60					60
currant, red, white	g	88	tr	12	tr			50	1			32					12
dandelion root	s	92	2	6	0	0	0	32.5	0.5			30			5		0
dandelion leaves	s	92.5	2.8	4	0.7	0.2	0.1	40	0.5			100			5		5ug
dandelions	j																800-14000IU
fireweed, young leaves	g	89.7	3.4	6.9	tr			50	1.7			13.8					572
fireweed	j																18708IU
lamb's quarter, raw	g	88.4	4.3	6.7	0.6			43	1.2			309					1159
lamb's quarters																	1160IU
lamb's quarters cooked	g	91.3	3.7	5	tr			32	0.6			257					969
mountain sorrel	j																8900IU
rosebud	j																4106IU
rosehip	s	96.5	2.1	1	0.4	0.2	0.1	16	0.5			70			5		300ug
scurvy grass	j																4546IU
violate leaves	j																8258IU
willow leaves	j																18300IU
cloud berry	g	89.4	2	8.6	tr			51	0.7			18					21
cloud berry	j																210-235 IU

foodname	refer	moisture	protein	CHO	fat	PUFA	SFA	energy	Fe	Zn	Cu	Ca	P	Mg	Na	K	Vit A
	ence	(g)	(g)	(g)	(g)	(g)	(g)	(kcal)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	RE
Canada goose	q								5.6				312				
Snow goose	k	70	24.1		6.1			178									
average goose	d	52.4	15.7	0	31			364	1.9	1.3	0.33	12	184	23	86	420	65ug
goose with skin roasted	c	52	25.2	0	21.9	2.5	6.9	305	2.83		0.264	13	270		70	329	21
goose without skin roasted	c	57.2	29	0	12.7	1.5	4.6	238	2.87		0.276	14	309	25	76	388	
mallard	k	71	24.3		3.6			164									
pintail	k	71	23.8		2.9			167									
white winged scoter roasted	q	78.6	20.2	0	0.4							8	164				280IU
average duck	d	63.7	18.1	0	17.2			243		2.1	0.45	11	187			292	
duck with skin	c	51.8	19	0	28.4	3.7	9.7	337	2.7	1.86	0.227	11	156	16	59	204	63
duck without skin roasted	c	64.2	23.5	0	11.2	1.4	4.2	201	2.7	2.6	0.231	12	203	20	65	252	23
willow ptarmigan	k	70.3	26.5		2.1			161									
willow ptarmigan, breast muscle	q	71.5	24.8	0	2.5				6.2				268				420
lake whitefish raw	a	72.77	19.09	0	5.86	2.15	0.91	134	0.37	0.99	0.072			33	51	317	
lake whitefish raw	m				5.2	1.54	0.86										
lake whitefish, raw	k	72.4	22.7		4.9			153									
lake whitefish, raw	q	71	12.2		15.3				0.2				257				541U
whitefish, mixed species, smoked	a	7.83	23.4	0	0.93	0.29	0.23	106	0.5	0.49	0.315	18	132	23	1019	423	57
lake whitefish flesh, air dried	q								0.9			65	844				730IU
lakewhitefish liver	q	76.1							8.6				297				1510IU
lake whitefish, head	q	76.3	18.6		3.6				3.9				242				
cisco flesh, raw	m				2.5	0.76	0.58										
cisco flesh raw	a	78.93	18.99	0	1.91	0.613	0.421	98		0.37				55			354
cisco smoked	a	69.8	16.36	0	11.9	2.27	1.74	177	0.49	0.3	0.215	26	150	17	481	293	
lake trout flesh	k	75.4	22.4		2.1	126											
char	s	75.4	20	0	4.6	1.12	1.5	123	0.7			20			55		12ug
char smoked	s	66.8	25	0	8.2	2.2	2.6	176	0.9			25			2800		15ug
arctic char flesh raw	l	68.2	24.5		7.7				1.8	0.8	0.08	34	284	26	95	394	
arctic char flesh canned	r	64.2	25.6	0	8.2			176				15	0.368				
northern pike flesh	q	76.3	0		1.1				0.6				253				
northern pike flesh, air dried	q								0.9				623				140IU
northern pike flesh, cooked dry heat	a	72.97	24.69	0	0.88	0.259	0.151	113	0.71	0.86	0.065	73	282		49	331	24

foodname	refer	moisture	protein	CHO	fat	PUFA	SFA	energy	Fe	Zn	Cu	Ca	P	Mg	Na	K	vit A
	ence	(g)	(g)	(g)	(g)	(g)	(g)	(kcal)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	(mg)	RE
northern pike flesh, raw	a	78.29	19.26		0.69	0.202	0.118	88	0.55	0.67	0.51	57	220		39	259	21
northern pike flesh, raw	d	79.6	18.4	0	0.85			89	1.05	1.1	47	20	192	25	63	250	15ug
northern pike flesh, raw	m				0.9		0.16										
burbot flesh raw	m				1.2		0.26										
burbot flesh raw	a	79.26	19.31	0	0.81	0.297	0.163	90	0.9	0.76	0.2	50	200	32	97	404	
walleye fish raw	a	79.31	19.14	0	1.22	0.447	0.249	93	1.3	0.62	0.178	110	210	30	51	389	

Table of published values for Cree traditional foods

part II (4 pages)

foodname	ref	vit C (mg)	thiamine (mg)	riboflavin (mg)	niacin (mg)	pantothenic acid (mg)	vit B6 (mg)	folacin mg	vit B12 ug
beaver, meat, raw	b	2	0.06	0.22	190				
beaver, meat, flesh	q		0.05	1.4	1.9				
beaver, meat, roasted	b	2	0.04	0.24	1.73				
beaver, meat, roasted	c		0.08	0.38					
muskrat, meat, raw	b	5	0.09	0.52	6.2				
muskrat, meat, roasted	b	6	0.06	0.56	5.64				
muskrat, meat, roasted	c		0.16	0.21					
rabbit, cooked stewed	b		0.02	0.07	6.4				
rabbit, wild, raw	b		0.03	0.06	6.5				
hare, raw	k								
average hare, wild	d		0.09	0.06	8.07	0.8	0.3	5	1
game meat, bear, cooked	b		0.1	0.82	3.35				
game, meat, bear raw	b		0.16	0.68	3.2				
american black bear, flesh	q		0.16	0.68	3.2				
caribou, meat, roasted	b	3	0.25	0.9	5.79	2.68	0.32	5	6.64
caribou, meat raw	b	3	0.32	0.72	5.5	2.55	0.37	4	6.31
caribou, meat, boiled	q								
caribou, meat, dried	g		1.1	1.1	19.8				
caribou, liver	q								
caribou, stomach, contents, raw	q		0.01	0.29	1.9				
caribou, stomach, contents, raw	g		0.01	0.29	2.9				
moose, meat, roasted	b	5	0.05	0.34	5.26				
moose, meat, raw	b	4	0.06	0.27	5				
moose, meat, flesh	q		0.09	0.18					
moose, liver	q								
polar bear meat	k								
polar, bear, meat	s	4	50	200					
polar bear, flesh	q								
polar bear meat, boiled	g	4	0	12.87	5.6				
bearded seal, meat	k								
beardo seal meat, middle fat	s	0	150	480					

foodname	ref	vit C (mg)	thiamine (mg)	riboflavin (mg)	niacin (mg)	pantothenic acid (mg)	vit B6 (mg)	folacin mg	vit B12 ug
bearded seal, liver	k								
bearded seal, liver	s	20	260	2450					
ringed seal, meat	k								
ringed seal, meat lean	s	0	150	480					
ringed seal liver	k								
ringed seal, liver	s	20	440	3000					
white whale	k								
blueberries	g	14	0.04	0.06	0.5				
blueberries	c								
blueberries	i	13	0.05	0.05	0.4				
blackberries	g	21	0.03	0.04	0.04			6.5	
blackberries	c								
blackberries	i	21	0.03	0.04	0.5			34	
currants, black	g	200	0.04	0.04	0.2				
currant, red, white	g	42	0.04	0.06	1				
dandelion root	s								
dandelion leaves	s								
dandelions	j	30-66							
fireweed, young leaves	g	98	0.03	0.84	1.72				
fireweed,	j	220							
lambsquarter, raw	g	79.9	0.16	0.44	1.2				
lambsquarter, cooked	g	36.5	0.09	0.25	0.85				
lambsquarter cooked	g								
mountain sorrel	j	40							
roseroot	j	68							
roseroot	s								
scurvy grass	j	111							
violate leaves	j	210							
willow leaves	j	190							
cloud berry	g	58	0.05	0.07	0.9				
cloud berry	j	158-147							

foodname	ref	vit C (mg)	thiamine (mg)	riboflavin (mg)	niacin (mg)	pantothenic acid (mg)	vit B6 (mg)	folacin mg	vit B12 ug
Canada goose	q		0.28	0.46	9.3	acid (mg)			
Snow goose	k								
average goose	d		0.12	0.26	6.4		0.58	4	
goose with skin roasted	c		0.08	0.32	4.2		0.37	2	
goose without skin roasted	c		0.09	0.39	4.1		0.47		
mallard	k								
pintail	k								
white winged scoter roasted	q								
average duck	d		0.3	0.2	3.5				
duck with skin	c		0.17	0.27	4.8	1.1	0.18	6	30
duck without skin roasted	c		0.26	0.47	5.1	1.5	0.25	10	0.4
willow ptarmigan	k								
willow ptarmigan, breast muscle	q		0.25	1					
lake whitefish raw	a								
lake whitefish raw	m								
lake whitefish, raw	k								
lake whitefish, raw	q		0.11	0.13					
whitefish, mixed species, smoked	a		0.03	0.1	2.4	0.1	0.39	7.3	3.26
lake whitefish flesh, air dried	q			0.14	10.3				
lakewhitefish liver	q		0.18	0.54	2.7				
lake whitefish, head	q								
cisco flesh, raw	m								
cisco flesh raw	a								
cisco smoked	a		0.46	0.159	2.31	0.308	0.268	2.1	4.26
lake trout flesh	k								
char	s	1	100	140					
char smoked	s	1	0.25	175					
arctic char flesh raw	l	0.48	0.35	0.34		1.94	0.33	13.3	7.79
arctic char flesh canned	r		0.09	0.83	4.5				
northern pike flesh	q								
northern pike flesh, air dried	q		0.11	0.33	12				
northern pike flesh, cooked dry heat	a	3.8	0.067	0.077			0.135		

foodname	ref	vit C (mg)	thiamine (mg)	riboflavin (mg)	niacin (mg)	pantothenic acid (mg)	vit B6 (mg)	folacin mg	vit B12 ug
northern pike flesh, raw	a	3.8	0.058	0.063			0.117		
northern pike flesh, raw	d	0.085	0.055	1.6			1.5		
northern pike flesh, raw	m								
burbot flesh raw	m								
burbot flesh raw	a								
walleye fish raw	a								

REFERENCES

The following are the references used to construct the table of nutrient composition values for Cree traditional food. The letter beside the references, corresponds to the letter on the table, in the reference column.

b) United States Department of Agriculture, Human Nutrition Information Services. Composition of Foods: lamb, veal, and game products, raw, processed, prepared. 1989.

c) Bowes and Church's Food Values of Portions Commonly Used. 15th ed. J.B. Lippencott, 1989.

d) Souci, S.W., Fachmann, W., Kraut, H. Food Composition and Nutrition Tables. Wissenschaftliche Verlagsgesellschaft, Stuttgart. 1989/90.

g) Health and Welfare Canada. Native Foods and Nutrition. Medical Services Branch, Canada, 1985.

i) Health and Welfare Canada. Nutrient Value of some common Foods. Minister of Supply and Services, Canada, 1987.

j) Farkas, C.S., Feit, H. A discussion and analysis of potential food intake and nutritive value of Waswanipi Cree Indian diets. Unpublished manuscript, Grand Council of Crees (of Quebec), Montreal, 1974.

k) Farmer, F., Neilson, H. The caloric values of meats and fish of Northern Canada. J. Can. Diet. Assoc. 69: 243-248,1976.

l) Hoppner, K., Nutrient levels of some foods of Eskimos from Arctic Bay, N.W.T.,Canada. J. Can. Diet. Assoc. 73: 257-261, 1978.

m) Exler, J., Weinrauch, J.L. Comprehensive evaluation of fatty acids in foods. J. Am. Diet. Assoc. 69:243-248, 1976.

q) Heller, C.A., Scott, E.M. The Alaska dietary survey, 1956-1961. U.S. Government Printing Office,Washington, D.C., 1967.

r) Farmer, F., Neilson, H. The nutritive value of canned meat and fish from Northern Canada. J. Can. Diet. Assoc. 31: 102-110, 1970.

s) Helms, P. Food table of Greenlandic food products. Hygiejnisk, Aarhus Universitet, 1985.