

FOOD PATTERNS, SHOPPING HABITS AND FOOD BELIEFS
OF INDIAN FAMILIES ON SELECTED ISOLATED
AND NON-ISOLATED RESERVES IN
BRITISH COLUMBIA

by

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ABSTRACT

Recent reports indicate that the nutritional status of native Indians is poorer than that of the general population. The culture of native Canadians is currently in a state of transition, with many factors affecting traditional life patterns, producing rapid changes in lifestyles. The present study was undertaken in order to gain fuller understanding of those problems related to food intake and the influence of social and cultural factors.

By use of a 24-hour recall, the nutrient content of diets of 144 individuals living at three reserves adjacent to urban centres was compared with diets of 105 individuals at four relatively isolated Indian reserves. Interviews were conducted with 92 women from the seven reserves and information regarding food beliefs, shopping habits, meal planning, food practices, as well as selected socio-economic and family variables, was collected. In addition, data on food prices and foods available in local stores was gathered.

Analysis of nutrient intake data showed that low intakes were frequent for calories, calcium, iron and vitamin C. Low caloric intakes were observed for adolescents and most adults, regardless of reserve location. Calcium intakes were lowest on isolated reserves, while iron status was

poorest in non-isolated communities. Vitamin C intakes on isolated reserves were considerably lower than on non-isolated reserves.

Rank correlation coefficients using Kendall's tau beta demonstrated that several independent variables were related to the dependent variable, food practices of the female household head. These included the location of the reserve, education of respondents, the women's attitudes toward nutrition, household size, and the level reached on the household facilities scale. The most significant factor related to food consumption was isolation ($p < .001$), with diets in urban areas being more adequate than those in rural areas.

Overall food selection was poorest in isolated reserves, notably Babine and Fort Ware. The items most often in short supply were dairy products, fresh meats and fresh fruits and vegetables. Food costs were also highest in the most isolated reserves.

It was concluded that food practices of native Indians are poorer at isolated reserves than at those adjacent to urban centres. Indications are that this is a consequence of the interaction of a number of factors: high food prices, poor selection, unemployment, inadequate housing and household facilities, depleting natural food resources, a lack of food/nutrition information, as well as a lack of involvement in health-related programmes.

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TABLE OF CONTENTS

	Page
ABSTRACT	ii
ACKNOWLEDGEMENTS	iv
LIST OF TABLES	vii
LIST OF FIGURES	x
 Chapter	
I INTRODUCTION	1
II REVIEW OF THE LITERATURE	7
Pricing and food buying practices	7
Food ideology and beliefs	13
Food habits of native Indians	18
III MATERIALS AND METHODS	24
Population and Sample	24
Description of Reserves	28
Description of Sample Population	45
Data Collection and Analysis	51
1. Questionnaire	51
2. Food practices	53
3. Food pricing and food availability	55
Statistical Analysis	56
IV RESULTS	60
Food patterns	60
A. Analysis of nutrient intake data	60
B. Food frequencies	81
Food ideology	90
A. Food beliefs of homemakers	90
B. Food beliefs as related to pregnancy, lactation, infancy and illness	92
Shopping practices	97
Meal planning and preparation	104
Food practices of homemakers	113
A. Food scores	113
B. Relationship between food practices and selected variables	117

Chapter	Page
Food pricing and food availability	123
V DISCUSSION AND IMPLICATIONS	126
VI SUMMARY AND CONCLUSIONS	149
BIBLIOGRAPHY	154
APPENDICES	
A. Questionnaire	165
B. Scoring system for food practice test	176
C. Food list used for food pricing and food availability	178
D. Table VII-3: Daily nutrient intakes of all children and adolescents compared to median intakes of the Nutrition Canada Survey	183
Table VII-4: Daily nutrient intakes of all adults compared to median intakes of the Nutrition Canada Survey	184
Table IX-2 to IX-7: Percentage contributions of food groups to calories and nutrients for each age and sex category	185
Legend to Appendix E	191
E. Raw Data — Individual nutrient values calculated from 24-hour dietary recalls for subjects from the seven reserves	192

LIST OF TABLES

		Page
Table		
I	Indian reserves in British Columbia involved in the study.....	27
II	Age distribution of sample population	46
III	Household characteristics of sample population.....	47
IV	Education level attained by family heads of household.....	49
V	Occupation of household heads.....	50
VI	Distribution of family income.....	51
VII-1	Daily nutrient intakes of children and adolescents from isolated and non-isolated reserves.....	61
VII-2	Daily nutrient intakes of adults from isolated and non-isolated reserves.....	62
VIII	Number of individuals, by age and sex, with daily nutrient intakes less than two-thirds of the Canadian Dietary Standards.....	63
IX-1	Percentage contribution of food groups to calories and nutrients (all ages).	64
X	Frequency of consumption of specific food items by isolation.....	82
XI-1	Sample daily menus, taken from dietary recall forms collected on "isolated reserves".....	88

Table

XI-2	Sample daily menus, taken from dietary recall forms collected on "non-isolated" reserves.....	89
XII	Number of women who listed a food group as important in the diet and gave a valid nutritional reason for its importance.....	91
XIII	Percentage of women indicating specific foods as beneficial or harmful during pregnancy.....	93
XIV	Percentage of women indicating specific foods as beneficial or harmful during lactation.....	94
XV	Percentage of women indicating specific foods as beneficial or harmful during infancy.....	95
XVI	Percentage of women indicating specific foods as beneficial or harmful during illness.....	96
XVII	Type of store where majority of food shopping is done.....	98
XVIII	Reasons for selecting store.....	99
XIX	Frequency of shopping for major and minor food purchases.....	99
XX	Person who does majority of food shopping.....	101
XXI	Food-shopping requests of children..	101
XXII	Frequency of selected shopping practices.....	102
XXIII	Distribution of monthly food expenditure.....	103

Table

XXIV	Changes in food buying with increasing food prices.....	104
XXV	Factors identified by respondents as influencing foods purchased.....	105
XXVI	Person who does majority of cooking....	106
XXVII	Use of and frequency of meal plans.....	107
XXVIII	Household facilities.....	107
XXIX	Food and cooking education of respondents.....	108
XXX	Sources of nutrition information identified by respondents.....	109
XXXI	Use of vitamin and mineral supplements.	111
XXXII	Traditional food patterns.....	112
XXXIII	Food practice scores achieved by respondents.....	114
XXXIV	Food scores of respondents based on major food groups.....	115
XXXV	Inter-relationship between food groups and food practices.....	117
XXXVI	Multiple range test of mean scores for food practices with respect to reserve.....	118
XXXVII	Relationship of dependent variables and food practice scores.....	119
XXXVIII	Interrelationship between variables....	121
XXXIX	Food availability at selected communities.....	124
XL	Cost of 30 food items in selected communities relative to the cost of these items in Vancouver.....	125

LIST OF FIGURES

Figure		Page
1.	British Columbia Indian Reserves involved in the study.....	25
2.	Non-isolated and isolated mean intakes of calories.....	65
3.	Non-isolated and isolated mean intakes of proteins.....	67
4.	Non-isolated and isolated mean intakes of calcium.....	69
5.	Non-isolated and isolated mean intakes of iron.....	71
6.	Non-isolated and isolated mean intakes of Vitamin A.....	73
7.	Non-isolated and isolated mean intakes of thiamin.....	75
8.	Non-isolated and isolated mean intakes of riboflavin.....	76
9.	Non-isolated and isolated mean intakes of niacin.....	78
10.	Non-isolated and isolated mean intakes of Vitamin C.....	80

CHAPTER I

INTRODUCTION

The existence of problems of malnutrition among various groups within the Canadian population was confirmed recently by the Nutrition Canada Survey (1973). The most striking problem identified by the survey was that of obesity, with about half of the Canadian adult population being overweight. While nutritional inadequacies were found throughout the general population, a higher proportion of deficiencies was apparent among native Indians. In the Indian population, dietary and biochemical assessment showed poor iron, calcium, folate and vitamin A status. Vitamin C nutriture, as indicated by low serum ascorbic acid levels, was also found to be inadequate, particularly in remote areas. These results were in agreement with previous reports dealing with the native Indian population (Lee et al, 1970; Dong and Feeny, 1967; Pett, 1950).

The poor nutritional status of Indians revealed by Nutrition Canada is a part of the overall inferior health conditions that exist among native Indians (Butler, 1975; Stanbury, 1975). The average age at death of Indians in British Columbia, for example, is forty-four years as compared to seventy-two years for all British Columbians.

The death rate from accidents and violence, largely associated with alcohol, is almost three times the provincial rate. The infant mortality rate, although decreasing rapidly, is still three times the rate for non-Indians. Inadequate maternal nutrition and poor sanitation are thought to be largely responsible (Stanbury, 1975). On a per capita basis, Indians use twice the number of hospital days as do non-Indians. Dental surveys conducted by Medical Services indicate that the dental health of natives is worse than that of the Provincial population as a whole (Foulkes, 1973). The 1973 Foulkes Report criticized these conditions:

"The health of the native peoples of this Province, both 'status' and 'non status' is such that it is a manifestation of social injustice so great that its correction demands the highest priority."

The nutritional problems experienced by the Indian people may be in part explained by their poverty and thus by their inability to obtain the foods necessary for a proper diet. They may also lack basic information about the foods required for good health, a problem shared by the general population. The situation of native Indians is made more complex, however, because their culture is in a state of transition. In recent years a number of factors have combined to affect traditional life patterns and produce rapid changes in lifestyle. Increased industrialization has led to increased mobility, and the degree of isolation

for many reserves has decreased. While the interaction with white centres is minimal for some, the majority of reserves are in close proximity to non-Indian settlements. A small number are, in fact, physically integrated with larger white urban centres.

Closer contact with the white culture undoubtedly has affected food resources and eating habits. Indications are that traditional food practices based on fishing, hunting, and gathering have greatly diminished (Smith, 1975; Lee et al, 1971; Schaefer, 1977). The extent to which families make use of game, fish and berries varies with the season and locality. Many families now depend on local grocery stores for their food supply. It is possible that such changes in food habits are impairing the quality of diets. In some areas native Indians are faced with an increased availability of non-traditional foods, including fast or convenience foods, processed foods and beverages, current food fads — all of which may lead to new dietary problems.

In more remote areas communities are frequently handicapped by higher food prices and a poor selection of nutritious foods. A study in the Northwest Territories (Stiles, 1971) showed that stores in isolated communities stocked about 125 items on the shelves as compared to 8,000 in a large urban supermarket. Prices in predominantly Indian centres ranged from 30 to 45 percent higher than city

prices. The concern that our food distribution system may not be operating effectively throughout the population was expressed recently by the Food Prices Review Board (1975), who recommended that:

"In particular, further study should be done about the special needs and interests of specific groups, such as our native population, persons living in remote, isolated or rural areas"

As such, there is a need for consumer and nutrition education to better equip native Indians to deal with these conditions. To be effective, however, nutrition education must be presented in a way that will motivate people to accept and use nutrition information. In developing effective programmes, nutritionists must first understand the life patterns of the people they want to reach. We must know the attitudes, beliefs and 'whys' of food behaviour, identifying positive dietary habits and working within that framework.

Recently, many researchers studying food habits have called for a broader ecological approach (Mead, 1965; Sanjur and Scoma, 1971; Sims et al, 1972). They stress that a study of dietary habits should not only deal with actual diets, but should investigate the total environment in which these habits occur. Mead (1965) has commented on the urgent need for a frame-of-reference for the subject of food habits. She suggests a multidimensional code for describing and recording a people's dietary pattern. Within the proposed code, food habits could be described from

different standpoints: in physiological-sensory terms, in chemical terms, in nutritional terms, in cultural terms, etc. Within the context of Mead's ideas, Sanjur and Scoma (1971) developed a model, using four specific dimensions to collect and assess food habits data:

- in food consumption terms
- in food preference terms
- in food ideology terms
- in socio-cultural terms

The code allows for a description of food habits from different standpoints, collecting information to provide a base for the development of effective nutrition education methods.

Few studies have analyzed the food habits of Canadian Indians in a socio-cultural context. Most studies have been limited to an examination of nutrient intake. The quality and quantity of the several nutrients supplied by different food patterns is measured against existing standards. Such an approach ignores the meanings and significances which underlie food behaviour. Thus there is a need for a study using a socio-cultural approach to gather information that would be helpful in the development of a nutrition education programme to deal with present dietary problems of B.C. Indians.

The main purpose of this research project was to learn more about the food habits of Indian families living at selected isolated and non-isolated reserves in British

Columbia, and to investigate the relationship of food practices to certain socio-cultural characteristics of the families, especially the female head of household. The specific objectives of the study were:

- 1) To compare diets of B.C. Indians living on isolated reserves with those on non-isolated reserves in terms of nutrient content. The sources of nine major nutrients in the diet as provided by eight selected food groups was also determined.
- 2) To investigate the relationship between the food practices of the female head of household and the family's socio-economic variables. Descriptive information regarding certain characteristics of cultural dietary patterns such as food ideology, purchasing habits, meal time practices, food beliefs, etc., which may determine or are highly associated with ultimate food behaviour, was collected.
- 3) To determine the selection and price of foods available in local stores.

The study sample consisted of 92 native Indian families living on reserves in British Columbia. Seven reserves varying in population from 100 to 550 were selected, with an equal representation of families from isolated and non-isolated reserves. Personal interviews were conducted with the female head of household to obtain information related to food practices, shopping habits and meal preparation.

CHAPTER II

REVIEW OF THE LITERATURE

Pricing and food buying practices

Few studies in Canada have attempted to deal with good purchasing practices of families and with the factors which motivate food selection. Generally, food-buying and food expenditures are considered as part of larger studies of consumer spending. Our food market is rapidly changing, with food becoming more and more costly. Between 1969 and 1974 for example, food costs as measured by the Consumer Price Index rose 52% and the overall cost of living by 36% (Food Prices Review Board, 1975). In addition, new foods and food analogs are being created, while other foods are being enriched, fortified or processed. With the changing consumer food market, individuals now require considerable more expertise to ensure that proper foods are purchased.

Concern with findings of the Nutrition Canada Survey, together with rapidly rising food costs led to the formation of a government agency, the Food Prices Review Board, to monitor food costs in Canada. Studies by the Board determined that most Canadians pay more for food than they need for a nutritious diet (Food Prices Review Board, 1975). Their investigations revealed that while 'a reference 4-person urban family' could purchase a basic nutritious diet for

approximately \$2,000 annually, most families spent \$2,900 a year. The report claimed that although most four-person families in the country can afford a nutritious diet, an estimated 9% of the 1.1 million four-person families in Canada cannot. Although these families were not identified, the report gave recognition to specific groups, notably the elderly, native Indians and those living in isolated communities who face their own unique food purchasing problems, and recommended further study with respect to these groups.

Individuals in remote or isolated communities must frequently contend with poor shopping facilities, as well as a limited selection of goods and high prices. Many of these problems are a result of high transportation costs, limited volume of sales, and inaccessability to suppliers, which result in high expenses for shopkeepers. These costs, in turn, are passed on to the consumer.

On native Indian reserves, problems may be compounded further, as illustrated in a survey in the Fort Smith Region of the Northwest Territories (Stiles, 1970). In that study both White and Indian residents were interviewed and groceries in stores in 9 communities were priced, with the cost of similar items in Edmonton used as a reference point. Comparisons showed that while food costs in predominantly white ("other") centres were within 20 to 25% of Edmonton prices, the price of groceries in smaller Indian

communities were 30 to 45% higher. Indian families with an average income of \$4,500 spent \$178 per month on food, or 48% of their income compared to 21% (\$185 per month) for 'other' families with annual incomes of \$9,000. Many Indians, however, harvested food from the land and although no estimate was made of the relative contribution of these collected foods, they did provide some assistance in bridging the gap between employment, income and food costs. The study report recommended that:

"The Government of the Northwest Territories should subsidize transportation cost for foods, as well as storage costs and the interest costs on capital investment in foods in isolated areas".

The higher cost of food on native reserves has been documented by other investigators. In another study Lee et al (1970) reported that native residents at the coastal reserve of Ahousat, British Columbia shopped for groceries at a local store or in the nearby town of Tofino. Food costs at the local store were about 30% higher than in Victoria, while prices at Tofino were only 10% higher. At the inland reserve of Anaham the authors surveyed grocery prices in six stores in nearby towns. Prices were recorded as 13.6% and 18.6% higher than the larger nearby centre of Williams Lake, where costs were less than one percent higher than Vancouver. At both reserves, income was low, but many families collected and preserved foods, managing fairly well, as judged by nutritional adequacy of the diet.

Lack of transportation often prevents many Indian families from shopping in neighbourhood non-Indian community supermarkets where prices are lower than on reserves (Bass and Wakefield, 1974). They are thus restricted to local stores where prices are high and supplies limited.

Whether or not the poor pay more for food than those of higher incomes has been the subject of a number of studies in the U.S. Myers (1970) claims that the poor consumer is held back by a lack of time, place, quality, amount and method of purchase. Immediate needs often overrule budget plans or shopping during weekly 'specials'; a lack of transportation forces them to shop in more costly local stores; they are not able to take advantage of bulk buying.

The types of grocery stores in many low-income areas are limited. Dixon and McLaughlin (1968) concluded that low-income residents in the "inner city" of Philadelphia bought most of their food in small neighbourhood stores and thus incurred increased cost. Prices in stores located in poverty and non-poverty areas in Omaha, Nebraska were examined by Captain (1969). He found no significant differences between the average food prices in the two income areas when the same foods and types of stores were compared. Few large chain stores, however, were found in low-income areas. Regardless of location, prices in small neighbourhood stores were higher than in large supermarkets. The small independent stores also tended to carry smaller quantity units of goods which

were more expensive. Captain concluded that low-income families pay more for food because of the kinds of stores patronized and unit sizes purchased.

The investigations of Goodman (1968), however, contradicted these observations. In interviews with 520 low-income families, the majority of whom were black, he found that 92% of the respondents went outside of their neighbourhoods to purchase the bulk of their groceries. Eighty-one percent shopped at supermarkets while 8% used competitively priced, moderate-sized stores. Families used small local stores mainly for "fill-in" and emergency shopping. Over half of the respondents believed that prices at supermarkets were lower, and so made special effort to go outside their neighbourhood to shop at these stores. Goodman claimed that because families were aware of price differences and shopped competitively, they did not pay more for their food than did high-income families. Goodman noted the limitation of this study in that those individuals with incomes below \$4,000 were not adequately represented.

While income is undoubtedly an important factor in food selection, other factors also exert an influence on food buying practices. Various studies have shown the relationship between food marketing practices of the homemaker and education (Bishop, 1965), nutrition or food-buying knowledge (Mize, 1962; Hammett and Blackstone, 1964a, 1964b;

Lamkin, 1970; Fusillo and Belsian, 1977), age (Stubbs, 1961; Dickins, 1965; Hammett and Blackstone, 1964b; Bishop, 1965), employment status (Dickins, 1961; Metheny et al, 1962b), race (Dickins, 1961, 1962; Larson, 1968), exposure to food information sources (Bishop, 1965; Hammett, 1968; Dickins, 1962a; Stubbs, 1961) and family members (Casper and Wakefield, 1975; Lamkin, 1978; Metheny, 1962; Dickins, 1962a, 1963; Van de Mark, 1962).

Bishop (1965) found that among a sample of 1,915 Virginia homemakers, younger women over 20 were more willing than those over 60 to try new products. Older homemakers had more established food-buying and meal-preparation patterns and were not as easily influenced by food information and advertisements. In general, women were most influenced by advertisements in newspapers. Other influencing factors included label information, recipes in cookbooks, requests of family members, and magazine articles on food. Increase education was also related to willingness to try new foods. Similar observations were made by Hammett and Blackstone (1964b) in a study of 1,654 Alabama homemakers. They observed that use of various food information sources was closely related to age, income, and education. Women under 30 or over 60 years of age showed greater economic concerns, and responded less to outside influences.

Employment of women outside the home can affect food selection. Metheny et al, (1962) interviewed 93 mothers of

preschool children in a comprehensive study of childrens food patterns and family influences. Among mothers who reported a recent change in family food practices, 15%, who were newly employed, reported purchase of foods that can be prepared more quickly. Dickins (1961) compared changes in marketing practices among urban and rural employed homemakers. Urban families were found to purchase more meat, fish, poultry, fruits and vegetables than rural families. They were also less traditional in their food patterns and more likely to use new foods (i.e. fruit juices, instant coffee, frozen meat pies, canned biscuits). Families of rural employed women were shifting from home production of foods to purchased foods.

Mize (1962) examining food marketing practices of 1,000 Georgian homemakers, identified four determinants in food purchasing. One-third of the women were concerned with cost, while about one-fifth each were influenced by family preferences, the application of food and nutrition knowledge, and innovation in food preparation practices (use of new products). Cost was a greater concern to low-income families (\$2,000 - \$3,000), while those with more than a \$5,000 annual income were more influenced by family preferences.

Food Ideology and Beliefs

Many investigators have stressed the importance of attitudes toward food and suggested that effective nutrition education programmes must be based on a knowledge of food patterns and attitudes. Food habits are generally realized

to be one of the most deeply rooted aspects of culture. Within their cultural framework individuals learn which foods are proper, and associate emotional feelings, together with taste, with them (Cassell, 1965). It is essential that dietary patterns be viewed in the context of cultural ideologies. Cooper (1966) defines ideology as "an individuals outlook on self and society". Food ideology would then be the person's way of thinking about food as part of his life pattern (Giffit, 1970).

Beliefs (along with attitudes and values) are components of ideology systems. According to Cooper (1966) beliefs are "attitudes which incorporate a large amount of cognitive structuring". They may be founded on cultural learning, reasoning, observation, factual information, or the authority of a credible source (Giffit, 1970). Beliefs provide individuals with the means of orientating themselves in their environment in ways that are gratifying (Goodenough, 1963). They function in relation to human purpose as:

1. a basis of action.
2. instruments of social purpose.
3. a means of emotional gratification (Goodenough, 1963).

According to Sanjur (1974) beliefs, together with customs, taboos, and prejudices "enter as value orientation affecting diet and nutrition".

The relationship between food ideology and nutritional status has not been widely investigated. One area that is

well documented, however, is the effect of the Latin American "hot-cold" theory of food ideology and disease etiology. (Sanjur et al, 1970a, 1970b, 1972, 1974; Ahmed and Van Veen, 1968). In one such study in a small Mexican village Sanjur et al (1970) studied the effect of this belief system on the feeding pattern of young children. The authors observed that the traditional concepts of health and disease are linked to food beliefs, and in general almost any degree of illness leads to the withdrawal of part of the child's food intake.

Among Puerto Rican and Mexican-American families, food beliefs were found to be linked to cultural variants of this "hot-cold" theory. In a study of low-income Puerto Rican families in New York, Sanjur (1974) found that diseases were grouped into 'hot' and 'cold' classifications, while food and medications were classified as 'hot', 'cold', or 'cool'. Sixty-two percent of the mothers studied withheld food from sick children, most frequently eggs and milk, and during illnesses such as fever, measles, cold and diarrhea.

Attitudinal factors, as they relate to the total pattern of food intake and lifestyles were investigated as part of a nutritional survey on the island of St. Vincent in the Caribbean (Beaudry - Darisme et al, 1972). Data were collected from 200 households in two villages and one suburban area. In examining the knowledge and attitudes towards the consumption of different foods women were asked to list foods they

considered as being 'good' or 'bad' during infancy, pregnancy, and lactation. Respondents generally gave traditional or non-specific reasons for feeling a particular food was good or bad at a particular life stage. It appeared to the authors that:

"Habits and practices relating to food consumption and avoidance are an integral part of the local culture pattern and that most women's behaviour is conditioned by environmental factors interrelated with the traditional way of life".

Food beliefs of Mexican-American women in the post-partum period were reported by Bailey (1970). Foods considered harmful to the mother and child at this time include; hot chili peppers, pickles, vinegar (or food prepared with vinegar), tomatoes, spinach, pork, and most fruit. Beneficial foods which contribute to lactation and rich milk are: chicken, toasted tortillas and bread, eggs, milk, cooked cereal, chocolates and meats other than pork.

The relation of nutritional beliefs and practices to several ecological variables was studied by Jalso et al (1965) among 340 subjects in New York State. The authors assessed beliefs in a nutritional opinions questionnaire, while food practices were measured by means of another questionnaire which tested use of food supplements, "health" foods, methods of weight control, special diets, and food avoidances. They found a high positive correlation between nutritional opinions scores and food practice scores, which suggested that the

subjects beliefs were reflected in their dietary practices.

A study of 600 urban slum youth between the ages of 14 and 21, in 8 Columbian cities showed that social and cultural factors were more significant than economic factors in influencing dietary intake (Walter, 1973). Of 13 variables studied, the youths attitude toward his actual diet was the most influential factor. Youths who rated their diets as "good" or "very good" had better diets or a better food quality index (FQI).

Pearson's (1972) study of nutrition opinions as they relate to health practices among a nationwide sample of 2,893 American adults, however, indicated that practices are not always supported by specific beliefs. While the majority of respondents believed that vitamin and mineral supplementation give more pep and energy and keep one healthy, only 20% were using vitamin pills. Similarly, more than half of the respondents believed in the merits of "health foods", but only 15% indicated that they ate or avoided particular foods because of their beliefs about food healthfulness.

Schaefer (1969) has stressed that attitudes towards food ought to be given prime consideration and measures to combat malnutrition must be based on food patterns and attitudes related to foods. In developing countries the introduction of high protein plant foods has not always been well accepted. According to Schaeffer (1969) a general increase in agricultural production alone cannot alleviate malnutrition,

but rather "a selective increase in the production of food products preferred by the people as registered by their attitudes". This selective approach must be coupled with an educational program to increase the public's acceptance and consumption of a wide range of foods.

Food Habits of Native Indians

In general there is a scarcity of studies on the food habits and nutritional status of Canadian Indians. Until the Nutrition Canada Survey in 1972, much of the information regarding native Indian dietary habits was based on studies carried out in Manitoba, Saskatchewan and Ontario several decades ago. (Moore et al, 1946; Corrigan, 1946; Nicholls, 1946; Vivian et al, 1948; Best et al, 1958, 1961). These were primarily clinical studies involving physical examinations, some dietary and biochemical evaluations and occasionally, anthropometric measurements. The majority of investigators gave only sketchy treatment to description of dietary patterns.

In their study, Moore et al (1946) surveyed the dietary habits and nutritional status of more than 400 northern Manitoba "Bush" Indians. Food intake was investigated by studying trading posts records of food purchases. The authors determined that of the 1470 calories purchased daily per person, 85% were supplied by white flour, lard, sugar, and jam. Although diets were supplemented by fish and game (which provided additional protein, niacin and some calcium),

this contribution was considered minimal as the supply of these foods was becoming depleted. Assessment of the nutrient content of diets revealed pronounced deficiencies of Vitamins A, C, and riboflavin. Clinical examinations showed marked tissue changes in the majority of individuals, with the most marked changes being in the conjunctival, ocular limbic blood vessels, tongue or gums. The authors associated these symptoms and the high mortality and morbidity rates, among other factors, to the lack of proper foods.

Vivian et al, (1948) conducted a similar study of two populations in the James Bay area. Food purchase records indicated that the bulk of food purchases from local stores included flour, fats, and sugar, with smaller amounts of milk, milk products, fruits and vegetables. Estimates of amounts of food obtained from hunting and fishing were made, and the nutrient intake from all sources was calculated. Intakes were considered adequate for all nutrients except for calcium, ascorbic acid and vitamin A. Clinical findings and especially anthropometric measurements showed poor nutritional status among the 10 to 19 year age group, with one-third to two-thirds of the teenagers examined being 10 to 30 pounds underweight for height.

In 1958, the nutritional status of children at Pine House and Pelican Narrows, Saskatchewan was investigated as a prelude to a demonstration nutrition project (Best and Gerrard, 1958). Dietary, anthropometric, and laboratory

data were collected. No frank deficiency diseases were encountered, but serum vitamin A and carotene and ascorbic acid levels were low. Hypoproteinaemia and anemia were common. Following the examinations the nutrition project began, with the introduction of a mid-day meal to the school children at Pine House, while Pelican Narrows served as a control. Reexamination of children in both settlements in 1960, showed improved serum vitamin A and carotene levels in those who had received the dietary supplements (Best et al, 1961).

Studies in British Columbia include a comparison of nutrient intake of 61 Indian and non-Indian school children in Alert Bay. (Dong and Feeney, 1968). Dietary histories of the subjects revealed that intakes of ascorbic acid and calcium were significantly lower for Indian children than for non-Indian children. Both populations had intakes of vitamin A and calcium below the Canadian standard.

A comprehensive study of the nutritional status of Indians in British Columbia, including evaluation of dietary, anthropometric, clinical, laboratory and dental parameters was carried out by Lee et al in 1968. In that survey, comparisons were made between a coastal fishing reserve, Ahousat and an inland hunting reserve, Anaham. Dietary analysis revealed that all age groups consumed a diet high in protein (excess of CDS). At both reserves more than half of the children had calcium intakes less than 2/3 of the

standards, while 61 percent of teenage girls at Anaham did not meet 2/3 of the standards for iron. Vitamin A was the only other deficient nutrient, with 45 to 70 percent of the Anaham population having intakes below the 2/3 level. Intakes of vitamin E, thiamine, riboflavin, niacin and ascorbic acid were adequate or in excess of standards.

In their dietary investigations the authors observed that although traditional foods were still used, diets on both reserves also contained large amounts of processed and refined foods. Information regarding meal patterns, food costs, food storage, handling, preparation and preservation was also collected in that study.

More recently Desai and Lee (1974) reported that among four Indian communities in British Columbia and the Yukon Territories, the number of subjects with plasma tocopherol levels in the deficient range varied from 1.3% (Ahousat) to 35.8% (Anaham), with 26.0% at Upper Liard and 19.5% at Ross River. An examination of dietary intakes, as measured by the 24 - hour recall indicated that the pattern of daily intakes of Vitamin E corresponded closely to the pattern of plasma tocopherol levels. The authors suggested that the overall dietary status of the communities was a consequence of "socio-economic and cultural factors and the geographic locations, as well as the climatic conditions".

Other studies have examined oral health among native Indians and related these to dietary data (Myers and Lee, 1974; Lee, 1975). Myers and Lee (1974) noted significant differences in the incidence of dental caries and periodontal disease among four Indian communities in British Columbia and the Yukon Territories. Variations in findings were thought to be the result of the availability of refined foods, as determined by cultural and economic factors.

The present day nutritional status of native Indians varies widely according to the relative importance of certain influences such as the basic traditional economy, the settlement patterns, the availability of the white man's food and the impact of teaching (Smith, 1975). The dietary pattern of even very isolated Canadian Indians has been altered from a traditional high meat and low carbohydrate diet to one high in carbohydrate and low in meat and fish (Ellestad-Sayed and Haworth, 1977). Intensified hunting and fishing have greatly depleted these resources. Thus the use and knowledge of traditional foods is low and disappearing with the increasing consumption of store-bought foods (Peterson, 1971). In addition, white teaching had tended to undermine the Indian values, and many native people are ashamed of traditional foods (Smith, 1975). Food is not thought in terms of nutrient value, but has tended to be polarized into two groups, white man's food and native food.

New foods are brought into local stores with little education on their nutritive value, relative cost or method of use. Increased availability of refined carbohydrate foods in local stores may contribute to suboptimal nutrition and high incidence of dental caries (Peterson, 1971; Goldthorpe, 1975). Native people tend to make poor food choices, so that native food items are being replaced by items of lower quality (Draper, 1975).

CHAPTER III

MATERIALS AND METHODS

Population and Sample

A study was conducted, utilizing descriptive and analytical survey research techniques to investigate the food habits of native Indian families on reserves in British Columbia. In order to identify differences in patterns of food intake and, possibly in nutritional status, reserves were selected on the basis of geographical isolation. They were classified as either isolated or non-isolated on the basis of: proximity to a center of 5,000 population, and access to medical and shopping facilities. Four reserves considered representative of isolated reserves in British Columbia were chosen. These include Fort Ware, Nazko, Babine and Takla Lake. In each case the reserve was at least 50 miles from an urban centre, shopping facilities were limited to one or two small general stores, and medical facilities consisted of a monthly visit from Medical Services personnel. Non-isolated reserves were located at or near large centres and had full access to medical and shopping facilities. They consisted of Nanaimo, Sechelt, and Necoslie reserves. (See Fig. 1 for locations). The final sample consisted of 52 families from non-isolated reserves and 40 families from isolated reserves. A summary of reserves

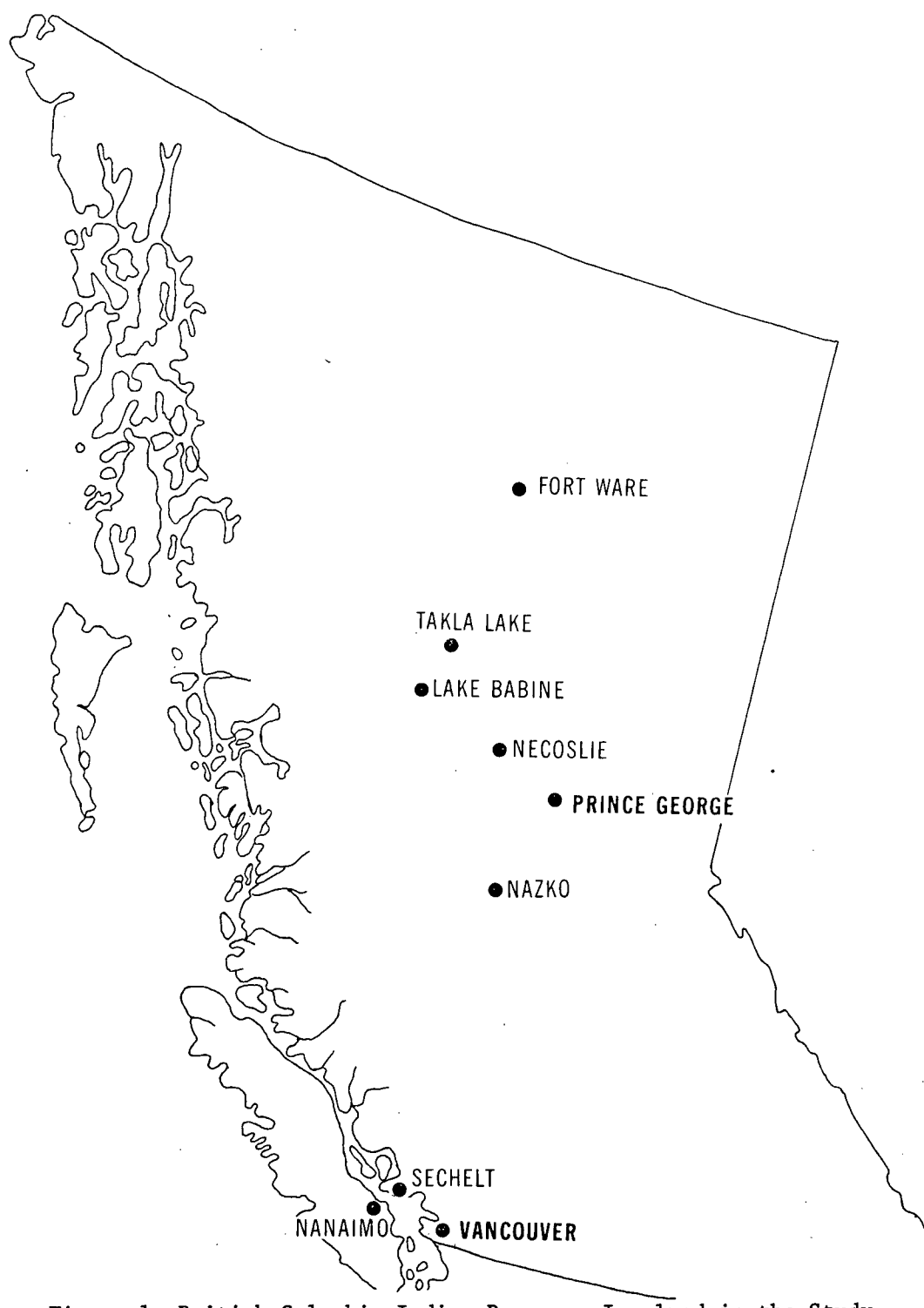


Figure 1: British Columbia Indian Reserves Involved in the Study.

is presented in Table I, indicating the population size of each reserve, the number of families interviewed and 24 - hour recalls collected, as well as the state of 'isolation', linguistic group, and cultural area of each reserve.

The reserves were selected with the help of Medical Services Branch (Pacific Region) of the Department of National Health and Welfare to maximize co-operation from the reserves. For all but one survey (Sechelt) preliminary arrangements were made with the Band Council or Chief of the reserve by personnel from Medical Services. At Sechelt, nutritionists from the School of Home Economics, University of British Columbia, met with the Indian Band Council to explain the purpose of the study and the procedures to be used.

Home visits were made and interviews conducted with the female household heads. For the initial contact with each family the interviewer was accompanied by the Public Health Nurse, Community Health Worker, or a female resident of the reserve. The study was explained and an appointment set up for a convenient time, usually the next day. At most of the reserves an attempt was made to approach all households. However, at Sechelt, Nanaimo, Necoslie and Nazko households were selected by the aide on a judgmental basis, i.e. only those families it was felt would co-operate were approached. Thus an unbiased, random sample was not possible.

TABLE I
INDIAN RESERVES IN BRITISH COLUMBIA INVOLVED IN THE STUDY

Reserve	Linguistic Group	Cultural Area	State of Isolation	Population Size*	Sample Size	
					1. 24-hour Recalls	2. Interviews
Sechelt	Salishan	Pacific Coast	Non-isolated	380	53	16
Fort Ware	Athapaskan	Mackenzie R.	Isolated	165	32	12
Necoslie	Athapaskan	Plateau	Non-Isolated	350	35	16
Nanaimo	Salishan	Pacific Coast	Non-Isolated	415	56	20
Nazko	Athapaskan	Plateau	Isolated	100	23	8
Lake Babine	Athapaskan	Plateau	Isolated	115	21	7
Takla Lake	Athapaskan	Plateau	Isolated	265	29	13

* Represents the number of status Indians presently living on the reserve.

Description of Reserves

1. Fort Ware

The Sekani village of Fort Ware, located on the banks of the Finlay River about 275 miles north of Prince George, is one of British Columbia's most isolated communities. There is no road access to the reserve, and it can be reached only by chartered aircraft or boat.

The reserve itself consists of about 25 log-cabin homes, many of which were built by members of the band, with supplies being provided by the Department of Indian Affairs. There is also a community hall, health station, elementary school and a small general store on the reserve. Several diesel generators supply electricity to the clinic and the homes of teachers, missionaries, and the storekeeper. Native homes have no electricity or indoor taps. Water is obtained from four wells and the nearby river.

The 165 band members live mainly by trapping and hunting, and seasonal jobs such as guiding and fighting forest fires. Local Initiative Programmes (LIP) provide some work around the reserve. Income from these activities is low and merely serves to supplement the welfare income on which almost the entire community relies. Trapping was once a more important source of

income but has declined with the lower price of pelts. The best trapper, for example, will only earn up to \$3,000 annually. Additional problems have been posed to wage earners by the formation of Williston Lake (created by the Bennett Dam) which hinders them from going south to Finlay Forks for summer jobs.

Health care is provided by Medical Services. At the time of the survey (September, 1975) monthly visits lasting 2 to 3 days were being made to the reserve by a Doctor - Public Health Nurse team. The doctor holds medical clinic, while the nurse is responsible for immunizations, child-health care, health education, etc. Since January, 1976, however, one of the Fransiscan Sisters stationed at the reserve, a registered nurse, has taken over the responsibilities of the public health nurse. Monthly visits are still being made by the doctor. Emergency patients are taken by chartered aircraft to either Mackenzie or Prince George.

Yearly examinations for T.B. are conducted by a survey X-ray team. More recently these have been stepped up because of the increased incidence of T.B. in the area. An annual dental service is also available, and includes the basic work of fillings and extractions, centering mostly on the children.

The elementary school is operated by the Department of Indian Affairs and includes classes from Grades one through seven. A kindergarten is supported by band funds. The school is staffed by three Fransiscan Missionary Sisters of Mary.

The diet for the most part consists of bannock and moose, supplemented by a small variety of goods available at the reserve store. Besides moose, the men hunt bear, beaver (in the spring and fall), goat and sheep (in the fall) and occasionally deer, grouse, and ducks. Few families fish, chiefly because the catch in the Finlay River is poor. Rainbow and lake trout are more plentiful at Rainbow Lake, a 7-mile boat trip and 3-mile walk away. The distance poses problems for many individuals and consequently the community does not rely on fish as an important food source. Huckleberries, cranberries, red currant and sopallalies are plentiful and gathered, generally only for summer eating. A few families make jam but no canning is done and only a little preserving. There are no farms or home gardens.

The only store on the reserve is a small trading post managed by a non-Indian and owned by a couple who live in Prince George. Food prices are substantially higher than those in Vancouver and the selection is

restricted to basic items such as flour, rice, sugar, powdered milk, etc and a variety of canned goods. During summer the stock is larger when a more varied supply of goods, including fresh fruits and vegetables are brought in from Prince George by barge. In winter prices increase further when the river freezes and food must be flown in by chartered plane at a cost of 30 cents a pound as compared to 10 cents a pound by barge. This poses an additional burden to the already impoverished inhabitants of Ware in obtaining an adequate diet. Regular reports in the press each winter speak of hunger and malnutrition in the community. Emergency food supplies are brought in at such times, but the difficulties persist.

2. Nazko

Nazko Reserve is a Carrier Indian community located sixty-five miles west of Quesnel. Until 1973, when a two-lane gravel road replaced the single lane dust trail that linked it to Quesnel, it was very much removed from outside influences. Even now there are no telephones, except for a radiotelephone operated by the Band. Nazko is the largest of a group of small reserves that includes Baezeko, Trout Lake, Pelican Lake, Moses Lake and Kluskies, spread over

a 100 by 40 mile area. It has a population of about 100. Most of the 18 homes that make up the reserve have cold running water but no electricity. This is an impoverished area, with little work for its inhabitants. Local Initiative Programmes have created some jobs on the reserve and in the fall during haying several families are employed by local white ranchers. Generally, however, most individuals are forced to rely on welfare.

Although hunting, fishing and trapping are carried out, they do not seem to be a major source of livelihood. In the peak fall season the men hunt moose; last year the reserve averaged two moose per household. A few families trap beaver in the spring. Salmon is also caught in the summer, most from the Nazko River, although the Quesnel River is also a source. Blueberries are the only fruit gathered in any substantial amount, with quantities obtained varying with their availability. Very little was found during the past year. When gathered, berries are dried for the winter; some are canned or frozen. In the summer of 1975, residents of the reserve planted a community garden that included beets, carrots, onions, lettuce and potatoes. Vegetables were taken as needed during the summer, but

none were stored or preserved. Thus later in the year, families purchased additional vegetables from ranchers.

Individuals on the reserve have access to two small grocery stores. One is privately owned and serves both the white and Indian communities. The other, which is located on the reserve itself, is owned and operated by the Band. Both stores are similarly stocked, chiefly with canned goods and a small selection of fresh fruits and vegetables. Food prices are cheaper at the reserve store, probably because the Band have their own truck and are able to bring in most of their own freight from Quesnel. Where families shop varies with the selection available at the particular time and credit given. Families who are able to, do their bulk shopping in Quesnel where food is cheaper.

Health facilities are limited. A public health nurse employed by Medical Services in Prince George makes a monthly visit to the area and remains for 3 to 5 days, serving the needs of both the Indian and non-Indian communities. Visits from a doctor are infrequent, and residents obtain routine medical care in Quesnel. There is a community health representative living on the reserve.

There is no school on the reserve so children are bussed to a nearby provincial school which extends to Grade eight. Students who wish to continue their education do so at high schools in Quesnel, Prince George, or Williams Lake.

3. Takla Landing

Takla Landing is a Carrier Indian community of about 265 people living on the edge of Takla Lake in north-western British Columbia. The village is accessible by water and rail from Ft. St. James, 192 miles to the south-east. It is about 30 miles north of Lake Babine and residents occasionally travel between the two centres, by foot in summer and skidoo in winter. Direct access to Smithers located 100 miles south is by chartered aircraft.

There are a variety of sources of income. Some of the men are employed as fallers by any one of three logging companies in the area. These are located at Leo Creek, 20 miles south, Lovell Creek, 20 miles north and Driftwood, 40 miles north. Work is casual, for periods stretching from 3 days to 3 months. LIP and Work Opportunities Programmes (WOP) provide work around the community for a number of band members. Under the LIP projects for example, members of the band built the

band office, a community hall, a hockey rink and one house, and repaired ten other houses. The WOP project was set up to provide services like house-cleaning, laundering, painting, collecting firewood, etc for needy band members. Fur trapping supplements the income of several families as well as handicrafts which are sold at the old Hudson's Bay store just outside the reserve. Social assistance is still an important source of income.

Takla Landing was the largest of the 'isolated' reserves visited. It consists of about 40 houses, a community hall, band office, Roman Catholic Church, pool hall, medical clinic, store, and a two-room schoolhouse. Housing is also available for local teachers and visiting priests. Few houses have electricity or indoor taps, most water being obtained from the river; wood and propane are used for heating and cooking.

The school on the reserve, which has classes up to Grade 7 is operated by DIA. Again students who wish to attend high school are boarded outside the community, at Smithers, Prince George, or Ft. St. James.

Residents of the reserve have access to two stores. One, located on the reserve itself and operated by a former chief, has a limited supply of goods. The owner was experiencing financial

difficulties at the time of the survey and there was a strong possibility that the store would soon close. Almost all residents shopped at the former Hudsons Bay Company trading post, now privately owned by a non-Indian couple. It is located just outside the reserve and had the largest stock of all 'isolated' reserves. Weekly supplies are brought in by rail from Fort St. James. In addition to food, shoes, clothing and local crafts (beaded moccasins and jackets) are also sold, the latter to tourists who come to the area to hunt and fish.

Salmon and trout caught in Takla Lake in the summer, and moose hunted throughout the year are important food sources for the entire community. About one-quarter of the families at Takla trap either for fur (lynx, martin, beaver) or food (grouse, rabbit, groundhog). Much of the fish and meat is preserved by salting, smoking, drying or freezing in winter. The band council is encouraging gardening and about half of the residents had planted potato gardens during the past summer.

Medical Services provides the same health care here as in Nazko. The public health nurse based

in Fort St. James visits the reserve twice a month, with visits from physicians being less frequent. A Community Health Representative lives on the reserve.

4. Babine

Babine Reserve is a Carrier Indian Community situated just 64 miles north of Smithers at the edge of Babine Lake. The 100 mile long lake is the site of an extensive artificial spawning channel and is one of the province's leading producers of sockeye salmon. Two copper mines, Granisle and Noranda, as well as a logging company, Northwood Pulp Ltd, operate in the area.

Although Babine has a population of 115, this number is severely affected by seasonal employment. In the summer, jobs such as tree planting, road construction, work at the hatchery and LIP grants for housing, repairs provide employment for the reserve. During winter, when such work is temporarily halted, most families leave the community to seek work in the nearby towns of Burns Lake and Smithers.

The 23 houses that make up the reserve have no running water and residents obtain water from a number of sources: the Babine River, Lake Babine, a seasonal creek and a single well. There is also

no electricity although the school and two families have private diesel generators. The only other buildings on the reserve are a small grocery store, church, and health station.

The school operated by the Department of Indian Affairs and Northern Development and staffed by a non-Indian had an enrollment of 18 students, from Grades 1 through 7. Two students attending kindergarten were taught by a local resident employed as a teacher's aide.

The small general store is owned and operated by the band. Selection is restricted to canned goods and a few fresh items i.e. apples, oranges and onions. Most residents buy their food in Smithers and shop at the store only when necessary between trips to town. The store is most frequently patronized by the elderly, who find it difficult to purchase their food in town and children, buying recess, lunch-time and after school "treats".

Medical Services delivers health care to residents of the reserve. One of the public health nurses stationed at Fort St. James makes a 3 - day monthly visit, providing the usual services. The position of the community health worker is currently vacant.

Hunting and fishing are carried out extensively. The reserve averages from four to five moose per family annually. Generally when one is killed, it is shared

among the community, lasting for approximately three weeks. Beaver is trapped from April to June at a time when its fur is at its best. Occasionally someone may catch a deer, cariboo, timber wolf, lynx, rabbit or porcupine. Game birds such as ptarmigans, grouse or ducks are also becoming scarcer. A variety of salmon including spring (August - late September), sockeye (mid-July), pink (summer), coho and steelhead (late September) are obtained from the Babine River. Trout and char are also fished. Band members fish in family groups and divide the catch. Almost all the fish is smoked or dried; very little canning is done. Some fish is salted in kegs.

As in other communities described, very little trapping is carried out. With the fall in the price of pelts, and fewer animals to hunt, trapping is no longer a worthwhile means of obtaining a living. Some of the elderly people tan moose hides which fetch \$100 apiece, but this is a tedious and lengthy (2 weeks) procedure.

5. Necoslie

The Carrier Indian community of Necoslie is located just outside Ft. St. James, on the banks of Stuart Lake. Lying almost at the geographical centre of the province, Ft. St. James is linked by

a paved road to Vanderhoof, 39 miles to the south. It is one of British Columbia's historical communities having been founded in 1806 by Simon Fraser as the main administrative centre for the region then called New Caledonia. Later it became an important fur-trading post for the Hudson's Bay Company.

Today Ft. St. James has a population of 5,000 and is the chief commercial centre for the north-central region. It is growing rapidly, with one secondary and two elementary schools, a 25-bed hospital, two supermarkets, a number of smaller grocery stores, hotels, restaurants, etc. Facilities in the town are used by the 350 residents of the reserve.

Many of the men at the reserve are employed by local logging companies and sawmills. Recently, women are also being hired and several women from the reserve are thus employed. Wages are good. Other employment is provided by LIP projects, chiefly for the construction of new homes on the reserve.

Housing on the reserve is generally poor. A survey carried out by Medical Services in 1976 judged 28 of the 63 existing homes as "unhealthy" (i.e. overcrowded, seriously deteriorating, no running water or proper sewage disposal). The situation is improving

slowly with new houses being constructed by the Band in collaboration with the Department of Indian Affairs. There is however presently, a four year waiting list for a new home on the reserve, and many young families impatient with this delay are leaving the reserve and purchasing homes in town.

Health services are provided by Medical Services. At the time of the survey one nurse, who was also responsible for six other nearby reserves, was stationed in Fort St. James. Her job has since been expanded (July 1976) to a two-nurse position. Similarly the CHR position has grown from half to three-quarter time. Residents of the reserve regularly consult with doctors at the hospital in Fort St. James or Vanderhoof.

Sockeye salmon is the most important locally available food and is netted in Stuart Lake during late summer. Char (mid-September to late October), whitefish (October - November) and trout (year-round) are also caught. Some fish is eaten fresh in season, but most is smoked, frozen or dried for consumption throughout the year. Only a few families can fish. Hunting is done away from the reserve near Beaver Lake. Where there are men in the family a household will average one to two moose annually. Beaver,

plentiful in the spring are trapped for both food and skin. Other game is rarer. A variety of berries (i.e. huckleberries, raspberries, soapberries and blueberries) are gathered by many families and dried or made into jam.

6. Nanaimo

Nanaimo, a community of 415 Cowichan people, is located on the east coast of Vancouver Island. It is made up of one larger main reserve located just outside of the city of Nanaimo, and four smaller river reserves on the Cedar Highway beside the Nanaimo River. The river reserves (numbered 2 to 5) are less developed and more thinly populated than the main reserve (reserve one). There are about 87 houses on the reserve, 68 of these on reserve one, six each on reserves 2 to 4 and one on reserve five. With a few exceptions all the houses on reserve one have electricity, telephone and water services available.

The city of Nanaimo has a population of 42,000 and is one of the largest urban centres on Vancouver Island. As such it has a hospital, a large supermarket (Safeway) together with a number of other smaller food and specialty stores and other amenities of small city life. There is easy access by highway to Victoria, 70 miles south and it is only a 2 - hour ferry ride away from Vancouver. The residents of Nanaimo reserve are thus

relatively urbanized.

Medical Services and the provincial government share in providing health care. An energetic CHR on the reserve works with a Public Health nurse from the Central Vancouver Island Health unit in Nanaimo and Federal Public Health nurses from Victoria in holding bi-monthly baby clinics, child care programmes, immunizations etc. Residents of the reserve can also obtain routine medical and dental care in town.

Fishing is still an important means of obtaining food. About half of the families set nets in the Nanaimo River every fall and the salmon caught are shared among members of the reserve. Many of the families also hunt for deer in the nearby Nanaimo Lakes area throughout the year. Some of the families gather berries and make jams. There is no trapping done.

7. Sechelt

Located on the 'Sunshine Coast' 30 miles north-west of Vancouver is the Salish reserve of Sechelt, adjoining the Village of Sechelt. Access from Vancouver is by ferry from Horseshoe Bay across Howe Sound to the Langdale Terminal, then by road to Sechelt. Travel time is approximately one hour.

Although the population of Sechelt Village itself is only 550, the total sub-area population of the region, known as the Powell River-Sechelt belt, is 32,000. There are 380 band members currently living on this reserve.

Facilities for modern day living are quite complete. All homes have running water and electricity. There is an elementary school (Grades I to VII) in Sechelt Village, and a secondary school is located at the nearby community of Gibson's Landing. A 35-bed hospital was opened in 1964 on land donated by the reserve. Shopping facilities are adequate, with a large supermarket (Shop Easy) and other smaller grocery and specialty stores.

The major source of employment in the area is forestry and many of the men at the reserve work in local logging camps or sawmills. A small number of families make a living at commercial fishing in the Strait of Georgia. There is also seasonal employment for women at local fish packing houses.

Fishing is also carried out as a means of obtaining food; clams are eagerly gathered. Some deer hunting is done, but no family reported trapping.

As in Nanaimo, the responsibility for health services is shared by the Provincial and Federal Governments. There is a CHR on the reserve.

Description of the Sample Population

Univariate frequency tables were designed to describe how the isolated and non-isolated populations were distributed with respect to demographic characteristics.

Age

The age of women ranged from 17 to 72 years, with a mean age of 37.2 years in non-isolated areas and 37.9 years in isolated areas (Table II). Male heads of households living in isolated reserves were slightly older, on the average, than males in non-isolated reserves. The mean age for the populations was 41.1 years and 37.3 years, respectively. There were 321 children in the study population, equally distributed in number between the two groups. A larger percentage of children of isolated reserves however fell into the 12 years and under categories (82.0% as compared to 60.0% for non-isolated reserves).

Household Characteristics

As indicated by Table III, the size of households was large. The size of families ranged from 2 to 18 members, with a mean size of 6.80 family members in isolated areas, and 5.65 members in non-isolated areas. Isolated families had a larger number of children per household. The mean number of children in each family studied was 4.0 on isolated reserves and 3.0 on non-isolated reserves. There was no difference, however,

TABLE II
AGE DISTRIBUTION OF SAMPLE POPULATION

Age	Non-isolated No. (%)	Isolated No. (%)
Female Household Head	n = 52	n = 40
0 - 25 years	8 (15)	7 (17)
25 - 35 years	18 (35)	16 (40)
36 - 50 years	16 (31)	10 (25)
51+ years	10 (19)	7 (18)
Male Household Head	n = 37	n = 34
0 - 25 years	7 (19)	6 (18)
25 - 35 years	11 (30)	8 (23)
36 - 50 years	12 (32)	11 (32)
51+ years	7 (19)	9 (27)
Children	n = 158	n = 163
0 - 2 years	12 (8)	22 (13)
2 - 5 years	37 (23)	39 (24)
6 - 12 years	46 (29)	73 (45)
13 - 18 years	50 (32)	26 (16)
19 - 21 years	13 (8)	3 (2)

TABLE III
HOUSEHOLD CHARACTERISTICS OF SAMPLE POPULATION

Household Characteristic	Non-isolated		Isolated	
	No.	(%)	No.	(%)
Household Size				
0 - 3 members	12	(23)	2	(5)
4 - 6 members	26	(50)	15	(38)
7 - 10 members	10	(29)	21	(53)
10+ members	4	(8)	2	(5)
No. Children/Household				
0	6	(11)	2	(5)
1 - 3	28	(54)	16	(40)
4 - 6	16	(31)	17	(43)
7+	2	(4)	5	(13)
No. Adults/Household				
1	4	(8)	3	(8)
2	27	(52)	21	(53)
3	14	(27)	7	(18)
3+	7	(13)	9	(23)
Household Type				
Nuclear	28	(54)	23	(58)
Extended	13	(25)	13	(33)
Single parent	6	(12)	3	(8)
Other	5	(10)	1	(3)

in the mean number of adults per household in the two populations. Almost all "other" adults were parents, relatives, or older children of the male/female household heads. Table III also shows the different types of households, with the majority of households among all reserves classified as nuclear and extended.

Education

Table IV shows the level of education attained by people in each of the two populations. No woman on an isolated reserve had completed high school, whereas 15% of the women on non-isolated reserves had graduated from high school. The majority of women on isolated reserves (71%) had either no formal schooling or some grade school. On non-isolated reserves, 60% of the women had completed some high school.

Similar findings were observed for the male household heads. While 46% of men on non-isolated reserves had completed some high school, only 21% on isolated reserves had reached that same level of education

Occupation

Since there was little difference among job categories of working women interviewed, the work status i.e. whether or not a woman was employed, was used as a measure of occupation rather than the type of work itself. Distinct differences were observed between the two populations (Table V). Whereas an equal number of women on non-isolated reserves were either working or homemakers, the majority

TABLE IV
EDUCATION LEVEL ATTAINED BY FAMILY HEADS OF HOUSEHOLD

EDUCATION	Non-isolated		Isolated	
	No.	(%)	No.	(%)
Female Head	n =	52	n =	40
No Formal Schooling	0	-	13	(33)
Some Grade School	6	(12)	15	(38)
Completed Grade School	5	(10)	13	(8)
Some High School	31	(60)	9	(23)
Completed High School	8	(15)	0	-
High School and Other Training	2	(4)	0	-
Male Head	n =	37	n =	34
No Formal Schooling	2	(5)	11	(32)
Some Grade School	6	(16)	9	(26)
Completed Grade School	2	(5)	2	(6)
Some High School	17	(46)	6	(18)
Completed High School	6	(16)	1	(3)
High School and Other Training	4	(11)	0	-
Don't know	0	-	5	(15)

(85%) of women on isolated reserves were homemakers.

Although male household heads on all reserves were involved in similar types of occupations, a larger percentage of men on non-isolated reserves had jobs among the higher "strata" of job classification (i.e. tradesman, craftsman).

TABLE V
OCCUPATION OF HOUSEHOLD HEADS

OCCUPATION	Non-isolated		Isolated	
	No.	(%)	No.	(%)
Work Status - Female				
Working full-time	19	(36)	2	(5)
Working part-time	6	(12)	4	(10)
Not working outside home	27	(52)	34	(85)
Occupation - Male				
Chief, Counsellor	2	(5)	1	(3)
Tradesman, craftsman	6	(16)	0	-
Sawmill, Forestry	15	(39)	11	(32)
Fisherman, Longshoreman	6	(16)	4	(12)
Labourer, Trapper	5	(13)	12	(35)
Unemployment, retired	4	(11)	6	(18)

Income

Table VI shows that the distribution of income for the entire study population was low. Although results are broadly clustered into 5 categories, the majority of families reported a yearly income of just over \$5,000.00. Differences are seen for the two areas, with a larger number of families on non-isolated reserves earning \$5,000 or more annually.

TABLE VI
DISTRIBUTION OF FAMILY INCOME

INCOME	Non-Isolated		Isolated	
	No.	(%)	No.	(%)
0 - 2500	2	(4)	0	-
2500 - 5000	7	(14)	12	(30)
5001 - 10,000	30	(58)	22	(55)
10,001 - 15,000	7	(14)	5	(13)
15,000+	6	(12)	0	-
No response	0	-	1	(3)

Data Collection

Three instruments were developed or adapted to gather data.

1. Questionnaire

A questionnaire was developed to assess the food habits and shopping practices of native Indian women in British Columbia. Prior to the survey it was pre-tested among a group of women from the Duncan Indian Band on Vancouver Island. In accordance with suggestions of the pre-test

subjects, the questionnaire was reduced in length and modified for the study. (Appendix A).

The questionnaire was designed to measure separately, food beliefs, shopping habits, meal planning, and other food practices, as well as selected socio-economic and family variables.

Attitudes of the women toward nutrition, termed food beliefs, were measured by asking the women two questions: "What foods or types of food do you try to include in your family's diet each day?" and "Why do you think each of these foods is important." In the methods used to score the answers, credit was given for naming each basic food group or a food from each group, and for correctly providing the name of a nutrient or a function of a nutrient in the food group. As a measure of variety, the fruit and vegetable group was divided into two food groups. Each food group and nutrient and function named correctly scored one point, the maximum score possible being 10.

On the food ideology data, women were asked to give their ideas on foods considered desirable and undesirable at certain stages of the life-cycle, i.e. during pregnancy, lactation, sickness, and for babies and younger children. Information concerning the women's opinions of diets in their area, and recent changes in native diets was also collected, but because much of this was incomplete, it was not included in the study report.

Food-buying habits were assessed in another section of the questionnaire composed of 12 questions dealing with shopping site and reason for patronage, shopping frequency, children's food requests, the use of recommended food-buying practices, food expenditures and method of payment, factors influencing choice of purchases and changes in food-buying patterns with rising food costs.

The questionnaire also contained a number of questions designed to collect descriptive information indicative of other nutrition practices. These included meal planning and preparation, the use of nutrient supplements, sources of nutrition information, and use of traditional foods.

Data concerning selected socio-economic and family characteristics such as age, education, family composition, occupation, household facilities, etc., was also recorded because of indications in the literature that they are important in affecting nutritional status. A more complete description of the variables is given in the statistical analysis section of this chapter.

2. Food Practices

After examining the various methods of collecting dietary intake data it was decided that the 24-hour recall was the most feasible method to assess food practices. This method is the simplest and most direct method for collecting data on large groups of individuals, and data compares

favourably with that of the 3-day or 7-day record. (Young, et al, 1952). It was recognized that results could only be interpreted in terms of groups, not individuals, and that foods consumed would not necessarily reflect seasonal or long-term patterns (Marr, 1971).

When the female household head was interviewed, the dietary recall method was explained. She was asked to recall all foods consumed by her and one or two other family members during the 24 hours prior to the interview. When other family members were present, information was obtained from them directly. Subjects were asked to mention the amount of food and drink consumed, using where necessary, glasses, measuring cups and cereal bowls as aids in estimating portion size. With the aid of the Nutritional Status Investigation Computer Programs of the School of Home Economics, University of British Columbia, the daily intake of 9 nutrients (calories, protein, calcium, iron, vitamin A, thiamin, riboflavin, niacin and ascorbic acid) was computed from the 24-hour recall of each individual. For both population groups, daily nutrients were grouped according to age and sex and the number of subjects with intakes below 2/3 of the Canadian Dietary Standard were noted. In all, a total of 249 recalls were obtained.

In addition, in order to measure the criterion variable 'food practices' the information obtained from the 24-hour

dietary recalls of the 92 female heads of households were scored using the British Columbia Dairy Foundation's "Guide to Good Eating Everyday". Scores were assigned for each food group, according to the recommended number of daily servings of that group (Appendix B). The maximum score possible was 25. This numerical score represented a quantitative estimate of food practices.

3. Food Pricing and Food Availability

Information on food prices and food availability was collected by the use of a food list containing 66 items adopted from the 'food basket' of the Food Prices and Review Board, 1975 (Appendix C). Items of the same size and brand, where possible, were used. It was originally planned that the 66 food items would be used to develop a price index that would give some measure of food prices in each area relative to food prices in Vancouver. In the final analysis, because many of the items were not available on a number of the reserves it was not possible to develop a food index. Instead, the cost of 30 food items which could be found in all reserves was compared to the cost of the same items in Vancouver. The 30 food items included the following: powdered skim milk, evaporated milk, apples, bananas, apple juice, canned peaches, oranges, raisins, potatoes, onions, turnips, canned peas, canned soup, dry cereal, rolled oats, flour, macaroni, cookies, canned tuna,

sardines, beans with pork, peanut butter, eggs, bacon, butter, margarine, shortening, sugar, jam, and tea.

Data Analysis

The data analyzed in the study were collected on native Indian reserves in British Columbia between the months of August 1975 and February 1976.

All the variables (socio-economic, family and reserve) were viewed where possible in rank order, as this is required for the association tests demanding ordinal ranking.

Variables were treated as follows:

1. Socio-economic Variables

Education: was grouped according to the number of years completed in school, separately coded for the male and female head of the house.

Occupation: was that of the male household head and was grouped according to the five categories; unemployed or retired, labourer or trapper, fisherman or longshoreman, sawmill worker or logger, tradesman or craftsman, and chief or councillor.

Work status: of the female household head was dichotomized for 'yes' or 'no', according to whether she was involved in other than domestic work at home.

Income: represents the approximate yearly income of all adults in the household. It includes all money from work, trading, UIC and welfare.

Per capita income: refers to the yearly income divided by the number of individuals dependent on that income.

Household facilities scale: was constructed using the presence or absence of the following items in the household — electricity, stove, oven, running water, refrigerator and freezer.

2. Family Characteristics

Age: of the female head of household is expressed in years.

Household size: refers to the number of adults and children living in the household.

Food beliefs: answers to this question were ranked as discussed in the text.

Nutrition education: was again dichotomized and refers to whether or not the female household head had received any food or nutrition information in an education setting.

3. Reserve Variables

Reserve: refers to one of the seven reserves.

Isolation: refers to the geographical location of the reserve as previously described.

4. Food Practices Score

As described earlier, the food practice score was obtained from a 24-hour food intake record of the female head of household of each family.

After coding, data were key-punched on cards and treated statistically by computer analysis. The Statistical Package for the Social Sciences (1963) was used as a reference for programming.

The Kendall rank correlation coefficient, tau beta, was used to measure the degree of association between the food scores and all but one of the socio-economic variables. These parameters, as has been described, were all ranked in an ordinal manner. The Kendall rank correlation coefficient measures the degree of association or correlation between two sets of ranks (variables) ranging from -1 to +1. A +1 denotes a perfect identical ordering of the ranks and a -1 indicates a perfect opposite ordering.

In determining whether or not there was any significant difference between reserves, a variable which had no ordinal property, and food practices, the analysis of variance was used.

Although the major concern in this study was to investigate the relation between selected socio-economic, family, and reserve variables and the dependent variable, food practices, it was thought that since relations between two variables may often be due to a third, it would be useful

to look at relations between all of the variables. This was done by means of a matrix of Kendall's tau beta rank order correlations.

CHAPTER IV

RESULTS

Food PatternsA. Analysis of nutrient intake data

The average daily nutrient intakes by age and sex categories, of the isolated and non-isolated populations are shown in Tables VII-1 and VII-2, and illustrated in Figures 2 to 10. Tables VII-3 and VII-4 (Appendix D) show the mean daily nutrient intakes of the same age categories for the combined isolated and non-isolated populations (provincial) compared to median intakes of the Nutrition Canada Survey. The latter data are presented for general interest only and will not be discussed.

The percentage distribution of each nutrient derived from each of the 8 food groups, for the two populations is given in Table IV-1 and for each age and sex category in Tables IX-2 to IX-7 (Appendix D).

1. Calories

The mean calorie intakes for all children up to 9 years for both populations were equal to or greater than the CDS. Adolescents of both sexes, regardless of reserve location had mean calorie intakes below the recommended Dietary Standards. Among teenage boys from non-isolated communities,

TABLE VII-1

DAILY NUTRIENT INTAKES OF CHILDREN AND ADOLESCENTS FROM ISOLATED AND NON-ISOLATED RESERVES. MEANS AND STANDARD DEVIATIONS ARE GIVEN. FIGURES IN PARENTHESES ARE NUMBER OF INDIVIDUALS. 1

	0-4 Years, M & F		5-9 Years, M & F		10-19 Years, F		10-19 Years, M	
	NI (12)	I (10)	NI (17)	I (14)	NI (10)	I (15)	NI (14)	I (11)
Calories	1763±613	1396±549	2082±879	1902±554	1875±342	1926±598	2235±744	2301±480
Proteins	65±22	56±22	78±41	69±18	73±16	82±23	82±34	70±16
Calcium	1029±500	1034±1096	1008±448	705±270	786±427	552±299	958±530	676±249
Iron	10.3±6.4	10.7±4.5	13.2±8.7	14.4±6.1	10.8±2.6	16.9±5.0	12.5±5.3	14.9±7.2
Vitamin A	3932±2278	3581±2192	3323±2272	3301±2282	3275±1715	2532±1302	4986±2618	2176±1305
Thiamin	1.02±0.37	1.04±0.36	1.66±1.13	1.15±0.32	1.22±0.45	1.33±0.28	1.49±0.46	1.20±0.39
Riboflavin	1.72±0.63	1.59±0.49	2.17±1.16	1.59±0.42	1.62±0.77	1.84±0.40	2.02±1.06	1.58±0.60
Niacin	13.9±10.6	10.8±5.1	16.8±10.5	16.6±8.1	17.4±6.9	21.6±6.3	19.5±8.3	17.0±5.3
Ascorbic Acid	106±79	117±114	182±160	84±80	145±163	62±29	185±131	78±151

1 For this and other tables, units are Protein (gm), Vitamin A (International units), all others (mg). NI = Non-isolated I = isolated.

TABLE VII-2

DAILY NUTRIENT INTAKES OF ADULTS FROM ISOLATED AND NON-ISOLATED RESERVES.
MEANS AND STANDARD DEVIATIONS ARE GIVEN. FIGURE IN PARENTHESES ARE NUMBER
OF INDIVIDUALS.

	20 + Years, F		20 + Years, M	
	Non-isolated (58)	Isolated (43)	Non-isolated (32)	Isolated (13)
Calories	1635 \pm 423	1594 \pm 485	2979 \pm 953	2127 \pm 618
Proteins	67 \pm 20	73 \pm 23	121 \pm 37	107 \pm 24
Calcium	554 \pm 305	548 \pm 547	848 \pm 468	573 \pm 241
Iron	10.8 \pm 4.2	14.9 \pm 5.6	18.7 \pm 7.3	23.5 \pm 8.1
Vitamin A	4018 \pm 2730	3608 \pm 2915	7234 \pm 4740	3825 \pm 3871
Thiamin	1.05 \pm 0.47	1.08 \pm 0.32	1.86 \pm 0.77	1.70 \pm 0.48
Riboflavin	1.36 \pm 0.67	1.65 \pm 0.61	2.08 \pm 0.85	2.18 \pm 0.82
Niacin	18.5 \pm 6.3	19.6 \pm 6.7	31.2 \pm 11.1	28.4 \pm 9.3
Ascorbic Acid	97 \pm 101	42 \pm 52	144 \pm 163	119 \pm 197

TABLE VIII

NUMBER OF INDIVIDUALS, BY AGE AND SEX, WITH DAILY NUTRIENT INTAKES LESS THAN TWO THIRDS OF THE CANADIAN DIETARY STANDARDS. FIGURES IN PARENTHESES ARE TOTAL NUMBERS OF INDIVIDUALS IN EACH GROUP.

	0 - 4 Yrs. (M & F)		5 - 9 Yrs. (M & F)		10 - 19 Yrs. (F)		10 - 19 Yrs. (M)		20 + Yrs. (F)		20 + Yrs. (M)	
	NI (12)	I (10)	NI (17)	I (14)	NI (10)	I (15)	NI (14)	I (11)	NI (58)	I (43)	NI (32)	I (13)
Calories	1	1	3	2	2	3	6	2	15	13	5	4
Proteins	1	0	0	0	0	0	0	0	0	1	0	0
Calcium	2	1	1	2	3	11	6	5	28	23	8	4
Iron	2	1	4	0	3	0	4	1	26	7	2	0
Vitamin A	1	1	0	1	3	4	1	4	9	11	5	4
Thiamin	0	1	5	0	2	0	1	1	13	2	4	0
Riboflavin	0	0	2	1	1	0	2	2	11	3	3	1
Niacin	2	1	3	1	0	0	2	2	2	3	1	2
Ascorbic Acid	1	1	3	3	1	5	2	7	7	15	2	4

NI = Non-isolated

I = isolated

TABLE IX-1
PERCENTAGE CONTRIBUTION OF FOOD GROUPS TO CALORIES AND NUTRIENTS
(ALL AGES)

	Calories		Protein		Calcium		Iron		Vit. A		Thiamine		Ribofl.		Niacin		Ascorb.	
	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I
1. (Milk, milk products)	13	10	17	12	60	51	3	2	12	11	8	5	34	23	1	1	2	2
2. (Meat, fish poultry, eggs, legumes)	26	20	55	58	14	10	46	55	23	20	32	36	36	50	52	58	3	2
3. (Vegetables)	7	8	5	5	5	4	11	7	32	34	12	11	5	4	11	10	25	30
4. (Fruits)	8	5	2	1	6	3	9	3	15	10	14	8	5	2	6	3	70	65
5. (Grains, cereals)	25	34	20	24	14	30	29	28	1	3	32	39	16	18	21	22	-	1
6. (Fats, oils)	10	10	-	-	1	1	-	-	17	22	-	-	-	-	-	-	-	-
7. (Sugars)	8	14	-	1	1	2	2	5	-	-	-	-	-	1	-	-	-	-
8. (Misc.)	1	-	-	-	-	-	-	-	-	-	2	1	2	1	9	6	-	-

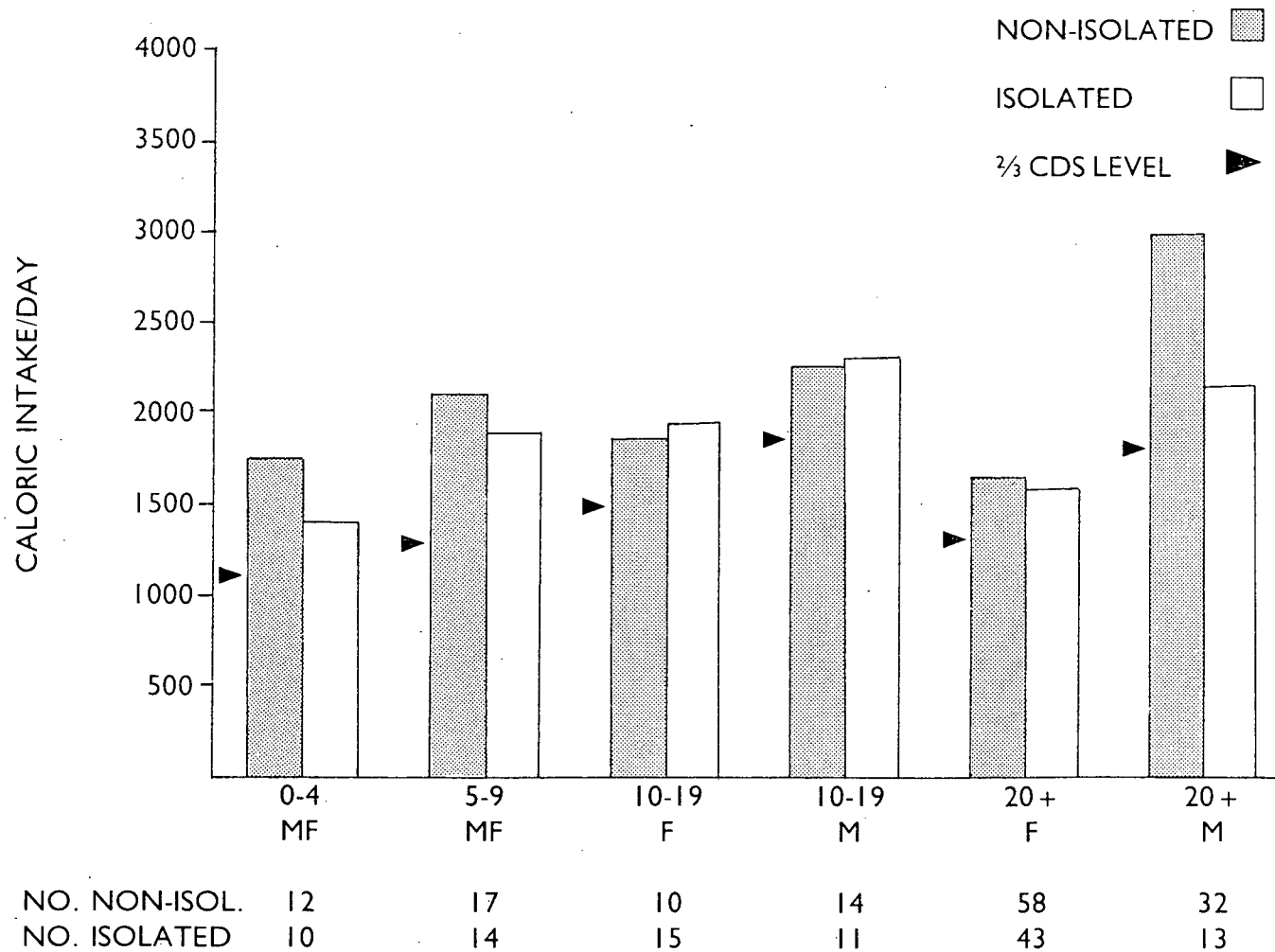


FIGURE 2. NON-ISOLATED AND ISOLATED MEAN INTAKES OF CALORIES

in particular, a large percentage (48%) failed to achieve intakes equal to two-thirds of the CDS. The calorie intakes of adults, except males in non-isolated areas, were well below the CDS.

The major food group source of dietary calories varied only slightly between children from the two populations, with 26-35% of calories being derived from grains and cereal products, 16-21% from meat, fish, poultry, and 11-23% from the milk group. A similar picture was obtained for adolescents, except for teenage boys in isolated areas where the contribution of sugars (20%) was fairly high. In adult diets, grains and cereals and meats were still the largest source of calories, but significant amounts were derived from fats and oils and from sugars (8-13%). In general, for all groups, grains and cereals contributed more calories to diets on isolated reserves, while the meat and milk group supplied more calories to individuals on non-isolated reserves.

2. Protein

Mean daily protein intakes for all age and sex groups, for both populations, exceeded the recommended standards, often by as much as 100%. The number of individuals who failed to achieve two-thirds of the CDS was negligible. Protein intakes on non-isolated reserves were generally higher than on isolated reserves. Approximately one-half of all protein

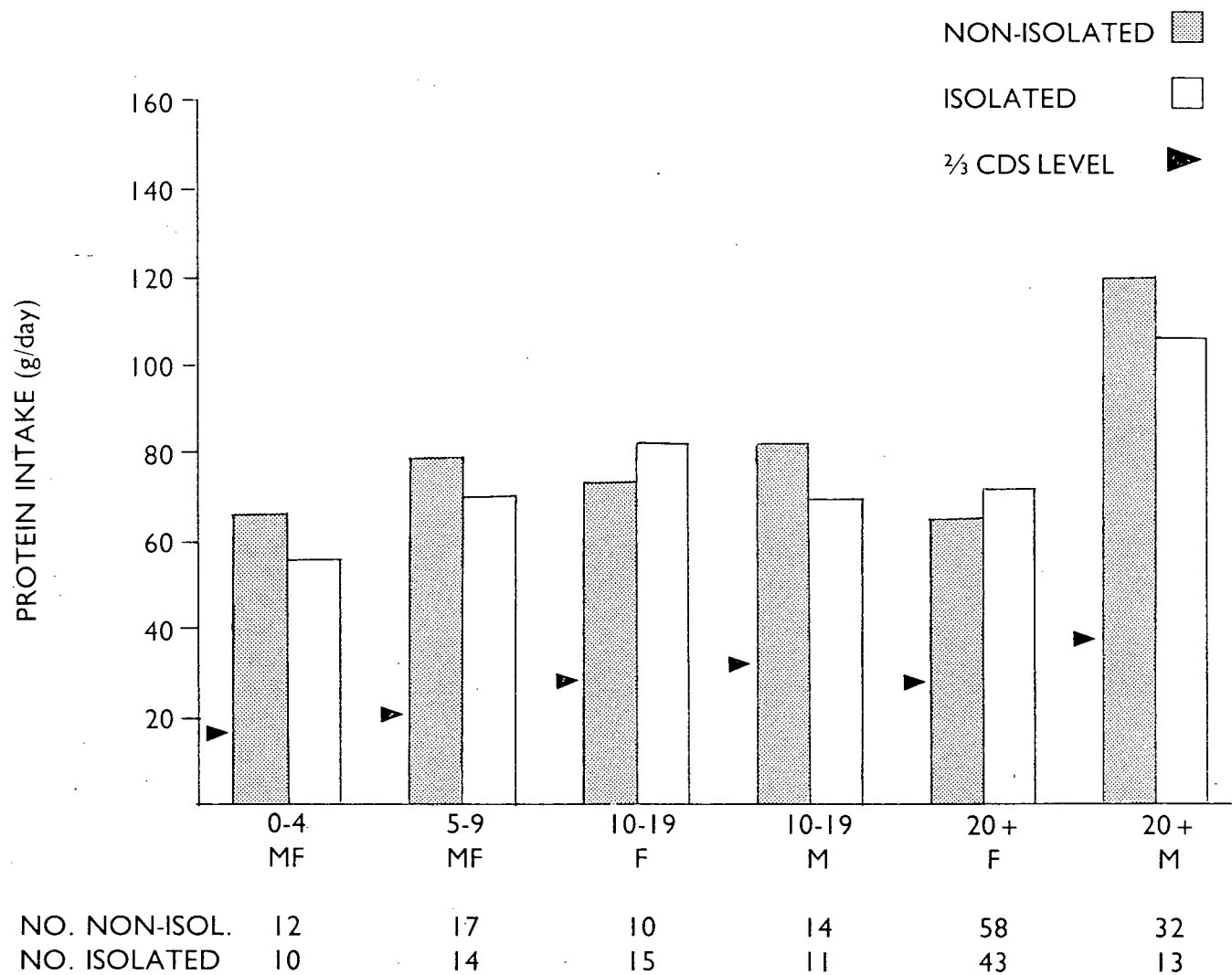


FIGURE 3. NON-ISOLATED AND ISOLATED MEAN INTAKES OF PROTEINS

was derived from meat, fish, poultry, eggs and legumes, while grains and cereals and milk and milk products supplied the remainder. Among children up to 9 years, milk contributed about 24-35% of the protein to diets in non-isolated areas and slightly less (17-26%) in isolated reserves. Milk supplied less protein in the 10-19 age bracket, but the proportion at non-isolated reserves was again greater, in this case almost double that at isolated reserves. Among adults, protein from meat sources was 60-69%, while milk and milk products supplied less protein compared with children and adolescents.

3. Calcium

Up to the age of 9 years, calcium intakes were above the CDS and few children in either age category from either population obtained less than two-thirds of the recommended amount of calcium. In the 10-19 age bracket the mean intakes of calcium in non-isolated communities was slightly greater than in isolated areas, but for both groups diets did not meet the CDS. Approximately one-half of adolescent girls (30% on non-isolated reserves and 73% on isolated reserves) and adolescent boys (43% on non-isolated and 55% on isolated reserves) had calcium intakes below the two-thirds level. Mean calcium intakes for adults were also below the CDS, with a greater percentage of women (50-58%) than men (26-33%) failing to obtain two-thirds of the recommended

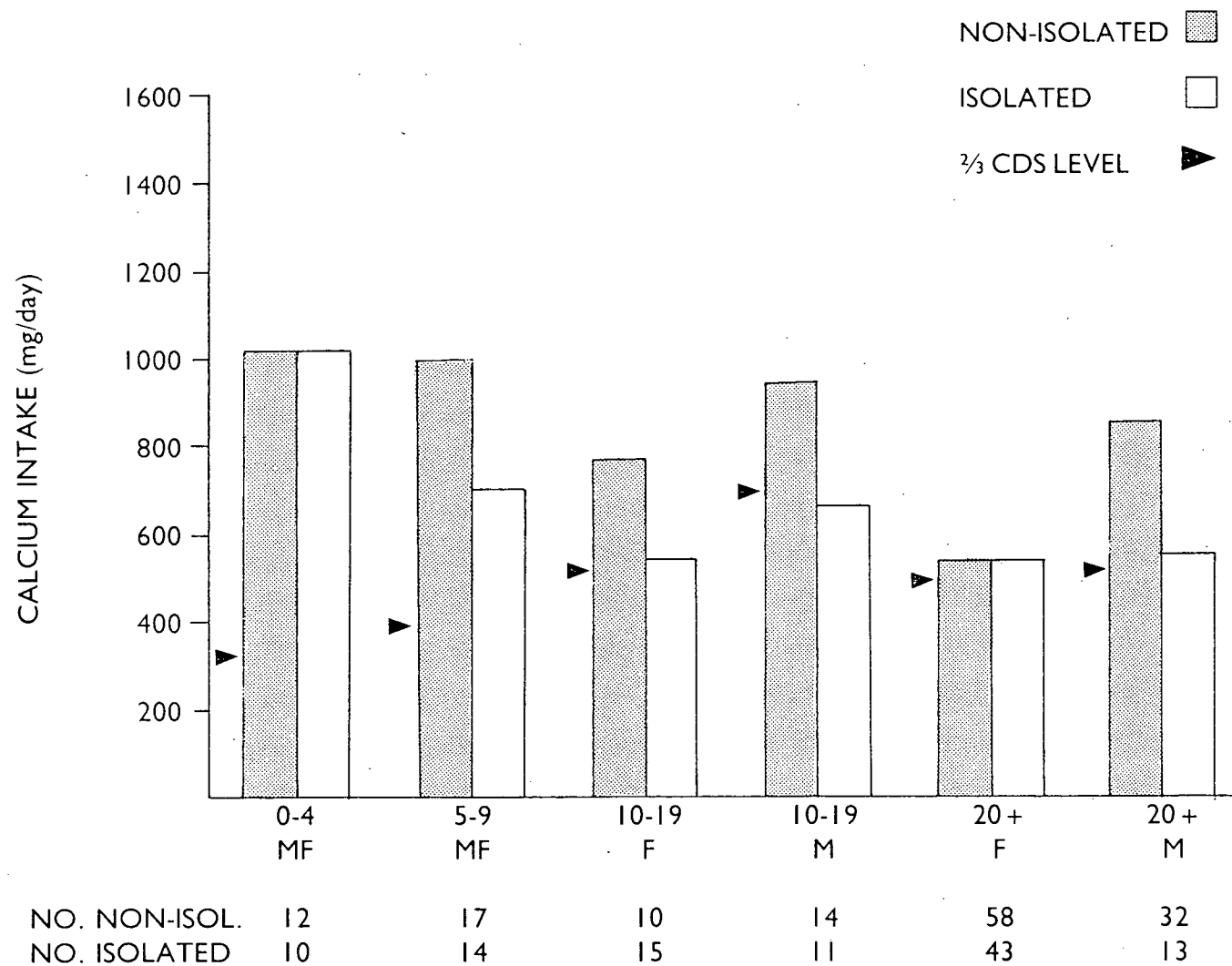


FIGURE 4. NON-ISOLATED AND ISOLATED MEAN INTAKES OF CALCIUM

amounts.

In general, milk and milk products supplied 50-60% of the calcium in the diet. The proportion of calcium contributed by milk was highest among children and adolescents (49-75%) and greater at reserves adjacent to urban centres than at isolated reserves. Significant amounts of calcium were also supplied by grains and cereals, with twice as large a proportion from this source at isolated reserves (21-37%) as compared to non-isolated reserves (11-17%). Meat was an additional calcium source, but in this case provided more calcium to non-isolated diets.

4. Iron

Mean daily iron intakes for almost every group and both sexes were well above the recommended levels. There was, however, a wide range in individual intakes — from 2 mg to 40 mg daily, with intakes on isolated reserves consistently higher than on non-isolated reserves. Thus in some groups a considerable number of persons failed to obtain two-thirds of the recommended standards. Teenagers of both sexes, and adult females, had the highest percentage of individuals with intakes below the CDS. On non-isolated reserves, almost one-third of adolescent boys and girls, and 50% of women, failed to obtain 2/3 of the recommended intakes. Among adult men at both reserves iron intakes were considerably in excess of recommendations, and the number of men failing to meet 2/3 of the CDS was low.

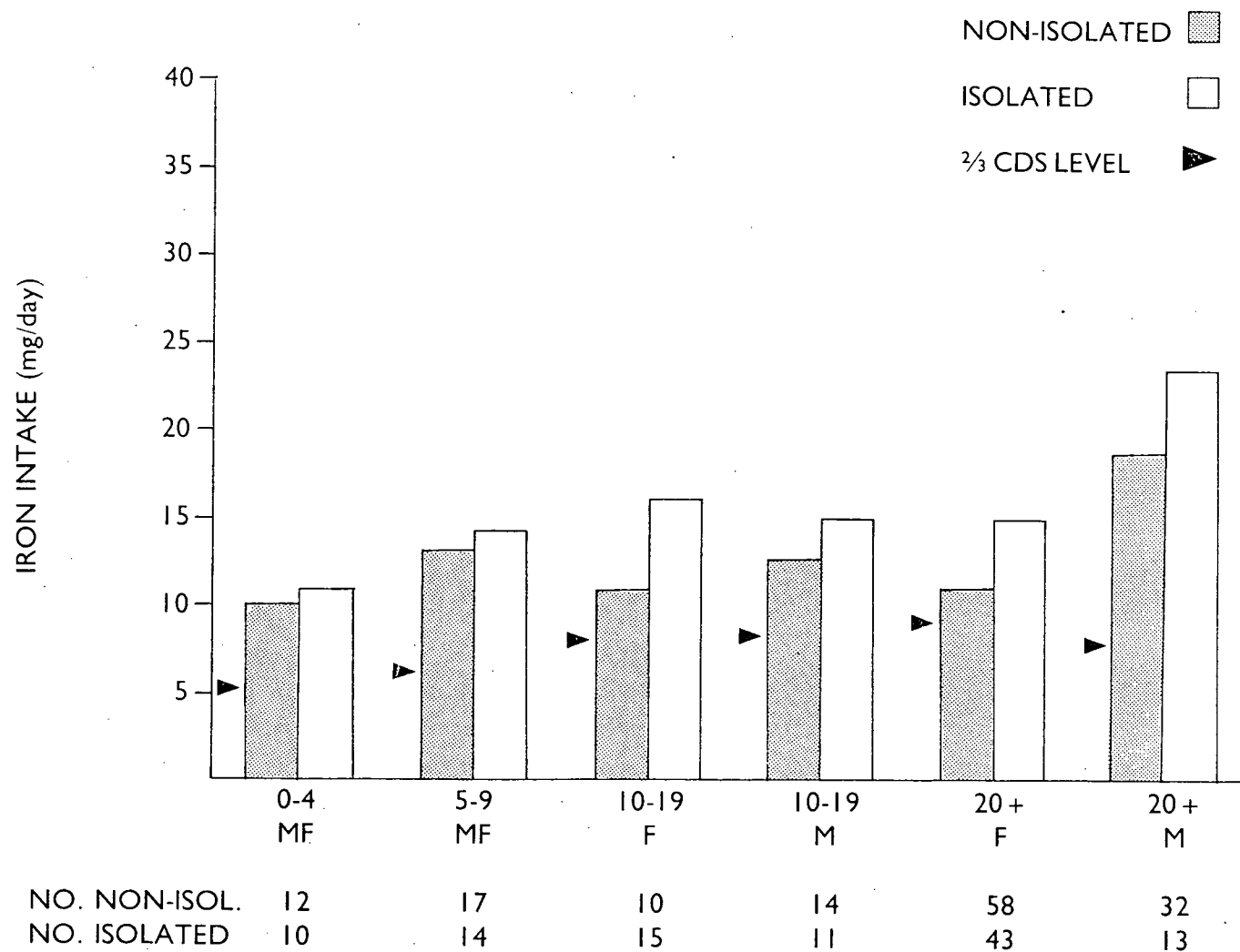


FIGURE 5. NON-ISOLATED AND ISOLATED MEAN INTAKES OF IRON

The primary food group sources of dietary iron for all individuals were meat, fish, poultry and legumes (Group II), contributing approximately half the dietary iron, and cereals and grains (Group V), supplying almost 30% of intake. Both dietary food groups made roughly similar contributions to the diets of the two population groups. Some difference was observed, however, between the contribution of fruits and vegetables to the iron intake. While vegetables were a better source of iron to diets on non-isolated reserves, the reverse was true for fruits.

5. Vitamin A

All age groups had mean vitamin A intakes greatly in excess of standards. Individual daily intakes of this nutrient, however, were extremely variable — from a low of zero to a high of 18,050 iu. Except for age groups 0-9, about 20% of diets of all other groups were deficient in vitamin A when compared with 2/3 of the CDS. Adolescent girls had poorest intakes, with 28% failing to achieve 2/3 recommended levels. The mean vitamin A intakes on non-isolated reserves were generally higher than those on isolated reserves, and a larger proportion of individuals from isolated reserves failed to meet requirements.

The contribution of the various food groups to the diets of children was variable. Vegetables (Group III), the largest single contributor, supplied approximately 1/3 of

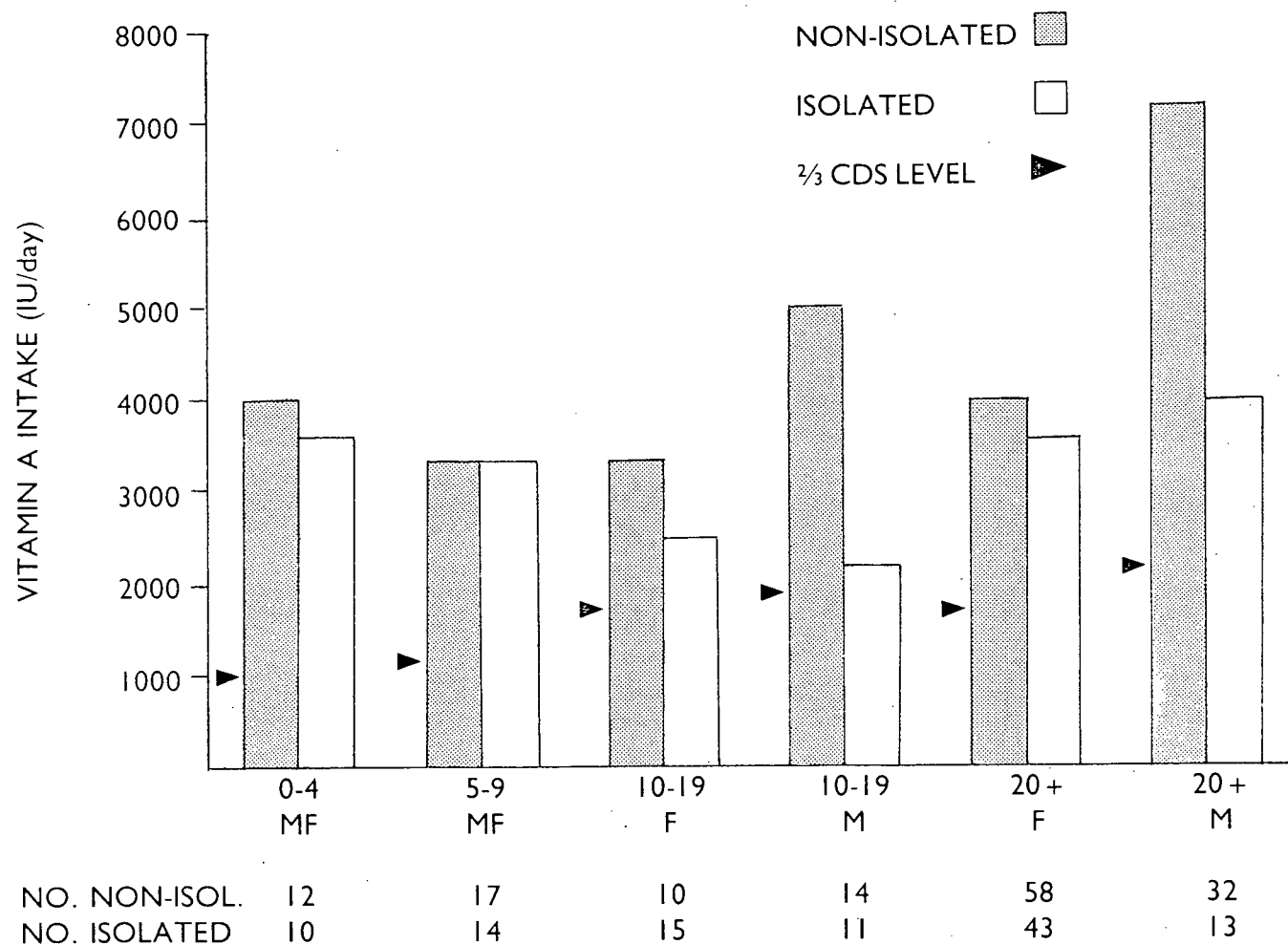


FIGURE 6. NON-ISOLATED AND ISOLATED MEAN INTAKES OF VITAMIN A.

the vitamin A, regardless of reserve. But milk was a better source in urban reserves, while both the meat (Group II) and fats and oils (Group VI) supplied more vitamin A on isolated reserves. Among teenagers in non-isolated communities, fruits supplied the most vitamin A (26-33%). Fats and oils (16-32%), milk and milk products (16-22%), and the meat group (10-22%) made similar contributions to adolescent diets. Vegetables were an important contributor of vitamin A to adult diets (28-44%), followed by meats (20-34%), and fats and oils (14-21%).

6. Thiamin and Riboflavin

Mean thiamin and riboflavin intakes were in excess of the recommended standards for every group with the exception of adolescent males on isolated reserves. Intakes of thiamin were similar for both population groups, except for 5-9 year olds, and adolescent and adult males, where intakes were greater in non-isolated areas. Intakes of riboflavin were also generally higher on non-isolated reserves, except for teenage girls and adult groups. At the same time the variance of intake of both nutrients on non-isolated reserves was larger than on isolated reserves, so that more individuals on non-isolated reserves failed to meet the 2/3 CDS. Thus 29% of children in the 5-9 year old category, 20% of adolescent females, and 23% of adult women in non-isolated communities did not reach the 2/3 level. With respect to

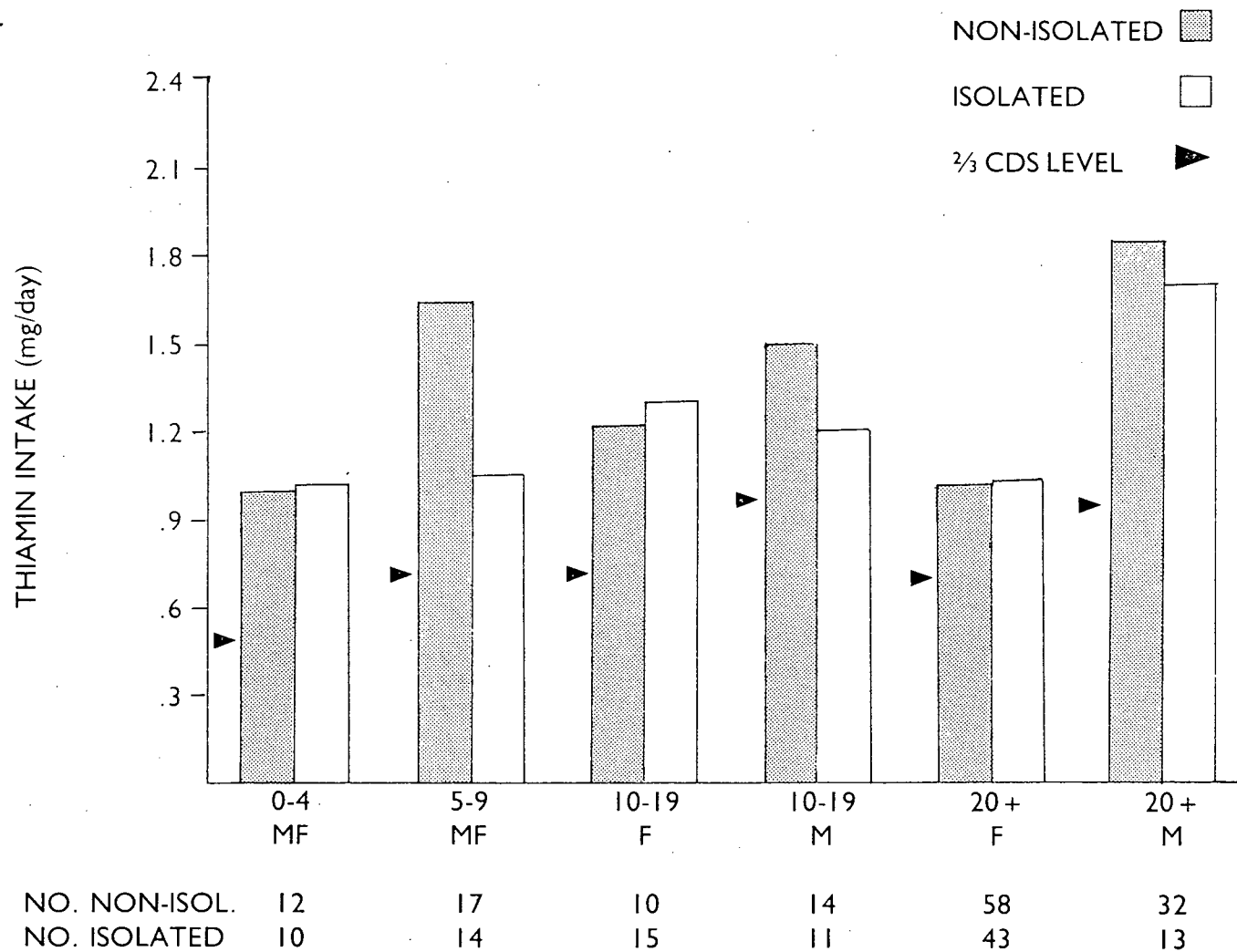


FIGURE 7. NON-ISOLATED AND ISOLATED MEAN INTAKES OF THIAMIN

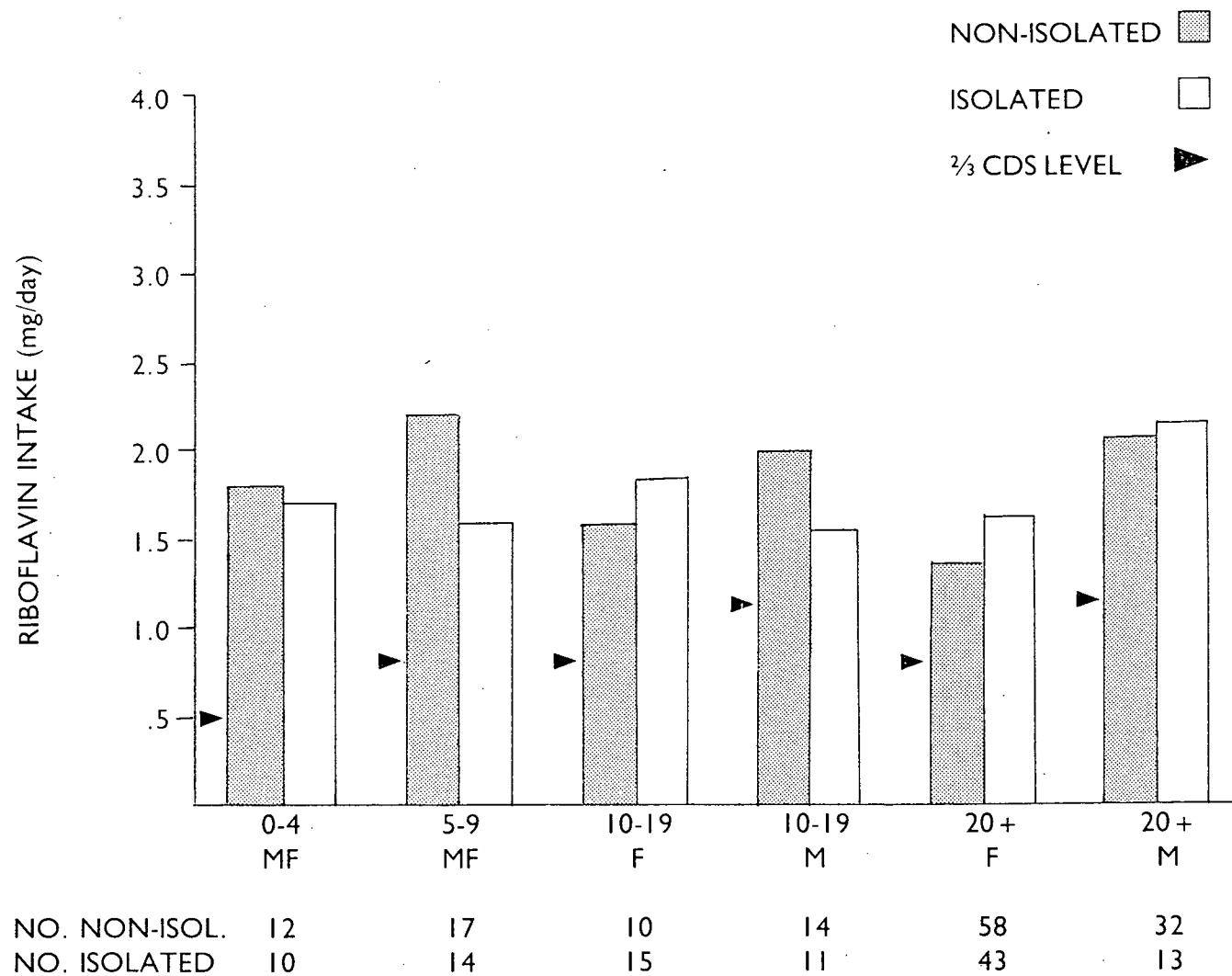


FIGURE 8. NON-ISOLATED AND ISOLATED MEAN INTAKES OF RIBOFLAVIN

riboflavin, only adult women in non-isolated areas failed to ingest amounts equal to 2/3 of the CDS in significant numbers (30%).

The contribution of the various food groups to thiamin intake were roughly similar for both population groups, with grains and cereals (Group V) contributing 29-55% of the thiamin, and meat, fish, poultry and legumes (Group II) contributing the second largest amounts. Fruits, particularly in urban areas, contributed significant amounts of thiamin to the diets of children (7-23%), while both the fruit and vegetable groups provided thiamin to adult diets (4-18%).

Among the population under 9, milk and milk products contributed the largest amount of riboflavin, approximately 56% in the 0-4 age group, and 35-47% in 5-9 year old children. In the case of adolescents in urban areas milk contributed 45% of the riboflavin, while meat (Group II) supplied similar quantities of riboflavin to diets of adolescents in isolated communities. Among adults, meat contributed the largest amount of riboflavin, with the largest proportion in diets of isolated residents. For all groups, most of the remaining riboflavin came from grains and cereals (14-25%).

7. Niacin

Average intakes of niacin were considerably greater than the recommended standards for every group. On isolated

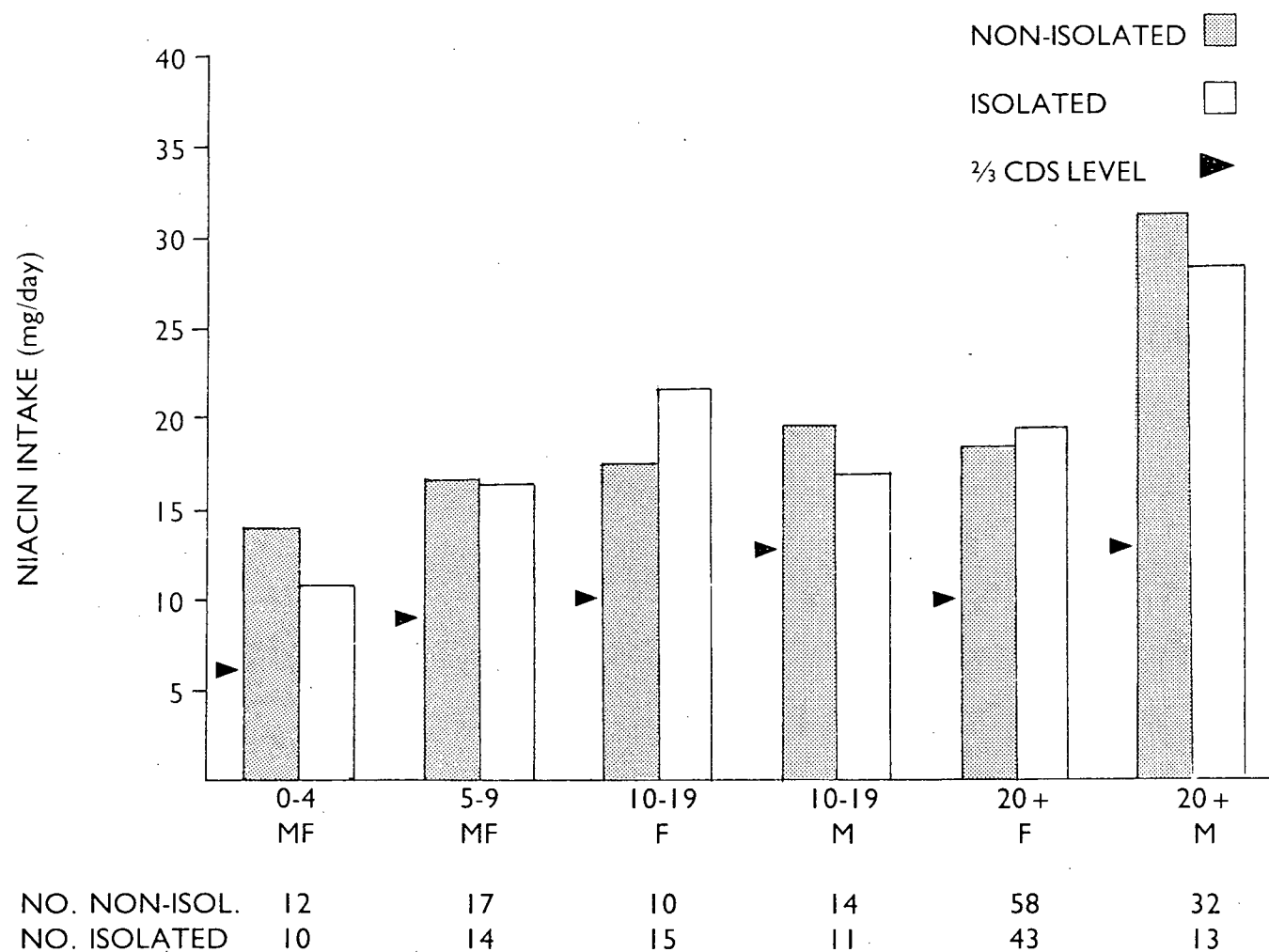


FIGURE 9. NON-ISOLATED AND ISOLATED MEAN INTAKES OF NIACIN

reserves, 0-4 year olds, adolescent and adult males had lower mean niacin intakes than did the corresponding groups on non-isolated reserves. In all other groups intakes in non-isolated areas were equal to or greater than those in reserves adjacent to urban centres. The number of individuals with intakes below 2/3 of the CDS was negligible, with not more than one to three persons in any age group from either population in that category.

In all groups meat, poultry and legumes (Group II) were the major contributor to dietary niacin, with residents from non-isolated areas obtaining slightly less niacin (43-56%) from that source, than isolated residents (43-66%). The second important contributor was the cereal and grain groups (about 25%), followed by vegetables (7-15%), both equally distributed between reserves.

8. Ascorbic Acid

Mean intakes of ascorbic acid were in excess of the Canadian Dietary Standards in every age category for both populations, with intakes on non-isolated reserves being considerably greater than those on isolated reserves (except 0-4 year olds, where the two were similar). However, because of the large variance, 9-36% of persons in most age groups failed to take in sufficient ascorbic acid to meet two-thirds of the CDS. Among adolescent boys, for example, 64% of those from isolated areas failed to achieve

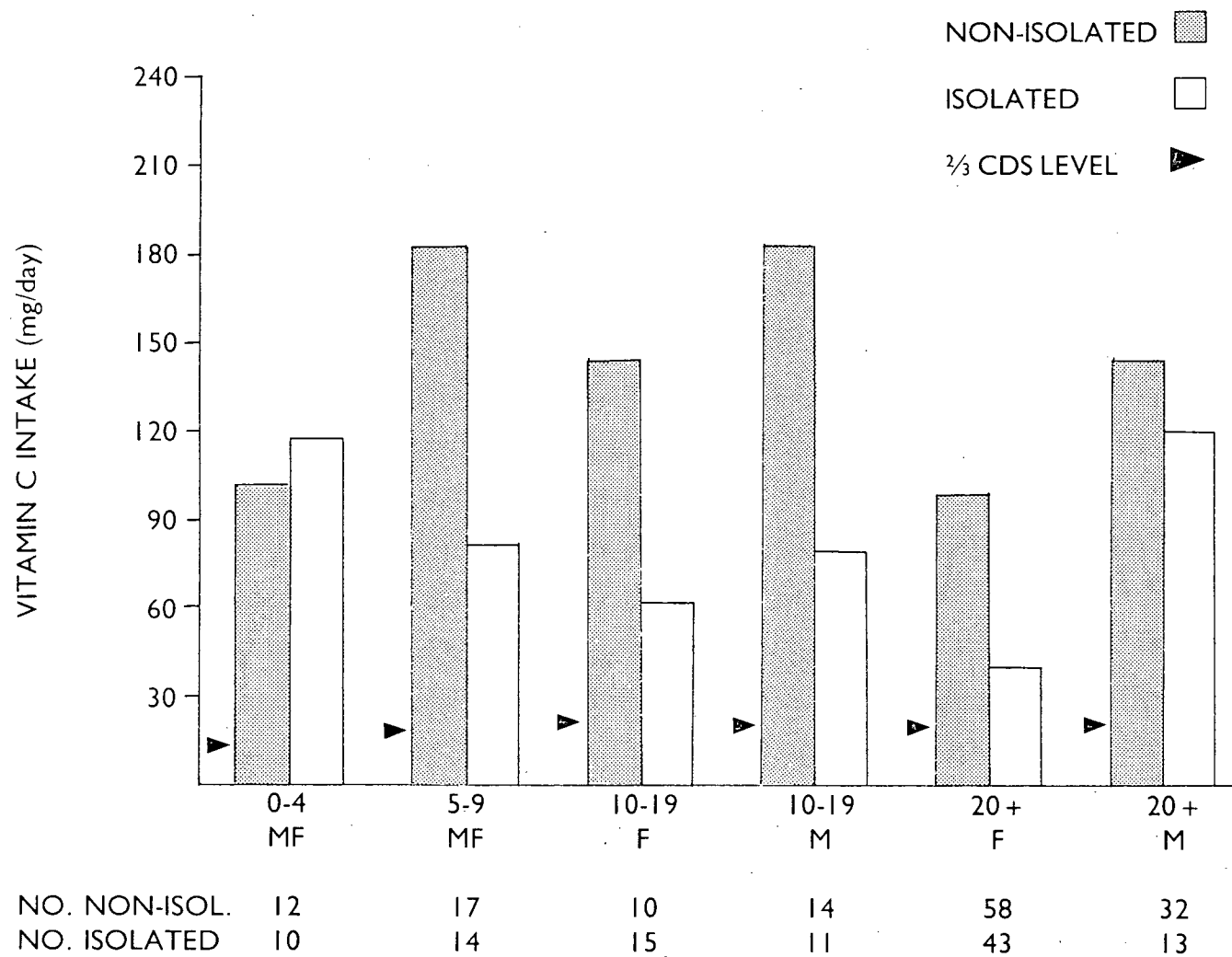


FIGURE 10. NON-ISOLATED AND ISOLATED MEAN INTAKES OF VITAMIN C

that level of intake.

The primary source of ascorbic acid intake among children and adolescents was the fruit group, with individuals on non-isolated reserves receiving more vitamin C from that source (81-89%) than those on isolated reserves (66-81%). Vegetables also contributed a large percentage of ascorbic acid, but more at isolated reserves (15-29%) than on non-isolated ones (8-15%). Among adults, the pattern of intake was related more to the sex of the individuals than to isolation. Whereas vegetables (Group III) contributed just over one-half of the vitamin C to diets of women, fruits (Group IV) provided males with that same amount.

B. Food Frequencies

The frequencies with which individual foods were consumed by respondents are given in Table X. Data for this table was obtained from the 249 24-hour recalls collected and may not be representative of the total diet of any one individual over time. Foods used most extensively include bread, potatoes, tea and coffee, as well as a variety of meats, particularly game.

Although the quantity of meat consumed was similar for the two populations, the pattern of consumption varied.

TABLE X
 FREQUENCY OF CONSUMPTION OF SPECIFIC FOOD ITEMS
 BY ISOLATION*

Foods	% Urban	%Isolated
<u>Meats</u>		
Fish	31	7
Poultry	13	7
Luncheon meats	31	19
Hamburger/stew	37	10
Game	11	69
"Other" meats	16	3
Eggs	43	40
Peanut butter/beans	17	9
Bacon	20	17
<u>Fruits and Vegetables</u>		
Apples/bananas	26	15
Citrus fruits/juice	25	5
Peaches/apricots	14	11
"Other" fruits	14	6
Celery/cucumber	21	0
Vegetable soup (pkg)	8	18
Potato	64	62
Onion	31	17
Leafy green vegetables	39	3
Tomato/juice/sauce	29	11
Peas/green beans	23	10
Carrots/beets	32	10
Corn/turnips	22	18
<u>Bread & Cereals</u>		
Bread	83	88
Rice	31	58
Breakfast cereal	11	11
Hot cereal	14	25
Macaroni/spaghetti	17	25
Pancakes	5	23
Biscuits/crackers	5	12

* Calculated from 24-hour recalls and based on the number of individuals who listed the specific food in their recall.

Foods	% Urban	% Isolated
<hr/>		
<u>Milk and Milk Products</u>		
Evaporated milk	38	52
Powdered milk	7	20
Fresh milk	42	7
Cheese	20	9
Other milk products	22	6
<u>Sugars</u>		
Sugar/honey	68	82
Jam/jelly	31	52
Cookies/cakes	29	36
Cheesies/chips, etc.	18	19
<u>Fats and Oils</u>		
Margarine	52	48
Butter	25	26
<u>Miscellaneous</u>		
Pickles/relish, etc.	30	10
Tea/coffee	71	79
Tang	31	21
Pop/Kool Aid	25	19
<u>Meal Frequency</u>		
Breakfast	80	88
Lunch	87	97
Dinner	99	95
Snacks	79	69

Whereas game meat, namely moose, was the main protein source for residents in isolated reserves, its consumption being reported by almost 70% of those respondents, individuals in non-isolated reserves generally ate a greater variety of meats. These included luncheon meats, poultry, hamburger and stew meats, and "other" meats. Individuals on non-isolated reserves also consumed more fish, this being largely a function of geographical location as all three "urban" reserves were situated near fishing areas. Egg consumption was high for both populations, its frequency of use being about 40%. Peanut butter was the only vegetable protein eaten in appreciable quantities, with highest intakes in non-isolated areas.

Milk intake was generally low, with many respondents indicating gastro-intestinal disturbances with its ingestion. Evaporated milk was the milk used most frequently, particularly in isolated communities where it was consumed by 52% of respondents. It was rarely drunk as a beverage, but was added to coffee, tea or cereal. Powdered milk was also used more frequently on isolated reserves. This would be expected because of lack of refrigeration, cost of milk, and difficulty in obtaining fresh milk and other dairy products. The use of fresh milk, cheese, and other dairy products was highest on reserves adjacent to urban centres, where access to supermarkets and thus a larger variety of milk products was greater.

Consumption of foods from the cereal group was high, with bread (including bannock) being the most popular item, included in over 80% of all diets. Nutrition Canada (1977) also found that for all age groups the mean consumption of bread and rolls, as well as the mean consumption of cereals in general was higher for the native Indian population than the general population. For almost all groups, in fact, cereals were a primary source of calories. Similar results were documented by Lee et al (1970). In the present study, cereals provided more calories to diets of individuals on isolated reserves than on non-isolated reserves. This is reflected in the greater frequency of consumption of "other" foods from the cereal group by isolated respondents. These include rice, which was eaten by almost twice as many residents — 60% on isolated reserves — as well as hot cereal, macaroni and spaghetti, pancakes, biscuits and crackers.

Fruit and vegetable intake was low as has been described in other studies (Lee et al, 1970; Nutrition Canada, 1977). Smith (1975) reported that when available, potatoes are often eaten, while other vegetables are usually thought to be too expensive to purchase. In the present study, potatoes were a staple of the diet. They were, in fact, the only vegetable mentioned by almost 2/3 of respondents, regardless of geographical location. The most common method of preparation was by frying.

Vegetables most frequently eaten included onions, tomatoes, carrots, peas, corn and turnips which were generally included in popular one-pot dishes such as meat and vegetable stews or soups. A surprising finding was the relatively high consumption (39%) of leafy green vegetables reported by urban respondents. These were, again, mostly eaten as part of a combination food — either in sandwiches or hamburgers — and not as a distinct vegetable dish, i.e. salads.

Intake of fruits, as well as vegetables was lower on isolated reserves than on non-isolated reserves. Fruits such as apples, bananas or canned peaches and apricots — which are more easily purchased on isolated reserves — were reported most frequently, but the number of individuals doing so was low. Citrus fruits were almost completely absent from the diets of isolated residents, and this was reflected in their lower vitamin C status.

No native fruits and vegetables were mentioned except for several types of berries. One reason for this may be because of the time of the year the study was conducted, i.e. fall and winter when store supplies are also low.

It has frequently been reported that native diets are high in "empty calorie" items. (Schaeffer, 1977; Ellested-Sayed, 1977). Smith (1975) noted that sweet (and greasy) foods have a great appeal; young children are often given bottles filled with sugar water or pop; cookies, candies

and soft drinks are popular snack items for both young children and adolescents. Nutrition Canada (1977), however, found that the percentage contribution of sugars, beverages and soft drinks to the caloric intake of native diets was similar to that of the general population. Here, the food items most frequently consumed in this category were sugars added to coffee and tea, or jams, jellies and syrup, most often eaten with bannock, bread or pancakes. In both cases consumption was higher in isolated communities where, in fact, foods from this group provided almost twice as many calories to diets (Table IX-1). Cookies and cakes were also eaten by about 30% of respondents from non-isolated reserves and 36% from isolated reserves. Other foods also classified as "empty calorie" such as cheesies, chips, carbonated beverages and Kool Aid were also consumed by both groups, but to a lesser extent.

A high percentage of the population, 71% on non-isolated reserves and 79% on isolated reserves, consumed large quantities of tea or coffee. Margarine was used more frequently than butter, possibly because of availability and cost.

Tables XI-1 and XI-2 show some randomly selected but representative meal patterns. In almost all cases three meals a day were eaten. Breakfast was the meal most commonly missed, by 20% of respondents on non-isolated reserves and 12% on isolated reserves. Almost all recalls included an evening meal. The frequency of snack consumption was high, indicated by almost three-quarters of all respondents.

TABLE XI-1

SAMPLE DAILY MENUS, TAKEN FROM DIETARY RECALL
FORMS COLLECTED ON "ISOLATED" RESERVES.

Early Morn	2 white toast with marg. and jam. Small bowl of oatmeal with sugar and evap. milk. Coffee with sugar and evap. milk	2 cups coffee with sugar and evaporated milk
Mid Morn	Coffee with sugar and evap. milk; 2-3 cookies	
Noon	3-4 oz. moose, $\frac{1}{2}$ cup mashed potatoes with marg. and evap. milk; 1 piece bread with marg. and jam. Tea with evap. milk and sugar	1 cup tomato soup (pkg). 6 oz. moose steak, $\frac{1}{2}$ cup rice, potato
Mid-afternoon	Coffee with sugar and milk. Bread with marg. and jam.	1 cup tea with sugar
Evening	Moose meat. $\frac{1}{2}$ cup rice. Tea with sugar and milk	Moose stew with noodles. Potatoes and rice. Bannock with marg. Tea with sugar
Late evening	Coffee with sugar and milk bread with marg. and jam	1 - 2 cups coffee with sugar and milk

TABLE XI-2

SAMPLE DAILY MENUS, TAKEN FROM DIETARY RECALL
FORMS COLLECTED ON "NON-ISOLATED" RESERVES.

Early Morn	1 small pancake with marg. and jam. Coffee	2 toast (white) with marg. Coffee with sugar and evap. milk
Mid Morn	Coffee	4 cups coffee with sugar and milk
Noon	Macaroni and cheese 2 toast (white) with marg. and applesauce	1 cup rice; 1 thick slice ($\frac{1}{4}$ ") fried balogne. Tea with sugar and milk (2-3 cups tea)
Evening	Fried chicken Breast 1 baked potato with marg. and gravy $\frac{1}{4}$ cup canned corn. 8 oz. Tang	Beef stew with spaghetti and onions 1 cup tea with sugar and milk
Late Evening	1 sandwich with meat- spread, mayonnaise, and marg. 1 pop	4 cups tea with sugar and milk

Food Ideology

A. Food beliefs of homemakers

Table XII gives the measured food attitudes of respondents. With the exception of the cereal group, women in non-isolated areas were more able than those on isolated reserves to list foods which should be included in their daily diet. In non-isolated areas women most frequently mentioned meat (100%), vegetables (88%) and the milk group (73%) as the foods most important to their families, while those from isolated areas listed meat (90%), cereals (85%) and vegetables (70%). It is interesting to note that while many of the respondents listed the vegetable group, 52% of these named the potato specifically.

Women from non-isolated reserves were also more likely to provide valid nutritional reasons for including specific foods in their diet. Whereas 69% of women could give a valid nutritional reason for including vegetables in their diet, only 10% of those on isolated reserves could give similar answers. Knowledge was poorest with respect to the cereal group, and only about 10% of respondents from either location could provide a valid reason for the importance of this group.

TABLE XII

NUMBER OF WOMEN WHO LISTED A FOOD GROUP AS IMPORTANT IN THE DIET AND GAVE A VALID NUTRITIONAL REASON FOR ITS IMPORTANCE.

FOOD GROUP	ISOLATED (52)		NON-ISOLATED (39)	
	No.	(%)	No.	(%)
1. Milk group				
a. Listed	38	(73)	19	(49)
b. Valid Reason	34	(65)	6	(21)
2. Meat group				
a. Listed	52	(100)	35	(90)
b. Valid Reason	24	(46)	11	(28)
3. Fruits				
a. Listed	37	(71)	15	(39)
b. Valid Reason	22	(42)	3	(8)
4. Vegetables				
a. Listed	46	(88)	27	(70)
b. Valid Reason	36	(69)	4	(10)
5. Cereal group				
a. Listed	34	(65)	33	(85)
b. Valid Reason	6	(12)	4	(10)

B. Food beliefs as related to pregnancy, lactation, infancy and illness

Tables XIII to XVI list some of the most common foods considered beneficial or harmful at certain stages of the life cycle. General statements made by respondents indicating why foods were so classified, together with certain traditional food beliefs are also presented.

Respondents listed few dietary alterations that occur during pregnancy, and for the most part stressed the consumption of a regular diet (Table XIII). Foods from the milk and vegetable groups were mentioned most frequently as foods important to the pregnant woman. Few foods were considered taboo. Avoidances of specific foods appear to be more closely related to restriction of weight gain than any widely held folk-belief.

Opinions related to maternal nutrition during lactation are presented in Table XIV. Many of the women related that they had not breastfed their infants and were thus unsure of the best diet at this time. Foods most frequently classed as "beneficial" to lactation were fluids, as either milk (36%), tea, coffee, or soup (13%). Certain vegetables and fruits, and chocolates were considered as "harmful" by a small percentage of women (9-12%) because they were thought to cause diarrhea and cramps in infants.

Table XV shows that respondents were more likely to

TABLE XIII

PERCENTAGE OF WOMEN INDICATING SPECIFIC FOODS AS
BENEFICIAL OR HARMFUL DURING PREGNANCY

BENEFICIAL FOODS	(%)	HARMFUL FOODS	(%)
Milk	42	Greasy/starchy	14
Vegetables	33	Meat	12
Regular diet	28	Fruits/vegetables	8
Fruits	26	Empty calories	7
Meat	23	Alcohol	6
Cereal	8	Salt	6
Soup	6	Milk	4
Vitamins	5		

N=86

General statements:

Bananas and potatoes are too starchy.
 Not too much starches — gain too much weight.
 Don't eat potato — baby will get too big.
 No sugar, baby will be too big.
 Not too much meat — baby might grow too big.
 Don't eat double or baby will get too big.
 Green apples and coconut are bad for baby.
 Baby will be healthy if you eat grouse and rabbit.
 My mother-in-law told me not to eat onions.

Traditional beliefs:

Certain seaweed will darken baby's hair (or skin).
 Fish heads (or eggs) will produce a bald-headed baby.
 Eating beaver or pig's feet will deform feet of baby.
 No berries (huckle/blue) or baby will have spots.
 Eating fish eggs will cause scars on child's face.
 No fish tails — baby will be breach.

TABLE XIV

PERCENTAGE OF WOMEN INDICATING SPECIFIC FOODS AS
BENEFICIAL OR HARMFUL DURING LACTATION

BENEFICIAL FOOD	(%)	HARMFUL FOOD	(%)
Milk	(36)	Vegetables	(12)
Tea	(13)	Chocolates/pop	(10)
Soup	(13)	Fruits	(9)
Coffee/other fluids	(13)	Fatty foods	(6)
Fruits	(12)	Meat	(5)
Regular diet	(12)	Spicy foods	(3)
Vegetables	(10)		

N=86

General Comments:

Fruits give baby gas pains and diarrhea.

Turnips and cabbage will upset the child with gas.

Orange stops the milk flow (also causes diarrhea).

Onions will make baby smell.

The mother cannot eat meat for 40 days because her stomach is weak and cannot grind it.

Gum, chocolates and sweets will give baby cramps.

TABLE XV

PERCENTAGE OF WOMEN INDICATING SPECIFIC FOODS AS
BENEFICIAL OR HARMFUL DURING INFANCY

BENEFICIAL FOODS	(%)	HARMFUL FOODS	(%)
Milk	74	Empty calories	23
Canned baby foods	52	Solids	7
Fruits	51	Cereal	5
Vegetables	48	Meat	4
Meats	43	Canned baby foods	4
Cereal	42		
Juice	21		
Regular (mashed)	14		
Soups	7		

N=86

General Comments:

Almost everything we eat, ground up.

Not too much meat. If so, should be well done.

Cabbage and cauliflower are too gassy..

No strong foods such as meat and fish.

No bannock or dried meat, baby might choke.

TABLE XVI

PERCENTAGE OF WOMEN INDICATING SPECIFIC FOODS AS
BENEFICIAL OR HARMFUL DURING ILLNESS

BENEFICIAL FOODS	(%)	HARMFUL FOODS	(%)
Soup	57	Solids	20
Fruit juices	55	Meat	6
Liquids	26	Usual meals	5
Soft drinks	13	Fried foods	5
Tea	12	Cereal	4
Meat	12	Vegetables	4
Milk	9		

N=86

General Comments:

Soup is easier to take.

Can't eat when you are sick.

Don't eat most foods.

Avoid heavy starchy foods that will lay heavy in stomach.

provide opinions regarding diets of infants. Milk was mentioned by 74% of women as an important food for infants, while over 50% listed fruits, vegetables, and canned baby foods. Almost no foods were considered harmful during this period, although almost 25% of respondents emphasized that "empty calorie" foods should be avoided.

During illness, some alterations in food intake occur, as indicated in Table XVI. Many respondents indicated that consumption of liquid foods, notable soups and fruit juices when ill. Twenty percent of respondents mentioned withdrawal of solids and other "heavy" foods from their diet.

Shopping Practices

Table XVII shows that supermarkets were the most popular type of store selected for food purchasing by women on non-isolated reserves. Isolated homemakers, in contrast, shopped at small grocery or general stores. Where access was possible, 23% of isolated families travelled to larger centres and purchased their food in supermarkets.

Better, selection, convenience, and the availability of credit were the principal reasons given by women on non-isolated reserves for selecting stores (Table XVIII). On many isolated reserves families were restricted to one grocery outlet. In those isolated areas with more than

TABLE XVII

TYPE OF STORE WHERE MAJORITY OF FOOD SHOPPING IS DONE

STORE	NON-ISOLATED		ISOLATED	
	No.	(%)	No.	(%)
Supermarket	36	(69)	9	(23)
Small supermarket	12	(23)	-	-
Convenience store	3	(6)	-	-
General/Grocery store	-	-	31	(78)
Co-op	1	(2)	-	-

one store, purchasing decisions were based on better selection and the availability of credit. Cost was given equal consideration by the two populations.

Frequency of shopping for major and minor, or "fill in" food purchases are reported in Table XIX. A small number of respondents expressed difficulty in categorizing shopping trips, and this problem may be reflected in the results. The majority of homemakers shopped once weekly or every two weeks for their major grocery supplies. Among the isolated group, one-third of the families, including many of those who sought alternative grocery outlets outside their

communities, did a large monthly shopping. Minor purchases were frequent and the majority of families from both areas shopped two or more times a week.

TABLE XVIII
REASONS FOR SELECTING STORE

Reason	Non-Isolated		Isolated	
	No.	(%)	No.	(%)
Better selection	21	(40)	11	(28)
Cheaper	6	(12)	5	(13)
Convenient	8	(15)	0	
Credit	9	(17)	1	(3)
Selection & price	3	(8)	1	(3)
No choice	0		15	(38)
Service	3	(8)	0	
Location	2	(4)	4	(10)
Patronage	0		3	(8)

TABLE XIX
FREQUENCY OF SHOPPING FOR MAJOR AND MINOR FOOD PURCHASES

Frequency	Non-Isolated		Isolated	
	No.	(%)	No.	(%)
Major shopping				
Daily	1	(2)	5	(13)
Weekly	12	(23)	9	(23)
Bi-weekly	31	(60)	11	(28)
Monthly	8	(15)	13	(33)
Other	0	(10)	2	(5)
Minor shopping				
6 - 7x/week	15	(29)	5	(13)
4 - 5x/week	7	(14)	8	(20)
2 - 3x/week	20	(39)	20	(50)
Weekly	7	(14)	4	(10)
Don't do	3	(6)	3	(8)

The responsibility for purchasing food for the household differed with isolation (Table XX). Whereas on non-isolated reserves the female head of household was by far the principal food shopper (85%), on isolated reserves this task was almost equally distributed between the woman and other family members. The majority of women (76%) did not shop alone, and were accompanied to stores by family members, most frequently, children.

The types of foods children encourage mothers to purchase while shopping were classified into the food groups and are presented in Table XXI. Snacks and empty calorie foods such as pop, sweets, potato chips, etc. were the most popular items requested, particularly on isolated reserves. Foods from the milk group (notably ice cream), fruits, and cereals were also liked by children.

The use of several recommended food - buying practices was assessed, as illustrated by Table XXII. While respondents on non-isolated reserves were more likely to budget and pay cash for food purchases, an equal percentage of women from both groups used shopping lists.

Monthly food expenditure ranged from \$84.00 to \$630.00 with a mean of \$252.16 on non-isolated reserves, and \$302.43 on isolated reserves. (Table XXIII). A larger percentage of families on isolated reserves reported expenditure of three hundred dollars and more. (53% as compared to 29% for non-isolated reserves).

TABLE XX

PERSON WHO DOES MAJORITY OF FOOD SHOPPING

Shopper	Non-Isolated		Isolated	
	No.	(%)	No.	(%)
Female head of household	44	(85)	18	(45)
Male head of household	-	-	6	(15)
Female head of household & other family member	7	(13)	11	(28)
Children/other adult	3	(6)	5	(8)
<u>Person accompanying Food Shopper</u>				
Husband	8	(20)	5	(16)
Children	25	(61)	20	(65)
Friends/relatives	3	(7)	4	(13)
Entire family	5	(12)	2	(7)

TABLE XXI

FOOD SHOPPING REQUESTS OF CHILDREN

Food Group	Non-Isolated		Isolated	
	No.	(%)	No.	(%)
Milk	10	(31)	7	(29)
Meat	4	(13)	1	(4)
Fruits	13	(41)	4	(17)
Vegetables	2	(6)	0	-
Cereals	7	(22)	3	(13)
Empty calories	18	(56)	23	(96)
Other	5	(16)	0	-

TABLE XXII
FREQUENCY OF SELECTED SHOPPING PRACTICES

Practice	Non-Isolated(52)		Isolated(39)	
	No.	(%)	No.	(%)
Use of List				
Makes List	29	(56)	19	(49)
Doesn't make List	23	(44)	20	(51)
Budget				
Budgets for food	29	(56)	7	(17)
Doesn't budget	23	(44)	32	(82)
Payment				
Cash	36	(69)	6	(15)
Charge	13	(25)	25	(64)
Cash & charge	3	(6)	7	(18)
Charge & trade	0		1	(3)

To assess the effect, if any, of using food costs on the purchasing patterns of families, women were asked whether they now buy more, less, or the same amounts of certain foods. As illustrated in Table XXIV, 53% of women named meat as the food most affected. Many of these same respondents also indicated that they were now relying more on meat from hunting and fishing. Snack foods, fruits and vegetables were other food groups affected. Increased purchases were most apparent in the bread and cereal group, with almost 20% of families indicating that they were recently

buying more of these foods.

TABLE XXIII
DISTRIBUTION OF MONTHLY FOOD EXPENDITURE

Food Expenditure (\$ per month)	Non-Isolated		Isolated	
	No.	(%)	No.	(%)
Less than 100	1	(2)	0	-
100 - 199	13	(25)	5	(13)
200 - 299	20	(39)	11	(28)
300 - 399	10	(19)	12	(30)
400 +	5	(10)	9	(23)
No response	3	(6)	3	(8)

The degree to which various factors influence food purchases and thus food consumption was also investigated, with the consideration that these attitudinal data could be used to increase the effectiveness of nutrition education programme. Homemakers were asked to indicate whether each factor listed was very important, or not important in influencing food selection (Table XXV).

"What the children like" was chosen most often as an influential factor. "Cost", "what is good for you", and "requests made by husbands" were also mentioned frequently. The woman's own food preferences was the main factor in the 'important' category, while ease of preparation was the least influential factor.

TABLE XXIV
CHANGES IN FOOD BUYING WITH INCREASING FOOD PRICES

Food Group	Buy less		Buy more		Same	
	No.	(%)	No.	(%)	No.	(%)
Milk	9	(15)	6	(10)	45	(75)
Meat	32	(53)	2	(3)	26	(44)
Fruits	12	(20)	2	(3)	46	(77)
Vegetables	11	(18)	3	(5)	46	(77)
Cereals/bread	5	(8)	11	(18)	44	(74)
Snack foods	22	(37)	2	(3)	36	(60)

N = 60

Meal Planning and Preparation

Table XXVI shows that the chief individual responsible for the preparation of family meals, regardless of isolation was the female head of household. Males play little, if any, role in the actual cooking of food.

Whether or not meals were planned ahead, and how far in advance was also assessed, as illustrated in Table XXVII. Although few women used meal plans, a larger percentage of those in non-isolated reserves were more likely to do so.

TABLE XXV
FACTORS IDENTIFIED BY RESPONDENTS AS INFLUENCING
FOODS PURCHASED.

Factor	Very Important No.	(%)	Important No.	(%)	Not Important No.	(%)
What the homemaker likes	14	(22)	45	(70)	5	(8)
What husband likes	21	(34)	28	(46)	4	(7)
What children like	34	(53)	25	(39)	3	(5)
Easy to prepare	6	(10)	22	(34)	36	(56)
Cost of Food	27	(42)	22	(34)	15	(23)
What is "good" for	26	(40)	35	(55)	3	(5)

N = 64

TABLE XXVI
PERSON WHO DOES MAJORITY OF COOKING

Cook	Non-Isolated		Isolated	
	No.	(%)	No.	(%)
Female head of household	35	(70)	25	(63)
Male head of household	0		1	(2)
Other adult	3	(6)	1	(2)
FHH and other adult	3	(6)	3	(8)
FHH and daughter	5	(10)	4	(10)
FHH and MHH	1	(2)	3	(8)
Shared by all	3	(6)	2	(5)
Children	0		1	(2)

There was a significant difference in household facilities available to individuals living in the two areas (Table XXVIII). Whereas almost all families in non-isolated reserves had running water, electricity, refrigerators, stoves and ovens, these were reported by a much smaller percentage of families in isolated areas. Freezers were an appliance least available to all respondents.

Homemakers were asked whether they had ever "studied about what to eat" and where they had studied. There was a large difference between the two populations, with 65% of women on non-isolated reserves having received some training, but only 25% of those on isolated reserves having food education (Table XXIX). Formal schooling was

indicated by the majority of respondents from both areas as the source of teaching. Women were also in agreement that the food or cooking information they had received was of benefit to them.

TABLE XXVII

USE OF, AND FREQUENCY OF MEAL PLANS

Plan	Non-isolated		Isolated	
	No.	(%)	No.	(%)
For one week	4	((8)	0	-
For a few days	4	((8)	1	(3)
Day before	8	(15)	2	(5)
Day-to-day	36	(69)	37	(93)

TABLE XXVIII

HOUSEHOLD FACILITIES

Facility	Non-isolated		Isolated	
	No.	(%)	No.	(%)
Running water	51	(98)	11	(21)
Electricity	51	(98)	13	(33)
Freezer	26	(50)	4	(10)
Refrigerator	52	(100)	2	(5)
Stove	52	(100)	39	(98)
Oven	52	(100)	32	(80)

TABLE XXIX
FOOD AND COOKING EDUCATION OF RESPONDENTS

Education	Non-Isolated		Isolated	
	No.	(%)	No.	(%)
Received training	34	(65)	10	(25)
Did not receive training	18	(35)	30	(75)
Source of teaching				
Grade school	1	(3)	1	(10)
High school	24	(71)	5	(50)
Vocational school/ other training	3	(9)	2	(20)
High school & other	5	(14)	1	(10)
Evening classes	1	(3)	1	(10)
Value of information				
Helpful	26	(79)	9	(90)
Not helpful	7	(21)	1	(10)

Sources of nutrition information identified by respondents are illustrated in Table XXX. The primary source of information listed by respondents was their mother, while family members and other relatives were indicated by almost 40% of women. Of the non-human sources, cookbooks and other books received a high response from the population. Newspapers and magazines were cited by 50% of women on non-isolated reserves, but not mentioned by women on isolated reserves. Nutritionists, dieticians, physicians, or nurses were mentioned infrequently.

TABLE XXX
SOURCES OF NUTRITION INFORMATION IDENTIFIED BY RESPONDENTS

Source	Non-isolated (52)		Isolated (40)		Total (92)	
	No.	(%)	No.	(%)	No.	(%)*
1. Physicians, nurses dentists	6	(12)	2	(5)	8	(9)
2. Nutritionists, dieticians	3	(6)	0		3	(3)
3. Mother	26	(50)	25	(63)	51	(55)
4. Family member/other relatives	20	(38)	15	(38)	35	(38)
5. Friends	13	(25)	1	(3)	14	(15)
6. Newspapers, magazines	29	(56)	0		29	(32)
7. Cookbooks, other books	26	(50)	18	(45)	44	(48)
8. T.V./Radio	9	(17)	0		9	(10)
9. Past experience	13	(25)	9	(23)	22	(24)

* expressed as % of all women

A large percentage of respondents, 73% on non-isolated reserves and 78% on isolated reserves indicated use of vitamin and mineral supplements (Table XXXI). Less than half of these, however, mentioned that supplements were used regularly. Different patterns of use were apparent. Whereas on isolated reserves the majority of users (80%) were children, on non-isolated reserves, children, the female head of household and the entire family were taking supplements. The type of supplement being taken also varied with location with 'Tri-Vi-Flor/Adeflor' (issued by Medical Services) being the most frequently mentioned supplement on isolated reserves, and 'Multivitamins' on non-isolated reserves.

In order to assess the role of alternate food sources to families, respondents were asked to rank the importance of fishing, hunting, trapping, gardening, and gathering as a food source to them (Table XXXII). In almost every case, subjects in isolated areas were more likely than those in non-isolated areas to rate food from the land as being a more important means of obtaining food. The most notable differences were in hunting and fishing; whereas 100 percent of respondents in isolated communities indicated that hunting was either very important or important to them, only 56% of those on non-isolated reserves did likewise. Similarly trapping

TABLE XXXI
USE OF VITAMIN AND MINERAL SUPPLEMENTS

Variable	Non-Isolated		Isolated	
	No.	(%)	No.	(%)
Practice				
Take supplements	38	(73)	31	(78)
So not take supplements	14	(27)	9	(23)
Frequency				
Regular	18	(47)	13	(42)
Irregular	15	(40)	18	(58)
Winter only	5	(13)	0	
Family member				
Child/children	10	(26)	24	(80)
Female head of household	13	(34)	3	(10)
Male head of household	1	(3)	1	(3)
Other family members	1	(3)	0	
All or most of family	13	(34)	2	(7)
Type of supplement				
Multiple	21	(55)		
Adeflor/Tri-vi-flor	5	(13)	30	(100)
Calcium	1	(3)		
Iron	2	(5)		
Iron + vitamins	5	(13)		
Cod liver oil	1	(3)		
Combination of types	2	(5)		
Don't know	1	(3)		

TABLE XXXII
TRADITIONAL FOOD PATTERNS

Practice	NON-ISOLATED (52)			ISOLATED (40)		
	Very Impt.	Impt.	Not Impt.	Very Impt.	Impt.	Not Impt.
Fishing	30 (50)*	14 (27)	8 (15)	28 (70)	9 (23)	3 (8)
Hunting	15 (29)	14 (27)	23 (44)	37 (93)	3 (8)	0
Trapping	1 (2)	5 (10)	46 (88)	8 (20)	12 (30)	20 (50)
Gardening	8 (15)	7 (14)	37 (71)	6 (15)	10 (25)	24 (60)
Gathering	6 (12)	2 (4)	25 (48)	7 (18)	22 (55)	11 (28)

* Figures in parentheses indicate percentage of isolation type

PRESERVATION PRACTICES

	Non-isolated		Isolated	
	No.	(%)	No.	(%)
Preserves Food	37	(71)	29	(73)

was stressed by 50% of isolated residents, but only 12% of non-isolated families. Gardening appeared to be least important to all respondents, while fishing was most important.

The practice of food preservation was not affected by isolation and almost three-quarters of all families preserved food (Table XXXII).

Food Practices of Homemakers

A. Food Scores

Food practices were measured by a score based on a 24 - hour recall of the intake of the female household head. As an indication of dietary adequacy, the assumption of Au Coin et al (1972) was adopted:

"In recognition of the fact that it is quite possible to obtain a satisfactory nutrient intake in terms of Canadian Dietary Standards yet not meet all of the recommendations of Canada's Food Guide (McClinton et al, 1971; Milne et al, 1963) for the purpose of this study, a score of 70 or more out of a possible 100 was considered to be adequate (p.147)."

Table XXXIII shows that scores for food practices varied widely, with a range of 10 to 25 points and a mean of 18.3 for the entire population. Satisfactory intake was obtained by only 57% of the women, as indicated by scores of 18.5 (70%) or greater. Significant differences were observed between the scores of the two populations, with

TABLE XXXIII
FOOD PRACTICE SCORES ACHIEVED BY RESPONDENTS

Score	Non-isolated (52)		Isolated (40)	
	No.	(%)	No.	(%)
10	0		1	(2.5)
11	0		1	(2.5)
12	2	(3.8)	1	(2.5)
13	1	(1.9)	3	(7.5)
14	1	(1.9)	4	(10.0)
15	3	(5.8)	2	(5.0)
16	1	(1.9)	3	(7.5)
17	6	(11.5)	3	(7.5)
18	3	(5.8)	5	(12.5)*
19	6	(11.5)	7	(17.5)
20	10	(19.2)	5	(12.5)
21	8	(15.4)	4	(10.0)
22	4	(7.7)	1	(2.5)
23	4	(7.7)	0	
24	2	(3.8)	0	
25	1	(1.9)	0	
	mean = 19.3		mean = 17.2	

* level of dietary adequacy

women on non-isolated reserves scoring higher. In non-isolated areas, 67% of respondents had adequate diets, while only 43% of respondents on isolated areas did so.

Food practice scores were also broken down into major food groups (Table XXXIV).

TABLE XXXIV.
FOOD SCORES OF RESPONDENTS BASED ON MAJOR FOOD GROUPS

Food Group	Score	Non-isolated (52)		Isolated (40)	
		No.	(%)	No.	(%)
MILK	0	8	(15)	3	(8)
	1	3	(6)	5	(13)
	2	8	(15)	9	(23)
	3	3	(6)	11	(28)
	4	13	(25)	6	(15)
	5	2	(4)	1	(2)
	6	15	(27)	5	(13)
		mean = 3.5		mean = 2.9	
FRUIT AND VEGETABLES	0	3	(6)	8	(20)
	2	3	(6)	3	(8)
	3	2	(4)	8	(20)
	4	4	(8)	9	(23)
	5	18	(35)	6	(15)
	6	4	(8)	4	(10)
	7	18	(35)	2	(5)
		mean = 5/2		mean = 3.4	
MEAT	1	1	(2)	0	(0)
	3	3	(6)	1	(3)
	4	3	(6)	4	(10)
	5	10	(19)	6	(15)
	6	35	(68)	29	(72)
		mean = 5.4		mean = 5.6	
BREAD AND CEREAL	0	1	(2)	2	(5)
	2	3	(6)	2	(5)
	3	1	(2)	0	(0)
	4	7	(14)	3	(8)
	5	4	(8)	0	(0)
	6	36	(69)	33	(83)
		mean = 5.3		mean = 5.4	

Meat and cereal were the most adequate groups in the women's diets. Ninety-five percent of the respondents consumed the recommended daily intake of meat or meat products, as demonstrated by a score of 4 or greater. Only one woman had no foods from this group. No significant differences were found between the two populations for meat consumption.

For the cereal food group, 69% of women on non-isolated reserves, and 83% of women on isolated reserves consumed 3 servings, thus achieving a maximum score of 6 points. A total of 87% of respondents had an adequate intake of foods from this group (adequate being taken as a score of 4 plus).

Milk and milk products was the group consumed in the least adequate amounts. Foods from this group were eaten by only 22% of the women in the recommended $1\frac{1}{2}$ servings. When a score of 4 is taken as a basis for dietary adequacy, 44% of the surveyed population had an adequate intake of foods from this group. Although intakes were lower in isolated areas, this difference was not significant.

A significant difference between the two populations was observed, however, in the intake of fruits and vegetables. Only 30% of women on isolated reserves had adequate intakes of foods from this group (indicated by a score of 5 plus), as compared to 78% of women on non-isolated reserves. Forty-eight percent of isolated respondents had one or no serving of fruits and vegetables.

TABLE XXXV

INTER-RELATIONSHIP BETWEEN FOOD GROUPS AND FOOD PRACTICES

		1	2	3	4	5
Milk	1					
Fr Veg	2	-0.015				
Meat	3	-0.134	0.002			
Cereal	4	0.128	-0.207 ^b	0.051		
Practices	5	0.499 ^c	0.437 ^c	0.142 ^a	0.250 ^b	1.000

^a_p < .05

^b_p < .01

^c_p < .001

Inter-correlation of mean scores in the four food groups showed only a strong negative correlation ($p < 0.01$) between scores for the cereal and the fruits and vegetables groups (Table XXXV).

Mean scores of each of the four food groups were positively correlated with the total food practice mean scores. Milk, and fruit and vegetable group mean scores were found to correlate most strongly ($p < .001$), while cereal ($p < .01$) and meat ($p < .05$) group mean scores related less strongly to total food practice mean scores.

B. Relationship between food practices and selected variables

Analysis of variance indicated that the location of the reserve did influence the food practice scores of respondents (Table XXXVI). The mean food practice scores

TABLE XXXVI
MULTIPLE RANGE TEST OF MEAN SCORES FOR FOOD PRACTICES,
WITH RESPECT TO RESERVE

Reserve	N	Mean Score
1. Sechelt	16	19.00 ^b *
2. Fort Ware	12	16.08 ^{ab}
3. Necoslie	16	19.81 ^{bc}
4. Nanaimo	20	19.10 ^b
5. Nazko	8	18.50 ^b
6. Babine	7	19.14 ^b
7. Takla	13	16.23 ^{ab}

* Means not sharing the same subscript under each variable are significantly different at $p < 0.05$.

of women from Necoslie did not differ significantly from the mean scores of women at Sechelt, Nanaimo, Nazko or Babine, but were significantly different from the mean scores of those at Fort Ware or Takla.

Results of Scheffe's Test for food practice scores in terms of reserves:

3	1	4	5	6	
<hr/>					
1	4	5	6	7	2
<hr/>					

For reserves underlined by the same line, differences in mean practice scores were not significant.

TABLE XXXVII

RELATIONSHIP OF DEPENDENT VARIABLES AND FOOD PRACTICE
SCORES (KENDALL'S CORRELATION COEFFICIENT)

Variable	Food Score
Isolation	- 0.286 ^c
Age - female	0.040
Household size	- 0.136 ^a
Education-female	0.179 ^a
Education-male	0.155
Nutrition Education	0.137
Beliefs	0.229 ^b
Family Income	- 0.079
Per Capita Income	0.083
Work Status-female	0.021
Occupation-Male	0.144
Household facilities	0.238 ^b

^a_p < .05

^b_p < .01

^c_p < .001

Rank correlation indicated that a number of variates were significantly related to nutrition practice scores (Table XXXVII).

The most significant factor relating to food consumption was isolation ($p < .001$). Isolation was also significantly correlated with different independent variables (Table XXXVIII). Reserves in more urbanized areas were associated with increased levels in the general way of life, i.e. more education, higher occupational status, increased income and level of living and better nutritional attitudes.

A significant negative correlation was observed between the women's food scores and total household size. In this study, families with large households tended to be located in isolated areas, had lower incomes, and less formal education.

Education of respondents was also significantly related to nutrition practice scores ($p < .05$). Women who had a higher educational level tended to live in urban areas, had smaller families, a higher income, and a better attitude toward nutrition.

The women's attitudes toward nutrition, as expressed in their food beliefs, had a significant effect on their food practices ($p < .01$). Beliefs were also significantly related to other variables influencing dietary practices - i.e., education, household facilities and isolation.

There was a significant correlation between the level reached on the household facilities scale and nutrition adequacy ($p < .01$).

TABLE XXXVIII
INTER-RELATIONSHIP BETWEEN VARIABLES

	1	2	3	4	5	6	7	8	9	10	11	
ISOLATION	1	1										
F AGE	2	.012										
BELIEFS	3	-.387 ^c	-.085									
HSHLDSIZE	4	.251 ^b	.171 ^a	-.062								
INCOME	5	-.184 ^a	-.044	.128	.135							
INC/FAMSIZE	6	-.318 ^c	-.118	.127 ^a	-.527 ^c	.485 ^c						
F EDUC	7	-.581 ^c	-.350 ^c	.477 ^c	-.244 ^b	.152 ^a	.272 ^c					
M EDUC	8	-.460 ^c	.450 ^c	.299 ^c	-.382 ^c	.178 ^a	.395 ^c	.560 ^c				
F WORK	9	-.347 ^c	-.092	.231	-.067	.172 ^a	.150 ^a	.418 ^c	.226 ^a			
NUTR EDUC	10	-.401 ^c	-.371 ^c	.397 ^c	-.233 ^b	.219 ^a	.323 ^c	.623 ^c	.522 ^c	.238 ^a		
HSHLD FACIL	11	-.788 ^c	.119	-.344 ^c	-.081	.250 ^b	.257 ^c	.382 ^c	.291 ^b	.256 ^b	.272 ^b	
M OCCUP	12	-.291 ^b	-.139	.156 ^a	-.103	.321 ^c	.271 ^c	.185 ^a	.356 ^c	.086	.236 ^a	.229 ^b

^a_p < .05; ^b_p < .01; ^c_p < .001

Cross-tabulation of the age of the female household head with scores on food practices revealed no significant relationship between the two variables.

No significant relationship was observed between the educational level of the male head of household and the diet of respondents.

Correlation of the nutrition education of the respondents with scores on food practices showed that food practice scores increased with nutrition education, but the relationship was not significant.

Whether or not female household heads were employed did not significantly affect their food practice scores. Neither was there a significant relationship between food practice scores of homemakers and the occupation level of husbands.

Although there was a trend toward a more adequate diet with increased income, no significant relationship was observed between family income and dietary practices. Similarly when family income was expressed as per capita income and cross tabulated with the women's food practice scores, no significant effect was indicated.

Food Pricing and Food Availability

The availability of the 66 food items contained in the 'food basket' in the selected reserves is shown in Table XXXIX. Overall selection was poorest in isolated reserves, notably Babine and Fort Ware. Distinct differences were also observed in the availability of certain categories of foods between isolated and non-isolated reserves. The items most often in short supply were dairy products, fresh meats, and fresh fruits and vegetables.

The cost of 30 food items selected from the 'food basket' on the different reserves relative to Vancouver prices is shown in Table XL. Because so few food items were available in the small grocery store at Babine and most residents there shopped at Smithers, food costs for Babine residents were calculated from the supermarkets at Smithers rather than Babine itself.

As indicated in Table XL, food costs were highest in the most isolated reserves (Fort Ware and Takla), where transportation costs were also expensive. Prices in more urbanized areas varied from 5% (Nanaimo) to 15% (Fort St. James) higher than Vancouver.

TABLE XXXIX
FOOD AVAILABILITY

CATEGORY	NO. ITEMS LISTED	COMMUNITIES							
		Sechelt	Ft. St. James	Nanaimo	Smithers	Babine	Takla	Nazko	Fort Ware
Dairy products	7	7	7	7	7	2	2	6	3
Fruits/vegetables:									
Fresh	12	12	11	11	12	4	9	8	6
Processed	13	13	13	13	13	5	9	11	9
Breads and cereals	8	8	8	8	8	6	8	8	6
Meat:									
Fresh	9	9	9	9	9	0	7	5	0
Processed	8	7	8	7	8	2	8	8	6
Fats and oils	5	5	5	5	5	0	5	5	3
Miscellaneous	4	4	4	4	4	4	4	4	4
Total	66	65	65	64	66	23	52	55	37

TABLE XL

COST OF 30 FOOD ITEMS IN SELECTED COMMUNITIES
RELATIVE TO THE COST OF THESE ITEMS IN VANCOUVER

Community	Cost	% Higher Than Vancouver
Vancouver	\$29.86	
Sechelt	33.35	12
Fort St. James	34.24	15
Nanaimo	31.24	5
Smithers	31.51	6
Takla	40.59	36
Babine		
Nazko	36.50	22
Fort Ware	54.37	82

CHAPTER V

DISCUSSION AND IMPLICATIONS

A. Analysis of nutrient intake data

In the present study, low nutrient intakes (defined as less than two-thirds of the Canadian Dietary Standard) were frequent for, calcium, iron, Vitamin C and calories.

Among native Indian populations, calcium intakes have frequently been reported to be poor. (Heller, 1964; Lee, 1970; Dilling et al, 1978). Nutrition Canada (1975) reported inadequate intakes among teenage girls and pregnant women, marginal intakes among children 5 to 9 years of age, all adult women and elderly men. In the study described here, calcium intakes were lowest for adolescents of both sexes, particularly on isolated reserves. This difference in regional adequacy is reflected in food frequency consumption as indicated in Table X. Milk and milk products which supplied about one half of the calcium intake, were consumed more frequently at non-isolated reserves. Intakes of all adults, particularly women were also inadequate. Concern is expressed for the low calcium intakes among adolescents and women, particularly those of child-bearing age who have increased dietary demands for calcium. On the evidence of bone density studies Fraser (1975) has suggested that low calcium intakes may predispose adults over 40 years to a higher incidence of osteoporosis.

Calcium is a nutrient that requires careful consideration, particularly with recent reports of lactose intolerance among native groups (Leichter and Lee, 1971; Ellestad - Sayed and Haworth, 1977). Leichter observed a high incidence of lactose intolerance among adolescent B.C. Indians, however test doses given to subjects were very high. There appears to be less intolerance when lactose is given as a whole milk in small quantities (Garza and Scrimshaw, 1976) or milk taken with other foods or as part of a food recipe (Leichter, 1977). It would be advisable then for nutrition education programmes to encourage incorporation of milk and milk products into other food dishes i.e. cooked cereal, ground meat, mashed potato, cream soup, cocoa, etc.

Iron intakes followed the trend noted in other studies, with a high percentage of adolescents and adult women below the two-thirds level (Lee, 1970; Nutrition Canada, 1975). Those individuals on non-isolated reserves exhibited the poorest iron status. This is very likely due to differences in the consumption pattern of meat which contributed less iron to diets of non-isolated than isolated residents (Table IX-1). The type of meat consumed may be an additional factor. Diets on isolated reserves contained more meats with a high iron content (i.e. moose) than those on non-isolated reserves where fish, luncheon meats, and poultry were more commonly eaten (Table X).

Among adolescents, poor dietary practices often contribute to low iron intake (Schorr et al, 1972; Singleton et al, 1976). Adolescent girls in particular may restrict caloric intake or subscribe to fad diets in order to lose weight (Singleton et al, 1976). The low caloric intake of adult women in this study no doubt contributed to their low iron status, as any reduction of calories is likely to reduce iron intake (Clements, 1975). The low dietary intake of iron, like calcium, among women of child-bearing age is of concern because of increased demands at this time.

The geographical pattern of lower Vitamin C intakes among native Indians in remote areas as compared to those living nearer to urban centres, identified by Nutrition Canada (1975) was also observed in this study. Vitamin C intakes on isolated reserves, particularly among adolescent boys, were considerably lower than on non-isolated reserves. Of interest to note also, was the changing pattern of the source of ascorbic acid in diets. Whereas Lee (1970) noted that residents of the Anaham and Ahousat reserves were dependent on evaporated milk for their Vitamin C, individuals in this study obtained most of their supply from fruits (about 70%). Foods from the milk group contributed a negligible 2% of the ascorbic acid intake. One explanation for this may be increased consumption of the orange drink Tang on both isolated and non-isolated reserves (Table X). Tang, which is cheap, convenient, easy to store and

widely available has been readily accepted as a "fruit" drink in native diets (Peterson, 1974). Among the national native population, as well as the general population, vegetables as well as fruits are a primary source of Vitamin C (Nutrition Canada, 1977).

Low caloric intakes were observed for all adolescents, particularly boys, and for most adults, regardless of reserve location. That diets of adolescent girls were more favourable than those of adolescent boys was of interest. Generally studies show that nutritional status of adolescent boys is superior to that of adolescent girls, chiefly because boys eat more food than girls and thus have a better chance of obtaining adequate intakes (Schorr et al, 1972). One reason for our results may be the uneven distribution of girls in the 10 to 19 years category, many of whom were under 13 years, in the age range where intakes are more favourable (Au Coin et al, 1972; Haley et al, 1977).

One paradox that was apparent here, and described in other studies (Prothro et al, 1976; Nutrition Canada, 1975), was that although caloric intake of adults, particularly women, was not excessive, many of the women appeared to be overweight. It has been suggested that factors such as past nutritional history, omission of food items in recalls, and a sedentary lifestyle may explain this inconsistency (Nutrition Canada, 1975).

B. Relationship between food practices and selected variates

The location of the reserve (rural vs. urban) may through physical availability — i.e., food production, preservation, distribution — affect food habits. In the present study, the most significant factor related to food consumption was isolation, with diets in urban areas being more adequate than those in isolated areas.

Other studies which have examined the influence of location have tended to focus on differences between city and farm diets (Dean et al, 1954; Hendel et al, 1965). In their investigation Dean et al (1954) found that intakes of city children were better than those of children living in nearby rural areas. The 1955 USDA survey studied closely the effect of residence and found that farm diets tended to be lower in vitamins A and C than city diets.

Contradictory results were obtained in the 1965 USDA survey, and it was concluded that other factors besides residential differences were exerting an effect on dietary adequacy. Similarly, results of the Nutrition Canada Survey indicated that the "type of food consumed was little influenced by region or season...." (Educational Services, 1978).

Several investigations have found a direct relationship between the homemaker's age and dietary adequacy. Young (1955) reported better nutritional practices among young

homemakers (under 40 years) than middle aged or older homemakers. As age increased, use of milk products and citrus fruits decreased. In Jolso's study (1965) increasing age was positively associated with increasing rigidity and with decreasing nutritional practice scores. Bowering et al (1976) found that among 119 low-income women attending an obstetrics clinic in New York, age was associated with dietary indices. Older women tended to have poorer diets.

In this study, although there was a wide distribution in ages among respondents, age had no effect on dietary practices, although older women tended to have less education and larger families. Age was however not related to isolation or level of living, two variables which exerted the strongest influence on food practices.

Household size may exert a negative influence on nutritional status. It has been hypothesized that as family size increases, there is a decrease in the amount of money spent for food per person (Davis, 1969). Studies among preschoolers of various cultural backgrounds have yielded conflicting results. While Sanjur and Scoma (1972) and Caliendo et al (1976) found that nutrient intake was not dependent on family size, Sims and Morris (1974), Cook et al (1973) and Hendel et al (1965) did observe some effect. Examinations of the dietary habits of teenagers have shown no relationship between these two variables (Thompson, 1975;

Schorr et al, 1972; Duyff et al, 1975). Similarly in a study of 483 expectant Negro women, Crump et al (1959) found no relationship between size of the family unit and prenatal nutrition of subjects.

Boek (1956) however, reported that dietary intake of calcium as well as dietary diversity of Michigan farmers were inversely related to family size. Results of the present study were in agreement with the findings of Boek in that a significant negative correlation was observed between food scores and household size.

A direct relationship has also frequently been reported between educational attainment and nutritional adequacy of different population groups. (Eppright, 1970; Payton, 1960; Cliendo et al, 1977; Haley et al, 1977). Both Futtrell (1971) and Eppright (1970) stressed that the education of the woman was a more significant factor than income in determining dietary quality. Murphy and Wertz (1954) found that the dietary adequacy of 65 pregnant women increased with their educational level. While 42% of women with the highest education ate an adequate diet, only 20% of those with lesser education were in this group. The present study supported these studies. Dietary practices were significantly related to the educational level of respondents.

The importance of the educational level of the male household head has been discussed by a number of

investigators. It is generally considered that with increased education, the socio-economic level increases, providing individuals with higher incomes for purchasing food (Davis et al, 1969).

Many studies have examined the relationship between the educational level of the male parent and the dietary adequacy of children from varying backgrounds, with inconsistent results. While Au Coin (1971), Haley (1977) and Hinton (1963) reported that the father's educational achievements exerted a strong influence on dietary practices of their school children, Caliendo et al, 1976 and Walter (1974) failed to obtain a similar significant relationship in their studies. The present investigation was in agreement with the latter two studies in that no significant correlation was observed between the educational level of the male head and the dietary practices of homemakers. One reason for this finding may be the general lack of employment on reserves, regardless of education. Most jobs available do not require specialized training, and can be occupied by anyone, regardless of education.

A large number of investigators have documented the positive relationship between nutrition education and dietary practices (Coale, 1972; Hunt, 1976; Bowering et al, 1976). Walter (1974) found that Indian youths having educational dietary programs available to them had a better

Food Quality Index (FQI), while Hunt (1976) recently reported that low-income pregnant women participating in nutrition education programs significantly increased their mean intakes of protein, ascorbic acid, niacin, riboflavin and thiamine. Results of the present study, however, showed that women who had received "food or nutrition information" did not achieve significantly higher food scores. The majority of women reported formal schooling as the source of their food information, with only a small percentage indicating other sources of learning. This finding suggests that among the study subjects, food or nutrition education received in Home Economics classes did not significantly alter dietary practices. Schwartz (1975, 1976) also found no relationship between enrollment in Home Economics classes and the nutrition practice scores of 313 Ohio high school graduates, and again among 352 Canadian public health nurses.

Results of the present study indicate that the food beliefs or attitudes of the women affected their dietary practices. A highly significant positive correlation ($p < .001$) was found between food beliefs and practices of respondents. These findings support the work of Schwartz (1975, 1975), Jalso et al (1965) and Dickins (1962), who have documented similar positive relationships between

nutrition attitudes and practices.

Income is considered to have a direct effect on nutrition practices with the quality of the diet generally improving with an increase in the income level. (Delgado et al, 1961; Hendel et al, 1965; Dickins, 1965; Payton et al, 1960). Although a recent report based on data from the Nutrition Canada Survey concluded that for most physiological groups income does not affect nutritional status, native Indians were not included in the study population (Health and Welfare Canada, 1975).

No relationship was observed between income and dietary practices in the present study. The study of Walter (1974) among American Indian youths also found no significant relationship between these two variables. In his discussion of this finding Walter distinguishes between the effects of two kinds of poverty: internal and external poverty. Internal poverty is described as a poverty one is born into, the "culture of poverty". Under conditions of an impossible environment, the poor develop a sense of living in the present, with an immediate approach to life. External poverty lies outside the culture of poverty and is the result of different factors i.e. a decline in economic activity resulting in unemployment and loss of income. Walter concludes that the relationship between income and diet exists in the

external poverty sense, but not to those subject to internal poverty. It may be that the population group in the study were similarly a part of the internal poverty and factors other than income affected the way they eat.

No significant differences were found between dietary practices of employed and non-employed respondents, confirming the reports of Robson (1971), Au Coin et al, (1972) and Doyle et al (1953). Other studies have concluded that families of employed women show better diets (Schorr et al, 1972; Dickins, 1961; Sanjur and Scoma, 1972; Coale, 1971). The difference in findings may be caused by the similarity of occupations in which homemakers were employed.

The effect of the occupational status of the male head of household on family food practices has been studied among adolescents (Schorr, 1972), children (Sims, 1974), and adult women (Murphy and Wertz, 1954), with positive results. Duyff (1975) however, found that among a sample of Puerto Rican teengagers a higher level in the occupational scale of the parents was associated with frequent consumption of soft drinks, perhaps indicating that more money was available. Walter (1974) similarly noted that the occupation of the family head had no

influence on the food practices of 35 Indian youths. The findings of the present study support the last study in that there was no significant relationship between food practice scores of homemakers and the occupational level of male heads. This may be because here, as in Walter's study, differences in occupational categories were minimal, and many of the men were employed in similar types of work.

The types of public services and materials available - water, electricity, equipment and facilities for food preparation and eating - all influence food patterns. There is generally, a lack of these services and facilities on Indian reserves, resulting in a high incidence of various diseases (Simpson, 1974; Smith, 1975). Among the study group, respondents with higher household facilities scale exhibited better dietary practices. This is consistent with other reports. Boek (1956) showed a significant positive correlation between calories and ascorbic acid and level of living among a group of Michigan farmers. Walter (1974) found that Indian youths living in homes with electricity tended to have better FQI than those not having this benefit. Level of living was also significantly related ($p < .01$) to the family food scale in each area studied in the Caribbean Island survey of Beaudry - Dariame et al (1971).

C. General Discussion

The most significant factor related to food consumption is isolation. Diets of families living in non-isolated communities are more adequate than those in rural areas. Changes in the way of living that are affecting native Canadians are having in some ways a more profound effect on the nutritional status of those native peoples in isolated reserves. Traditional dependence on local food resources, although still in evidence is declining, the local community store becoming a more important food source for many families. Many of the foods brought into these stores are nutritionally inferior to native foods (Schaefer, 1977). As a result, the traditional native diet, rich in protein, is being replaced by low-quality carbohydrate foods, i.e. "luxury sugars", with disastrous consequences to native health (Schaefer, 1977; Ellestad-Sayed and Haworth, 1977).

A comparison of food prices among the reserves reveals that costs are greatest in isolated communities, notably Fort Ware, Takla Landing and Nazko. Although the relationship between food costs and reserve location was not statistically explored, it is of interest to note that food practice scores of women are also lowest at these three reserves. Food practice scores are highest at Necoslie and the fourth isolated reserve, Lake Babine. These two communities still relied strongly on 'food from the land', yet had access to a well-stocked, reasonably-priced food outlet (in

the case of Babine, the supermarket at Smithers, 64 miles south). It may be that access to both modern and traditional methods of food procurement, available to these two reserves, is one of the ways through which reserve location affects food practices.

Variety for selection is also poorest on isolated reserves, particularly with respect to dairy products, frozen and fresh meats, and fresh fruits and vegetables. Lack of fresh meats is most probably due to harvesting of fish and game from the land. The absence or limited supply of dairy products and fresh fruits and vegetables, reflected in dietary recalls, may pose nutritional problems.

The problems of obtaining food on isolated reserves is intensified by lack of employment, hence inadequate income to purchase these expensive foods. Thirty percent of respondents on isolated reserves indicate yearly incomes of \$5,000 or less, as opposed to 18% on non-isolated reserves. At the same time families on non-isolated reserves report mean monthly food expenditures of \$252.16, while those on isolated reserves spent \$302.43 monthly. Thus those families with the least money to spend on food, and the most restricted choices, are forced to spend more money.

Housing, public services and household facilities on isolated reserves are inadequate, compounding difficulties further.

" We forget that modern cooking requires a great deal of equipment, appliances, a source of electricity, pans, dishes, running water, and storage areas and these are not always available to native peoples" (Smith, 1975)

While dependence on store-bought foods has increased, information regarding use of these new foods has not been passed on. Few women on isolated reserves have received any food, nutrition, or cooking education. Until recently the majority of Indian children received their education at residential schools where homemaking skills were not taught. They did not purchase or prepare foods. Children at the schools often ate only with each other and not with adults. With no adult model around to watch it is difficult to teach children to accept new foods (Smith, 1975). The majority of respondents list mothers (63%) and other family members or relative (38%) as their primary 'human' sources of nutrition and food information. Other investigators have also found homemakers to be strongly influenced by the experience of their mothers (Schwartz, 1975; Young et al, 1956; Coale, 1971). Although 45% of women on isolated reserves indicate cookbooks and other books as a source, individuals on non-isolated reserves are more likely to use mass media as a source of nutrition/food information. When compared with other studies, however

the use of printed material and television as a source of nutrition information is much lower; printed material appears to have more influence among population groups with higher income levels (Sanjur, 1972; Coale, 1971; Young et al, 1956; Jalso, 1965; Schwartz, 1975).

Similarly, professional persons are mentioned less frequently as nutrition information sources than has been documented in the studies of Coale (1971), Lund and Burke (1969), Eppright et al, (1970), or Fox et al (1970).

When shopping, homemakers are strongly influenced by the "likes and dislikes" of their children who often accompany them to stores. "Cost", "what is good for you", and "requests made by husbands" are also influential factors. Similar findings were reported by Young et al (1956) who also found foods "good" for the family, preferences, and cost to have significant influence on meal planning. In another study among low-income homemakers in New York Sanjur et al (1972) also reported taste as the predominant element influencing food shopping, followed by cost, familiarity with food, and nutritive value. Preparation time, the least influential factor in the present study has similarly been found not to be a major consideration in other studies (Shapiro, 1962; Young et al, 1956; Coale, 1971).

There is little evidence of budgeting and meal planning. According to Goldthorpe (1975) planning ahead

does not fit into the Indian way of life:

"the Indian culture is not to plan or save but to share and live fully for today, so that within months of a successful return from the trapline, there may have to be a welfare cheque."

Smith (1975) claims that native people do not sit down and work out a budget or determine where the best bargains are. Shopping is a social activity, a way of meeting with friends and neighbours, thus they prefer to shop daily. Results of the study indicate that this is true more for residents of isolated than non-isolated reserves. Almost 70% of urban respondents shop at supermarkets, a figure comparable to that found in the studies of Leichter et al (1978), Metheny et al (1962) and Stubbs (1961). Better selection is the most important reason given in their selection of the supermarket. That 23% of families on isolated reserves travelled to larger centres and purchased food in supermarkets where 'costs are cheaper' and 'selection is greater' is also an indication of their increasing awareness of shopping skills.

Food practices on non-isolated reserves are more adequate than those in isolated reserves. Although families in urban communities rely even less on food from the land than those in rural areas, they have greater access to supermarkets and a larger selection of store foods. Increased

availability of milk and milk products, for example, has resulted in greater consumption of these foods. At the same time, a larger selection of foods does not necessarily mean that individuals will necessarily make the best choices. Consumption of fruits and vegetables among urban families is still inadequate. Tang, although fortified with Vitamin C, is a poor substitute for fruit juices. In the U.S., food consumption studies have shown that with increased urbanization, there has been a concurrent decline in two particular nutrients, vitamins A and C. According to Parrish (1971) this decline is a reflection of change from "wide-variety to limited-variety food habits" combined with consumer preference for fast foods (low in A and C) and neglect of fresh fruits and vegetables (high in A and C).

Of interest to note is the frequency with which respondents and their families take vitamin/mineral supplements. Following the results of the Nutrition Canada Survey, Butler (1975) reported that "action is being intensified...in the provision of vitamin and iron supplements to risk groups." Smith (1975) claims that nurses tend to overestimate the use of vitamins because they base it on the amount distributed, while in fact actual use is much lower. Results of the study indicate that

while a very high percentage of family members take supplements (73 to 78%) less than 50% of these do so regularly. Frequency of use of supplements is nevertheless higher than has been found among other population groups. Figures obtained in other surveys include: 27% among a group of 383 elementary schoolchildren in Winnipeg (Ellestad - Sayed and Haworth, 1977), 31% of a group of adolescent girls (Huenemann et al, 1968), 20% of 2839 adults surveyed in a country-wide U.S. study (Pearson, 1972) and from 15% (Leichter et al, 1978) to 24% (Read and Miles, 1977) of elderly Canadian citizens. Supplements are most often taken by children on isolated reserves and by homemakers, children and the entire family on non-isolated reserves. Two areas of concern are identified. That few women on isolated reserves reported use of supplements indicates that few pregnant women, an identified risk group, are also taking supplements. It is recommended that judicious use of supplements be combined with nutrition counselling of risk groups and intensified efforts to improve availability and selection of foods.

Implications

Results of the study indicate the need for nutrition education programs designed to improve the quality of native diets. An understanding of those factors which

influence food habits is basic to any such programme. Nutrition education programs which consider those factors affecting food choices can better improve dietary practices. Nutrition educators working with native peoples ought to encourage those strong aspects of food practices such as one pot meat-vegetable stews and soups, oatmeal cereals, and use of traditional foods. Emphasis might be given to increase intake of vegetables, dairy products and foods high in iron.

One logical place from which nutrition education programs could be provided is the school, where there is presently no formal program of nutrition education. In some areas, vitaminized biscuits, developed by the Department of National Health and Welfare specifically for native Indian children, are distributed by teachers. Distribution is not combined with any nutrition education programs (Smith, 1975). Children exert strong influences on family food practices through demands for mothers admitted, as has been discussed, that "what the children like" was a very important influence on what she bought. Nutrition information learned by the children would hopefully be "passed on" through discussion and sharing of materials with other family members.

Nutrition education programmes aimed at the homemaker herself are suggested. In the majority of households it is the female head herself who purchases and prepares the food,

and thus determines what her family eats.

Food beliefs may indicate the basis of decision-making processes, which ultimately affect food selection (Sanjur, 1972). Examination of food beliefs of respondents reveals that many of the beliefs held by women have their basis in non-Indian teaching rather than traditional native culture. Certain attitudes expressed by women indicate those areas which are amenable to nutrition education. During pregnancy many women are concerned with restricting weight gain, a practice which is contrary to the recommendations of the Committee of Maternal Nutrition, Food and Nutrition Board in the U.S.A. (1970) and the British Columbia Medical Association as endorsed in the position paper established by the Nutrition in Pregnancy Committee of the Health Planning Council of British Columbia (1973) that recommends an average weight gain of 24 pounds.

Although the majority of women indicate that 'breastfeeding is best for baby', the practice is not widespread among the study population. Smith (1975) attributes the decline in breastfeeding to giving birth in a hospital where women receive little encouragement and support to breastfeed. Present policy of Medical Services is to strongly advocate breastfeeding. Sound dietary advice as part of the breastfeeding education programme may help to alleviate some

of the 'difficulties' (i.e. drying up) experienced by nursing mothers. For women who choose not to breastfeed, education is needed in the preparation of formulas.

Over 50% of respondents list canned baby foods as a food beneficial to infants. If in fact, a large number of families are buying prepared foods, information regarding careful selection of these products ought to be included in education programmes. Where conditions permit, home preparation of infant foods is also to be encouraged.

Nutrition education programmes, however, cannot replace food, and before they can be effective there must be adequate food supplies. Funds ought to be made available to subsidize transportation costs of certain foods i.e. fruits and vegetables to isolated areas. Dialogue with local shopkeepers to encourage stocking of more nutritious foods, replacing low-quality high sugar foods is also suggested. Where possible use of traditional foods ought to be encouraged.

Perhaps the most important factor in considering improved nutritional status is motivation. Individuals will not improve dietary practices unless motivated to do so:

"No matter how much money one has, or how much food (enriched or not) is available, and regardless of the cultural situation or nutrition education level, people must have proper motivation to eat well. This is partially a matter of nutrition education but much more is involved" (Briggs, 1970)

Many of the health problems of native Indians are associated with their lifestyle and environment and alleviation of these problems requires the support of the people themselves as well as the agencies responsible for environmental services (Butler, 1975). While Indian Band Councils are becoming increasingly autonomous and often manage their own funds, health related projects are not always given top priority (Simpson and Dormaar, 1974; Butler, 1975). If motivation to improve food practices is to be increased, it is necessary also to increase the awareness of native peoples of nutrition problems and encourage their participation in education programmes.

CHAPTER VI

SUMMARY AND CONCLUSIONS

This study was conducted to investigate the food habits of native Indian families in British Columbia. By use of a 24 - hour recall, the nutrient content of diets of 144 individuals living on non-isolated reserves was compared with diets of 105 individuals living on isolated reserves. A secondary purpose was to examine the relationship between the food practices of the female head of household and certain socio-cultural characteristics of the family. Ninety-two women from seven reserves were interviewed. In addition, information on food prices and foods available in local stores was collected.

Rank correlation coefficients using Kendall's tau beta demonstrated that several independent variables (socio-economic, family and reserve characteristics) were related to the dependent variable, food practices.

Independent variables which were significantly and positively related to food practices included the location of the reserve, education of respondents, the women's attitudes toward nutrition, and the level reached on the household facilities scale. The size of the household was negatively correlated to the adequacy of the woman's diet. The most significant factor related to food consumption was isolation, with diets in urban areas being more adequate than those in rural areas. Family income and

whether or not the woman had received food or nutrition education were not significantly related to food intake, although there was a trend towards improved diets.

Analysis of nutrient intake data showed that low intakes (defined as less than two-thirds of the Canadian Dietary Standard) were frequent for calories, calcium, iron and vitamin C. Calcium intakes were lowest for adolescents of both sexes, particularly on isolated reserves. Calcium intakes of all adults, particularly women, were also inadequate. A high percentage of adolescents and adult women exhibited poor iron intakes, particularly on non-isolated reserves. Vitamin C intakes on isolated reserves, particularly among adolescent boys, were considerably lower than on non-isolated reserves. Low caloric intakes were observed for all adolescents, particularly boys, and most adults, regardless of reserve location. Mean daily protein intakes at all age and sex levels for both population groups exceeded the recommended standards.

Food frequency studies revealed that bread, potatoes, tea and coffee, as well as a variety of meats, particularly game, were the foods used most extensively. Game meat, namely moose, was the main protein source in isolated areas, while individuals in non-isolated reserves consumed a greater variety of store-bought meats. Milk intake was generally low, and many respondents indicated gastro-intestinal disturbances with ingestion. Consumption of foods from the

cereal group was high, particularly on isolated reserves. Potatoes were the main vegetable eaten. Generally intake of fruits and vegetables was highest in non-isolated communities. Sugar was the "empty calorie" food consumed most frequently (in coffee or tea) together with jams, jellies and syrup eaten with bannock, bread or pancakes. Generally three meals a day were eaten; breakfast was the meal most commonly missed, while most respondents reported eating an evening meal. Snacks were frequent.

Information regarding food beliefs of respondents was collected. With the exception of the cereal group, women in non-isolated areas were more able than those on isolated reserves to list foods that should be included in their daily diet. They were also more likely to provide valid nutritional reasons for including specific foods in their diet. During pregnancy, respondents listed few dietary alterations and for the most part stressed the consumption of a regular diet. Few women mentioned specific beliefs regarding nutrition during lactation, as few had breastfed their infants, and were thus unsure of the best diet at this time. Respondents were more likely to provide opinions regarding diets of infants, listing milk, fruits, vegetables and canned baby foods as important foods for infants. Liquid foods, notably soups and fruit juices were foods most frequently consumed during most types of illnesses.

Investigation of shopping habits revealed that on non-isolated reserves women most frequently shopped in supermarkets because of better selection and convenience. Families in many of the isolated communities were restricted to one grocery outlet. The majority of homemakers shopped once weekly or every two weeks for their major grocery supplies, while minor purchases were more frequent. Responsibility for purchasing food rested with the female household head in non-isolated reserves, but was shared among family members in isolated reserves. Children frequently accompanied mothers to stores, requesting them to purchase empty calorie foods, ice-cream, fruits and cereals. Respondents on non-isolated reserves were more likely to budget and pay cash for food purchases while an equal percentage of women from both groups used shopping lists. Monthly food expenditure ranged from \$84 to \$630, with a mean of \$252.16 on non-isolated reserves, and \$302.43 on isolated reserves.

Rising food costs had altered the purchasing patterns of families. Over 50% of families were buying less meat and relying more heavily on meat from hunting and fishing. Of the factors which the homemaker perceived as influencing buying, "what the children like" was most often selected. "Cost", "what is good for you" and "requests made by husband" were also mentioned frequently. The female head of household was the chief individual responsible for the preparation of

family meals, regardless of degree of isolation. Few women used meal plans. There was a significant difference in household facilities available to the two areas, with a larger percentage of homes in non-isolated having access to running water, electricity, refrigerators, stoves, ovens and freezers. Women on non-isolated reserves were also more likely to have "studied about what to eat." The primary nutrition/food information source identified by respondents was their mother, followed by family members and other relatives. Homemakers in urban communities also cited newspapers and magazines. Although a large percentage of respondents indicated use of vitamin and mineral supplements, (73% on non-isolated reserves, 78% on isolated reserves) less than half of these mentioned that these were used regularly. Subjects in isolated areas were more likely than those in non-isolated areas to rate food from the land as being an important means of obtaining food.

Overall food selection was poorest in isolated reserves, notably Babine and Ft. Ware. Distinct differences were also observed in the availability of certain categories of foods between isolated and non-isolated reserves. The items most often in short supply were dairy products, fresh meats, and fresh fruits and vegetables. Food costs were highest in the most isolated reserves (Fort Ware and Takla), where transportation costs were also expensive. Prices in more urbanized areas varied from 5% (Nanaimo) to 15% (Fort St. James) higher than Vancouver.

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APPENDIX A
QUESTIONNAIRE

Family No. _____

Date _____

Band No. _____

Card _____

Town _____

DEMOGRAPHIC DATA

1. Population of reserve _____

13 _____

2. Isolation (no. of miles from urban centre of 5,000 pop.) _____

14 _____

3. Health services available to the community:

15 _____

16 _____

4. Shopping facilities:

17 _____

5. Price of food:

18 _____

6. a. How many people live and eat in your home? _____

19 _____

b. Number of children _____

20 _____

c. Number of adults _____

21 _____

22 _____

23 _____

d. Relationship of adult(s) to female head of household:

____ mother/mother-in-law

24 _____

____ father/father-in-law

25 _____

____ relative

26 _____

____ friend

27 _____

7. a. Age of female head of household _____

28 _____

b. Age of male head of household _____

29 _____

c. Age of child/children _____

30 _____

31 _____

No. that are:

____ less than 2 years

32 _____

____ 2—5 years

33 _____

____ 6—12 years

34 _____

____ 13—18 years

35 _____

____ more than 18 years

36 _____

8. Type of household:

- ☐ nuclear ☐ single parent
☐ extended ☐ communal

37 _____

9. a. Occupation of male head of household: _____

38 _____

b. Occupation of female head of household: _____

39 _____

If housewife, have you ever worked in the past?

- ☐ yes ☐ no

40 _____

If yes, how long ago?

- ☐ less than 1 year ☐ 5—10 years
☐ 1—4 years ☐ more than 10 years

41 _____

10. a. What was the last grade you completed at school?

- ☐ some grade school
☐ completed grade school
☐ some high school
☐ completed high school
☐ completed high school and also other training, but not college
☐ some college
☐ completed college
☐ some graduate work
☐ graduate degree
☐ none
☐ other

42 _____

43 _____

b. What was the last grade your husband completed? _____

44 _____

45 _____

11. Social Class _____

46 _____

12. What is your approximate family income?

- ☐ less than \$2,500 ☐ \$10,001—\$15,000
☐ \$2,501—\$5,000 ☐ more than \$15,000
☐ \$5,001—\$10,000

47 _____

FOOD BELIEFS

1. What foods or types of foods do you try to include in your family's diet each day? Why do you think each of these foods is important?

1. nutritional reason 2. non-nutritional reason 3. no reason given

milk group _____	48 _____
Reason _____	
meat group _____	49 _____
Reason _____	
fruits _____	50 _____
Reason _____	
vegetables _____	51 _____
Reason _____	
cereal group _____	52 _____
Reason _____	
empty calories _____	53 _____
Reason _____	
other _____	54 _____
Reason _____	

2. Are there any foods you think should/shouldn't be eaten during pregnancy?

____ yes ____ no

If yes, what foods should be eaten?

milk group _____	56 _____
meat group _____	57 _____
fruits _____	58 _____
vegetables _____	59 _____
cereal group _____	60 _____
empty calories _____	61 _____
other _____	62 _____

What foods shouldn't be eaten?

milk group _____	63 _____
meat group _____	64 _____
fruits _____	65 _____
vegetables _____	66 _____
cereal group _____	67 _____
empty calories _____	68 _____
other _____	69 _____

3. Are there any foods you think should/shouldn't be eaten while breastfeeding?

____ yes ____ no

If yes, what foods should be eaten?

milk group _____

meat group _____

fruits _____

vegetables _____

cereal group _____

empty calories _____

other _____

What foods shouldn't be eaten?

milk group _____

meat group _____

fruits _____

vegetables _____

cereal group _____

empty calories _____

other _____

4. What do you think is best for babies— bottle-feeding or breast-feeding?

____ bottle-feeding ____ both the same

____ breast-feeding ____ don't know

5. Are there any foods you think should/shouldn't be eaten by babies and younger children?

____ yes ____ no

If yes, what foods should be eaten?

milk group _____

meat group _____

fruits _____

vegetables _____

cereal group _____

empty calories _____

other _____

What foods shouldn't be eaten?

milk group _____

70 _____

71 _____

72 _____

73 _____

74 _____

75 _____

76 _____

77 _____

78 _____

79 _____

80 _____

No. _____

Card _____

5 _____

6 _____

7 _____

8 _____

9 _____

10 _____

11 _____

12 _____

13 _____

14 _____

15 _____

16 _____

17 _____

18 _____

meat group _____	19 _____
fruits _____	20 _____
vegetables _____	21 _____
cereal group _____	22 _____
empty calories _____	23 _____
other _____	24 _____

6. Are there any foods you think should/shouldn't be eaten by sick persons?

____ yes ____ no 25 _____

If yes, what foods should be eaten?

milk group _____	26 _____
meat group _____	27 _____
fruits _____	28 _____
vegetables _____	29 _____
cereal group _____	30 _____
empty calories _____	31 _____
other _____	32 _____

What foods shouldn't be eaten?

milk group _____	33 _____
meat group _____	34 _____
fruits _____	35 _____
vegetables _____	36 _____
cereal group _____	37 _____
empty calories _____	38 _____
other _____	39 _____

7. a. How would you describe the diet of the Indian people in your area?

____ excellent	____ poor	40 _____
____ good	____ don't know	
____ fair	____ other	

b. Why do you think it is _____ ? _____

41 _____

c. Do you think it has changed in your lifetime?

____ yes ____ no 42 _____

If yes, how do you think it has changed? _____

43 _____

SHOPPING HABITS

1. Where do you do most of your shopping?

- | | |
|--|--|
| <input type="checkbox"/> supermarket | <input type="checkbox"/> specialty store |
| <input type="checkbox"/> convenience store | <input type="checkbox"/> health food store |
| <input type="checkbox"/> food co-op | <input type="checkbox"/> other |
| <input type="checkbox"/> general store | |

44 _____

2. Why do you shop there?

- | | |
|---|--------------------------------------|
| <input type="checkbox"/> cheaper | <input type="checkbox"/> no choice |
| <input type="checkbox"/> better selection/quality | <input type="checkbox"/> convenience |
| <input type="checkbox"/> location | <input type="checkbox"/> patronage |
| <input type="checkbox"/> credit given | <input type="checkbox"/> other |
| <input type="checkbox"/> service | |

45 _____

3. How often do you shop for groceries?

a. major trips

- | | | |
|---------------------------------|------------------------------------|--------------------------------|
| <input type="checkbox"/> daily | <input type="checkbox"/> bi-weekly | <input type="checkbox"/> other |
| <input type="checkbox"/> weekly | <input type="checkbox"/> monthly | |

46 _____

b. minor trips

- | | | |
|---------------------------------|------------------------------------|--------------------------------|
| <input type="checkbox"/> daily | <input type="checkbox"/> bi-weekly | <input type="checkbox"/> other |
| <input type="checkbox"/> weekly | <input type="checkbox"/> monthly | |

47 _____

4. How do you get to and from the store?

- | | | | |
|------------------------------------|-------------------------------|----------------------------------|---------------------------------|
| <input type="checkbox"/> walk | <input type="checkbox"/> bus | <input type="checkbox"/> boat | <input type="checkbox"/> animal |
| <input type="checkbox"/> car/truck | <input type="checkbox"/> taxi | <input type="checkbox"/> bicycle | <input type="checkbox"/> other |

48 _____

5. Who usually does the shopping?

- | | |
|---|--|
| <input type="checkbox"/> female head of household | <input type="checkbox"/> son |
| <input type="checkbox"/> male head of household | <input type="checkbox"/> relatives/friends |
| <input type="checkbox"/> other female adult family member | <input type="checkbox"/> other children |
| <input type="checkbox"/> other male adult family member | <input type="checkbox"/> other |
| <input type="checkbox"/> daughter | |

49 _____

50 _____

Does anyone go with that person?

- | | |
|------------------------------|-----------------------------|
| <input type="checkbox"/> yes | <input type="checkbox"/> no |
|------------------------------|-----------------------------|

51 _____

If yes, who?

- | | |
|---|--|
| <input type="checkbox"/> female head of household | <input type="checkbox"/> mother |
| <input type="checkbox"/> male head of household | <input type="checkbox"/> friends/relatives |
| <input type="checkbox"/> children | <input type="checkbox"/> other |

52 _____

If family member, does she/he request certain foods?

- | | |
|------------------------------|-----------------------------|
| <input type="checkbox"/> yes | <input type="checkbox"/> no |
|------------------------------|-----------------------------|

53 _____

If yes, what foods?

milk group _____

meat group _____

fruits _____

vegetables _____

cereal group _____

empty calories _____

other _____

54 _____

55 _____

56 _____

57 _____

58 _____

59 _____

60 _____

6. Do you use a shopping list?

____ yes ____ no

61 _____

If no, when do you decide to buy?

____ before going to store

____ both

____ at the store

____ other

62 _____

7. How do you feel about:

a. The number of grocery shops in your area

____ too many

____ enough

____ too few

____ don't know

63 _____

b. The variety of foods in the shops

____ excellent

____ fair

____ don't know

____ good

____ poor

64 _____

c. The prices charged

____ reasonable

____ too low

____ too high

____ don't know

65 _____

d. The quality of the food

1. good

2. fair

3. poor

4. don't know

____ meat

____ fruits

____ vegetables

____ dairy products

____ bread

66 _____

67 _____

68 _____

69 _____

70 _____

8. Do you set aside a certain amount of money every week, month, or twice a month for buying food?

____ yes ____ no

71 _____

9. How much money do you usually spend on food every month? _____

72 _____

73 _____

74 _____

10. How do you pay for your food?

____ cash

____ charge

____ other

____ trade

____ food voucher

75 _____

11. How important are the following in helping you to decide what to buy?

1. very important 2. important 3. not important

___ what you like
 ___ what your husband likes
 ___ what your children like
 ___ what is easy to prepare
 ___ cost of the food

___ what is good for you

76 _____

77 _____

78 _____

79 _____

80 _____

No. _____

Card _____

5 _____

12. Rising food costs have forced many people to make changes in their shopping habits. Do you find that you now buy more, less or the same amounts of the following foods?

1. buy less 2. buy more 3. same 4. don't know

___ milk/dairy products
 ___ meat
 ___ fruits
 ___ vegetables
 ___ cereals/bread
 ___ snack foods

6 _____

7 _____

8 _____

9 _____

10 _____

11 _____

MEAL PLANNING AND PREPARATION

1. Who usually does the cooking in your home?

___ female head of household ___ daughter
 ___ male head of household ___ son
 ___ other female adult household member ___ shared
 ___ other male adult household member ___ other

12 _____

13 _____

2. Does your family eat together?

___ yes ___ no

14 _____

If yes, when? How many times per week?

___ morning ___ afternoon
 ___ mid-morning ___ early evening
 ___ mid-day ___ late evening

15 _____

16 _____

17 _____

18 _____

19 _____

20 _____

1. 6-7 times a week
 3. 2-3 times a week
 5. once every two weeks

2. 4-5 times a week
 4. once a week
 6. other

3. How far ahead do you plan your meals?

___ for the entire month ___ day-to-day
 ___ for two weeks ___ no plan
 ___ for one week ___ other
 ___ for a few days

21 _____

4. Do you have:

- ☐ running water
☐ electricity
☐ a freezer
☐ refrigerator
☐ stove
☐ oven
☐ other storage facilities

22 _____
 23 _____
 24 _____
 25 _____
 26 _____
 27 _____
 28 _____

FOOD PRACTISES

A. Factors affecting food practises

1. Have you ever taken cooking classes or studied about foods?

☐ yes ☐ no

If yes, where? _____

Do you think what you learned has been helpful to you?

☐ yes ☐ no

29 _____

30 _____

31 _____

2. Has anyone else ever taught you about food or nutrition?

☐ yes ☐ no

If yes, who?

- ☐ nurse
☐ doctor
☐ dentist
☐ friends
☐ relatives
☐ family member
☐ pharmacist
☐ dietician/nutritionist
☐ mother
☐ health food personnel
☐ shopkeepers
☐ other

32 _____

33 _____

34 _____

35 _____

36 _____

37 _____

38 _____

39 _____

40 _____

41 _____

42 _____

43 _____

44 _____

3. Have you obtained food or nutrition information from anywhere else?

☐ yes ☐ no

If yes, where?

- ☐ newspapers
☐ magazines
☐ T.V.
☐ radio
☐ talks/lectures
☐ cookbook
☐ other books
☐ past experience
☐ other

45 _____

46 _____

47 _____

48 _____

49 _____

50 _____

51 _____

52 _____

53 _____

54 _____

B. Actual practises

1. Do you or your family take vitamins?

☐ yes ☐ no

If yes, what kind?

55 _____

How often?

☐ regularly ☐ irregularly

56 _____

57 _____

Who advised you to take them?

- | | |
|------------------------------------|---|
| <input type="checkbox"/> nurse | <input type="checkbox"/> dietician/nutritionist |
| <input type="checkbox"/> doctor | <input type="checkbox"/> mother |
| <input type="checkbox"/> dentist | <input type="checkbox"/> husband |
| <input type="checkbox"/> friends | <input type="checkbox"/> pharmacist |
| <input type="checkbox"/> family | <input type="checkbox"/> health food personnel |
| <input type="checkbox"/> relatives | <input type="checkbox"/> other |

58 _____

59 _____

2. How important are the following as a food source for your family?

1. very important 2. important 3. not important

- ☐ fishing
☐ hunting
☐ trapping
☐ home gardening
☐ gathering

60 _____

61 _____

62 _____

63 _____

64 _____

3. Do you can, freeze, dry, smoke or otherwise preserve any foods?

☐ yes ☐ no

65 _____

APPENDIX B

SYSTEM USED FOR SCORING FOOD

PRACTICES (24-HOUR RECALLS)

SCORING SYSTEM FOR FOOD PRACTICES

FOOD GROUP	RECOMMENDED SERVINGS (1974)	POINTS PER SERVING	MAXIMUM POINTS
Milk and Milk products	1½	½....2 points	6
Fruits and vegetables	3 Vitamin C source	1....2 points	6
		1....1 point	1
Meat and alternates	2	1....3 points	6
Cereals, bread and pastas	3	1....2 points	6
		Maximum score	25

Source: B.C. Dairy Foundation, Guide to Good Eating Every Day.

APPENDIX C

FOOD LIST USED FOR FOOD PRICING
AND FOOD AVAILABILITY STUDY

FOOD	UNIT	BRAND	PRICES		AVERAGE
			Store 1	Store 2	
<u>DAILY PRODUCTS</u>					
pwd. skim milk	3 lb	Pacific			
evaporated milk		Pacific			
fresh, while	qt.	"local"			
fresh, 2%	qt.	"local"			
Cheddar cheese	1 lb	"local"			
processed cheese	2 lb	"local"			
ice cream	3 pts				
<u>BREAD & CEREALS</u>					
bread (whole wheat)	16 oz	"local"			
bread (white)	16 oz	"local"			
ready-to-eat cereal	12 oz	Kelloggs			
rolled oats	5 lb	Quaker			
flour, enriched	10 lb	Five Roses			
rice	2 lb	Delta			
macaroni, enriched	2 lb	Catelli			
cookies	4 lb	Dad's			
<u>FRESH FRUIT AND VEGETABLES</u>					
potatoes	1b	"local"			
lettuce	head	"local"			
carrots	1b	"local"			
onions, cooking	1b	"local"			
cabbage	1b	"local"			
corn	cobs	"local"			
turnips	1b	"local"			
beets	1b	"local"			
apples	1b	"local"			
bananas	1b	"local"			
tomato	1b	"local"			
oranges	1b	"local"			

FOOD	UNIT	BRAND	PRICES		AVERAGE
			Store 1	Store 2	
<u>PROCESSED MEAT/MEAT ALTERNATES</u>					
canned tuna	6½oz	Cloverleaf			
canned sardine	3¼oz	Brunswick Canadian			
bologna	1b	"local"			
weiners (bulk)	1b	"local"			
bacon	1b	"local"			
beans with pork	28oz	Libby's			
peanut butter	16oz	McColls			
eggs, large A	doz	"local"			
<u>FATS AND OILS</u>					
butter	1b	B.C.			
margarine	31b	Empress			
shortening	1b	Crisco			
salad/cooking oil	32oz	Mazola			
salad dressing	24oz	Mayonnaise			
<u>MISCELLANEOUS</u>					
Sugar	51b	B.C.			
jam	24oz	Nabob			
coffee	1b	Nabob			
tea	1b	Lipton			

FOOD	UNIT	BRAND	PRICES		AVERAGE
			Store 1	Store 2	
<u>PROCESSED FRUITS AND VEGETABLES</u>					
apple juice=	48oz	Sun-Rype			
(vitam)					
tomato juice	48oz	Town House			
canned tomatoes	28oz	Royal City			
applesauce	14oz	Town House			
canned peaches	14oz	Town House			
orange juice	12oz	Bel Air			
raisins	15oz	Golden Harvest			
prunes	16oz	-			
canned peas	14oz	Town House			
canned corn	14oz	Town House			
frozen vegets.	2lb	Green Giant			
canned soup (veg)	10oz	Campbell's			
dry soup (split pea)	16oz	Avion			
<u>FRESH AND FROZEN MEAT</u>					
beef liver	1b	"local"			
beef roast (blade or chuck)	1b	"local"			
beef, hamburger	1b	"local"			
beef, stewing	1b	"local"			
chicken	1b	"local"			
turkey	1b	"local"			
pork chops	1b	"local"			
ham, butt end	1b	"local"			
fish, cod	1b	"local"			

APPENDIX D

TABLES VII-3 and VII-4: Daily nutrient intakes of all children, adolescents and adults compared to median intakes of the Nutrition Canada Survey.

TABLES IX-2 to IX-7: Percentage contribution of food groups to calories and nutrients for each age and sex category.

TABLE VII-3

DAILY NUTRIENT INTAKES OF ALL CHILDREN AND ADOLESCENTS. MEAN AND STANDARD DEVIATIONS ARE GIVEN. MEAN PROVINCIAL INTAKES ARE COMPARED TO MEDIAN INTAKES OF THE NUTRITION CANADA SURVEY. FIGURES IN PARENTHESES ARE NUMBER OF INDIVIDUALS.

	0-4 Years, M & F		5-9 Years, M & F		10-19 Years, F		10-19 Years, M	
	Province	N.C.*	Province	N.C.	Province	N.C.	Province	N.C.
	(22)		(31)		(25)		(25)	
Calories	1596 \pm 601	1678	2001 \pm 744	2025	2250 \pm 503	2129	2264 \pm 630	2584
Proteins	61 \pm 22	60	74 \pm 33	67	78 \pm 20	69	77 \pm 28	89
Calcium	1031 \pm 804	881	871 \pm 403	798	645 \pm 366	661	834 \pm 446	791
Iron	10.5 \pm 5.5	10	13.7 \pm 7.5	11	14.5 \pm 5.1	12	13.5 \pm 6.2	16
Vitamin A	3772 \pm 2193	703(R.E)	3313 \pm 2239	784	2829 \pm 1493	724	3750 \pm 2540	971
Thiamine	1.03 \pm 0.36	1.00	1.43 \pm 0.89	1.13	1.29 \pm 0.35	1.12	1.36 \pm 0.45	1.53
Riboflavin	1.66 \pm 0.56	1.72	1.91 \pm 0.93	1.71	1.75 \pm 0.58	1.57	1.82 \pm 0.90	2.04
Niacin	12.5 \pm 8.5	21	16.7 \pm 9.3	25	19.9 \pm 6.7	27	18.4 \pm 7.1	35
Ascorbic Acid	119 \pm 94	81	138 \pm 138	71	95 \pm 121	83	138 \pm 147	70

* N.C. = Nutrition Canada Survey

TABLE VII-4

DAILY NUTRIENT INTAKES OF ALL ADULTS. MEANS AND STANDARD DEVIATIONS ARE GIVEN. MEAN PROVINCIAL INTAKES ARE COMPARED TO MEDIAN INTAKES OF THE NUTRITION CANADA SURVEY. FIGURES IN PARENTHESES ARE NUMBER OF INDIVIDUALS.

	20-39 Years, F		20-39 Years, M		40 + F		40 + M	
	Province	N.C.	Province	N.C.	Province	N.C.	Province	N.C.
	(62)		(27)		(39)		(18)	
Calories	1674 \pm 500	1970	2780 \pm 817	2893	1527 \pm 338	1577	2661 \pm 1135	2174
Proteins	71 \pm 23	72	119 \pm 33	105	67 \pm 19	60	114 \pm 37	85
Calcium	594 \pm 504	631	804 \pm 417	733	484 \pm 232	536	715 \pm 459	606
Iron	13.1 \pm 5.3	13	20.1 \pm 8.1	18	11.7 \pm 5.2	10	18.7 \pm 7.3	14
Vitamin A	3793 \pm 2880	684(R.E)	5848 \pm 4761	1173	3923 \pm 2711	959	6850 \pm 4750	1011
Thiamine	1.12 \pm 0.47	1.14	1.96 \pm 0.71	1.54	0.96 \pm 0.27	.84	1.61 \pm 0.63	1.21
Riboflavin	1.52 \pm 0.74	1.46	2.16 \pm 0.89	2.17	1.42 \pm 0.50	1.37	2.03 \pm 0.76	1.26
Niacin	19.0 \pm 6.8	30	30.5 \pm 12.2	41	18.4 \pm 6.1	23	30.5 \pm 8.1	34
Ascorbic Acid	83 \pm 104	68	156 \pm 210	82	59 \pm 52	55	109 \pm 86	59

TABLE IX-2

PERCENTAGE CONTRIBUTION OF FOOD GROUPS TO CALORIES AND NUTRIENTS (5 - 9 Years M & F)

FOOD GROUPS	Calories		Protein		Calcium		Iron		Vit.A		Thiamine		Ribofl.		Niacin		Ascorbic	
	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I
I. (Milk, Milk products)	18	11	28	17	73	63	2	2	21	12	13	8	48	35	2	2	3	3
II. (Meat,fish, poultry, eggs, legumes)	18	16	41	47	3	7	38	41	6	15	28	25	28	37	51	51	-	-
III.(Vegetables)	4	7	3	5	1	3	5	7	73	31	5	11	2	4	7	12	8	22
IV.(Fruits	14	8	4	2	9	4	13	7	29	12	22	13	7	4	11	4	89	75
V. (Grains, cereals)	31	35	23	28	12	21	38	36	1	3	33	43	14	19	29	29	-	-
VI. (Fats,oils)	7	11	-	-	-	1	-	-	19	27	-	-	-	-	-	-	-	-
VII.(Sugars)	8	12	1	1	1	2	4	7	-	-	-	-	1	1	-	-	-	-
VIII.(Misc.)	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	-	-

TABLE IX-3

PERCENTAGE CONTRIBUTION OF FOOD GROUPS TO CALORIES AND NUTRIENTS (0-4 Years M & F)

	Calories		Protein		Calcium		Iron		Vitam A		Thiamine		Ribof.		Niacin		Ascorb.	
	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I
FOOD GROUPS																		
I. (Milk, milk products)	23	19	35	26	72	53	5	3	21	15	18	11	57	45	3	4	4	3
II. (Meat, fish, poultry, eggs, legumes)	21	16	38	42	6	4	28	44	12	23	25	27	20	30	54	47	-	1
III. (Vegetables)	7	5	5	4	3	1	9	7	43	28	11	8	4	3	12	12	18	11
IV. (Fruits)	9	11	2	4	4	3	10	8	8	19	16	19	4	5	6	12	78	84
V. (Grains, cereals)	26	29	20	22	14	37	41	35	2	1	29	36	14	16	25	24	-	1
VI. (Fats, oils)	8	9	-	-	-	-	-	-	15	14	-	-	-	-	-	-	-	-
VII. (Sugars)	7	11	-	2	1	1	7	4	-	-	-	-	-	1	-	-	-	-
VIII. (Misc)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-

TABLE IX-4

PERCENTAGE CONTRIBUTION OF FOOD GROUPS TO CALORIES AND NUTRIENTS (10 - 19 F)

FOOD GROUPS	Calories		Protein		Calcium		Iron		Vit A		Thiamine		Ribof.		Niacin		Ascorb	
	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I
I. (Milk, milk products)	15	9	22	10	68	49	3	2	17	16	11	4	42	18	2	1	2	2
II. (Meat, fish, poultry, eggs, legumes)	22	19	45	60	8	16	39	56	17	17	16	34	21	51	50	62	1	1
III. (Vegetables)	5	6	3	3	3	3	7	4	7	16	9	8	4	3	8	7	12	29
IV. (Fruits)	14	5	5	1	6	3	16	3	33	22	23	6	9	2	11	2	85	66
V. (Grains cereals)	28	37	25	26	14	25	34	29	-	3	41	47	24	24	26	23	-	2
VI. (Fats, oils)	11	10	-	-	1	-	-	-	26	26	-	-	-	-	-	-	-	-
VII. (Sugars)	11	13	-	-	-	3	-	5	-	-	-	-	-	1	-	-	-	-
VIII. (Misc.)	-	-	-	-	-	-	-	-	-	-	1	-	1	1	4	4	-	-

TABLE IX-5

PERCENTAGE CONTRIBUTION OF FOOD GROUPS TO CALORIES AND NUTRIENTS (10 - 19 Years,M)

FOOD GROUPS	Calories		Protein		Calcium		Iron		Vit. A		Thiamine		Ribof.		Niacin		Ascorb	
	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I
I. (Milk,milk products)	23	9	27	16	75	56	4	2	21	22	13	6	48	28	2	2	3	2
II. (Meat, fish poultry, eggs, legumes)	18	12	41	40	4	5	37	34	23	10	15	18	25	36	43	43	3	-
III. (Vegetables)	7	8	5	4	2	3	10	6	13	16	11	9	4	4	12	12	13	23
IV. (Fruits)	13	5	5	1	6	4	17	5	26	13	21	11	8	3	12	3	82	74
V. (Grains, cereals)	26	38	23	38	11	26	31	45	1	7	39	55	14	25	29	36	-	1
VI. (Fats,oils)	8	8	-	-	1	1	-	-	16	32	-	-	-	-	-	-	-	-
VII. (Sugars)	5	20	-	1	1	5	2	8	-	-	-	1	1	3	-	1	-	-
VIII. (Misc.)	-	-	-	-	-	-	-	-	-	-	-	1	-	1	2	4	-	-

TABLE IX-6

PERCENTAGE CONTRIBUTION OF FOOD GROUPS TO CALORIES AND NUTRIENTS (20 + FEMALES)

	Calories		Protein		Calcium		Iron		Vit.A		Thiamine		Ribof.		Niacin		Ascorb.	
	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I
FOOD GROUPS																		
I. (Milk, milk products)	11	9	14	9	57	46	2	1	10	9	7	5	30	20	1	1	2	3
II. (Meat, fish poultry, eggs, legumes)	28	23	60	63	16	12	50	63	21	20	33	42	41	56	51	60	4	4
III. (Vegetables)	8	9	6	5	7	5	13	8	44	44	15	13	7	4	11	10	34	50
IV. (Fruits)	6	3	2	1	4	1	6	1	10	5	11	3	4	1	4	1	60	41
V. (Grains, cereals)	23	32	17	21	13	34	26	24	1	3	31	35	15	17	18	19	-	1
VI. (Fats, oils)	10	12	-	-	1	1	-	-	14	21	-	-	-	-	-	-	-	-
VII. (Sugars)	11	14	-	-	1	1	2	4	-	-	-	-	-	-	-	-	-	-
VIII. (Misc.)	3	-	-	-	1	-	-	-	-	-	3	2	3	2	15	9	-	-

TABLE IX-7

PERCENTAGE CONTRIBUTION OF FOOD GROUPS TO CALORIES AND NUTRIENTS (20 + MALES)

	Calories		Protein		Calcium		Iron		Vit. A		Thiamine		Ribofl.		Niacin		Ascorb	
	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I	NI	I
FOOD GROUPS																		
I. (Milk, milk products)	8	5	8	6	38	40	2	-	8	5	3	3	17	15	1	1	1	1
II. (Meat, fish, poultry, eggs, legumes)	32	30	65	69	30	17	54	61	34	30	42	46	49	61	56	64	6	4
III. (Vegetables)	8	9	6	5	6	6	12	8	28	33	14	13	7	6	11	11	36	32
IV. (Fruits)	5	6	2	1	6	4	6	4	12	10	10	8	4	3	4	2	57	64
V. (Grains, cereals)	25	30	19	19	17	30	24	21	1	3	29	28	19	14	19	15	-	-
VI. (Fats, oils)	12	9	-	-	1	1	-	-	18	19	-	-	-	-	-	-	-	-
VII. (Sugars)	8	11	-	-	1	2	1	4	-	-	-	-	-	-	-	-	-	-
VIII. (Misc.)	2	-	-	-	1	-	-	-	-	-	2	1	3	1	9	7	-	-

LEGEND TO APPENDIX E

<u>Variable</u>	<u>Code</u>
Isolation	1=Non-Isolated Reserve 2=Isolated Reserve

APPENDIX E

Raw Data — Individual Nutrient Values
Calculated From 24-Hour Dietary
Recalls For Subjects From The Eight*
Reserves.

Units are protein, total fat,
carbohydrate (gm), Vitamins A and E
(International Units), all others
in mg.

* Data from Fort Ware and Injenika were later pooled
under Fort Ware, making a total of seven reserves.

CODE NUM	AGE	ISO LAT ION	RE SER VE	SEX	CALO RIES	PROT EIN	CALCIUM	IRON	VITAMIN A	VITAMIN E
A. SECHELT										
11	41	1	1	F	1549	58	614	4.6	1000	201.8
13	12	1	1	F	1516	71	771	8.8	3080	128.4
14	14	1	1	M	2115	91	1456	8.7	3846	289.5
15	15	1	1	M	2650	106	1707	11.4	3590	517.3
21	42	1	1	F	1205	64	337	8.3	9132	49.4
22	52	1	1	M	1288	88	398	10.4	12975	62.3
23	15	1	1	M	1702	63	1390	6.2	3699	44.6
31	66	1	1	F	1457	63	608	8.8	2050	113.6
33	16	1	1	M	1963	96	962	11.2	2867	179.7
34	28	1	1	M	2515	119	657	17.2	5433	269.4
41	27	1	1	F	1624	98	797	14.0	2308	148.1
43	4	1	1	M	1940	106	1623	26.9	1891	131.1
44	5	1	1	F	1303	75	959	8.6	1720	74.4
51	26	1	1	F	1387	46	172	7.8	2027	280.0
53	7	1	1	F	1365	24	401	4.4	2120	280.6
54	6	1	1	M	1671	34	474	4.9	1970	307.9
61	25	1	1	F	965	59	228	7.2	1770	201.5
62	29	1	1	M	2546	161	777	17.5	3087	398.4
63	6	1	1	F	1445	49	461	8.2	2406	279.0
64	5	1	1	M	1026	34	400	5.7	1696	166.1
71	22	1	1	F	1548	82	910	7.2	1905	81.9
72	25	1	1	M	2600	127	796	16.8	2131	210.4
81	55	1	1	F	2019	74	369	17.0	2701	65.2
82	19	1	1	F	1650	55	167	13.3	1575	169.1
91	44	1	1	F	1444	42	203	8.1	4600	190.5
92	48	1	1	M	1407	52	239	10.1	5605	108.5
93	10	1	1	M	1554	40	522	9.6	5260	120.9
94	5	1	1	F	890	22	382	4.7	3000	87.9
95	13	1	1	M	1718	76	375	14.7	8482	97.9
96	15	1	1	M	1780	60	286	11.8	7480	66.5
97	16	1	1	F	1813	65	284	12.2	6940	61.2
98	21	1	1	F	728	36	125	6.9	4115	51.9
103	16	1	1	F	2533	81	1349	11.9	4066	339.8
104	18	1	1	F	1987	71	464	12.5	1950	94.5
105	12	1	1	M	770	28	180	5.5	865	33.6
106	13	1	1	M	2159	47	699	8.0	2502	99.1
111	45	1	1	F	1429	47	743	9.3	4779	145.0
112	44	1	1	M	4189	153	1434	25.1	15196	633.8
113	18	1	1	M	3702	124	1584	19.5	9363	250.0
114	8	1	1	M	2444	86	1466	12.4	10173	277.6
121	19	1	1	F	1476	107	747	8.6	1556	189.2
123	2	1	1	M	1691	41	317	11.5	3305	263.6
124	1	1	1	F	850	44	1227	2.1	1322	44.8
131	34	1	1	F	1245	51	139	11.0	5251	167.5
133	11	1	1	M	2630	77	1516	12.6	8675	438.2
134	12	1	1	M	2578	75	973	13.9	5840	239.2
135	5	1	1	F	1671	69	1154	7.9	3690	74.5

CODE NUM	AGE	ISD LAT ION	RE SER VE	SEX	CALO RIES	PROT EIN	CALCIUM	IRON	VITAMIN A	VITAMIN E
141	18	1	1	F	1736	82	1008	15.1	4009	212.5
142	20	1	1	M	2400	101	745	24.4	12460	367.4
151	35	1	1	F	1822	77	927	14.5	9596	126.6
161	22	1	1	F	1454	62	835	7.7	3554	190.7
162	21	1	1	M	4084	148	1063	28.5	13244	565.7
163	0	1	1	F	641	31	1549	2.8	2010	11.3

B. FORT WARE

171	61	2	2	F	870	129	241	30.1	160	11.5
172	69	2	2	M	870	129	241	30.1	160	35.5
173	18	2	2	F	1976	105	362	25.7	4480	227.3
181	33	2	2	F	553	42	118	9.6	0	14.5
182	48	2	2	M	1856	103	334	20.3	3280	194.9
183	7	2	2	F	892	63	990	9.2	935	25.9
184	4	2	2	F	544	30	923	1.9	50	10.5
211	86	2	2	F	958	48	193	10.8	464	83.6
213	3	2	2	F	1007	54	458	10.6	2060	70.8
214	5	2	2	F	1711	72	947	13.7	3540	176.8
215	21	2	2	F	1433	83	840	17.5	1812	182.4
221	32	2	2	F	989	32	184	5.0	390	44.8
223	8	2	2	F	1709	52	474	10.4	1507	120.6
231	22	2	2	F	1728	89	336	18.3	4820	150.4
233	1	2	2	F	1242	48	4091	15.9	4560	70.5
234	2	2	2	M	2270	100	1021	15.0	5293	135.9
241	31	2	2	F	818	24	272	4.2	2490	179.9
251	50	2	2	F	1273	47	449	8.7	3370	199.1
261	31	2	2	F	2102	117	695	24.9	2860	201.2
263	8	2	2	M	2110	67	891	11.7	3140	204.8
264	10	2	2	M	3304	97	1110	17.4	4390	299.2
265	14	2	2	F	3400	125	1413	26.2	4315	153.5
271	22	2	2	F	1326	50	445	9.1	1630	56.8
272	25	2	2	M	1929	120	356	14.6	125	69.4
273	5	2	2	F	1228	43	415	8.3	1465	50.8
281	33	2	2	F	2038	72	565	9.3	2525	217.1

C. INJENIKA

191	21	2	3	F	1647	76	605	17.8	9056	157.0
192	30	2	3	M	1670	77	413	21.0	13954	100.0
193	2	2	3	F	1073	39	578	8.7	7391	80.5
201	23	2	3	F	1979	81	3762	25.1	2555	98.0
202	28	2	3	M	2267	93	556	17.0	2655	214.7
203	3	2	3	F	1103	37	294	6.9	2820	72.7

D. NECOSLIE

291	30	1	4	F	1800	59	723	8.3	2523	136.7
293	7	1	4	F	2813	89	995	13.8	4210	179.2

CODE NUM	AGE	ISO LAT ION	RE SER VE	SEX	CALO RIES	PROT EIN	CALCIUM	IRON	VITAMIN A	VITAMIN E
294	8	1	4	M	4416	144	1364	24.4	5520	279.5
301	21	1	4	F	1823	65	625	10.3	2965	225.3
302	26	1	4	M	2750	95	577	16.4	3055	382.0
311	25	1	4	F	1828	69	581	14.0	10437	95.6
312	37	1	4	M	3667	148	562	25.5	15562	289.5
313	2	1	4	F	1687	65	1354	5.9	4490	86.2
321	21	1	4	F	1289	44	408	9.2	872	148.3
322	36	1	4	M	1315	71	366	15.6	1496	125.1
323	4	1	4	F	1870	54	220	10.2	1759	335.0
331	61	1	4	F	1163	69	867	6.1	6323	70.4
341	44	1	4	F	1887	85	680	12.7	5420	158.5
342	44	1	4	M	3417	161	755	25.8	11345	334.4
351	27	1	4	F	1666	72	922	7.4	2953	218.7
352	36	1	4	M	3639	113	800	17.9	3305	617.3
353	8	1	4	F	2130	74	1518	23.7	2155	184.1
361	51	1	4	F	1751	91	450	17.9	1512	120.5
371	24	1	4	F	2734	123	1572	15.0	11364	195.4
373	2	1	4	F	1475	62	1003	8.2	8685	57.9
374	4	1	4	F	1937	70	889	11.0	6183	107.0
381	39	1	4	F	1316	74	108	18.2	1120	114.8
382	38	1	4	M	3781	158	780	36.7	6450	182.3
383	5	1	4	M	2888	164	918	35.3	2513	110.9
391	27	1	4	F	1159	51	719	8.5	2931	56.2
393	6	1	4	M	1601	56	964	6.6	1650	48.2
401	54	1	4	F	1955	96	470	18.5	10312	303.9
403	20	1	4	F	1179	37	210	7.0	1179	200.1
411	52	1	4	F	1803	70	518	9.4	2470	97.3
421	37	1	4	F	2337	69	586	14.7	2373	191.4
423	74	1	4	F	1096	72	150	17.4	993	59.0
424	9	1	4	F	2799	110	1311	18.0	2795	275.0
431	26	1	4	F	2545	90	1256	14.1	3096	447.3
441	42	1	4	F	1914	58	237	10.6	4988	144.5
442	46	1	4	M	2867	107	726	16.9	7710	262.4

E. NANAIMO

451	28	1	5	F	2426	102	727	10.4	4042	359.6
452	31	1	5	M	2292	94	472	11.6	4460	463.5
453	3	1	5	M	2601	72	1348	9.5	5235	241.1
461	33	1	5	F	1773	95	566	18.8	2581	336.4
462	38	1	5	M	2498	154	597	31.4	18050	369.2
463	10	1	5	M	2922	141	1270	24.5	4399	559.8
464	8	1	5	M	2263	129	1126	20.6	2037	211.8
471	46	1	5	F	1175	55	674	7.0	1330	98.6
481	25	1	5	F	2447	61	687	14.1	2610	199.9
482	24	1	5	M	4479	129	1423	27.3	4010	431.8
483	24	1	5	F	2129	60	208	12.0	6370	199.7
491	46	1	5	F	1956	91	1345	9.2	3461	292.1
493	25	1	5	F	2055	91	655	12.2	2487	274.7

CODE NUM	AGE	ISO LAT ION	RE SER VE	SEX	CALO RIES	PROT EIN	CALCIUM	IRON	VITAMIN A	VITAMIN E
501	40	1	5	F	1618	41	501	4.7	1805	216.1
502	42	1	5	M	1495	39	284	5.7	1450	101.3
503	18	1	5	F	1918	57	704	9.3	4650	258.0
504	13	1	5	F	2354	57	855	9.7	3179	272.4
511	42	1	5	F	1470	43	205	9.4	2078	240.6
512	44	1	5	M	3941	142	849	26.5	12869	668.0
513	3	1	5	F	2505	84	1603	13.0	2745	151.2
514	5	1	5	F	1962	81	1603	10.9	2040	117.7
521	60	1	5	F	1728	55	654	6.4	2008	518.4
522	64	1	5	M	1975	88	1034	5.6	1410	593.8
523	17	1	5	F	1767	80	1508	6.8	1748	325.9
531	84	1	5	F	1406	33	511	5.2	7665	46.3
533	46	1	5	M	4302	187	2080	19.0	9750	268.4
541	61	1	5	F	1459	71	603	9.4	7025	232.3
551	48	1	5	F	1961	60	780	8.7	3711	433.4
552	50	1	5	M	3861	122	712	20.6	5561	880.2
553	24	1	5	M	1548	51	491	7.0	1980	387.2
561	38	1	5	F	1845	88	206	14.4	2135	224.8
562	40	1	5	M	2586	148	608	19.9	3633	345.7
563	17	1	5	M	3051	130	496	17.5	2939	438.8
571	57	1	5	F	1113	58	439	11.8	2210	78.9
573	85	1	5	F	1044	57	387	6.2	2055	132.6
581	29	1	5	F	1520	43	490	3.9	1314	356.5
582	29	1	5	M	3885	190	2128	15.9	4470	530.0
583	25	1	5	F	2296	121	879	17.1	3804	314.6
584	24	1	5	M	2615	124	742	19.2	5433	421.6
591	56	1	5	F	1438	63	396	8.0	4816	115.8
592	63	1	5	M	3490	109	703	13.0	5046	527.9
593	29	1	5	M	3047	150	1374	17.6	8377	375.3
601	27	1	5	F	1613	66	759	23.2	5716	173.2
602	24	1	5	M	3466	116	1674	13.9	6337	189.9
611	26	1	5	F	1936	62	488	12.4	8505	543.9
613	24	1	5	F	1216	45	325	8.6	5742	330.2
614	4	1	5	F	1462	56	659	7.9	3232	223.9
615	2	1	5	M	2493	96	551	14.0	6321	736.9
621	41	1	5	F	1895	86	511	12.9	8110	251.1
622	41	1	5	M	4120	120	547	20.9	12944	686.7
631	28	1	5	F	1420	72	297	13.3	3485	111.7
641	27	1	5	F	1653	64	521	8.5	1514	269.2
643	6	1	5	M	2713	89	1644	14.2	6804	266.2
651	23	1	5	F	1105	47	234	8.0	7858	125.9
652	23	1	5	M	3269	103	734	17.7	6660	437.6

F. NAZKO

661	36	2	6	F	1633	85	719	16.9	2220	197.1
662	41	2	6	M	2234	104	872	21.9	2820	273.4
671	26	2	6	F	2443	93	808	24.2	11971	302.0
673	4	2	6	F	1346	49	763	8.2	1720	159.1

CODE NUM	AGE	ISO LAT ION	RE SER VE	SEX	CALO RIES	PROT EIN	CALCIUM	IRON	VITAMIN A	VITAMIN E
674	12	2	6	F	1234	52	464	11.0	400	273.5
681	20	2	6	F	2332	120	814	19.4	6910	339.2
683	2	2	6	M	1443	53	602	10.7	3467	110.2
691	29	2	6	F	1679	65	654	11.2	9462	107.9
693	11	2	6	F	2359	89	388	19.3	3890	137.8
701	44	2	6	F	1410	63	660	8.3	2958	166.4
703	8	2	6	F	2769	98	1200	12.8	3168	227.4
711	51	2	6	F	1046	65	254	11.0	4408	39.5
713	17	2	6	M	2627	83	806	14.7	2630	248.7
714	13	2	6	M	1658	67	447	10.5	2120	44.3
715	11	2	6	F	1621	63	324	10.5	1472	115.7
716	14	2	6	F	1592	60	429	13.4	1290	150.9
717	11	2	6	M	2483	77	824	11.8	2539	139.8
718	11	2	6	M	2067	78	667	13.9	600	295.0
719	16	2	6	M	2640	72	478	17.7	2155	423.1
723	14	2	6	M	1800	41	720	5.5	1490	79.6
724	11	2	6	M	1850	43	380	7.3	730	343.5
731	33	2	6	F	1945	76	622	8.8	3445	290.6
733	7	2	6	M	2557	78	557	11.1	5551	467.0

G. LAKE BABINE

741	32	2	7	F	1777	71	429	15.4	2317	268.8
742	35	2	7	M	2305	101	553	40.3	1890	289.3
743	10	2	7	M	2412	77	1035	32.8	3661	100.2
744	8	2	7	F	1702	64	896	27.8	2591	85.2
751	59	2	7	F	1809	62	672	14.1	4142	223.2
753	20	2	7	F	1924	76	635	17.3	4172	158.7
754	10	2	7	F	1641	60	550	11.2	3302	86.3
761	71	2	7	F	1236	70	367	12.1	1630	160.3
763	27	2	7	M	1616	75	669	11.5	1889	79.9
764	20	2	7	M	2888	147	507	31.4	2329	174.1
765	22	2	7	M	2911	146	1041	31.6	2663	240.7
766	28	2	7	M	3097	98	851	19.7	6410	333.0
771	42	2	7	F	1464	64	397	13.6	8630	169.6
773	14	2	7	F	2098	68	663	15.0	3030	205.4
781	17	2	7	F	2143	86	367	20.9	3624	109.0
783	9	2	7	F	2406	71	670	18.3	3340	261.4
784	14	2	7	F	1025	79	314	15.0	311	132.9
791	35	2	7	F	2090	83	706	17.4	2170	335.2
801	40	2	7	F	1612	74	324	17.2	2260	206.0
803	2	2	7	F	1647	65	873	12.6	2620	180.9
804	9	2	7	M	2289	111	354	26.7	1610	286.4

H. TAKLA LAKE

811	45	2	8	F	1673	57	198	13.8	1530	237.7
813	20	2	8	F	1618	67	264	16.7	1620	231.5
821	33	2	8	F	1234	49	440	9.9	6195	59.0

CODE NUM	AGE	ISO LAT ION	RE SER VE	SEX	CALO RIES	PROT EIN	CALCIUM	IRON	VITAMIN A	VITAMIN E
823	6	2	8	F	1615	48	722	10.8	5090	72.0
824	12	2	8	F	1839	78	614	14.3	2611	95.1
831	56	2	8	F	1667	86	555	19.2	9825	37.6
833	15	2	8	F	1215	71	242	16.0	1840	50.2
841	27	2	8	F	1103	36	240	4.9	5730	114.2
843	7	2	8	F	2493	78	780	11.2	9715	181.9
851	35	2	8	F	1377	85	318	19.2	1898	143.6
853	11	2	8	F	2027	65	803	14.1	2818	176.2
854	14	2	8	M	2009	70	419	18.1	3270	169.6
861	36	2	8	F	772	52	168	12.1	1040	52.2
863	9	2	8	F	1321	62	258	16.3	1732	43.2
871	46	2	8	F	2194	86	628	19.2	2662	79.8
872	60	2	8	M	2311	120	689	27.6	2460	81.4
873	6	2	8	F	1820	63	709	13.0	2830	49.0
881	23	2	8	F	2627	84	860	15.6	8310	255.8
883	3	2	8	F	2287	82	735	16.6	5833	246.5
884	28	2	8	F	1488	88	467	19.3	2100	147.2
891	50	2	8	F	1439	63	307	14.0	5607	116.7
892	52	2	8	M	1697	81	362	18.4	9100	89.6
901	28	2	8	F	1092	58	101	14.5	135	74.1
911	35	2	8	F	1827	118	687	22.0	1694	171.7
913	12	2	8	F	2136	119	869	20.3	2480	227.3
921	26	2	8	F	1983	74	451	13.3	2140	47.7
931	20	2	8	F	2358	87	714	14.6	3014	127.4
933	13	2	8	F	2579	105	473	20.5	2110	98.1
934	53	2	8	F	1990	93	394	15.6	2800	73.6
935	10	2	8	M	2457	68	550	13.6	346	68.6

CODE NUM	AGE	ISO LAT ION	RES ER VE	SEX	THIA MINE (MG)	RIBO FLAVIN (MG)	NIACIN (MG)	ASCOR BIC ACID	TOTAL FAT	CARBO HYD RATE
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A. SECHELT

11	41	1	1	F	0.50	1.12	18.4	7	42	158
13	12	1	1	F	1.05	1.53	11.3	67	60	174
14	14	1	1	M	1.67	2.44	19.5	190	72	279
15	15	1	1	M	1.44	3.03	25.2	41	87	377
21	42	1	1	F	0.55	0.95	11.9	61	46	81
22	52	1	1	M	0.75	1.12	16.8	83	61	90
23	15	1	1	M	1.86	1.68	15.4	328	57	242
31	66	1	1	F	0.83	1.45	11.1	60	58	174
33	16	1	1	M	1.50	2.53	17.1	73	103	178
34	28	1	1	M	1.56	1.98	27.2	246	117	248
41	27	1	1	F	1.24	2.00	21.6	9	70	170
43	4	1	1	M	1.05	2.50	16.8	24	89	193
44	5	1	1	F	0.61	2.02	9.8	5	66	106
51	26	1	1	F	0.61	0.61	14.8	34	76	135
53	7	1	1	F	0.48	0.60	4.8	2	57	202
54	6	1	1	M	0.63	0.67	11.7	72	69	245
61	25	1	1	F	0.87	0.47	12.6	139	31	113
62	29	1	1	M	1.60	1.45	33.8	157	105	244
63	6	1	1	F	1.29	0.82	11.9	316	37	243
64	5	1	1	M	0.97	0.68	8.2	258	21	183
71	22	1	1	F	0.62	1.27	11.9	45	52	190
72	25	1	1	M	1.69	1.48	20.6	40	95	324
81	55	1	1	F	0.55	1.03	20.1	92	100	215
82	19	1	1	F	0.38	0.65	15.3	8	95	153
91	44	1	1	F	1.10	0.72	15.0	255	43	231
92	48	1	1	M	1.32	0.89	17.5	323	43	210
93	10	1	1	M	1.35	1.09	12.7	422	29	301
94	5	1	1	F	0.68	0.65	6.2	214	23	159
95	13	1	1	M	1.44	1.55	13.0	312	75	190
96	15	1	1	M	1.47	0.92	19.0	340	66	248
97	16	1	1	F	1.48	1.13	17.0	232	78	218
98	21	1	1	F	0.69	0.64	8.6	174	29	80
103	16	1	1	F	1.02	2.39	12.5	52	93	368
104	18	1	1	F	1.54	1.11	14.8	24	79	274
105	12	1	1	M	0.47	0.52	7.1	0	31	101
106	13	1	1	M	1.00	1.20	10.9	11	69	362
111	45	1	1	F	0.86	1.46	10.9	62	62	188
112	44	1	1	M	2.14	3.00	27.6	116	154	569
113	18	1	1	M	2.18	3.11	23.0	183	105	599
114	8	1	1	M	1.57	2.60	14.4	122	83	358
121	19	1	1	F	0.71	1.70	35.9	24	59	127
123	2	1	1	M	0.85	1.09	10.3	152	73	228
124	1	1	1	F	0.57	1.97	1.5	14	33	104
131	34	1	1	F	0.53	0.74	16.4	92	55	134
133	11	1	1	M	0.99	2.45	15.4	123	107	354
134	12	1	1	M	1.63	1.68	27.9	136	132	276
135	5	1	1	F	0.70	1.97	12.7	52	64	205

CODE NUM	AGE	ISO LAT ION	RES ER VE	SEX	THIA MINE (MG)	RIBO FLAVIN (MG)	NIACIN (MG)	ASCOR BIC ACID	TOTAL FAT	CARBO HYD RATE
141	18	1	1	F	1.51	3.26	16.8	40	59	225
142	20	1	1	M	1.92	2.50	37.7	146	117	263
151	35	1	1	F	1.80	1.70	18.2	565	50	275
161	22	1	1	F	0.79	1.32	12.5	58	67	158
162	21	1	1	M	3.31	2.72	33.2	911	161	535
163	0	1	1	F	0.35	1.55	1.9	8	36	48

B. FORT WARE

171	61	2	2	F	1.40	3.08	38.5	1	28	17
172	69	2	2	M	1.43	3.05	39.7	1	28	17
173	18	2	2	F	1.43	2.47	31.5	5	87	198
181	33	2	2	F	0.75	0.98	15.2	60	11	69
182	48	2	2	M	1.66	2.16	24.7	80	96	142
183	7	2	2	F	0.94	2.10	10.9	47	20	106
184	4	2	2	F	0.51	1.35	3.0	27	5	89
211	86	2	2	F	0.78	1.05	14.1	1	35	114
213	3	2	2	F	0.85	1.39	10.9	70	39	107
214	5	2	2	F	1.11	1.98	12.1	112	71	186
215	21	2	2	F	1.23	2.28	17.5	34	48	158
221	32	2	2	F	0.73	0.55	7.2	24	37	139
223	8	2	2	F	1.00	0.75	9.8	26	50	260
231	22	2	2	F	1.73	1.77	21.8	214	64	209
233	1	2	2	F	1.00	1.87	5.7	26	46	158
234	2	2	2	M	1.87	2.20	17.9	381	83	278
241	31	2	2	F	0.44	0.66	5.1	56	45	78
251	50	2	2	F	0.84	1.21	5.4	47	55	150
261	31	2	2	F	1.56	2.88	28.9	3	80	224
263	8	2	2	M	1.07	1.79	10.9	4	82	278
264	10	2	2	M	1.62	2.40	16.3	5	126	453
265	14	2	2	F	1.57	2.58	24.1	30	126	424
271	22	2	2	F	0.80	1.16	9.8	2	43	194
272	25	2	2	M	1.54	1.17	24.0	6	73	210
273	5	2	2	F	0.77	1.06	7.6	1	33	189
281	33	2	2	F	0.87	0.92	14.1	33	69	283

C. INJENIKA

191	21	2	3	F	1.23	1.88	21.1	49	56	203
192	30	2	3	M	1.37	1.68	24.2	75	43	234
193	2	2	3	F	0.78	1.11	7.8	111	33	148
201	23	2	3	F	1.93	1.61	15.1	158	87	224
202	28	2	3	M	1.89	1.74	14.8	152	95	262
203	3	2	3	F	0.98	0.78	8.6	232	40	154

D. NECOSLIE

291	30	1	4	F	2.20	1.41	17.8	285	70	238
293	7	1	4	F	3.07	1.94	17.6	521	104	384

CODE NUM	AGE	ISO LAT ION	RES ER VE	SEX	THIA MINE (MG)	RIBO FLAVIN (MG)	NIACIN (MG)	ASCOR BIC ACID	TOTAL FAT	CARBO HYD RATE
294	8	1	4	M	5.09	2.88	30.9	504	173	578
301	21	1	4	F	0.73	1.26	13.2	9	96	180
302	26	1	4	M	1.56	1.58	24.9	19	132	306
311	25	1	4	F	1.71	1.38	16.5	34	85	201
312	37	1	4	M	3.89	2.07	34.8	73	199	339
313	2	1	4	F	1.20	2.24	8.2	134	84	174
321	21	1	4	F	0.85	1.38	16.6	5	33	207
322	36	1	4	M	1.27	2.02	22.1	6	41	158
323	4	1	4	F	0.98	0.86	18.9	82	77	244
331	61	1	4	F	0.64	1.40	19.1	58	50	109
341	44	1	4	F	1.24	1.61	25.5	56	77	218
342	44	1	4	M	2.31	2.72	38.6	114	171	315
351	27	1	4	F	0.84	1.69	15.9	67	60	215
352	36	1	4	M	1.48	1.67	40.1	125	175	432
353	8	1	4	F	1.49	2.25	15.1	277	58	346
361	51	1	4	F	1.42	1.89	30.2	160	50	238
371	24	1	4	F	2.00	3.11	34.9	324	80	387
373	2	1	4	F	1.03	1.94	11.8	166	47	202
374	4	1	4	F	1.27	1.79	18.2	158	61	283
381	39	1	4	F	1.06	1.43	26.6	11	28	195
382	38	1	4	M	2.71	3.15	42.6	46	135	505
383	5	1	4	M	2.20	3.75	45.4	43	95	340
391	27	1	4	F	1.92	3.94	17.0	25	29	178
393	6	1	4	M	1.90	3.47	14.8	12	52	215
401	54	1	4	F	1.56	2.40	24.2	29	89	196
403	20	1	4	F	0.60	0.60	11.2	42	56	132
411	52	1	4	F	0.94	1.31	19.0	48	76	216
421	37	1	4	F	1.40	1.60	17.1	25	77	341
423	74	1	4	F	0.93	1.64	21.9	20	26	143
424	9	1	4	F	2.20	2.65	22.8	94	103	360
431	26	1	4	F	1.39	2.03	24.9	84	97	337
441	42	1	4	F	0.66	0.82	17.1	56	69	137
442	46	1	4	M	1.99	1.90	28.1	176	105	285

E. NANAIMO

451	28	1	5	F	1.46	1.47	34.0	244	99	291
452	31	1	5	M	1.80	1.81	26.8	213	109	251
453	3	1	5	M	1.04	1.68	11.5	286	107	343
461	33	1	5	F	1.63	2.46	22.1	167	64	207
462	38	1	5	M	2.13	5.07	35.6	36	90	272
463	10	1	5	M	2.20	4.51	30.1	239	114	343
464	8	1	5	M	1.72	4.12	31.2	188	71	293
471	46	1	5	F	0.98	1.35	11.4	60	50	132
481	25	1	5	F	0.74	0.94	8.3	7	77	374
482	24	1	5	M	1.77	1.83	28.9	21	168	589
483	24	1	5	F	1.22	0.76	25.5	246	58	352
491	46	1	5	F	1.10	2.23	19.3	46	99	183
493	25	1	5	F	1.02	1.30	23.4	190	95	163

CODE NUM	AGE	ISO LAT ION	RES ER VE	SEX	THIA MINE (MG)	RIBO FLAVIN (MG)	NIACIN (MG)	ASCOR BIC ACID	TOTAL FAT	CARBO HYD RATE
501	40	1	5	F	0.71	1.14	22.7	96	49	172
502	42	1	5	M	0.79	0.92	20.6	161	40	163
503	18	1	5	F	1.58	1.15	17.4	449	78	262
504	13	1	5	F	1.86	1.17	14.5	401	95	329
511	42	1	5	F	1.39	0.86	10.8	13	94	116
512	44	1	5	M	3.22	2.57	32.5	285	206	402
513	3	1	5	F	1.83	2.87	11.2	92	87	336
514	5	1	5	F	1.67	2.55	10.6	155	73	261
521	60	1	5	F	0.68	0.96	20.8	43	71	227
522	64	1	5	M	0.57	1.30	34.2	64	77	233
523	17	1	5	F	1.11	2.10	18.1	151	53	247
531	84	1	5	F	0.60	0.81	8.8	37	37	254
533	46	1	5	M	1.93	3.29	45.3	91	219	404
541	61	1	5	F	0.94	1.12	25.1	168	49	184
551	48	1	5	F	0.74	1.41	14.2	47	97	214
552	50	1	5	M	1.81	1.75	27.1	70	204	405
553	24	1	5	M	0.56	0.84	12.4	48	79	159
561	38	1	5	F	1.08	1.00	26.9	206	100	145
562	40	1	5	M	1.32	2.02	35.1	35	141	185
563	17	1	5	M	1.65	1.54	37.1	197	134	340
571	57	1	5	F	1.01	1.24	21.2	100	37	136
573	85	1	5	F	0.94	1.16	16.1	49	43	107
581	29	1	5	F	0.43	0.57	17.1	27	64	191
582	29	1	5	M	1.81	2.59	72.9	230	130	486
583	25	1	5	F	2.81	3.17	32.7	249	96	243
584	24	1	5	M	2.43	2.10	29.2	128	118	266
591	56	1	5	F	1.39	1.19	16.6	48	66	106
592	63	1	5	M	1.85	1.78	39.7	53	156	340
593	29	1	5	M	3.06	2.76	38.8	270	150	286
601	27	1	5	F	1.01	1.56	16.4	72	72	192
602	24	1	5	M	1.54	2.42	21.5	120	168	378
611	26	1	5	F	1.10	1.09	17.2	127	99	217
613	24	1	5	F	0.76	0.62	11.9	38	51	160
614	4	1	5	F	0.83	1.11	13.7	97	62	186
615	2	1	5	M	1.28	1.00	42.5	64	143	240
621	41	1	5	F	1.00	1.38	23.7	48	85	204
622	41	1	5	M	1.77	1.71	35.3	118	180	519
631	28	1	5	F	0.92	1.02	23.8	120	26	204
641	27	1	5	F	0.73	0.82	16.5	32	67	216
643	6	1	5	M	1.96	3.23	17.4	255	100	378
651	23	1	5	F	0.65	0.70	11.1	176	58	103
652	23	1	5	M	1.82	1.46	21.0	98	138	415

F. NAZKO

661	36	2	6	F	1.28	2.18	21.0	26	46	203
662	41	2	6	M	1.61	2.60	26.5	42	62	288
671	26	2	6	F	1.63	2.99	27.2	8	99	306
673	4	2	6	F	1.12	1.63	8.9	4	50	177

CODE NUM	AGE	ISO LAT ION	RES ER VE	SEX	THIA MINE (MG)	RIBO FLAVIN (MG)	NIACIN (MG)	ASCOR BIC ACID	TOTAL FAT	CARBO HYD RATE
674	12	2	6	F	1.50	1.49	11.9	2	22	212
681	20	2	6	F	1.46	2.19	28.9	33	110	221
683	2	2	6	M	0.95	1.30	11.7	143	44	215
691	29	2	6	F	0.89	1.36	18.6	37	62	215
693	11	2	6	F	1.66	1.91	22.6	213	104	274
701	44	2	6	F	0.67	1.12	16.3	30	58	162
703	8	2	6	F	1.33	1.88	26.7	162	94	378
711	51	2	6	F	0.84	1.75	18.0	154	30	127
713	17	2	6	M	1.31	2.60	18.9	262	93	354
714	13	2	6	M	0.91	1.88	15.6	44	58	218
715	11	2	6	F	1.05	1.64	18.4	64	57	210
716	14	2	6	F	1.21	1.28	18.2	6	44	244
717	11	2	6	M	0.87	1.19	15.6	7	101	303
718	11	2	6	M	1.39	1.58	25.1	12	74	284
719	16	2	6	M	1.46	1.57	22.0	15	84	400
723	14	2	6	M	0.60	0.77	7.1	7	68	260
724	11	2	6	M	0.86	0.81	9.3	7	62	280
731	33	2	6	F	0.76	1.39	16.2	37	95	203
733	7	2	6	M	1.16	1.25	22.0	41	110	326

G. LAKE BABINE

741	32	2	7	F	1.27	1.56	22.7	172	63	240
742	35	2	7	M	1.43	2.16	31.1	61	77	294
743	10	2	7	M	1.94	1.99	21.3	471	56	421
744	8	2	7	F	1.29	1.65	15.6	219	54	256
751	59	2	7	F	1.30	2.33	20.3	36	56	259
753	20	2	7	F	1.15	2.20	21.5	40	54	265
754	10	2	7	F	0.83	1.67	14.9	28	49	246
761	71	2	7	F	0.93	1.43	20.9	45	40	146
763	27	2	7	M	1.47	1.27	15.7	14	74	167
764	20	2	7	M	2.08	3.06	44.4	67	99	353
765	22	2	7	M	2.45	3.86	41.0	150	73	430
766	28	2	7	M	2.74	1.80	24.0	751	84	492
771	42	2	7	F	1.01	1.42	17.6	21	53	185
773	14	2	7	F	1.40	1.67	17.5	33	66	306
781	17	2	7	F	1.81	2.45	24.9	192	53	333
783	9	2	7	F	1.43	1.96	19.5	132	76	353
784	14	2	7	F	1.09	1.43	27.9	40	24	120
791	35	2	7	F	1.36	2.12	23.3	12	75	274
801	40	2	7	F	1.20	1.71	21.5	21	49	219
803	2	2	7	F	1.08	1.95	14.5	84	60	206
804	9	2	7	M	2.02	2.14	37.7	41	63	316

H. TAKLA LAKE

811	45	2	8	F	0.97	1.21	19.3	40	51	249
813	20	2	8	F	0.95	1.40	19.7	0	53	213
821	33	2	8	F	0.79	1.23	16.4	16	42	170

CODE NUM	AGE	ISO LAT ION	RES ER VE	SEX	THIA MINE (MG)	RIBO FLAVIN (MG)	NIACIN (MG)	ASCOR BIC ACID	TOTAL FAT	CARBO HYD RATE
823	6	2	8	F	0.91	1.35	11.9	125	53	229
824	12	2	8	F	1.28	1.74	18.4	14	86	195
831	56	2	8	F	1.21	1.94	23.1	31	54	202
833	15	2	8	F	1.24	1.54	20.1	108	39	146
841	27	2	8	F	0.58	0.63	11.1	27	39	160
843	7	2	8	F	1.32	1.64	12.3	233	84	351
851	35	2	8	F	1.24	1.92	27.0	22	41	164
853	11	2	8	F	1.00	1.70	15.2	28	67	285
854	14	2	8	M	1.06	1.42	19.1	24	61	283
861	36	2	8	F	0.79	1.17	15.2	9	25	82
863	9	2	8	F	0.87	1.26	19.2	18	39	170
871	46	2	8	F	1.18	1.92	25.9	29	85	264
872	60	2	8	M	1.44	2.63	35.0	8	81	262
873	6	2	8	F	0.86	1.47	16.5	12	67	235
881	23	2	8	F	1.24	2.20	24.0	10	90	383
883	3	2	8	F	1.31	2.32	18.6	88	87	302
884	28	2	8	F	1.21	2.08	23.2	2	49	172
891	50	2	8	F	0.84	0.95	18.1	119	43	197
892	52	2	8	M	0.99	1.19	23.8	146	58	211
901	28	2	8	F	0.82	1.13	19.6	0	30	144
911	35	2	8	F	1.57	2.26	34.1	152	53	217
913	12	2	8	F	1.64	2.16	34.0	165	63	272
921	26	2	8	F	1.09	1.52	19.8	2	87	235
931	20	2	8	F	0.97	1.84	18.7	3	104	260
933	13	2	8	F	1.26	1.94	24.2	1	86	347
934	53	2	8	F	1.09	1.60	21.1	1	95	195
935	1.0	2	8	M	1.23	1.14	17.0	2	44	449