

Evaluation of the Nuxalk Food and Nutrition Program: Traditional Food Use by a Native Indian Group in Canada

HARRIET V. KUHNLEIN¹ AND SANDY A. MOODY²

¹School of Dietetics and Human Nutrition; Macdonald College of McGill University, Ste. Anne de Bellevue, Quebec, Canada, H9X 1C0; and ²Nuxalk Health Clinic, Pacific Region Medical Services, Bella Coola, British Columbia, Canada, V0T 1C0

INTRODUCTION

Native Indian people of North America have always been known for their ability to live well and to develop a high standard of culture with local resources, but today they are among the least advantaged peoples for health risk and other standard measures of the quality of life. Modern health care agencies routinely document intractable problems of recurrent infection, infant morbidity and mortality, dental caries and tooth loss, obesity, diabetes, alcoholism, and impaired mental health (1, 2). All of these conditions are affected, directly or indirectly, by the food system and its dietary quality.

Although it is rare to find published reports of a lack of "food" (energy, protein, carbohydrate, or fat) for a Native group in the United States or Canada, there are several studies that clearly document insufficient quantities of essential nutrients, particularly micronutrients (e.g., iron, vitamin A, folate, vitamin D, and others) (3-7). Foods containing the energy nutrients are generally available to Indian people of all income levels, to such an extent that obesity and dental caries are pressing nutritional problems. However, the best sources of most micronutrients are among the more expensive items in contemporary food markets in Indian areas, because these areas are often remote in terms of commercial transportation networks. Thus, these foods (fresh fruits, vegetables, dairy items, unprocessed meats) are infrequently purchased by those with low incomes.

In considering health status, food market access, income, education, housing, and other "material goods," Native Indian groups might be viewed as developing

societies in the midst of highly visible national levels of achievement for all of these parameters. Societal contrasts in apparent material wealth (e.g., housing, income) have been thought to contribute to Indian problems of mental health (crime, suicide, etc.) and a lagging cultural morale, particularly in young people (8-11).

It is in this context that many Native Indian leaders and public health officials have sought to develop new concepts of nutrition and health promotion for Indian people which would encompass traditional values and practices (12). In particular, the traditional foods of native people living in rural areas have been recognized as being important sources of nutrients which, if available and cost-effective to acquire, could be promoted to improve nutritional status.

THE NUXALK OF BELLA COOLA

The Nuxalk Nation is located in a west coast forest environment (13) on the central west coast of British Columbia, Canada. The Bella Coola Valley is a classically beautiful, riverine setting approximately 40 kilometers long, 4 kilometers wide, and bordered by 2000 meter glaciated peaks. The Nuxalk reserve lands, established under federal legislation in the 1890s, encompass approximately 25 square kilometers at the mouth of the Bella Coola River on the eastern end of Burke Channel, a sea fjord. Although the Nuxalk were "discovered" by Captain Cook and Sir Alexander Mackenzie living in several neighbouring villages (total population estimated "in the thousands") in the late 1700s, they were collectively resettled by government action in the town of Bella Coola in the late 1800s, following debilitating outbreaks of smallpox and other diseases introduced by European contact (14, 15). Bella Coola is the major settlement of Nuxalk people today, where approximately 800 Native people live in 150 homes. The Bella Coola Valley has a

Please address correspondence to: Dr. H.V. Kuhnlein, School of Dietetics and Human Nutrition, Macdonald College of McGill University, Ste. Anne de Bellevue, Quebec, Canada, H9X 1C0.

current population of approximately 2300, with the majority being of European descent. The Bella Coola Valley has two elementary schools, a small high school, a credit union, a small library, a 10-bed hospital administered by the United Church of Christ, two grocery outlets, an all-night market, and various federal and provincial services. Reserve residents are primarily governed by the chiefs and council. Generally recognized health problems of the Nuxalk parallel those for other isolated and semi-isolated native communities for the province: obesity, dental caries, alcoholism, diabetes, high risk infants, and mental health problems (16, 17). The native community has high unemployment (over 30%), and formal education rarely exceeds ninth grade. The fishing and logging industries provide seasonal employment for men (18).

The food system traditional to the Nuxalk culture emphasizes fish, particularly salmon, other seafoods, game, berries, roots, greens, the inner bark of trees, and fats of marine origin. These have been described in detail elsewhere (19-24).

Several factors have been reported as contributing to a reduced *per capita* use of traditional foods in the Nuxalk diet since European contact. These include legislation restricting traditional food resource use; demographic changes; availability of marketed foods; enhanced use of marketed foods as a result of education, media promotion, and social contacts; the attendant concerns of employment (time, money, etc.); and the interruption of knowledge transfer to younger generations (25).

THE NUXALK FOOD AND NUTRITION PROGRAM

The initial concepts of the Nuxalk Food and Nutrition Program were developed in 1980 in discussions with the Nuxalk chief, council and elders, and personnel in the Medical Services Division of Health and Welfare Canada and the Nuxalk Health Clinic. The central focus of the program was the traditional cultural food system of the Nuxalk. Program goals were to enhance community knowledge of the use of these traditional foods; to encourage their expanded use; and to improve the overall nutritional health of the Nuxalk people. Full funding for the Nuxalk Food and Nutrition Program was obtained for three years, from 1983 to 1986, from Health and Welfare Canada. Community household food use interviews, which included 24-hour recalls of food eaten by women homemakers, were conducted in 1981 (19). This provided a nutrient focus for nutritional status improvement, a needs assessment for the program proposal, and essential baseline data for program evaluation. Nutritional status evaluations were done on the entire community in May 1983 and May 1986. Measurements included dental status, blood values for iron (ferritin, hemoglobin, hematocrit), folate (serum and erythrocyte),

serum carotene and retinol, gamma glutamyl transferase, high density lipoproteins and cholesterol, 24-hour recall of individual food intake, and anthropometry. Food-use interviews which paralleled those completed in 1981 were repeated in the late summer of 1985. Thus, evaluation of the education program which was conducted from late May 1983 to May 1986 was possible through assessment of the change in the use of traditional Nuxalk foods from 1981 to 1985, as well as the change in individual nutritional status from 1983 to 1986.

Some aspects of the 1981 and 1983 evaluations have been reported elsewhere (19, 26). It is the purpose of this report to describe the nutrition and health promotion intervention program, and to report the changes that occurred in the use of traditional Nuxalk foods from 1981 to 1985. These changes serve as an evaluation of the Nuxalk Food and Nutrition Program.

NUXALK EDUCATIONAL STRATEGIES

This research program on nutrition education for Native People had specific goals for improving food use and health, but the techniques to be employed were not specified at the outset, except that primary emphasis would be given to foods traditional to the Nuxalk culture. As the program evolved, community leaders in the health center, the council, and among the elders gave guidance on how to maximize traditional food use and community participation. The primary orientation of the program was the improvement of local health by increasing the community base of knowledge and use of the foods in the Nuxalk traditional food system. Secondary emphasis was given to general health promotion and the use of marketed foods to optimize the daily diet.

The Nuxalk elders provided information sessions to describe the different species of fish, animal and plant foods of the area, and how these foods were traditionally harvested, preserved, prepared, and used by families. There were two part-time nutrition aides, both Nuxalk women, who learned the traditional food-use techniques from the elders. They then acted as instructors to the Nuxalk community under the administrative guidance of the nurse and the health representative. A record was kept on each teaching event, the level of participation, and the suggestions made for improving the quality of the event for the next occasion.

Educational activities involving traditional Nuxalk foods were carried out in several settings, and included techniques for harvesting, preserving, and preparing the foods. Weekly flyers advertising these events were distributed to each home. Activities were held at the harvest site, the health center, the schools, or at a particular preservation spot, such as a smokehouse, a barbecue area, etc. Usually, at least one elder was present to supervise each traditional food event.

During the course of the three-year program, the community increased its "inventory" of traditional food processing equipment as project personnel helped families to construct ooligan [small, fat-rich fish used to prepare a fish oil (20)] bins and cooking boxes, build smoke-houses, and identify berry harvesting areas. Pressure canners were also purchased collectively at reduced price, and instruction was given in their use for preserving fish. Permanent resources added to the health center for teaching purposes included a barbecue pavilion, a food dryer, a home freezer, a pressure canner and a water-bath canner, a fitness room, and a 15' x 15' demonstration garden of traditional food plants. The food plant garden was constructed and labeled with the assistance of the elders and an ethnobotanist. Each of these resources was used by several community groups.

Feasts, either pot-luck or prepared by program staff, were popular events during the program, and traditional Nuxalk foods were the most popular attraction. Feasts were held for special events (to honour an elder, to celebrate Father's Day, etc.), as well as to stimulate interest and participation (popular summer-day "teens-only-barbeques", for example).

Two resource publications were prepared, printed and distributed to each Nuxalk family. The first, the *Nuxalk Food and Nutrition Handbook* (27), described techniques for handling each of the 75 species of traditional Nuxalk foods to be found in the area, and included general information on nutrition and physical fitness. This 120-page softcover handbook was designed for use by schools and continuing education instructors, as well as by families. The *Nuxalk Recipe Book*, *Kanusyam A Snenik* ["Real Good Food"], was prepared by the nutrition aides in response to popular demand. They were assisted in this task by many Nuxalk women who contributed recipes.

An adult education program for mothers and children called "Mom's Time Out" also proved to be popular. Meetings were held once a month during the final year of the program. Activities centered around the use of traditional foods, grocery shopping, and nutrition. Games, food prizes, and social interaction were the themes of these afternoon programs.

A special program on dental nutrition education, daily tooth brushing, and weekly fluoride rinses was conducted in the two elementary schools in Bella Coola. The nutrition aides provided weekly lessons and assisted the teachers of classes (kindergarten through grade eight) to monitor the children's progress. The weekly fluoride rinses were conducted from September 1985 until May 1986; however, other classroom educational activities were conducted throughout the entire course of the program.

Aerobic fitness classes were conducted at various sites in the community by two interested Nuxalk nutrition aides. They were trained by a fitness instructor from

Vancouver. Thirty to forty-minute classes were held at three levels of intensity: regular, and light or moderate for overweight clients. In addition, twelve special fitness events and four distance "fun-runs" were conducted for the residents of Bella Coola.

The nutrition and health assessment programs evaluated the physical health of community members, and provided an avenue for informal discussions on health and nutrition. Other features of the program which were included in order to increase participants' awareness of the relationship between diet and health included: an explanation of the consent forms for blood nutrient analysis, a bicycle ergometer fitness test, a diet record evaluation, and serving traditional foods and tea as a thank you to participants.

Community participation in the 375 activities of the Nuxalk Food and Nutrition program from 1983 to 1986 is shown in Table 1. It was estimated that about 25% of the population did not participate regularly in program events. Older adult men were particularly difficult to engage in program activities, other than the feasts. Most people participated in at least one event. Feasts, nutrition and dental education in schools, fitness, and the nutrition and health assessments were the events with the highest community participation during the three year program.

METHODS

Traditional food-use and weekly food expenditures were used to evaluate the success of the Nuxalk Food and Nutrition Program. Food-use interviews were conducted by trained Nuxalk interviewers July through September in both 1981 and 1985. Each home in the community was surveyed. In both interviews, the questions concerned food purchasing, use of home food processing equipment, and, in particular, the quantities of traditional Nuxalk foods which were harvested, preserved, and used by each family for the preceding twelve-month period. The interviews also included a 24-hour recall of individual food intake of each family member present at the time, and, in 1985, an additional series of questions on program participation (not reported here).

There were two Nuxalk interviewers, one of whom worked during both periods. They were trained in techniques of interviewing by the authors, and they practiced the food-use questions until the techniques were consistent. A simple numerical measure was used for ease in recording traditional food use. For example, "How many cases of flat tins of sockeye did you can this year?"; "How many sticks of ooligans with 25 ooligans/stick did you smoke this year?"; "How many quarts of raspberries did you jar, jam, or freeze this summer?"; etc. Interviewees were asked to report the amount of food used fresh or preserved after harvesting during the preceding

Table 1. Participation in Community Events: Nuxalk Food and Nutrition Program, May 1983–May 1986

| Activity | Number of Events (Total 375) | Total Participants* |
|--|---------------------------------|---------------------|
| Food events — community | | |
| Fish cutting classes | 13 | 88 |
| Berry picking | 19 | 139 |
| Green and root gathering | 4 | 27 |
| Fish preserving | 5 | 55 |
| Children's food summer camps | 5 | 64 |
| Ooligan fishing and grease making | 1 | 18 |
| Feasts | | |
| Various events and age groups | 19 | 1456 |
| Public awareness and adult education | | |
| Mom's Time-Out | 8 | 232 |
| Nutrition education classes | 10 | 138 |
| Handbook, recipe book | 2 | Each home |
| Flyers (approximately 150) | Weekly | Each home |
| Booths at fairs, circus, displays | 3 | Not counted |
| School programs | | |
| Nutrition education, grades 3–6; Two schools, also high school | 47 | 581 |
| Ooligan grease making classes | 2 | 30 |
| Nursery school nutrition | 1 | 10 |
| Fish-use classes | 2 | 36 |
| Dental and nutrition education | 42 | 2059 |
| Fitness Events | | |
| Light exercise classes | 72 | 439 |
| Regular exercise classes | 69 | 700 |
| Overweight fitness classes | 29 | 145 |
| Special fitness events | 12 | 381 |
| Fun-runs | 4 | Not counted |
| Schools — regular fitness classes | 4 | 43 |
| Nutrition and Health Assessments | | |
| May 1983 | 1 | 370 |
| March 1986 (fitness only) | 1 | 33 |
| May 1986 | 1 | 477 |

*Computed from attendance records kept for each event.

twelve-month period. These quantities were then converted to edible portion measures for computer analysis. All the Bella Coola data were coded and entered in files on an Amdahl V8 computer and statistically analyzed using SAS routines.

Seventy-three families completed interviews in 1981 and ninety-eight families completed them in 1985. In both cases, this was 65–70% of the families registered in the community. Several families were added to the band registration list in 1984, as a result of new registration of Indian women living alone or with non-Indian men.

In both interview periods, the percentage of families agreeing to participate was judged representative of the entire Nuxalk community, as assessed by methods described earlier (19).

From 1981 through 1985, the cost of food in Bella Coola was determined in the only grocery market, the Co-op, in accordance with the methodology devised by Agriculture Canada for its "nutritious food basket" publications (28). Agriculture Canada priced seventy-eight standard food items on the last Wednesday of the month in various Canadian cities. The Bella Coola prices of the basket of foods closely paralleled those published for Yellowknife in the Northwest Territories, a remote city known for high food costs. It was thus possible to compare Nuxalk family grocery expenditures, as reported in the interviews in 1981 and 1985, with the cost of a standardized "nutritious market basket" of foods.

RESULTS AND DISCUSSION

Table 2 lists the amount of Nuxalk family traditional foods used for the preceding twelve-month period, as reported in 1981 and 1985. The results show that more families in 1985 reported using the Nuxalk foods than in 1981, and that for most items there was a significant increase in the mean quantities of the traditional foods used. The greatest increases were seen in the use of fish species. A notable exception was with the use of ooligans (*Thaleichthys pacificus*) and the rendered oil from this fish, called "ooligan grease" (20). Nineteen eighty-five was a poor year for ooligan spawning, due to flood conditions and silt in the river. Although many more families reported using ooligan grease (61 families in 1985 versus 46 families in 1981), it was available in limited quantities and thus a smaller amount was used per family in 1985.

More families used game, wild berries, wild greens, and garden fruit and vegetables. However, the quantity of garden vegetables used per family in 1985 was less, primarily because fewer potatoes were grown.

While these results seem very clear, some qualifying comments on the amounts of food used are necessary in the interpretation of Table 2, primarily due to the yearly fluctuations in the availability of fish, game and wild plant foods. The decline in the ooligan run in 1985 is a case in point. While human error in reporting must also be taken into account, the interviewers had no evidence of over-reporting in 1985 or under-reporting in 1981. In addition, it was obvious to the entire community that intensive food harvesting and processing was being practiced during the summer of 1985.

The total amount of fish and game used by Nuxalk families is high. Daily dietary records show that the quantity of fish consumed by an individual adult is rarely less than eight ounces. Fish, potatoes, and sweetened tea are often the main components of Nuxalk meals, with

Table 2. Nuxalk Family Food Use, 1981 and 1985

| | 1981 | | 1985 | | Difference in Average Usage 1981 and 1985 |
|----------------------|---------------------------------|------------------------------------|---------------------------------|------------------------------------|---|
| | Percent Families Using (n = 73) | Average Used/Consuming Family/Year | Percent Families Using (n = 98) | Average Used/Consuming Family/Year | |
| Steelhead | 49 | 56.9 lb | 77 | 156.3 lb | + 99.4 lb** |
| Spring salmon | 64 | 85.4 lb | 90 | 349.2 lb | +263.8 lb** |
| Sockeye salmon | 79 | 61.1 lb | 90 | 195.8 lb | +134.7 lb** |
| Pink salmon | 23 | 4.1 lb | 25 | 58.8 lb | + 54.7 lb** |
| Chum salmon | 22 | 76.4 lb | 48 | 143.3 lb | + 66.9 lb** |
| Coho salmon | 37 | 138.1 lb | 76 | 187.0 lb | + 48.9 lb** |
| Ooligans | 75 | 122.4 lb | 78 | 38.9 lb | - 83.5 lb** |
| Cod | 4 | 11.7 lb | 47 | 23.0 lb | + 11.3 lb** |
| Other fish/shellfish | 11 | 15.1 lb | 64 | 26.5 lb | + 11.4 lb** |
| All fish rope | 7 | 27.2 lb | 76 | 72.5 lb | + 45.3 lb** |
| Ooligan "grease" | 46 | 62.5 qt | 61 | 8.2 qt | - 54.3 qt** |
| Game | 30 | 76.3 lb | 73 | 196.2 lb | +119.9 lb** |
| Wild berries | 56 | 41.5 qt | 87 | 49.1 qt | + 7.6 qt N.S. |
| Wild greens | 14 | 1.0 lb | 64 | 17.3 lb | + 16.3 lb** |
| Garden vegetables | 38 | 533.9 lb | 61 | 288.6 lb | -245.3 lb* |
| Garden fruit | 7 | 132.9 lb | 82 | 167.0 lb | + 34.1 lb N.S. |

*p < .01

**p < .001

fish obviously contributing the majority of nutrients. The Nuxalk also have frequent visits from members of their extended families who come to the reserve on weekends and holidays. Preserved fish (smoked, dried, canned, frozen) is a highly-appreciated, frequent gift to these visitors.

The reported Nuxalk family grocery expenditures in 1981 and 1985 are given in Table 3. Based on an average family size of four persons, \$104.31 was spent in 1981 and \$82.90 in 1985. This represents a reduction of 20% in expenditures. Also given in Table 3 is the Bella Coola cost of the Canadian "nutritious food basket" of seventy-eight foods during this period. The "basket" prices gradually rose from \$105.62 in July 1981 to \$125.76 in August 1985, representing a 19% increase in food prices over

Table 3. Nuxalk Family* Grocery Expenditures and Cost of "Canadian Food Basket"^b, 1981-1985

| Year | \$ |
|-----------------------|--------|
| Nuxalk Average Family | |
| 1981, July-September | 104.31 |
| 1985 July-September | 82.90 |
| Market Basket | |
| 1981, July | 105.62 |
| 1982, July | 111.32 |
| 1983, July | 116.58 |
| 1984, September | 119.25 |
| 1985, August | 125.76 |

* Computed for a family of four persons.

^b Prices determined for the Agriculture Canada Market Basket of seventy-eight foods for a standard four-person family. Prices were recorded in Bella Coola.

this period. Thus, combining the Nuxalk family reduced total expenditures at the Co-op with the nationwide inflation in the price of the food basket, Nuxalk families saved a total of 40% of what they might have spent if expenditures and inflation had followed their natural course. This reduction in food expenditures was reported by several Nuxalk families to be directly related to an increased use of home harvested and preserved foods, as well as to the more economical shopping practices learned through the Nuxalk Food and Nutrition Program.

CONCLUSIONS

It was concluded that the Nuxalk Food and Nutrition Program was successful in gaining participation of community members in its activities. There was evidence of significant changes in food use, presumably as a result of the extensive community education program. Traditional food use was significantly higher in 1985 than in 1981, with the exception of ooligan and ooligan grease. While the Nuxalk increased their use of traditional Nuxalk foods, their per family food expenditures on marketed foods declined.

Many requests for programming information have been received from the health representatives of coastal Indian groups, so that they may also benefit from the Nuxalk experience. Although the changes in nutritional status resulting from this program have yet to be fully reported, it is clear that the local perception is that the Nuxalk Food and Nutrition Program was a successful one, and adaptable to other native communities. Groups living in

a similar environment can make direct use of the program different traditional food systems) can benefit from the techniques used to develop and evaluate the educational program.

ACKNOWLEDGMENTS

The Nuxalk Food and Nutrition Program had its inception in 1980 and was completed in 1986. There were at least one hundred individuals involved through the Nuxalk Nation, Health and Welfare Canada (Medical Services Branch, the Health Promotion Contribution Program, and the National Health Research and Development Program), the University of British Columbia, the B.C. Provincial Museum in Victoria, and McGill University. Notwithstanding, the concepts of the education-specific program components and the analyses reported here require special thanks to certain individuals: Edward Moody, Elected Nuxalk Chief, and Archie Pootless, Nuxalk Band Manager and recently Elected Chief; Nuxalk assistants Rose Hans, C.H.R., Louise Hilland, Emily Schooner, Grace Hans, Theresa Barton, David Hunt, Eliza Saunders, Warren Snow, and the late Sarah Saunders; Rhea Joseph; Nuxalk elders Willie Hans, Hazel Hans, Elsie Jacobs, Katie Nelson, the late Dr. Margaret Siwallace, the late Felicity Walkus and the late Alice Tallio; for assistance with programming and statistical analysis to Frank Flynn and Jim Karounis; for ideas on educational activities to Margo Palmer, Dr. Don Davis, Dr. Jean Steckle, Dave Bogoeh, Wendy Wolfe, and Dr. Nancy Turner. Each of these people participated in very special ways. For further information on the Nuxalk program, we direct the reader to the final report of the project, available from either author, and to the literature cited. Support for this health promotion education program came from Health and Welfare Canada, Health Promotion Contribution Program, project 6554-2-28.

References

- Ackerman, A. *Food and nutrition policy options for American Indians and Alaskan Natives*. Washington: National Science Foundation 1980, pp. 21-66.
- Schaeffer, O. Changing dietary patterns in the Canadian North: Health, social and economic consequences. *Journal of the Canadian Dietetic Association* 38:17-25, 1977.
- Butte, N.F., D.H. Calloway, and J.L. van Duzen. Nutritional assessment of pregnant and lactating Navajo women. *American Journal of Clinical Nutrition* 34:2216-2228, 1981.
- Desai, I.D. and M. Lee. Nutritional status of British Columbia Indians. III. Biochemical studies at Ahousat and Anaham. *Canadian Journal of Public Health* 62:525-536, 1971.
- Lee, M., R. Reyburn, and A. Carrow. Nutritional status of British Columbia Indians. I. Dietary studies at Ahousat and Anaham. *Canadian Journal of Public Health* 62:285-296, 1971.
- Bureau of Nutritional Sciences. *Nutrition Canada, National Survey*. Department of National Health and Welfare Canada, Minister of Supply and Services Canada, 1975, pp. 64-110.
- Bureau of Nutritional Sciences. *Nutrition Canada, Indian Survey*. Department of National Health and Welfare Canada, Minister of Supply and Services Canada, 1975, pp. 27-148.
- Indiana and Northern Affairs Canada. *Indian Conditions, A Survey*. Minister of Supply and Services Canada, 1985, pp. 15-80.
- Stanley, S., ed. *American Indian Economic Development*. Chicago: Mouton Publishers, Aldine, 1978, pp. 409-510.
- Dosman, E.J. *Indians: The Urban Dilemma*. Toronto: McClelland and Stewart Ltd., 1972, pp. 68-83, 130-151.
- Barnett, D. and R. Sterling. *Bobbi Lee: Indian Rebel. Struggles of a Native Canadian Woman*. Richmond, B.C., IMS Press, 1975, pp. 60-65.
- Medical Services Branch. *Native Foods and Nutrition*. National Health and Welfare. Minister of Supply and Services Canada, 1985.
- Treidl, R. Editor. *Handbook on Agricultural and Forest Meteorology*. Fisheries and Environment Canada, Minister of Supply and Services Canada, 1978, pp. 3-5.
- Mackenzie, A. *Voyages from Montreal on the River St. Lawrence Through the Continent of North America to the Frozen and Pacific Oceans in the Years 1789 and 1793*. Reprinted from the original in 1971. Rutland: Charles E. Tuttle, 1981, pp. 342-375.
- Duff, W. *The Indian History of British Columbia. Vol. 1. The Impact of the White Man*. Victoria, British Columbia: The B.C. Provincial Museum, 1969, pp. 40-52.
- Pacific Regional Medical Services. *Dental Health Survey of Indian Children in the Pacific Region*. Vancouver: Health and Welfare Canada, 1980.
- Pacific Regional Medical Services. *Annual Report*. Vancouver: Health and Welfare Canada, 1982.
- Census of Canada. *Enumeration Area Statistics*. Vancouver, Statistics Canada, 1981.
- Kuhnlein, H.V. Traditional and contemporary Nuxalk foods. *Nutrition Research* 4:789-809, 1984.
- Kuhnlein, H.V., A.C. Chan, N.J. Thompson, and S. Nakai. Ooligan grease: A nutritious fat used by native people of coastal British Columbia. *J. Ethnobiology* 2(2):154-161, 1982.
- Kuhnlein, H.V. and N.J. Turner. Cow-parsnip (*Heracleum lanatum*): An indigenous vegetable of a native people of northwestern North America. *J. Ethnobiol.* 6:309-324, 1986.
- Kuhnlein, H.V., N.J. Turner, and P.D. Kluckner. Nutritional significance of two important "root" foods (springbank clover and pacific silverweed). *Ecology of Food and Nutrition* 12:89-95, 1982.
- Turner, N.J. and H.V. Kuhnlein. Two important "root" foods of the Northwest Coast Indians: Springbank clover and pacific silverweed. *Economic Botany* 36(4):411-432, 1982.
- Turner, N.J. and H.V. Kuhnlein. Camas and riceroot — Two liliaceous root foods used by British Columbia Indians. *Ecology of Food and Nutrition* 13:199-219, 1983.
- Kuhnlein, H.V. Change in the use of traditional foods by the Nuxalk native people of British Columbia. In *Perspective on Dietary Change. Studies in Nutrition and Society*, G.H. Pelto and L.A. Vargas, eds. Cambridge, MA: International Nutrition Foundation for Developing Countries, (in press).
- Barr, S.I. and H.W. Kuhnlein. High density lipoprotein and total serum cholesterol levels in a group of British Columbia Native Indians. *Nutrition Research* 5:827-837, 1985.
- Journal of American Dietetic Association. Nuxalk Food and Nutrition Handbook. Book listing. *Journal of American Dietetic Association* 85:526, 1985.
- Robbins, L. and M. Zarkadas. The Agriculture Canada nutritious food basket. *Food Market Commentary* 2 (4):34-42, 1980.