First Nations Nutrition and Health Conference

Proceedings



Alfred Wong, Editor

June 19 - 20, 2003 Recreation Centre, 100 Lower Capilano Road, Squamish Nation

Sponsored by Friends of Aboriginal Health

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Proceedings of the First Nations Nutrition and Health Conference, 2003

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2003 Conference Delegates

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Foreword

We welcome you to this gathering of aboriginal people, scientific experts and concerned citizens to discuss and develop modernized traditional ways and means to reclaim the health of the people of the First Nations.

This aboriginal-initiated project was developed because of the widespread frustration among the aboriginal leadership and the people, about the continuing poor health status, despite more than 50 years of applications of western methodology for aboriginal health. "Too many pills are being prescribed to the native population". There is a growing belief and interest in re-linking cultural practices, traditional diet and good health.

The Conference is a 100% volunteer project in which no funding support has been solicited from governments, corporations or aboriginal organizations. The Conference aims to be an independent forum.

Follow-up active dissemination of Conference outcome to the communities will include publication of Conference proceedings, work book, Internet web link and community seminars. We hope the delegates will take the message back to their communities. There is a path forward to reclaim the people's health.

Gerald Amos, Chairman

Al Wong, Program Coordinator

Final Program

Thursday, June 19, 2003

- 0845 Gerald Amos, Conference Chairman Welcome and opening remarks
- 0900 Drums of the Squamish First Nation

Politics and Culture

- 0900 Ovide Mercredi, Former Grand Chief, Assembly of First Nations Time for justice, sovereignty and health after more than 200 years of foreign colonization and cultural destruction
- 0945 Lydia Hwitsum, Member, Political Executive, First Nations Summit Present Status of Aboriginal Health in British Columbia
- 1015 Health break: *Water and red alder* bark tea of the Haisla people
- 1030 Gerald Amos, Former Chief Councillor, Haisla First Nation *Health of the people and community*
- 1100 Michael Gordon, Director, M.R. Gordon & Associates Ltd., Halfmoon Bay, British Columbia Loss of use of a traditional fishery -The Kitamaat Eulachon
- 1130 Andy Carvill (Chief) and David Ravensdale (Health Director), Carcross/Tagish First Nation Wellness Governing Model: The Union of Our Two Worlds and Traditional Knowledge
- 1200 Lunch break Traditional food of the South Coast people (prepared under the supervision of elders)

Traditional Food and Natural Resources

1300 Ida John, Elder, Chilliwack Territory, Sto:Lo First Nation *Traditional foods of the Sto:Lo Nation*

- 1330 Nancy Turner, Professor, and Rosemary Ommer, Professor, School of Environmental Studies, University of Victoria, Victoria, British Columbia *Our Food is Our Medicine: Traditional Plant Food, Traditional Ecological Knowledge and Health in a Changing Environment*
- 1400 Wata, Elder, Fort Rupert Territory, Kwakiutl First Nation Acculturation and natural food sources of a coastal community
- 1430 Sergio Paone, Environmental Consultant, David Suzuki Foundation, Victoria, British Columbia Impact of fish farming on the natural food resources of First Nations people
- 1500 Health break: *Water and soapberry drink of the Sto:Lo people*
- 1515 Simon Lucas, Elder, Hesquiaht Tribe, Nuu-Chah-Nulth First Nation Overall Health - Mental, Emotional, Spiritual and Physical Aspects
- 1545 Neil Towers, Professor Emeritus, Department of Botany, University of British Columbia, Vancouver, British Columbia Identification of anti-biotics and anticancer chemicals in selected medicinal plants and mushrooms of the West Coast of Canada
- 1630 Harriet Kuhnlein, Professor, Human Nutrition Centre for Indigenous Peoples' Nutrition and Environment (CINE), School of Dietetics and Nutrition, McGill University, Ste Anne-de- Bellevue, Quebec Indigenous peoples and their food resources - considering benefits and risks
- 1800 Conference Banquet Traditional foods of the South Coast people (prepared under the supervision of elders)

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Friday, June 20, 2003

- 0845 Drums of the Squamish First Nation
- Diet and Health
- 0900 Laurie Nicholas, Community Nutritionist, Akwesasne Mohawk Territory *A sharing and learning journey in nutrition labelling*
- 0940 Francisco Perez Bravo, Professor, Genetic Epidemiology Program, Instituto de Nutricion y Technologia de los Alimentos (INTA), Universidad de Chile, Santiago, Chile *Ethnic Groups in Chile and Chronic Disease Prevalence: Epidemiological Transition.*
- 1010 Health break: *Water and Devil's club tea* of the Sto:Lo people
- 1025 Al Wong, President, Xymega Corp., Vancouver, British Columbia Reversing the high prevalence of obesity, diabetes, hypertension and depression among the aboriginal people
- 1055 Rosie Hans (Elder) and Louise Hilland, (Nutritionist), Bella Coola Territory, Nuxalk First Nation Nuxalk Food and Nutrition Project: re-introduction of traditional diet and its impact on the health of the people
- 1125 Cecile Lardon, Professor, Department of Psychology, Center for Alaska Native Health Research (CANHR), University of Alaska, Fairbanks, Alaska Understanding what health and wellness means to the Yup'ik people
- 1200 Lunch break Speaker: Ian Gill (President, EcoTrust, Vancouver, British Columbia) Traditional food of the people of the South and North Coast (prepared under the supervision of elders)

Path Forward to Better Health

1300 Open Forum for the people to relate their own experience with failures of the western medicine and western medical practices for the aboriginal people Presenters: Wata and Conference delegates at large

- 1515 Health break: *Water and Pu7yaas tea of the people of Nuxalk people*
- 1530 Panel Discussion:
 - * Ida John, Sto:Lo Nation
 * Andy Carvill, Carcross/Tagish Nation
 - * Wata, Kwakiul First Nation * Gerald Amos, Haisla First Nation Path forward for reclaiming the health
 - of the people
- 1630 Al Wong, FNNHC Program Committee *Closing Remarks*
- 1700 Farewell Banquet Traditional food of the people of the North and South Coast (prepared under the supervision of elders)

Time for justice, sovereignty and health after more than 200 years of foreign colonization and cultural destruction



Ovide Mercredi Former Grand Chief Assembly of First Nations

Abstract

Visitors to the traditional lands and water used the people of the First Nations for food, shelter and spirituality have always been treated with great cordiality. There was no titled "land or water ownership" by individuals; it was a commonwealth.

The destruction of the peoples life and spirit began about 200 years ago with the imposition of government decrees and unequal treaties for seizure of traditional land and water. The people are effectively alienated from the natural environment to which their total well-being has always been wholly dependent on. In the terminology of the late 20th Century, it was ethnic-cleansing which has resulted in long-lasting upheaval of the traditional society.

Induced adoption of the industrial-age lifestyle has wrecked the total health of the people to the present day. Indeed, the people of the First Nations have the lowest health status in comparison to Canadians at large. Aboriginal people represent 2% of the adult population in Canada, and yet, aboriginal people comprise 17% of the incarcerated population.

Substantial reversal of this low health status is possible if the people are provided with adequate tools and unfettered rights to design and implement improvement of their health status on the basis of their own traditional cultural practices, which include the restoration of alienated use of resources in the natural environment. Greater access to western medical services and increased nutritional education according the western dietary model do not necessarily result in better health of the people. Let the people make their own decision!



The Present Status of Aboriginal Health in British Columbia

Lydia Hwitsum Task Group Member First Nations Summit

Abstract

The present health status of the people remains unsatisfactory. High prevalence of suicide, alcoholism, infant mortality, obesity and diabetes is symptomatic of the alienation of our people from the traditional culture and the natural environment. Despite various set backs and obstacles encountered during the past year, the First Nations Chiefs' Health Committee continues working to mitigate some of the underlying causes of ill health of the people, in particular those living in isolated, rural communities.

I acknowledge the Squamish Peoples and thank you for the invitation to speak on Squamish territory. I also thank the organizers of the conference, previous speakers and send out greetings to everyone in attendance this morning.

I am honoured to be able to be here and to speak to you about my experience and relate a snapshot of the status of aboriginal health in British Columbia. I will refer to the 2001 B.C. Provincial Health Officer's Report and the federal government's 2001/02 Non Insured Health Benefits Annual Report. I will also speak to aboriginal health in the context of B.C. treaty negotiations.

In my lifetime, diet has been changing within our communities. All the children in my family were born at home in the village of Quamichan, with my aunt helping. As a child I was able to go down to Cowichan Bay and harvest with my family, never having concerns about the quality or quantity of the resources we harvested. Some of my earliest memories are of my mother feeding me Hi' hwa', sea urchin roe, as we waded into our traditional waters. There has always been a strong focus on the spiritual strength of eating our traditional foods.

My own children ate canned Cowichan fish, enjoying the 'bone candy' that nurtured their young bodies. I was 12 years old before I saw a western medical doctor. Seafoods were certainly a mainstay of our diet, along with fish from the river. Now, due to the toxins in

the environment, there are many restrictions on the amount that can be safely consumed, if at all.

Our experience in communities relates to:

- Changes to and impacts on the environment
- Changes in our ability to access our traditional resources
- The eroded traditional authority/jurisdiction (ie. due to DFO and BC Fisheries restrictions)
- The availability of healthy resources (due to polluted habitat)

Provincial Health Officer's Annual Report 2001: The Health and Well-being of Aboriginal People in British Columbia

British Columbia has a Provincial health Officer who issues annual reports on the health of people in British Columbia. The Health Officer uses 60 indicators to describe aboriginal health status in B.C. The 60 indicators include: community environments, healthy growth and development, the physical environment, health services, and disease and injury prevention.

For First Nation persons in British Columbia:

- the standard of living averages 20% below the provincial average (based on measures: income, employment, education and housing)
- there is generally at higher risk related to any disease or health condition, and
- a shorter life expectancy by 7.5 years.

The Provincial Health Officer's Report highlights the general inequality that affects Indigenous peoples in B.C.

This report speaks to a huge recovery in First Nations health over the last few decades in areas of infant mortality, injuries, suicide and most other causes of death. If current improvements continue, First Nations could reach a standard of health comparable to the average British Columbian.

Of the 60 indicators of aboriginal health used in the Report, 20 show an improving trend, 7 show not much improvement and 3 are worsening.

The 3 areas worsening are the percentage of our children in care, alcohol related deaths and HIV/AIDS deaths.

The areas that are not showing much improvement include: youth in justice institutions, low birth weight, pre-term births, childhood immunization, children's dental procedures, community follow-up of mental health admissions.

The health and well being of Aboriginal peoples varies considerably across BC from the interior, Vancouver area and the north and south. There are specific variations in health indicators depending on where you live in the province.

The Health Officer's Report also raises recommendations related to the improvement of aboriginal health status including:

- Formal commitments to provincial and regional targets for aboriginal health and ability to hold ministries and authorities accountable for progress;
- Improved standard of living for aboriginal people in British Columbia;
- Collaboration in addressing aboriginal health, economic and educational standards;
- More recognition and respect for the challenges aboriginal people face;
- More holistic approach to aboriginal health: more value on non-medical, cultural and spiritual determinants;
- More representation of aboriginal people in health governance.

The Provincial Health Officer's Report says that progress has been made in some areas of aboriginal health in B.C. and critical challenges remain. The First Nation Summit Chiefs in assembly adopted the Medical officer's recommendations and urges the provincial government to adopt the target based approach towards improving Aboriginal health in this province.

Non-Insured Health Benefits (NIHB) Program Annual Report, 2001/2002

Having discussed the BC Health Officer's report, I would like to share some facts from the federal side of the First Nations health equation.

Health Canada's Non Insured Health Benefits (NIHB) Directorate provides health benefits (goods and services) that are not insured by other federal, provincial, territorial or third party health insurance plans.

The purpose of NIHB is to provide health benefits that:

- are appropriate to First Nations unique health needs.
- contribute to achieving a health status comparable to the Canadian population as a whole;
- is sustainable from a fiscal perspective; and
- facilitates First Nations and Inuit control at a time and pace of their choosing.

One of the questions before us is whether these purposes of NIHB are being fulfilled in BC.

First Nations participation

The First Nations people eligible for NIHB benefits increased from under 400,000 in 1988 to over 720,000 in 2002. This growth is, in part, attributable to Bill C-31, which resulted in over 100,000 additional First Nations people, the vast majority of them women. Please note that the federal government continues to exclude all First Nations people who are not status (under that Indian Act definition) from these health benefits.

The First Nation population is one of the fastest growing sectors in Canada. From 1993 to 2002, the Canadian population grew by 9% while the NIHB eligible population increase 27%. The First Nations and Inuit client population has grown at an average annual rate of 3% compared to 1% for the Canadian population.

NIHB serves over 720,000 eligible First Nations people. 115,000 are in the Pacific Region (16% of the national total).

Funding - 2001/02

In 2001/02, First Nations and Inuit Health Program funding totalled \$1.3 Billion. NIHB expenditures are \$630 million, over 40% of the total. Total NIHB expenditures in the Pacific Region were \$80 million. Growth rates in NIHB expenditures over the ten-year period in Pacific rose 44%.

Pharmaceuticals - prescribing pills to our people

Nationally - pharmacy benefits increased more than other benefit, up 140% from \$105 million in 1992 to \$250 million last year. 35% of First Nations people eligible nationally do not access pharmacy benefits.

The national average expenditure per claimant in pharmacy is \$506. The Pacific region is at \$446. Drugs for the Central Nervous System, including Tylenol 3, antidepressants (Prozac) and sedatives (Halcion), account for over 30% of the pharmacy expenditures. Almost \$7 million was spent nationally on Losec 20 mg tablets - used for treating ulcers and other gastric conditions.

In 2001/02, 6.2 million prescription drug claims were made. A further 2 million Over-The Counter (OTC) drugs were claimed. Methadone Powder was the second most dispensed item at 175,000 claims, an increase of 55.0% from the previous year. Dispensing and administering of Methadone Powder must be done for patients on a daily basis, which helps to account for the high claim frequency.

The drug with the largest expenditure was Losec 20 mg Tablets. Almost \$7 million was spent on this drug in 2001/02, a 30.0% increase from 2000/01. Losec is used in the treatment of ulcers and other gastric conditions.

Exceptions

NIHB provides for "Drug Exception Requests", with BC the second leading region (after Ontario) with 19% of all requests. This fact suggests that NIHB is not providing the drugs that physicians prescribe for BC First Nations, forcing the First Nations to take the extra step to access the medicine they need. First Nation concerns include: (1) accessing the treatments their physicians would like to prescribe that are not on the list and, (2)

seeking an increase in from the federal limit on the benefit per patient - the elder who has reached their monthly limit for the oxygen in their tank.

Health Canada is undertaking a mandate renewal for its Non Insured Health Benefits (NIHB) program. A treasury Board submission is proposed for 2005 to enhance First Nation and Inuit control of the NIHB program. This is an opportunity for BC First Nations to make submissions based on the health needs of First Nation peoples in B.C.

Health Canada spent \$250 million on pharmacy benefits for aboriginal health in 2002. I note that the covering page in the program for this Conference contains the quote, "Too many pills are being prescribed to the native population." I share "the growing belief and interest in re-linking cultural practices, traditional diet and good health". A strong First Nation voice on aboriginal health is important.

Treaty

When I was Chief (1997-2001), Cowichan Tribes were successful in protecting 1700 hectares of land. The Cowichan Valley Regional District had proposed using the sacred site for a landfill. The area has great cultural significance to Cowichan peoples for purposes including the harvest of medicinal plants and spiritual ceremonies. On the 1700 hectares all encumbrances (ie. tree and mineral licences) were removed by Order in Council and a further 1000 hectares of the surrounding area was preserved. It is important to Cowichan protect this culturally significant area because of its immense contribution to the spiritual and physical health of our people.

As treaty negotiations proceed, the agreements that are being developed include authority over law making as it relates to the Health Services that a First Nation provides. We must be looking to ensure that there are necessary resources for the health services we negotiate through treaty. We must negotiate arrangements based on the best information that we have available as it relates to improving and maintaining the health of First Nations.

Response to Questions from the floor:

I spoke earlier of the spiritual strength that comes with traditional practices. One serious problem facing many First Nations is the eroded link to spiritual strengthening that is necessary to complement the physical, emotion and mental needs. Another serious issues with youth is the eroded sense of purpose. Where historically this was made clear through the traditional teachings and practices a disconnection from the teachings and practices can lead to an eroded sense of purpose.

Some of our people remain concerned about seeking treatment from western medical doctors. Some people still rely on traditional healers and traditional medicine, where that knowledge exits and is practiced by a trusted Elder. One thing we always have as First

Nation people is hope. We must always have hope and we must perpetuate hope for our young people.

I wish you all well in your deliberations at this conference, and I wish you all strength, health and happiness as you each continue on your path.

LIST OF REFERENCES

FIRST NATIONS SUMMIT	http://www.fns.bc.ca
RIGHTS AND DEMOCRACY	http://www.ichrdd.ca/
Snuneymuxw First Nation Health Center	http://www.snuneymuxw.ca/health.htm
Aboriginal Health Careers Program	http://www.naaf.ca/health.html
Assembly of First Nations - Health	http://www.afn.ca/Programs/Health
Secretariat	
National Aboriginal Health Organization	http://www.naho.ca/
Turtle Island Native News Network	http://www.turtleisland.org/front/front.htm
United Nations - Permanent Forum on	http://www.un.org/esa/socdev/pfii/index.html
Indigenous Issues	
World Health Organization	http://www.who.int/en/

Health Canada

Non-Insured Health Benefits (NIHB) Program (including 'A Statistical Profile on the Health of First Nations in Canada') <u>http://www.hc-sc.gc.ca/fnihb-dgspni/fnihb/index.htm</u> Non-Insured Health Benefits (NIHB) Program Annual Report, 2001/2002 <u>www.hc-sc.gc.ca/fnihb-gspni/fnihb/nihb/annualreport/annualreport2001_2002.htm</u>

British Columbia

Provincial Health Officer's Annual Report 2001: The Health and Well-being of Aboriginal People in British Columbia <u>http://www.healthplanning.gov.bc.ca/pho/ar/index.html</u> Office of the Special Advisor for Aboriginal Health (including BC First Nations Health Handbook, and other aboriginal health publications) <u>http://www.healthplanning.gov.bc.ca/aboriginal</u>

Non Insured Health Benefits (NIHB)

The FNIHB Regional Offices and First Nations and Inuit Health Authority offices listed below can be contacted for detailed information about the NIHB Program.

FNIHB Pacific Region	First Nations and Inuit Health Branch
	757 West Hastings Street, Suite 540
	Vancouver, British Columbia V6C 3E6
	Toll free: 1-800-317-7878

Inuit Tapiriit Kanatami	NIHB Coordinator 170 Laurier Avenue West, Suite 510 Ottawa, Ontario K1P 5V5 (613) 238-8181
Assembly of First Nations	AFN Health Secretariat 1 Nicholas Street, Suite 1002 Ottawa, Ontario K1N 7B7 (613) 241-6789
Northern Secretariat	Toll free: 1-888-332-9222
FNIHB Alberta Region	Toll free: 1-800-232-7301
FNIHB Saskatchewan Region	Toll free: 1-800-667-3515
FNIHB Manitoba Region	Toll free: 1-800-665-8507
FNIHB Ontario Region	Toll free (From area codes 416 & 905): 1-800- 640-0642; All other locations: (613) 952-0093
FNIHB Québec Region	Toll free: 1-877-483-1575
FNIHB Atlantic Region	Toll free (From area codes 902, 506 & 709): 1- 800-565-3294

Health of the people and community



Gerald Amos Former Chief Councillor Kitamaat Village Haisla First Nation e-mail: gerald@ecotrustcan.org

Abstract

The Haisla people have relied on the natural environment for their physical and cultural well-being for many millennia. The advent of industrial pollution and wantant commercial exploitation of the natural resources has severed the harmonious balance between the indigenous people and their surroundings. The lost of unfettered access to the resources of the land and sea for food has, among other things, driven the people to become dependent on unhealthy processed foods. Restoration of the natural environment is the first step in the path towards better health for the people and the community.



Loss of Use of a Traditional Fishery – The Kitamaat Eulachon

Michael Gordon Director M.R. Gordon & Associates Ltd. 7834 Lohn Road, Halfmoon Bay, B.C. V0N 1Y1 e-mail: mgordon@dccnet.com

Abstract

In 1970, an unbleached Kraft pulp and paper mill began operating adjacent to the Kitimat River in British Columbia. Since then and to the present day, effluent from the mill has been discharged into the Kitimat River upstream of a traditional First Nation fishery for eulachon (*Thaleichthys pacificus*), an anadromous smelt that returns to spawn in late winter or early spring. Although the mill employed secondary treatment of its effluent, indications of fish tainting associated with the mill's effluent were identified by the First Nation, by the Canadian Fisheries and Marine Service and by Environment Canada in early studies.

The First Nation people who traditionally fished for eulachon in the Kitimat River had raised concerns about the impact of the mill discharge when they became aware of its proposed construction, because the fishery had significant economic and cultural importance to the community. In addition, this fishery was a central part of the diet for this community. Within a few years of the commencement of mill operations, the First Nation had stopped fishing for eulachon because of taint associated with the mill effluent. However, the First Nation has continued to assert the need to resolve the tainting impact and maintained their desire to return to the Kitimat River to fish eulachon.

Despite various operational improvements undertaken by the mill over the years, taint of eulachon in the Kitimat River by mill effluent persists today. In the past decade, a multi-stakeholder process to address the problem has resulted in a road map for further improvements that should resolve the impact.

This paper reviews the environmental, social and economic consequences of this pollution impact and the lessons that can learned from this experience.

Wellness Governing Mode: The Union of Our Two Worlds and Traditional Knowledge



Andy Carvill, Chief, and David Anthony Ravensdale, Health Director, Carcross/Tagish First Nation P.O. Box 17 Carcoss, Yukon Y0B 1B0 e-mail: ckendall@yt.sympatico.ca

Abstract

For several years, moving towards our settlements with Canada under self-government, Carcross/Tagish First Nation has been going through a deep process of self-examination. Within this process, we have reflected on the world as it was before European contact, and where we are now. Through several community consultation processes, we have challenged ourselves on coming to terms with what we call the "root issues." Within this overall picture, what is called the medical or disease model currently forms our selfgoverning operations. Bringing together the best from both worlds, what we are now referring to as our 'wellness model,' begins to emerge forming our self-governing world view. This begins with understanding the 'whole self,' whereby all other self-governing operations evolve reflective of our nation's government. This presentation will unveil this conceptual understanding beginning with self, our food operations, a holistic wellness pharmacy clinic, and how this holistic living process is 'mirrored within our self-governing operations.

Environmental Impact on Food and Lifestyle



:Wik Tna A Seq Nakoo (Light Shinning on the Water); Ida John Chawathil First Nation e-mail: <u>ida_john6@hotmail.com</u>

Abstract

The health value of traditional foods from the natural environment is superior to that of modern processed foods. For several millennia, the healthy lifestyle of the ancestors has evolved continually in harmony around the physical, mental and spiritual elements of the whole person and the community. Consumption of modern processed food has effectively alienated the people from the land and water, to result in losing control of their lives.

Law, Good Morning. I want to thank the Ancestors and People of this part of Mother Earth for allowing me to be here.

Thanks to all the people that have seen the need for this Conference, allowing the First Nation people to have their voice and inviting me to speak on their behalf.

My interest and passion in life has led me to work in the area of health as a Holistic Nutritionist, and Addictions and Spiritual Counselor.

I first saw the environmental impacts on us a people through my family. Looking at five generations, this is what I have learned and observed.

My grandfather was subjected to live on a parcel of land, which they call a reserve, when his way of life was nomadic. He provided his family with foods of the land. They could not say his name, so they gave him an English name at random; it did not have meaning to him, thus his identity was denied.

My mother was taken to a residential school as a very young girl. Her losses were immeasurable; she lost her parents and family, traditional teaching, spirituality, diet and language. My mother died of starvation at age 58. When everything is taken away, you lose self.

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As a child I was in the transition of my mother adapting from the traditional lifestyle to the contemporary way of life. I saw her open a can of Chinese food (one can taped atop of another, one had noodles and one had chicken with vegetables) and heat it up in a few minutes. She laughed and said this is so easy, not like skinning a deer, cutting it up, then cooking it.

Food played an important part of my helath through out my life. In residential school, I experienced cultural shock from totally different food and it's preparation. Cows milk served with hot cereal and white bread everyday. Domestic meat and other foreign food, I could not understand, enjoy and my spirit starved. I learned to survive by taking vegetables from a cellar, fruit from an orchard and traded my milk and cereal for more bread. Looking back now, I can see that I had a form of anorexia.

I studied food and nutrition as my children were growing up. As student in nutrition, I was encouraged to follow the Food Guide. My youngest son began his first years of life In a nutriton program. I forced my family to experiment with recipes using only government surplus food. I have recently ddiscoveredthat these foods are high in saturated fats and starch which contributed to the high rise in diabetes and its many complications. The Pima Indians of Arizona are a case study in point in a program promoting milk, cereal and orange juice. These foods are culturally and traditionally detrimental to our people.

In my generation food and lifestyle changed to fast food and a fast way of life.

I noticed my granddaughter Azalia at age two looked very sick in a picture. Her Mom said she was injected with a five year vaccine for influenza. Around that time I began to have digestive problems. Our family was not nutritionally healthy. The health statistics of out Sto:lo Nation was steadily on the decline. Diseases such as diabetes, heart disease, obesity and autoimmune disease were quickly rising. We have the highest number of gall bladder operations, prescription drugs for stomach problems and alcohol use. I wondered, what is wrong? We are eating right aren't we? I began to question what I knew in jutrition. I began to investigate exactly what we were putting into our bodies. Remember the term "You Are What You Eat""? I thought what are we? Are all the vaccines, chemical additives, air contaminants, fluorides necessary? Are we slowly destroying our biodies in the name of health?

We have lost good health from nutritionally deficient foods and contaminated water. This resulted from depleted soils, chemicals, additives and animal enzymes added to foods. Our bodies are starving and malnourished in the twentieth century. Our immune system is jeopardized by impurities and over processing and additives, some whose name we cannot even pronounce.

People are born to certain area's and their DNA is naturally fed by the foods that are from that region. We are people of the River and our spirit needs to befed by the river. We need fresh clean fish such as salmon.

When I was first encouraged to believe, such as fats are not healthy and should be eliminated was erroneous. Certain fats are necessary as they contain essential fatty acids. Also, that cow's milk was healthy for everyone. There are many of us who are allergic or lactose intoleranmt, that was not taught to me. Organic oranges contain 50% more vitamin C than fertilized and pest treated oranges. Organic spinach contains 1584 mg per 100 grams of iron compared to 19 mg per 100 grams in conventional grown. We can only assume that naturally grown wild sources of foods are comparable. An example is stinging nettles, which we eat like spinach. It is very nutrient dense, high in iron, a natural blood cleanser and stimulates metabolism. There are contaminants from metal tins that our canned foods are packaged in. It hurts me to know the teachings I was given have all had to be discarded for the truth I was taught by the elders long ago.

The Elders Teachings	Bitterness is Healing sweetness is sickness Pray and Give thanks for the food and water ingest, you will receive higher energy Always give offerings to the spirit of anything you take from mother earth When you are gathering food, always leave some behind i.e., seeds for next year Never touch food or cook when menstruating
	Give from the heart and you will always receive Take care of your Ancestors with a yearly Burning Ceremony Widows are not to gather food, hunt or fish for a year Teach respect to Community by having a First Salmon Ceremony yearly. Your first catch should always be shared. Never waste anything, use all that you take. Men in the community are to hunt and fish for single mothers and elders Show respect by always serving your Elders and Children first.

From the time of conception even after death food plays an important tole in our lives.

They say everything old becomes new again and history repeats itself. We can only pray that the words of old will help us to renew so we can stop the destruction of our people.

All my Relations

:Wik Tna A Seq Nakoo

"Our Food is Our Medicine": Traditional Plant Foods, Traditional Ecological Knowledge and Health in a Changing Environment



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Abstract

Plant foods – especially berries, green shoots, root vegetables, and seaweed – have been a key element in maintaining health and well-being for First Nations across Canada. As well as direct nutritional contributions, their harvesting, processing, and serving are essential components of peoples' cultural heritage and traditional ecological knowledge systems. Research into environmental change and economic restructuring by the "Coasts Under Stress" major collaborative research project has shown that these changes have impacted use of plant foods, and as a result, the health and well-being of individuals and communities is now at risk.

"Our Food is Our Medicine" – Edith O'Donaghey, Stl'átl'imx elder, Shalalth, and Lillooet, B.C.

Introduction

In this paper, we first present an overview of the many, diverse traditional plant foods used by First Nations in British Columbia. We discuss their nutritional benefits, the ways in which they have been harvested and processed, and their contributions to the nutrition and general health of the peoples who have utilized them. We then discuss these foods in a broader context, as part of an entire cultural system and way of life that has undergone tremendous disruption and change over the past century or more. What are the implications of these changes for peoples' health and well-being?

British Columbia First Nations are not alone in having experienced major changes to their diets and lifeways. There are common threads that transcend cultures, communities and regions across Canada and beyond. In Labrador and Newfoundland, for example, the Métis and other peoples in rural communities have undergone comparable changes, with similar implications for their overall health. Understanding the systemic nature of dietary change can help us to identify ways of alleviating and remedying its negative aspects. While modern, imported foods can be beneficial and healthy, those of higher quality are often very expensive, and are difficult to obtain and hard to keep fresh. Decreasing the amount of local food consumed therefore often leads to an inferior diet, especially for people in remote places. Reconfiguring and enhancing peoples' food systems are not an easy or straight-forward task. In a concluding section, we provide some recommendations on how such a task might be approached.

Plant Foods of BC First Peoples

The region now known as British Columbia is diverse culturally, linguistically and ecologically. First Nations have relied on the bounty of this region since time immemorial, and they, for their part, have been the caretakers of the land and its resources. The origin stories of virtually every nation contain lessons in how to look after the gifts given by the Creator to the people. This includes the different fish, shellfish, animals, and birds, and also the many different kinds of berries and fruits, greens, root vegetables, and other plant foods that have been a part of peoples' diets for thousands and thousands of years. Knowing how, when and where to harvest these foods, how to process them, and the proper ways to serve them is important cultural knowledge. However, because of the drastic changes to peoples' cultures and environments since European contact (and again in the present as environmental change and economic globalization takes hold), the use of many traditional foods and the knowledge required to maintain and prepare them is disappearing. Younger people seldom know or use traditional food to the same extent as their parents and grandparents.

In all, there are approximately 135 different kinds of plants that provided food, beverages or flavourings in traditional diets in various parts of British Columbia. These include: a few kinds of seaweed; one species of lichen; a few kinds of mushrooms (in the Interior); inner bark and cambium (growing tissue) of several different kinds of trees; about a couple dozen kinds of green shoots and young leaves; many kinds of "root vegetables" (roots and other underground parts, like bulbs, tubers, corms, and rhizomes); a very few types of seeds and nuts; and many, delicious wild berries and fruits. As well as these foods, some plants are for beverages, others (e.g. tree gum) for chewing or nibbling, and others to sweeten or flavour other foods during preparation or cooking. Salal leaves, for example, are sometimes cooked in fish soup as a flavouring, although they are not themselves eaten. Examples from each of these different categories, and some references to further details of their use, are provided in Table 1. As well as being used in regular meals and food preparation, some plants have additional significance as famine foods, sought after at times of scarcity, such as in the early spring, when winter food stores have dwindled. Prickly-pear cactus (Opuntia spp.) is an example of such a famine food (Turner and Davis 1993).

Nutrient and Other Contributions of Traditional Plant Foods

The major modes of preparation and nutritional contributions of the foods in these groups are highlighted in Table 2.

Table 1. Examples of Traditional Plant Foods of Indigenous Peoples of Northwestern North America (Total, about 135) (Compton 1993; Gottesfeld 1992; K'san, People of 1980; Hebda et al. 1996; Kuhnlein and Turner 1991; Ktunaxa/Kinbasket Tribal Council, et al. 1999; Nuxalk Food and Nutrition Program 1984, 1985; Turner 1995, 1998; Turner et al. 1980, 1983, 1990)

Fruits (Total: ~ 60 species)	Amelanchier alnifolia ; Rosaceae (saskatoon berry)Corylus cornuta; Betulaceae (hazelnut)Fragaria spp.; Rosaceae (strawberries)Gaultheria shallon; Ericaceae (salal)Prunus spp.; Rosaceae (choke cherry, pin cherry)Pyrus fusca ; Rosaceae (Pacific crabapple)Ribes spp.; Grossulariaceae (currants, gooseberries)Rubus spp.; Rosaceae (raspberry, blackcap, thimbleberry, salmonberry, blackberry)Vaccinium spp.; Ericaceae (huckleberries, blueberries, cranberries)
	<i>Viburnum</i> spp.; Caprifoliaceae (highbush cranberries)
Green Vegetables (Total: ~ 25 species)	Balsamorhiza sagittata; Asteraceae (spring sunflower – shoots, budstalks)Epilobium angustifolium; Onagraceae (fireweed - shoots)Heracleum lanatum; Apiaceae (cow-parsnip - budstalks, leafstalks)Lomatium nudicaule; Apiaceae (Indian celery - young leaves and stalks)Rubus spp.; Rosaceae (thimbleberry, salmonberry - shoots)Rumex occidentalis; Polygonaceae (western dock)
"Root" Vegetables (Total: ~ 35 species)	Allium cernuum; Liliaceae (wild nodding onion - bulbs)Camassia spp.; Liliaceae (blue camas - bulbs)Claytonia lanceolata; Portulacaceae (spring beauty, mountain potato - corms)Dryopteris expansa; Polypodiaceae (spiny wood fern – rootstocks)Erythronium grandiflorum; Liliaceae (yellow glacier lily - bulbs)Fritillaria spp.; Liliaceae (rice-root - bulbs)Lewisia rediviva; Portulacaceae (bitterroot)Lomatium spp.; Apiaceae (biscuitroots, kous - roots)Potentilla anserina; Rosaceae (silverweed - roots)Trifolium wormskioldii; Fabaceae (springbank clover - rhizomes)
Other plant foods (Total: ~ 15 species)	Ledum spp.; Ericaceae (Labrador-tea - leaves as beverage) Pinus spp.; Pinaceae (pines - inner bark) Polypodium glycyrrhiza ; Polypodiaceae (licorice fern - rhizomes as flavouring) Populus balsamifera ssp. trichocarpa ; Salicaceae (cottonwood - inner bark) Porphyra abbottae; Rhodophyceae (red laver seaweed) Tricholoma populinum; Basidiomycete (cottonwood mushroom) Bryoria fremontii; Lichen (black tree lichen, or "black moss")

Table 2. General overview of harvesting and processing methods and nutrients contributed by different classes of traditional plant foods (for specific examples, refer to Table 1) (References: Laforet et al. 1983; Kuhnlein 1980; Kuhnlein et al. 1982; Kuhnlein and Turner 1987, 1991; Keely 1980; Keely et al. 1982; 'Ksan, People of, 1980; Medical Services Branch. 1985; Norton et al. 1984; Smith 1998; Turner 1995, 1997)

Class of Food	Harvesting/Processing	Nutrient contributions
Fruits (fleshy), including	Picked from late spring	good sources of ascorbic acid (Vitamin C);
berries	through fall, depending on	also often contain high amounts of carotene,
	species; juicy types mashed	folic acid and minerals such as calcium;
	and dried in cakes or dried	dietary fibre; popular and generally well
	whole like raisins (then soaked	liked – off all the major traditional food
	overnight before eaten); tart	groups, used the most today
	fruits stored in boxes under	
	water or oil; traditionally often	
	eaten with oil and, more	
	recently sugar	
Fruits: Seeds and Nuts	Very few types (hazelnuts,	Good sources of protein, carbohydrates, and
	pine seeds); harvested late	fats; also contain significant amounts of
	summer or fall; eaten as a treat	vitamins and minerals
Green Vegetables: shoots,	Harvested fresh in spring;	high moisture content; often contain
stems, leaves and buds	among the first foods of the	(Vitamin A) acadeia acid (Vitamin C) and
	new season; most edible only	(\underline{v}) $($
	when young; usually eaten	folic acid, as well as important minerals like
	melagas an augor	of distant fibre
Deat Vegetables, meeta bulba	Liqually, how set ad during	function of storage organic of storage contain
tubers corms rhizomos	dormont stopp in fall or spring	autholity of forms and
tubers, cornis, mizomes	for summer for spring	flavoura (a g starah inulin): good sources of
	(of summer for spring-	minorals (e.g. starch, munn), good sources of
	strung or tied in bundles and	clover, silverweed high in iron) and some
	dried: some types cooked in	vitamins e g beta-carotene (Vitamin A)
	underground nits then dried.	acorbic acid (Vitamin C): some protein
	soaked and cooked for eating	deorore dere (<u>vraamme</u>), some protein
Inner Bark and Cambium of	Usually harvested when the	Probably good source of carbohydrates.
certain trees (e.g. pines – <i>Pinus</i>	sap is running, in late spring:	expected to be rich in minerals (e.g.
spp.)	scraped off the inside of the	calcium) and vitamins: dietary fibre
-FF.)	bark or from wood when outer	
	bark removed; eaten fresh or	
	sometimes dried; may be eaten	
	with oil and/or berries	
Mushrooms and black tree	Not generally eaten on the	Mushrooms contribute some vitamins and
lichen (Bryoria fremontii)	Coast; harvested in interior,	minerals, low carbohydrate and protein;
	usually in fall; mushrooms	lichen, after cooking, probably good source
	dried; lichen pit-cooked then	of carbohydrate
	dried; cooked in soup or stew	
Marine Algae (Seaweeds)	Harvested at low tide, usually	rich in minerals and vitamins, but also
	early to late spring, sometimes	contain carbohydrates and protein. Red
	with herring spawn; usually	laver, the commonly eaten seaweed of the
	dried; served in soup, or eaten	Northwest Coast (Porphyra spp.) is said to
	as snack or condiment	be one of the most nutritious foods on earth.
Beverage plants (e.g. Labrador	Harvested at various times,	Contribute vitamins and minerals (e.g.
<i>tea</i> – Ledum groenlandicum)	mostly during growing season	calcium)

When used in complement with the wide array of nutritious fish, seafood, marine mammals, birds and land mammals that comprised a major portion of peoples' food systems, these foods provided a complete, healthy diet (Nuxalk Food and Nutrition Program 1984, 1985; Kuhnlein 1992; Hunn 1981; Keely 1980; Keely et al. 1982; Jacobs and Jacobs 1982; Johnson 1997; 'Ksan, People of 1980).

The different methods of harvesting and processing these foods are also significant in terms of the nutrients they provide. Some of these plants have toxic properties (see Turner and Szczawinski 1991) that are eliminated through peeling or other processing methods. For example, cow-parsnip (*Heracleum lanatum*), whose bud-stalks and leaf-stalks are an important springtime vegetable, is harvested only at its young, pre-flowering stage, and must always be peeled before it is eaten, or it will cause severe skin irritiation and blistering of the hands and mouth. It contains a type of "phototoxin" that is activated in the presence of ultraviolet light (sunlight). When properly prepared, however, cow-parsnip is an important and nutritious food. [Figure 1]



Figure 1. Cow Parsnip (*Heracleum lanatum*), also known on the coast as "Indian Celery" and in the Interior as "Indian Rhubarb." The peeled stalks are an important springtime green vegetable. [Warning: only those who are positive about identifying and preparing this plant should attempt to eat it.]

Pit-cooking, an important traditional cooking method that is seldom used today, may enhance the mineral content of foods through the minerals in the soil, the vegetation used around the food or in the skins of the plant foods themselves. Additionally, pit-cooking has been shown to chemically alter foods in ways that make them more palatable and more digestible. For example, camas bulbs (*Camassia* spp.) [Figure 2], a staple root vegetable of Vancouver Island Salish peoples (also used by the Nlaka'pmx, Okanagan, and Ktunaxa peoples across the southern Interior of BC and by many groups in the U.S. Pacific Northwest), contain a complex sugar called inulin as their major carbohydrate. Inulin is not very tasty, nor is it very digestible for humans. Through prolonged, lowlevel cooking in an underground pit, however, much of the inulin in camas bulbs is broken down chemically into fructose and fructans, which are sweet tasting and more easily digested. Practices used to "cure" edible seaweed may similarly enhance its digestibility.



Figure 2. Camas (Camassia quamash, flowers and edible bulbs)

It is also important to note that plant materials, such as those used in pit-cooking, to surround, protect and flavour the food being cooked, and those used as a surface on which to dry berries, or for layering between seaweed during its curing process, are all contributing in significant ways to peoples' nutrition. So, too, are all the different plant materials that are used to make the implements for fishing, hunting, and processing animal foods, as well as the fuels, like alder wood, that are used for cooking and for smoking and curing fish and meat. The basketry materials and the cedarwood for making the ingenious storage and cooking boxes used by many coastal peoples are also a significant component of the food system (Turner 1998). As well as being essential for transporting and storing food, these containers may, at least in some cases, have helped to preserve it, by protecting it against rodents, insects, mould and bacteria.

As the title of this article implies, there is often little differentiation between food and medicine; traditional food is considered to bring good health, and traditional medicines, often taken in the form of teas consumed over a period of days or weeks, also contribute important nutrients. Fruits and greens that are rich in Vitamin C [Figure 3] can alleviate the risk of scurvy, for example. Blueberries (*Vaccinium* spp.) [Figure 4] are known to have high antioxidant properties, evidently due to the pigment, anthocyanin, and are suggested to be good against urinary tract infections, as well as in reducing the risk of cancer (Blumenthal 2001).

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Figure 3. Indian celery or Indian consumption plant (*Lomatium nudicaule*), whose greens are rich in Vitamin C.



Figure 4. Oval-leaved blueberries (*Vaccinium ovalifolium*), a prized fruit that contributes important vitamins and minerals to the diet.



Figure 5. soapberry (Shepherdia canadensis).



Figure 6. Labrador tea, or swamp tea (Ledum groenlandicum)

Figure 7 shows a newspaper photo that illustrates the link between traditional diet and health in a very real way.

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Figure 7. The newspaper caption reads: Native Oldtimer William Waboose, one of Ontario's oldest residents at 112, is pictured with his wife Maria, 88, in Thunder Bay receiving medical attention. The Ojibwa Indian encountered few sicknesses in the first 107 years of his life and attributes his longevity to diet, saying he never touched storebought food until he was in his 50s... (Vancouver Sun, July 31, 1982)

Dietary Change

In addition to the various plant foods native to British Columbia, there are a number of foods that were introduced in the relatively early years of contact with Europeans, and were incorporated into First Peoples' food systems some 100-150 years ago. Foremost among these was the potato (*Solanum tuberosum*), which originated in the South American Andes, and was imported to the Northwest Coast by the Spanish and later, the English (Suttles 1951). Potatoes, and other crops, including turnips, carrots, beets, cabbage, rhubarb, peas, beans, tomatoes, raspberries, strawberries, currants, gooseberries, apples, pears, and plums, were being widely cultivated in peoples' gardens by the latter part of the 19th century. These readily became important components of peoples' diets, and because they were harvested fresh, and were unprocessed and easily available, they

made a generally positive contribution. Other products were also being incorporated more and more, however, and some of these turned out to be not so healthy.

It seems that people everywhere have an affinity for sweet-tasting things, and when first molasses, and then sugar, were introduced, they became very popular. These sweeteners were added to berries and fruits, sprinkled on the green shoots and even eaten with the root vegetables. Rice, corn, beans, raisins, and especially wheat and flour were other major new types of food that had potentially harmful effects. People used the flour and sugar to make bread, bannock, cakes, cookies and muffins of all different kinds, which have become a dietary mainstay. Before potatoes, sugar and wheat were introduced, the amount of carbohydrates people consumed was relatively limited. The introduction of these new foods, accompanied by a reduction in the use of traditional vegetables and other foods, has resulted in increased risk of malnutrition, and of certain diseases, most notably diabetes, heart disease and stroke, and possibly rheumatoid arthritis and other ailments as well (Stephenson et al. 1995). Other introduced products have also taken a major toll on peoples' health, including alcohol, tobacco, drugs, and to some extent rock salt (introduced for processing food), tea and coffee.

Changes in food systems both reflect and result in different technologies and lifestyles as well. Some, perhaps many, of the changes have been positive: for example, the technologies for jarring, canning and freezing food have allowed people to store their food more readily for wintertime use, even when drying is not possible. Cooking with gas and electricity instead of wood has also made life generally easier and has in some ways aided and supported the use and processing of traditional food. Transportation on the water is safer and more comfortable than formerly, and the automobile and roads have made access to some places more convenient, although the tradeoffs for this convenience are difficult ones. In the following section, we discuss some of the complexities of changing food systems, and place these in the context of broad-scale restructuring that is happening on a worldwide basis.

Discussion

Obviously, the food we eat is intimately connected – in many different ways – to virtually all aspects of our lives and to our health and well-being. Humans almost everywhere have undergone immense changes in our diets over the past two hundred years, since the advent of the Agricultural Revolution, the Industrial Revolution, the Green Revolution, and current trends towards increasing commercial food processing and globalization. For indigenous and local peoples, dietary transformation has been especially radical, as people have moved, often over the course of a single lifetime, from a diet in which the majority of nutrients are drawn from local and regional food, to a more generic diet of store-bought food, most of which was produced and processed far away, in some cases on the other side of the world.

Not only is this new market food often more expensive and less diverse than traditional food, but it is frequently less healthy than peoples' original food, tending to be higher in energy or calories, but lower in nutrients (Receveur et al., 1997; Whiting and Mackenzie,

1998). As a result, Indigenous Peoples and rural peoples everywhere are experiencing common problems in relation to their traditional food systems, food security and health. The UN Food and Agricultural Organization (1996) defines "food security" as "...when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life." When we discuss "health," we must also define this concept. We prefer the broadest definition of "health," as most of the people attending this conference will recognize. For purposes of our paper, we consider good health to be: a sense of physical, mental, emotional and spiritual well-being that reflects a lifestyle of balance and harmony within one's society and the environment in which one exists. These are qualitative attributes. difficult to measure. To them, moreover, we must add the capacity to respond to change and stress, which we call resilience. The entire earth is continuously changing, and life on earth is dependent on a capacity to adapt to change. Resilience is a measure of flexibility, of our ability to keep options open and to respond to change in an unpredictable and uncertain world. Resilience is related to the magnitude of shock that a system – cultural or ecological - can absorb and still remain within a given state. It is also related to selforganization capability and capacity for learning and adaptation (Resilience Alliance 2003).

First Nations and other rural communities in many parts of the developed world are in crisis, facing changes in circumstances so profound as to make a return to the previous situation impossible. The reasons why are complex but, in general terms, a process of broad systemic change, which the current jargon calls "restructuring," has radically altered both the environment and the socio-economic circumstances in Canada and many other countries. This, in turn, has been part of an international adjustment to a complex of factors which we speak of collectively as "global change."

We are part of a team of interdisciplinary scholars who are working on a research project called "Coasts Under Stress". It is addressing economic and social restructuring and its impacts on health and food securing in Canada's Coastal Communities. The work is relevant to First Peoples in British Columbia because it addresses these issues as systemic, recognizing that some of the solutions to the problems faced by First Nations in B.C. and Canada must be addressed at a very broad policy level. At the same time, the research recognizes that experiences and impacts of globalization and environmental degradation faced by individuals, families and communities are critical, both in themselves and in terms of necessary responses at the national and international level.

In short, First Nations of British Columbia are not alone in experiencing major detrimental dietary transformation. When similar threats exist in different regions and communities, there may be some important information and remedies that can be brought to bear from other experiences. We now know, for example, that coastal communities on both the Pacific and Atlantic Coasts of Canada have undergone major economic restructuring that, in part, relates to loss of traditional foods, and therefore in deterioration of health.

The negative impacts of environmental and social restructuring, including the changes to peoples' food systems, are neither trivial nor short-term. They are long-term, widespread

and pervasive. Moreover, it is clear that there have to be underlying structural causes of community distress. We have been working, in collaboration with coastal communities on Canada's West and East coasts, towards identifying "the important ways in which changes to the natural environment (triggered by such things as over-fishing) have interacted with social changes (such as industrial restructuring, state policy changes and the new global economy) to affect the health of people, their communities and their environment, over the long run." Certainly, the major alteration of Indigenous peoples' food systems is a major component of this situation.

The many factors that relate, both directly and indirectly, to traditional food systems are shown, schematically, in Figure 8. All of these are relevant in thinking about the changes in First Peoples' food systems and in the relationships of these changes to peoples' health and well-being, and to their resilience.



Figure 8. Schematic diagram showing factors related to, affecting and affected by Traditional Food Systems

For example, people today, including indigenous people, are generally leading more sedentary lives, with significantly less exercise than our ancestors. For First Nations, reduced levels of intensive harvesting, processing and preparation of the traditional kinds of food, people do not spend as long as formerly on their seasonal rounds, camping, boating, walking, or undertaking more strenuous physical activity. Children are particularly vulnerable, and in many communities they spend much more time playing videogames or watching television than their parents or grandparents did. The social outcomes of this change are that children and youth spend less time with the elders in their family and community. This means that, not only are they not gaining the special skills and techniques of food harvesting and preparation, but also that they are not learning the wisdom, the language, the stories, the relationships with plants and animals and all the other culturally important knowledge that is often imparted to young people at this time. For example the protocols and practices of their ancestors that mediated the peoples' deep relationships with their environments and resources are less well known and practiced than formerly. Many elders would say that such practices as giving thanks to the plants and animals they use, and always making sure they do not waste any food,

and that they share with all who need it, are as important to survival as the food itself.

It would be unrealistic, and in some cases impossible, for people to revert back entirely to their original foodways. Although many of the traditional foods are still available for use, some have disappeared or dwindled to the point where they can no longer be found (Lepofsky et al. 1985). The environmental deterioration that has resulted from overexploitation, pollution and other human impacts of the industrialized era is reflected in degradation or loss of a number of traditional species that used to be abundant. People have been prohibited from practicing their traditional management of species and landscapes, such as use of fire to enhance certain berry and root crops, and the elders say that these resources, as a result are not as abundant (Turner 1999). Clear-cutting, overgrazing, draining and dyking of wet-lands and conversion of the original landscapes to agricultural lands – all these practices have resulted in major deterioration of habitats and traditional resources. As well, government policies and regulations, frequently made without consultation with local communities, and land privatization, has reduced the ability of people to access their traditional foods. This situation has caused anger, anguish and grief for many indigenous elders and others who have loved and valued their homelands, and the environment as it was known and cared for by their ancestors.

The task at hand – to try to regain what has been lost, and to restore peoples' health and well-being, including reinstating, as much as possible, the traditional food system – is daunting and full of complexity. It will require tremendous understanding and cooperation. It will benefit from looking more widely and understanding the global and national situations and working within their constraints. There are many different roles to be played, and many actions that will be necessary. We conclude with some recommendations for strategies that can help.

Incorporating traditional food more fully into peoples' diets today will have to be done through a number of different approaches that incorporate food security, provide for conservation and restoration of food supplies, enhance peoples' resilience and selfdetermination, and provide for appropriate education for all of us, indigenous and nonindigenous, young and old alike, about the links between diet, lifestyle, culture, environment and health and well-being. *Promote Environmental Integrity:* Dawn Amos, a Nuu-Chah-Nulth student at the University of Victoria, expressed the critical importance of environmental health to human health in a recent essay. She wrote: "Our very health relies on the well-being of the environment – if our environment is not healthy, how can we be healthy?" Preventing environmental degradation, and restoring the integrity of all parts of the environment is a major priority, because all aspects of human health – physical, emotional, psychological and spiritual – depend upon the environment. Incentives to maintain and restore the health of the environment, and strong penalties for environmental damage, whether from pollution, overharvesting, overgrazing, introducing harmful exotic species, should be a matter of policy at all levels of government.

Ensure access to food and other resources, and locally based resource stewardship: All food resources are complex, and need to be protected and monitored at a range of scales. Local communities and First Nations have often been excluded in planning, policy development and decision-making in relation to their resources (e.g. harvesting of herring roe and abalone by coastal First Nations, or clearcutting forests throughout First Nations' territories). People have also often been prevented, legally or in practice, from accessing their traditional food, or from managing it as they have done in the past (e.g. Reefnet fishing was banned for the Saanich Nation). Where this exclusion still exists, policies and regulations must change to be more inclusive and permissive, with equitable and just use and management of limited resources.

Participatory research – Foods and Food Systems: There is still much that needs to be known about the health effects of certain foods and food systems, and how foods complement each other, in what ways their use and effects on metabolism may be genetically determined. Food allergies, toxins in foods, both natural and human-caused, and the relationships between exercise, calorie intake, nutrient balance, age, and health status, all need further investigation. Some important research in these areas exists – such as the work done in the 1980s with the Nuxalk Food and Nutrition program – and the models provided can be used in other communities.

Participatory research – Cultures, Languages and Lifestyles: How can communities and institutions best respond to environmental, social and lifestyle changes and ensure that people still retain their resilience and a positive, healthy cultural identity? Some communities have managed such change more effectively than others, so what are the elements that have made the difference? What role can individuals and institutions take in responding to, accommodating, and in some cases, resisting change and restoring previous cultural elements as desired? Collaborative, community based research can provide at least some answers to these questions.

Adaptive Action: Much is to be learned, but there is plenty that is already well known about the relationship between diet and health, and the important role that food and activities relating to food have on peoples' lifestyles, health and well-being. We know from the work with the Nuxalk Food and Nutrition Program, for example, that people actually develop a taste for certain food; they are more apt not to like food that they have not eaten very often. In the words of one elder, "The more you eat it, the more you like

it!" This has serious implications for efforts to reinstate traditional foods in communities where they have not been used much in recent times.

There should be focused efforts to promote traditional food systems within rural communities, and to facilitate and accommodate local food procurement. For example, schools can facilitate learning from elders within the context of the school curriculum, and can promote experiential learning by having children and youth participate in food-related activities, as well as providing them with and understanding of the health advantages of traditional foods and more active lifestyles. Promoting opportunities for youth to spend time with elders who can teach them about food is also important. Such promotion and occur both formally and informally. Feasts, potlatches, community dinners, sports tournaments (like participation in the All-Native Basketball Tournament at Prince Rupert) can all provide opportunities to promote and exchange food products and knowledge about food.

Books, videos, interactive computer games can also be developed that provide easy and interesting ways for children and youth to learn about traditional food and culture (cf. 'Ksan, People of, 1980; Nuxalk Food and Nutrition Program 1984, 1985; Port Simpson, People of, 1983; U'mista Cultural Society et al. 1998). Many different communities, cultural centres and school districts have already developed such teaching tools, and there is an opportunity for many more.

Honouring those individuals in the community who devote their time, energy and knowledge to food and health promotion is also a positive and effective action. Rewarding and acknowledging young people who demonstrate interest and awareness in the health of the environment and in their traditional foods and medicines would also raise the profile of these issues.

Culturally Appropriate Approaches: The traditional protocols and ways of working together, informing and teaching, and making decisions, work well in many different circumstances. In our experience, even with the tremendous and drastic changes that have occurred, the traditional values still are very much in existence, and in almost every community there are people who still know and understand these values. These are the same wise individuals who understand our relationships to the environment, and to each others. People like Dr. Mary Thomas of the Secwepeme Nation – and there are many others – are so important today that we have started to call them "cultural keystones," because the knowledge and wisdom they hold, drawn from their own experiences and from all the past generations of their home places, helps to sustain entire communities (see Thomas 2002).

The road to better nutrition and health for Indigenous Communities is not a straightforward one. The deterioration in diet experienced in rural and indigenous communities has many diverse causes and influences, some environmental, some political, some social. Recognizing the nutritional and cultural value of the original foods, and their close relationship to environmental health, is a first step that all of us need to take.
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Acculturation and natural food sources of a coastal community

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Abstract

The well-being of the people of the First Nations has declined precipitously through acculturation by government decree and by colonization during the past 200 years. Language and other cultural practices are being lost. Recognition of the critical values of traditional culture and ancestral dietary regime by the youth is an important critical step in restoring the health of the people from the ravage of modern "European" diseases such as alcoholism, drug abuse, obesity, diabetes, hypertension and depression.

Impact of Fish Farming on the Natural Food Resources of First Nations People

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Abstract

The practice of open net cage salmon farming can impact First Nation food resources in several ways. The incidence of disease on farms can have negative effects on the populations of wild salmon, as seen with the recent collapse of pink salmon in the Broughton Archipelago. The escape of farmed salmon can also interfere with traditional fisheries. We will also concentrate on changes in the nutritional content when a fish is farmed, as well as other implications for human health. Some of these arise from the use of various chemicals on salmon farms.

Introduction

There are two parts to this paper. The first part deals with changes that occur in the nutritional content, with respect to fat, when salmon are farmed. The second part is on the increased risk of disease for wild salmon that can occur as a result of salmon farms. Part 1 is given in detail here while the details for part 2 can be found by the reader in a report by the Pacific Fisheries Research Conservation Council (PFRCC, 2003).

Part 1: Changes in Fat Content of Salmon

Types of fat and dietary need

Fats consist of a chemical known as glycerol to which three fatty acids are attached. By varying the nature of the fatty acid 'building blocks', different types of fats are created. The many fatty acids that exist can be classified as either saturated, monounsaturated or polyunsaturated. The different names arise from the nature of the chemical structure.

In terms of human health, the type of fat consumed, not just the total amount, should concern us. Saturated fats are the ones that are considered 'unhealthy' if we overindulge. Too much saturated fat can lead to health problems such as heart disease and stroke, mainly due to the effect these fats have on blood cholesterol levels (Schaefer, 2002). Although it can vary from person to person, it is generally recommended that saturated fats contribute less than 8% of total caloric intake (Simopoulos, 2000). Based on a 2000-calorie daily diet, this means that daily saturated fat intake should be kept below18 grams. Many North Americans tend to get much more than this.

Omega-6 Fatty Acid	Adequate intake for
	adults (grams/day)
LA	4.4
Upper limit for LA	6.7
AA	
Omega-3 Fatty Acid	
α- LNA	2.2
EPA + DHA	0.65
Of which EPA is at least	0.22
Of which DHA is at least	0.22
* Table taken from Simopoulos e	t. al., 2000

It has been shown that replacing the saturated fats in our diet with monounsaturated fats has positive effects on our blood cholesterol levels (Schaefer, 2002). Meat and dairy products are the main sources of saturated fats and also provide substantial amounts of monounsaturated fats. Vegetable oils are high in monounsaturated fats while relatively low in saturated, with the exception of coconut and palm oil. Our bodies also have the ability to make these two types of fat. Excess calories are turned into saturated fats for storage and our bodies, using saturated fats as starting material, can make monounsaturated fatty acids.

In general, polyunsaturated fatty acids (PUFA) are much healthier for us, helping us to avoid the health problems mentioned above (Schaefer, 2002; Kris-Etherton, P.M. et al., 2002). There are two categories of PUFA, the omega-6s and the omega-3s. Recently, an international group of nutrition scientists has given recommendations on adequate intakes (AI) for some of the polyunsaturated fatty acids (Simopoulos, 2000). Table 1 shows a summary of these recommendations for adults. The Canadian government has not yet set recommended daily allowances (RDA) for specific polyunsaturated fatty acids but they have for total omega-3s (i.e. not distinguishing between the different omega-3s). The RDA for total omega-3s is between 1.1 and 1.6 grams per day.

The difference between an AI and RDA should be noted. A RDA needs a high level of evidence before it is set and represents an intake level that will meet the requirements of almost all healthy individuals. If evidence is strong but not conclusive enough to set a RDA, and AI can sometimes be set, which can be viewed as a good estimate while more research is conducted.

Strictly speaking, only linoleic acid (LA) and α -linolenic acid (α -LNA) are essential, in the sense that our bodies cannot make them. If it gets LA, the body can make the other omega-6 fatty acids, like arachidonic acid (AA). The body can also convert α -LNA into eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). Fatty acids like AA, DHA and EPA are often referred to as long-chain fatty acids. In practice, however, the efficiency of converting α -LNA into these other two omega-3 fatty acids is low, with

only 0.2% of blood plasma α -LNA able to be converted (Pawlosky, 2001). This is why it is usually recommended that adequate amounts of these 2 long chain omega-3s be obtained from foods. While α -LNA can be found in many vegetable sources as well as some meats, EPA and DHA are much less common. The best source of these long-chain omega-3s is fish and other seafood.

The adequate intakes in table 1 are for adults with the exception of pregnant or lactating women, who should ensure a DHA intake of 0.30 grams/day. This is mainly due to the importance of DHA for brain and central nervous system development. It is also important to note that table 1 shows an upper limit for the amount of the omega-6 fatty acid LA that should be consumed. Such an upper limit represents the maximum dietary intake level that can be consumed without any adverse effects. As the amount consumed increases beyond the upper limit, the risk of negative health effects also increases. section.

Omega-3 and Saturated fats in Farmed and Wild Salmon

Based on dietary intakes such as those shown in table 1 it is often recommended that people consume about two fish meals per week, with fatty fish such as salmon put forth as a top choice (Kris-Etherton, P.M. et al., 2002). But in addition to several species of wild salmon, there is also farmed salmon to select from. How do these different types of salmon compare when it comes to fat content, and what changes occur when salmon is farmed?

The nutritional composition of an animal will depend on the food it eats and on the conditions under which it grows. Like humans, both wild and farmed salmon must get their omega-3 fatty acids from their food. Farmed salmon are fed food pellets that are rich in oils made from other fish. The amount of fish oil fed to the salmon will determine its omega-3 content.

Figure 1 shows that farming Atlantic salmon doesn't alter its long-chain omega-3 content much, with farmed Atlantic salmon having slightly more than wild Atlantic salmon. However, farmed Atlantic salmon has more long-chain omega-3s than the 5 species of wild Pacific salmon. Does this mean that farmed salmon is the best choice for putting long-chain omega-3s in our diet? Before we reach such a conclusion we should look at the other fatty acids in the fish, especially those that might have negative health effects.

We can see from Figure 2 that farming Atlantic salmon more than doubles its saturated fat content. The amount is still within the range represented by the wild salmon species. However, for the 6 species shown, farming has moved Atlantic salmon from having the fourth most amount of saturated fat to the second most.

To better clarify how the various types of salmon compare in terms of omega-3 and saturated fat, let us look at how much saturated fat there is for each gram of long-chain omega-3 fatty acids. One gram is easily provided by any of the salmon and supplies about 4 days worth of the recommended amount. By keeping the amount of omega-3 constant, we can more easily see how the saturated fat compares. This is shown in Figure 3. We

can see that pink salmon comes out as an excellent choice, providing less than half the saturated fat for each gram of long-chain omega-3 as does farmed Atlantic salmon. Coho, Sockeye and chum all provide similar amounts of saturated fat per gram of omega-3 as farmed Atlantic salmon, while chinook provides about 30% more.



Figure 1. Long-chain omega-3 fatty acids in 200-gram serving of various salmon.



Figure 2. Saturated fat in 200-gram serving of various salmon



Figure 3. Saturated fat per gram of long-chain omega-3 fatty acids.

Omega-6 fats in Farmed and Wild Salmon

As mentioned earlier, an upper limit is given for the adequate intake level of the omega-6 fatty acid LA. Not getting enough can lead to health problems, but when it comes to LA, you can get "too much of a good thing". The upper limit takes this into account. In North America we generally don't have a problem with getting enough LA. In fact, most people get well beyond the recommended upper limit (Kris-Etherton, 2000).

Remember that, in our bodies, LA can get converted to AA and α -LNA to EPA and DHA. In this process LA and α -LNA compete, in the sense that they require some of the same enzymes. Studies show that too much LA in the diet can reduce the body's ability to convert α -LNA to EPA and DHA (Uauy, 1999). This effectively increases the amount of EPA and DHA that we need to get directly from our food. To put this in another way, consuming large amounts of LA can interfere with our ability to utilize omega-3 fatty acids.

The prevalence of LA in our diet comes from the dependence of our food supply on grains and vegetable based oils, which contain high amounts of this fatty acid. Studies done on cattle show that grain-fed cattle have much more LA and saturated fat than grass-fed cattle (Cordain, 2002). This is relevant for salmon since, in addition to the large fish oil and fish meal component, farmed salmon feed has a substantial, and increasing, vegetable component. By the late 1990's, farmed salmon feed contained a 31% vegetable component on average. It also contained up to 8% blood meal and meat meal (Tyedmers, 2000).

Figure 4 shows the omega-6 content of the different types of salmon. We can see that both the LA and AA content of farmed Atlantic salmon is much higher than any of the

wild salmon. In fact, the amount of LA and AA in farmed Atlantic salmon is much higher than any other wild seafood, which typically has very low amounts of omega-6 fatty acids.





Data is from United States Department of Agriculture (USDA).

Figure 4. Omega-6 content in 200-gram serving of various salmon.

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In addition to the competing effect between LA and α -LNA that was mentioned above, the upper limit value on LA intake is based on the link between fatty acids and the production of eicosanoids, hormone-like compounds that regulate blood pressure, clotting and many other bodily functions. A series of eicosanoids are made from the omega-6 fatty acid AA and a different series are made from the omega-3 fatty acids. The eicosanoids made from the omega-3s usually have a more gentle effect on the body and, help to mediate the more intense physiological effects of the omega-6 eicosanoids.

As with many other aspects of proper nutrition, balance is the key. The omega-6 and omega-3 derived eicosanoids are all needed for optimal health. However, too much LA and AA can throw off that balance and may lead to health problems (Monjazeb, 2002; Simopoulos, 2001).

Exactly how much LA is needed in order to get levels of AA that are too high isn't clear. It has been pointed out that even the consumption of large amounts of LA seems to lead to only small increases in the amount of AA in the blood (Cunnane, 2000). But, as with most fatty acids, AA is also stored in our fatty tissue and later released. The relationship between ingested LA, stored AA and level of AA in the blood needs to be better clarified. However, directly ingesting AA should increase its blood level. This is why the high level of AA in farmed Atlantic salmon is of interest. Not only does farmed salmon have much more AA than any seafood, but it has more AA than most foods.

To be clear, this paper is not suggesting that LA and AA are 'bad for you'. On the contrary, a certain amount of these omega-6 fatty acids are needed to maintain good health. The point is that, as with many nutrients, ingesting too much can lead to negative health effects. If particular individuals have a diet that is low in omega-6, then the higher levels of LA and AA found in farmed salmon as compared to wild salmon will not be an issue. But in North America, our food supply is such that most people ingest high levels of omega-6 and not enough omega-3 fatty acids. It is within this context that the different fatty acid profile between farmed and wild salmon becomes a concern.

Total Fat in Farmed and Wild Salmon

In addition to the individual types of fat, it is also helpful to look at the total fat content of our diet. The Canada Food Guide recommends that no more than 30% of total energy intake should be made up of fat. Based on a 2000-calorie daily diet, this means not consuming more than 66 grams of total fat per day. Figure 5 shows total fat content for various types of salmon (note that total fat obviously includes the monounsaturates, which were not compared for the salmon varieties). The total amount of fat in farmed Atlantic salmon is almost double that of wild Atlantic salmon It is also substantially higher than most of the other wild salmon and about the same as chinook. Although farmed Atlantic salmon is an excellent source of long-chain omega-3s, it provides them along with a relatively high level of total fat. If the consumer has a choice, it is best to obtain the required amounts of omega-3s while minimizing total fat.

The health risks associated with a change from consuming wild salmon to consuming farmed salmon is of particular concern for First Nations Peoples of the Pacific Northwest,

where wild salmon is such an important part of their diet. Wild salmon is in fact one of the largest remaining traditional sources of protein and fats, which provide an important counterbalance to modern-day processed foods and meats with their low omega-3 content.



Figure 5. Total fat per 200 gram serving of various salmon

Part 2: Disease Transfer to Wild Salmon

The farming of salmon in net-cages that are open to the marine environment increases the risk of disease transmission to wild salmon. Although the diseases that infect salmon farms in B.C. are caused by indigenous organisms, the presence of several hundred thousand salmon kept in close quarters on farms can amplify the population of those disease organisms. A recent example of how salmon farms can increases the risk of indigenous diseases is the recent collapse of wild pink salmon in the Broughton Archipelago in British Columbia. A review of the data by the Pacific Fisheries Resource Conservation Council concluded that, (PFRCC, 2003).

"While scientific certainty is not absolute, European research does indicate that sea lice abundance can be associated with salmon farming. Given this evidence, combined with the presence of sea lice on Broughton Archipelago pink salmon smolts, and the fact the decline in numbers was limited to Broughton Archipelago fish, the Council believes that sea lice were associated with the decline observed in the Broughton Archipelago."

We refer the reader to the detailed PFRCC report mentioned above. Part 2 of this presentation is based mostly on the work done by Alexandra Morton, whose work on sea lice is covered in the PFRCC report.

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Editor's Note:

In January, 2004, an extensive study of the presence of organic contaminants in farmed salmon was published in *Science*. The conclusion was that "Risk analysis indicates that consumption of farmed Atlantic salmon may pose health risks that detract from the beneficial effects of fish consumption".

Hites, R.A., Foran, J.A., Carpenter, D.O., Hamilton, M.C., Knuth, B.A., and Schwager, S.J. (2004). Global assessment of organic contaminants in farmed salmon. *Science*, 303: 226-229.

Overall Health - Mental, Emotional, Spiritual and Physical Aspects

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Abstract

In the traditional culture of indigenous people everywhere, good health embodies mental, emotional, spiritual as well as physical well-being. The people of the First Nations had always lived in balanced harmony with the natural environment for foods, shelter and spirituality, until the first contact with Europeans. The people of the First Nations have since suffered continual grievous assaults on their traditional cultural practices through, among other things, government-sanctioned arbitrary seizure of land and enforced acculturation through residential schools. Renewed cultural identity is vital for restoring the overall health of the people.

Identification of antibiotics and anti-cancer chemicals in selected medicinal plants and mushrooms of the West Coast of Canada.

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Abstract

Together with a number of students and Ph.Ds we have screened selected BC plants and mushrooms for their activity against bacteria and fungi and identified many with activity. With the collaboration of Professor J.B. Hudson of the Dept. of Pathology we have also studied activities against selected viruses. In addition, we have discovered chemicals in certain mushrooms which have demonstrable anticancer activities against certain cancer cell lines. This research is continuing.

Indigenous Peoples and Their Food Resources: Considering Benefits and Risks

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Introduction

The Centre for Indigenous Peoples' Nutrition and Environment (CINE) was established in 1992 in response to a need expressed by Aboriginal peoples in Canada for participatory research and education to address their concerns about the integrity of their traditional food systems. Aboriginal leaders worked together to lobby for funds and to establish a working structure for CINE's activities. Discussions about establishing the Centre, begun in 1988, following successful community work in Bella Coola on traditional food systems and community studies in the Arctic communities of Broughton Island and Fort Good Hope and Colville Lake. Initial funding for the Centre came through the Arctic Environmental Strategy, managed by the Department of Indian Affairs and Northern Development (DIAND), as an initiative of Canada's Green Plan. Staff recruitment and preparation of physical space at McGill University began in March 1992. and CINE officially opened in autumn 1993. The CINE Governing Board includes representatives from the Assembly of First Nations, Council of Yukon First Nations, Dene Nation, Inuit Circumpolar Conference, Inuit Tapiriit Kanatami, Metis Nation of the Northwest Territories, and the Mohawk Council of Kahnawake. As the Aboriginal community geographically closest to the university, the Mohawk Council of Kahnawake serves as the host of CINE.

CINE is a permanent multidisciplinary research and education resource with an international outlook. The forces of environmental and cultural change that impact on traditional food systems, nutrition, and health of Indigenous peoples have global similarities and significance. The Centre operates at arm's length from government and works closely with Indigenous peoples' communities on topics related to their traditional food systems.

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A hallmark of CINE's work - one for which CINE is seen as a model internationally - has been good participatory techniques for activities conducted with communities. All community-based activities include agreement on the conduct of projects, local staff training and involvement, and return of results to communities before final reports are submitted. A recent publication on participatory health research refers to good techniques followed during CINE dietary studies (Fediuk and Kuhnlein, 2003).

It is well established internationally that when traditional lifestyles of Indigenous peoples give way to modern ways of living and industrial-based diets, chronic diseases increase. This is often signalled by population indicators of diets high in commercial fats and simple carbohydrates, reduced physical activity, and increased obesity. (Bjerregard and Young, 1998; Popkin, 2001). Understanding patterns of food use by Indigenous Peoples has several potential benefits, including knowing the extent of contaminant exposure, knowing the extent of nutritional quality of the diet and specific food sources of nutrients and contaminants, and knowing what food items can be deleted or added to improve diet quality.

CINE's work in Canada

Figure 1 shows the extent of community work by CINE with Indigneous Peoples in Canada as research and education activity delivery. Significant research and results are reported in this conference about work of the founding CINE director in the community of Bella Coola (see companion article by Hans, Hilland and Kuhnlein). It was clearly demonstrated by this community that traditional food systems can be used to improve health in the community.



Figure 1. Map of CINE's work in Canada

Ooligans and ooligan grease are important traditional food resources that underscore the significance of protecting traditional food systems. Research on the nutrient benefits and contaminant risks of ooligan grease have been published, and highlights of the results are shown in Table 1 and Table 2.

Table 1. Nutrients and contaminants in British Columbia ooligan grease

Nutrient and Organochlorine Content of Ooligan Grease per 100 g lipid (mean ± SD)				
Nutrients (n = 19)				
Retinol, µg		2500 ± 1200		
Vitamin E, mg		$22 \pm 5.4 (5)^*$		
Saturated Fatty Acids (SFA), g		19 ± 2.5		
Multi-unsaturated Fatty Acids (MUFA), g		37 ± 5.5		
n-3, g		19 ± 5.2		
n-6, g		1.2 ± 0.5		
Organochlorines (n =	4)			
Σ Chlordane, ng		3000 ± 5.4		
Σ DDT, ng		5000 ± 6.3		
Σ PCB, ng		4200 ± 4.2		
* n = 5	(Chan et al, 1996; Ku	hnlein et al., 1996)		

Table 2. Food species numbers in 3 Arctic cultural areas

	Dene/Metis	Yukon	<u>Inuit</u>
Sea mammals	0	0	14
Land animals	17	16	14
Birds	16	26	70
Fish/Seafood	20	20	48
Plants	48	40	48
Total	101	102	194

Food Species in 3 Cultural Areas of the Canadian Arctic

It can be seen that ooligans are important sources of essential nutrients, particularly vitamins A and E, and that it contains sources of the monounsaturated fats and the omega 3 fatty acids. Unfortunately, ooligans also contain PCBs and other organochlorines, and the further south in British Columbia the fish are harvested, the more contaminated they

are. It is also unfortunate that the availability of ooligans is now very limited in some of the best rivers of coastal British Columbia.

Understanding Benefits and Risks of Using Traditional Food

Figure 2 demonstrates some of the considerations taken into account by Indigenous Peoples as they decide whether or not to harvest and consume their traditional food. At this point in time, for most traditional foods harvested in Canada, the benefits of the food used far outweigh the risks of small amounts of contaminants contained within them (Kuhnlein et al., 2001)



Figure 2. Benefits and Risks of Traditional Food Use

Dietary studies on benefits and risks of traditional food use usually begin with community information sessions. For larger studies in the Arctic conducted by CINE, representatives from each community attend workshops in a central location for a geographical region. The interview protocol is reviewed during these methodology workshops and the most representative communities in each region are selected. Interview teams include research managers and community-based interviewers trained in consistent interview protocol. Random samples of teen or adult individuals are selected in the larger studies. In smaller studies in select communities all households and individuals can be included; however in multiple community studies cost considerations dictate random sampling.

CINE's research strategy includes several steps Interview teams include research managers and community-based interviewers are trained in consistent interview protocol, comprised of several interview instruments: demographics and socio-cultural data, 24hour intake data, and frequency of food use data. The community research teams are also responsible for sampling food items currently being frequently used; these samples are analyzed in CINE laboratories or with collaborators. Interview data are coded and analyzed by the Centre, and copies of data left with the responsible CINE Governing Board members and the communities.

Some overview of findings of research in the Arctic with the Dene/Métis, Yukon First Nations, and Inuit demonstrate several consistent principles.

In Table 2, it can be seen that there are more than 100 species of traditional foods known by community members and used by the three cultural areas of the Arctic. While the extent of use of any one of them depends on availability, interest in the species as food and harvest technologies, Figure 3 demonstrates that the amount of traditional food consumed as a % of daily energy is only from 5-40 percent. This means that Northern peoples are consuming the majority of their calories from food bought in stores.

The market foods most frequently consumed are shown in Table 3. It is easy to understand from this list that food quality is much better with traditional food, and that nutrient density is higher. Figure 4 shows a comparison of nutrient density between traditional and market food. For most of the nutrients assessed, that portion of the diet from traditional food has greater nutrient density than does the market portion of the diet. In this figure, it is only calcium that is significantly greater in market food than traditional food; all other nutrients are higher in traditional food.

Table 3. Kinds of market food consumed

Most Commonly-Consumed Arctic Market Food

Tea	Whitener, Beverage
Sugar	Potatoes
Bread, white	Fats, Shortening, solid
Bannock/Biscuits	Rice
Lard	Soup, dry mixes
Drinks, crystal	Jelly/Jam
Coffee	Beef, ground
Milk, evaporated	Chicken, pieces, fried
Corn Flakes	Macaroni/Cheese
Cola-Type Beverages	Bacon
Butter	Oatmeal
Eggs	Frankfurters
Chips, salty snacks	



Figure 3. % energy from traditional food in 3 Arctic areas





(Kuhnlen et al, 2001)

Figure 4. Importance of nutrient density of traditional food

Work in the Inuit community of Broughton Island and two Sahtu Dene/Métis communities demonstrated the importance of seasonality (Figure 5) and age and gender (Figure 6) on the extent of traditional food consumed. It can be seen in Figure 5 that there are obvious high and low seasons for particular species used, and the total traditional food consumed. It is consistently shown in our studies that younger people consume less traditional food than do those older, particularly those over age 40.

There are important social and cultural functions of Arctic Indigenous Peoples' food. These include concepts of identity, provision of outdoor recreation and fitness activities, giving opportunities for sharing in the community, saving money, bringing respect to the hunters and fishers for providing for their families, building pride and confidence, and providing opportunity for children's education on the natural environment. Interviews indicate recognition that traditional/country food is significantly more healthy for children, healthy for pregnant/breastfeeding women, of excellent taste, and more important to community life compared to market food. Traditional/country food is the foundation of the social, cultural and spiritual way of life for Aboriginal peoples.



(Ku hnle in, 1995)

Figure 5. Importance of seasonality to traditional food consumed

Concerns for exposure to contaminants as heavy metals and organochlorines as risks and nutrient benefits were investigated. The research demonstrated that individuals with dietary intake from traditional food species from terrestrial systems (Dene/Métis and Yukon First Nations communities) had less exposure to organochlorines than did those who consumed a primarily sea based food system. Inuit adult mean intakes of two organochlorines, chlordane and toxaphene, exceeded tolerable daily intakes (TDI), and mean intakes of mercury were close to the tolerable daily intake (Figure 7). While it is recognized that TDI's are often based on limited toxicological knowledge and safety

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factors of up to 1000, it is still of concern that traditional food providing only 30% of daily energy leads to exposure eeceeding the TDI. This is especially true considering the remote regions inhabited by Inuit, far from industrial activity of any kind.

Food items contributing these contaminants are the same as those providing the majority of some essential nutrients in the diet. A variety of sea and land species provide contaminants to the diet in varying proportions. Traditional food items such as ringed seal, caribou, narwhal mattak, blubber, and arctic char were among the main contributors to the diet for energy, protein, fat, vitamin A, vitamin E, omega-3 fats, iron, zinc, copper and magnesium.



(Kuhnlein. 1995)

Figure 6. Importance of age and gender to amount of traditional food consumed

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Figure 7. Extent of consumption of contaminants in 3 Arctic cultural areas

Conclusions

These dietary studies have demonstrated the following:

- a) variation in traditional food and market food contributions to total diet;
- b) age and gender differences in food use;
- c) seasonal differences in food use;
- d) cultural and geographical differences in traditional food use;
- e) important nutritional contributions of traditional food
- f) higher overall nutrient density of traditional food in comparison to market food;
- g) cultural values associated with traditional food harvest and use;
- h) cultural and geographical differences in contaminant intakes

It is concluded that Arctic Indigenous Peoples enjoy substantial cultural and nutritional benefits from using their unique food systems. Terrestrial based food systems contribute less organochlorines to the diet than do marine based food systems. While Indigenous Peoples rarely consume an average of more than 30% of dietary energy from the local food system, this proportion of the Inuit diet can contribute substantial exposure to organochlorines and mercury.

Good sense is obviously needed on a case-by-case basis for traditional food use. Continued advice to breast feed infants is an example of how a traditional food with multiple known benefits to both infant and mother is still advised, even though contaminants are recorded in the milk of lactating women worldwide. Northern Indigenous women, who consume a wide variety of traditional food and whose milk is known to contain organochlorines, are still advised that breast milk is the best food for infants (VanOostdam et al, 1999; Dewailley et al, 1996).

There are many political issues related to use of traditional food, contaminants in these foods, and multiple benefits from their use. Political and industrial will is needed to support research into understanding how the contaminants now in global environments are present in traditional food systems of Indigenous peoples, with special attention to effects of contaminant mixtures in high-nutrient foods.

Despite its considerable cost, appropriate education for Indigenous peoples should be provided to emphasize the reasoned considerations of risks and benefits of using traditional food and the consequences of adopting a diet of poor-quality market food (Jensen et al, 1997; VanOostdam et al, 1999). While it is very frustrating and uncomfortable for Indigenous peoples to have different expert opinions on risks of consuming their traditional food, the best solution is to demystify the science so that the concepts of benefit and risk evaluations are easily understood.

Finally, it must become abundantly clear that the only reasonable and permanent solution to protecting health from organochlorines and other contaminants in the traditional food systems of Indigenous peoples is to intensify efforts in all possible global political arenas to stop emissions of persistent pollutants into global environments.

Traditional food systems of Indigenous Peoples throughout Canada, but especially fish and mammals, are excellent food and cultural resources important for health for peoples from many diverse indigenous cultures. All traditional plant and animal food resources need to be protected for use by indigenous Peoples whose traditional knowledge recognizes their health benefits.

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A sharing and learning journey in nutrition labelling

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Abstract

This informative and participatory presentation will highlight the new Nutrition Labelling Toolkit for First Nations and Inuit. The toolkit provides information on reading, understanding and using food labels. The presenter will review and provide useful tips when using the toolkit. Community health care providers can use this resource. The session will provide participants with knowledge and more.

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Abstract

The prevalence of obesity, Type II diabetes, hypertension and depression is exceptionally high among the aboriginal people, in comparison to the Canadian population at large. These chronic diseases are interlinked. Insulin resistance, one of the principal underlying causes of Type II diabetes, is generally deigned as a reduction in the ability of insulin to regulate glucose metabolism. Insulin resistance is an adaptation of the state of obesity of a person. Reduction of obesity, viz., body fat, would thus be an effective strategy to remedy the conditions of Type II diabetes, hypertension and depression.

Introduction

First Nations people in Canada suffer from a substantially higher prevalence of Type II diabetes mellitus in comparison to the population at large. Obesity is an associated factor. Despite enormous scientific and financial undertaking by various government agencies to "educate" the people about diabetes during the past 50 years, the problem persists. It is becoming evident that the problem could not be solved without an *a priori* understanding of the historical and cultural context experienced by the people of the First Nations.

Human health is influenced by genetics, environmental and cultural factors. Genetics is largely alterable only in an evolutionary time frame. In contrast, present-day health could be remedied to a large extent by addressing the underlying environmental and cultural issues. Health service should be the final stage of salvage therapy (See Figure 1).

Etiology of Obesity

Diabetes mellitus is a variable disorder of carbohydrate metabolism caused by a combination of hereditary and environmental factors. Insulin is the pancreatic hormone secreted by humans to regulate carbohydrate metabolism. Type II is a non-insulin dependent diabetes mellitus that develops mostly in adults. The on-set of adult Type II diabetes mellitus is closely linked to obesity (Broussard et al., 1991; Welty, 1991; Katzmaryzyk and Malina, 1998; Hanley et al., 2000). In diabetic persons, insulin resistance is increased as a physiological adjustment to the state of obesity of a person.

Obesity has other adverse health effects such as increased risk of coronary heart disease. mental depression and polycystic ovary syndrome (PCOS).

Figure 2 illustrates some of the inter-relational impact of obesity on physical and mental health. It is interesting to note that the chronic consumption of anti-depression drugs is notably high among aboriginals. The underlying causes have yet to be investigated by primary-care medical professionals.



Figure 1 - Factors affecting human health



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Figure 2 – Inter-relational impact of obesity

Obesity and Type II (non-insulin dependent) diabetes mellitus are interlinked. Insulin resistance, one of the principal underlying causes of Type II diabetes mellitus, is generally defined as a reduction in the ability of insulin to regulate glucose metabolism [Williams, 1999; Besesen, 2000]. Insulin resistance is an adaptation to the state of obesity of a person. Indeed, Type II diabetes mellitus develops most often in adults who are obese. Reduction in obesity, viz., body fat, would thus be an effective means to alleviate the conditions of Type II diabetes mellitus (See Figure 3). Insulin sensitivity may be improved by drug intervention such as Metformin. In general, improving insulin sensitivity does not always result in lowering obesity. The reason for this outcome is not well understood.



Figure 3 - Relationship between obesity and insulin resistance

In western societies, repeated failure of the classical approach over the past 50 years, viz., dieting + exercise + counselling, to arrest the growing trend of obesity in the general population is well recognized. The fundamental is that weight reduction has very complex behavioural and physiological dimensions. It is very difficult to reform human behaviour, particularly in the case where a life-threatening situation is not immediate. People like tasty, and not necessarily healthy, foods; people are not motivated to undertake physical activities when television watching is enticing and less strenuous; people become resistant to constant lectures about making behavioural changes.

The classical approach of obesity reduction among the aboriginal people is aggravated by the superimposition of the substantial disruption of the aboriginal culture by the western society during then past 200 years. The aboriginal people suffered grievously with the loss of their land and culture, through government-sanctioned decrees. The historical access to the land and waters for the procurement of traditional foods is steadily restricted by new government rules and regulations which are mandated without cultural considerations. Hope for a better future is diminishing precipitously in successive

generations to manifest in high prevalence of alcoholism, drug/substance abuse, chronic mental depression, suicide among the younger generation of aboriginal youths. Emulation of western lifestyle and value doe not appear to be an effective means to reverse this poor health status among the aboriginal people.

Epidemiology

It is generally recognized for more than a decade that the First Nations people in Canada suffer from a substantially higher prevalence of Type II diabetes mellitus, in comparison to the population at large (Montour et al., 1989; Young and Sevenhuysen, 1989; Edmonds, 1999; Anon., 1999; Young et al., 2000). Figure 3 shows the epidemic trend among aboriginal women in Canada. The situation for aboriginal men is similar. This appalling status is worsening despite periodic call to action by government agencies and medical professionals. The outlook is dismal as remedial methods are deployed repeatedly. There is an acute need for a new practicable strategy to alleviate the increasing prevalence of obesity and subsequently Type 2 diabetes mellitus among the people of the First Nations.



Figure 4 - Prevalence of Type II diabetes mellitus among aboriginal women in Canada (adapted from Young et al., 2000)

Acculturation

The deployment of a modernized ancestral, not western, diet strategy may be a practicable means to solve this critical health problem. Most aboriginal in the Americas have changed their diet and physical activity patterns during the past 100 years to that of an industrialized country model (Bouchard, 1991; Shintani et al., 1991; Rode and Shepard, 1993). The nutritional health of the aboriginals has deteriorated concomitantly. In particular, the result of acculturation has been a marked increase in the occurrence of obesity and Type II diabetes mellitus among the impacted aboriginals.

This observation is illustrated in Figure 5 in which the acculturation status of rural and urban Mapuche aboriginals in Chile was found to concur with the general epidemiological pattern (Uauy et al., 2001). The poor health status of the urban Mapuche aboriginals coincided with a greater degree of acculturation of non-traditional diet and a reduced level of physical activities. The generally lower socio-economic status of aboriginals is also an important contributing factor to the poor state of health of the aboriginal population.



Figure 5 - Body mass index and prevalence of Type II diabetes mellitus among rural and urban Mapuche aboriginals (adapted from Uauy et al., 2001).

Ancestral Diet

Regrettably, there has been little or no attention directed towards to the nutritional aspects of ancestral diets for disease prevention (Wolever et al., 1997; Anon., 2000; Anon.,

2001a; Anon., 2001b). Most nutritional studies have been largely directed to fitting aboriginals into the Caucasian (western) dietary model. For example, the consumption of diary foods, a cornerstone of western diet, has <u>not</u> been an integral part of aboriginal diet until the mid twentieth century when residential schooling was imposed on aboriginal children. And yet Health Canada and other government agencies are still promoting, among other things, a dairy-based diet for the aboriginal people without due consideration of its possible cultural inappropriateness (Anon., 1995).

An interesting example of misguided benevolence is the "Sandy Lake Health and Diabetes Project" which was started in 1992 by academics and governments to study the issue of diabetes and obesity in this aboriginal community (Hanley et al., 1995; Gittelsohn et al., 1995; Wolever et al., 1997; Gittelsohn et al., 1998; Hanley et al., 2000). Sandy Lake (53° N, 93° W) is an Ojibwa-Cree community of about 1,000 people, located in northwestern Ontario. After 10 years, the Project remains focused on directing aboriginal children to adopt the classical food guidelines issued by Health Canada for Canadians at large (Anon., 2002). This approach is still being undertaken even though the conventional Western diet is now linked ever increasingly to elevated risk of Type II diabetes mellitus among the *non-aboriginal* people in North America and Western Europe (van Dam et al., 2002).

Today the aboriginal people in Sandy Lake are taught, among other things, the health benefits of drinking Florida orange juice and milk produced by cows living near large urban centres in southern Ontario, and consuming whole grain bread made from wheat grown and milled in the Canadian prairies. It appears that no one has ever questioned the appropriateness of this western dietary regime for the Ojibwa-Cree people who have been sustained by their ancestral dietary practice for several millennia. The aboriginal people of this region had never relied historically on conventional crop agriculture and animal husbandry for their food supply (Vlahos, 1970). "Modern" diseases of obesity and diabetes were unknown until the latter part of the twentieth century. The causal link between modern diet and modern disease should be obvious to academics as well government officials. In the present remediation strategy, the ancestral dietary regime has been largely ignored and suppressed. Children are being alienated from their aboriginal identity. Traditional culture is destroyed along with the health of the people. The village of Sandy Point is surrounded by an abundant supply of natural foods. And yet, virtually all foods required by the Sandy Lake community are now brought in by air transport from Red Lake, more than 200 kilometres away. There are no roads linking Sandy Lake to the "outside world".

Healthy nutritional food should be more than a simple accounting of the fats, carbohydrates, vitamins and minerals in commercially-processed foods. Dieticians have largely failed to recognize the importance of the cultural aspects of human diet.

The 1984-85 Nuxalk Food and Nutrition Program was a start in the right direction, by mobilizing the community in Bella Coola (Anon., 1984; Anon., 1985). The Program had established an important model in cataloguing traditional practices of procurement and preparation of foods from the forests and waters. Regrettably, the initial enthusiasm in community has waned during the past 15 years because of the inability of the people to

defend against the continual onslaught of western culture and lifestyle. The Program publications became corrupted by endorsement of western processed foods. For example, less than 10% of the 100+ recipes given in the Nuxalk Recipe Book (Anon., 1985) could be classified as truly traditional, e.g., without the use of refined white sugar, butter or wheat flour. The government-sanctioned destruction of the culture of the people, such as residential schools, continues to have a long-lasting detrimental influence on the outcome of the Program.

Although human genetic adaptation to the natural environment evolves over several millennia, the recovery of aboriginal might be achievable through shorter-term dietary changes. Figure 6 illustrates the beneficial effect of ancestral diet on selected health indices of a test group of native Hawaiians (Shintani et al., 1991). Note the substantial concomitant decrease in key health risk factors such as cholesterol, triglycerides and body weight, after only 21 days of interventional dietary changes. The average systolic blood pressure was reduced from 134 mm Hg to 122 mm Hg, during this study period. This finding also suggested that an ancestral diet has considerable health merits, even under sedentary lifestyle conditions.



Figure 5 - Average changes in selected health risk factors after 21 days on traditional Hawaiian diet (adapted from Shintani et al., 1991)

Remedial Strategy

Nutrition

It may not be practicable to stop the advent of acculturation. However, because food and health are invariably linked, there is a vital role for the renewal of ancestral diet among aboriginals. The path forward would need to be a concerted effort to build a modernized ancestral dietary regime through education and purposeful design. Successful outcome could provide important benefits of the non-drug alleviation and prevention of modern diseases for present and future generations of aboriginals, with the concurrent maintenance of traditional cultural values.

It is recognized that changing human health behaviour is a difficult task, under most circumstances. Renew adaptation of healthy ancestral diet will take time and patience, as well as considerable leadership and financial resources. Re-introduction and promotion of ancestral diet requires an accompanying revival of traditional cultural pride and practices. In order to offset the competition from the heavily advertised processed foods, the traditional foods must be modernized to provide convenient accessibility and portability. A case in point is the glaring lack of a single grocery store in Vancouver in which traditional foods of the First Nations people may be purchased at affordable prices. In contrast, the Arabic ethnic group with an estimated 10,000 people living in Vancouver has its own stores to purchase Halal foods. In the transition period, specific nutrition-based therapeutics may provide an effective and convenient means to remedy this epidemic of obesity and resulting diabetes mellitus among aboriginals.

Physical Activities

It is recognized that nutrition alone would be resolve the obesity problem. Weight gain is invariably related to an imbalance of energy intake and energy expenditure over time, which results in the storage of energy as fat reserve.

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Energy intake = Energy deployed + Energy expended + Energy excreted + Energy stored
(for internal
maintenance) (as fat reserve)
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At any steady state condition, the body weight (accumulation or depletion of body fat and lean muscle) is equilibrated according to energy balance. Energy inflow is the absorptive consumption of food as chemical energy in the form of protein, lipids and carbohydrates. Energy outflow includes a) external work, e.g. locomotion and communication, and b) loss in secretions, urine, feces, cast-off hair, scales, hair and radiative surfaces. The difference in energy inflow and outflow is defined as the metabolic rate in which energy is directed to a) the formation and replacement of tissues, and b) essential internal work, e.g., chemical, electrical, osmotic and mechanical. Body weight will attain a new equilibrium value if one alters the energy inflow and outflow. In practice, body weight can be equilibrated effectively at a lower level in time by either consuming less food or by reducing the absorption of food consumed, at the constant energy outflow.

Over the past 50 years, the physical activities of the aboriginal people has declined considerably as a result of changing food procurement practices arising from the loss of traditional land and waters, and from changing pattern of "employment". In practice, a
simple plan of modest level of physical activities can be sustained without difficulties to result in significant beneficial outcome.

Concluding remarks

The high prevalence of obesity and diabetes mellitus among the people of the First Nations is well known for decades. And yet, no specific plan of action has ever been formulated and implemented to deal with this epidemic. There are always "further studies to study the problem". Dietary pattern among aboriginals has evolved through natural and imposed acculturation. Unfortunately, these changes are still not widely recognized to be a causal factor of the poor status of aboriginal health. A nutritional strategy based on ancestral diet could offer an effective and timely means to reclaim the health of the aboriginal people.

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Nuxalk Food and Nutrition Program. Re-introduction of Traditional Diet and Its Impact on the Health of the People

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Abstract

This community-based project took place in several stages during the 1980's, and was a very important initiative to document and educate our community about our traditional diet-- primarily the recognition and gathering of foods, and their nutritional value. Two books were published: one was a handbook and the other was a recipe book. These books are still used today. We believe and encourage other communities to preserve their knowledge of their traditional diet.

Background

The first introduction of mutual interests between Dr. Harriet Kuhnlein of the University of British Columbia and the Nuxalk Nation was in the early 1980's through the Union of B.C. Indian Chiefs. Archie Pootlass encouraged her interests in ooligans, and introduced her to the community through Ed Moody and Bill Tallio. Later the nursing station in the community became involved in several health studies which involved the elders and Council. The Nuxalk Food and Nutrition Program for health promotion took place in the community from 1983 to 1986 and was evaluated with before and after health assessments. Several researchers were included in the work over several years. Health Canada was the principal funder of this work. A list of published references is attached.

Traditional Food Studies

Plans developed to use traditional food as an avenue to understand and promote good health of the Nuxalk People. This meant that the traditional food species of fish, animals and plants needed to be documented and analyzed for their nutritional values. The first of these studies was with the ooligan, and this was followed by studies on traditional roots, berries, green plants and fish. Excellent sources of nutrients are found in the traditional food system of the Nuxalk. The elders were very important in locating, collecting and preparing the food samples for the laboratory. During the course of the program many classes were held by the elders to teach the younger generations and youth about techniques for traditional food harvest and preparation.

Interview Studies

The first interview study was on the dietary intake and food use conducted with adults in households in 1983. This study showed that all people take most of their calories in the form of store-bought food, and that very little traditional food, except for fish, was being consumed. The nutrients in most short supply in the diet records were iron, vitamin A and folic acid.

During the mid-1980's a study was conducted of grandmothers, mothers and daughters living on the Nuxalk reserve. The main outcome was to show the declining use of traditional food which took place during the 20th century, which was documented with frequency of use assessments of each traditional species. It also showed what factors were most important in retaining use of animals and plants (taste appreciation and availability to the community).

During 1986 a final interview study was conducted to demonstrate the change in traditional food use from the earlier period (1983). It was shown that families were able to increase their use of garden produce, berries and fish, and that they were doing this while saving money spent on food at the store.

Studies on then Local Ecology

In 1984 a project involving several Nuxalk students was conducted to document the availability of traditional wild plant foods on the Nuxalk reserve. It was shown that most of the wild plants known in the Nuxalk culture were still available in different parts of the reserve, but that quantities sufficient for feeding the entire community were not available within the reserve boundaries. A map of traditional plant foods on the reserve was prepared and posted for all to use.

During this time a traditional plant food garden was created in front of the health center, which was used by the elders to teach the younger generations about their local foods. The garden was not continued, and does not exist today, in part because the health center has been relocated to another area.

Health Promotion Program

Activities in the program were conducted out of the health center under the supervision of the community health nurse (Sandy Moody Burgess) and the community health representative (Rose Hans). Two community assistants (Louise Hans, Emily Schooner) were employed to implement all the activities planned through the health center. These

included many kinds of activities for the community, and several were conducted through the schools on the reserve. Activities included: traditional food events (for example, how to cut and smoke fish), activities for young mothers and their children, fitness events, teaching in the schools about dental health and good nutrition with traditional and market foods, cooking classes. There were special activities such as a buying program for pressure canners, and bringing in fresh produce by truck from the Okanagen for sale on the reserve. Weekly meetings were held for staff to brain-storm how to encourage the community to use more of their traditional food and good quality food that could be bought on the reserve.

A popular part of the program was the participation of David Bogach of Bogie's Fitness of Vancouver. When Bogie was in town, everyone came out for funruns and walks up the Four Mile and back to encourage fitness for the whole family.

An important component was written material. Each week there was a flyer sent to each home about the activities of the coming week. A handbook of traditional food was prepared and given each home which described the foods, and how to find, preserve and prepare them. Also, a recipe book including both traditional and market food was prepared and given to each home.

Health Assessments

The success of the program was documented by showing change from the first health assessment until the second health assessment, three years later. These assessments included interviews on diet and physical activity, fitness assessments, blood work for iron, vitamin A and folic acid, blood pressure, and other parameters. As a service to the community, vision and hearing were tested and referrals made for eye glasses and hearing aids.

It was shown that a statistical improvement was made in blood vitamin A, folic acid and iron during the three year period. The interview studies showed that more people were using more of their traditional food, and that more people knew what the foods were and how to prepare them.

During these years, there was only a modest concern for diabetes, and the program did not emphasize weight loss or diabetes control, except for the encouragement to increase physical activity in both adults and school children.

Essential Ingredients

From the very beginning, the support of the Chief and Council and the elders was necessary to keep program quality and enthusiasm up among the community members. Any troubleshooting needed was first made through the nursing station, and if needed through the elders and Council. On the first day of the health assessments, it was the Chief and Council members who were first in the door. Using the Council and the Cultural Committee on the reserve meant that everyone was encouraged to become a part of the program which involved all homes, the schools, the health network, the Co-op food store, and the leadership. It was important that the whole community assumed ownership of the program, and contributed ideas to its success.

This program was funded as a demonstration project by the Health Promotion Contribution Program of Health Canada. The whole community benefited, and the results are still felt today.

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Understanding What Health and Wellness Means to Yup'ik People: Working with Alaska Native Communities to Conduct Research and Promote Health

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Abstract

The Center for Alaska Native Health Research (CANHR) is funded by a grant from the National Institutes of Health, National Center of Research Resources. Its purpose is to address the health disparities experience by Alaska Natives. Its overall goals include (1) to build a stable and long term University infrastructure for biomedical research, including behavioral health, focused on diseases associated with health disparities among Alaska Natives and (2) carry out interdisciplinary research projects integrating genetic, behavioral, and nutritional factors related to obesity and its relationship to diabetes and cardiovascular disease.

There currently are three studies undertaken by CANHR researchers. Bert Boyer, Ph.D. is investigating genetic factor associated with obesity, Bret Luick, Ph.D. is studying contributing nutritional factors, and Cécile Lardon, Ph.D. examines the cultural and behavioral factors.

Background

Obesity, diabetes, and cardiovascular disease have been historically lower among Alaska Natives than Euro-Americans, but there has been a dramatic increase in both populations. However, the Researchers have hypothesized that rapid cultural change over the last century accounts for these changes, including a shift from a subsistence diet to increased exposure to processed food accompanied by a reduction in physical activity. Increased acculturation and stress related to deculturation are also thought to contribute to these increases in obesity, diabetes, and cardiovascular disease (Klyde, 1994, Hodge & Fredericks, 1999; Sullivan & Brems, 1997; Young, 1994).



Among Alaska Natives the Yup'ik are the most linguistically intact group. The area traditionally inhabited by the Yup'ik and Cup'ik¹ people is on the west coast of Alaska in the Yukon-Kuskokwim Delta. None of the communities in this area are connected to a road system that links them to each other or to other communities. The villages can only be reached by small air

craft or, in the summer, by boat. CANHR researchers will be working with 7 Yup'ik and Cup'ik villages (3 coastal and 4 interior) and with people in Bethel, the regional hub. Participants in the study will be 1,000 mostly adults, but will also include children age 8 and up. The data collected for this research will include blood samples, a variety of body measurements, and surveys.

In conducting research in this area researchers need to address a variety of cultural issues. First, researchers need to develop appropriate relationships with community members and tribal leaders, as well as with the regional Health Corporation providing health services to the research participants. Second, any research measures used in this type of cross-cultural research need to be linguistically and culturally adapted and need to be part of a culturally appropriate research methodology and interventions.

Collaborative Research Model

The research conducted at the Center for Alaska Native Health Research follows a collaborative and participatory model. The research process centers on a long-term partnership with the Yukon-Kuskokwim Health Corporation (YKHC) (the Native organization providing health care and social services to Yup'ik and Cup'ik people in the Yukon-Kuskokwim Delta) and the participating communities. Part of this collaboration are: (1) regular meetings with YKHC staff, (2) representation of YKHC staff and Board members on the External Advisory Council for CANHR, (3) joint selection of potential participating communities and collaboration on selecting variables to be researched, (4) agreement on what potential benefits to offer to participating communities for genetic and health screens, and (5) hiring people from participating communities to work on the research. YKHC staff and community members also provide input on some of the measures to be used in the research.

Developing Tools for Health Promotion in Rural Alaska

The cultural and behavioral research project of CANHR seeks to develop tools for effective health promotion in rural Alaska's communities. The project is based on the

¹ Cup'ik is a dialect of Yup'ik. This means that many words are pronounced differently, but Yup'ik and Cup'ik people also use different words for some things.

- 1. develop a cultural conceptualization of health and wellness,
- 2. develop, test, and validate a measure of health and wellness that is based on Yup'ik cultural values and beliefs,
- 3. examine the relationship between cultural-behavioral health, nutrition, and weight in a Yup'ik sample,
- 4. evaluate community-based health promotion programs in 1 or 2 Yup'ik communities.

Phase I (Years 1-3): Development Of A Measure

During phase I of the project a Yup'ik Wellness Measure has been developed. The process of developing this measure began with a series of focus groups with Yup'ik and Cup'ik people who aided in developing a Yup'ik/Cup'ik definition of wellness and provided guidance on the content, structure, and format of the measure. Six focus groups were conducted in two villages and the regional hub, Bethel. The groups consisted of young adults, older adults and elders, men, women, and Yup'ik health care providers. Two of the groups were held in English, one in Yup'ik, one in Cup'ik, and two in English and Yup'ik. All groups were co-facilitated by a Yup'ik (or Cup'ik) bilingual local co-facilitator who could also provide translation. The themes discussed in these groups included: eating Native foods, getting fresh air and being outside, physical activity, staying busy, respecting one's elders, spirituality, and changes in culture over time.

The resulting Yup'ik/Cup'ik Wellness Measure will be field tested with a sample of about 1,000 Yup'ik and Cup'ik persons at least 15 years of age. Data analysis will examine how this wellness measure relates to other psychological measures of health and wellness, such as social support, self-efficacy, happiness, and stress and coping. (These other psychological measures have also been selected and adapted to fit the cultural framework of Yup'ik people.) The wellness measure will also be used to predict other health outcomes, such as weight, body mass index, cholesterol, nutrition, and blood pressure.

Phase II (years 3-5): Health Promotion Programs

Based on the findings from phase I, we will work with one or two villages to develop health promotion programs targeting healthy weight, nutrition, and lifestyle. These health promotion programs will be evaluated and may form the basis for a model of health promotion in the Y-K Delta.

Two years into the research we can see what types of things have been helpful in developing the type of collaborative and participatory study we set out to do. Perhaps most important has been for the research team to spend time in Bethel and the participating communities and to let relationships develop slowly. The team needed to know about the region, and YKHC staff and members of the villages needed to know that we can be trusted. Also helpful has been to directly involve local people in the research. For example, the local focus group facilitators made it possible to talk about these complex topics across cultures and languages. They helped me adjust my leadership style to Yup'ik/Cup'ik ways of talking in groups and helped explain the things I was interested in to the participants of the groups. Finally, we learned to work closely with each other and with local organizations, such as YKHC and tribal councils. This close collaboration helped us maximize our resources and time and resulted in a more unified and consistent approach to the research.

Some of the issues that have emerged as part of this research relate to the complexities of working across cultures and to the constant change of a culture. For example, there are marked generational differences in how Yup'ik people think about health and wellness. While most older adults' beliefs and values were deeply grounded in Yup'ik tradition, many younger adults are more influenced my mainstream American beliefs. Developing a measure of health and wellness that adequately captures this cultural continuum presents a challenge. In addition, the measure needs to be sensitive to sub-regional differences, including linguistic differences (e.g., Yup'ik and Cup'ik). Other issues we have faced are related to coordinating three separate, but linked research projects that have to balance the need for in-depth information and the opportunity for gathering an enormous breadth of information. Similarly, we have sometimes struggled to balance the long-term benefits of basic scientific information to people in the whole region with short-term direct applicability of our findings to the participating communities. Finally, we have needed to take great care to not overburden the local health care system. For example, a question was raised about who would be responsible for treating health conditions that were discovered as part of our data collection. The Center does not have the purpose or the capacity to make clinical diagnoses or to treat people. But the Native Health Care Corporation may not have the resources to address a much increased demand for such services, either.

In sum, the Center for Alaska Native Health Research seeks to address health issues faced by Yup'ik people today. The research is collaborative and participative in nature and aims to understand the interactions between culture, behavior, and genetics as they relate to weight, diabetes, and heart disease. Culture plays a crucial role in health and well-being and must be an integral part of health assessment and interventions. So little is known about the health issues faced by Alaska Native peoples. This set of three studies seeks to shed some light on how genetics and social forces have interacted to influence the health of people in the Yukon-Kuskokwim Delta. The availability of systematically collected data will help State and local health care providers develop services that better address the rapidly rising rates of obesity, diabetes, and heart disease in this region. In addition, the approach to health promotion that will be developed as part of the cultural-

behavioral project will build on models of prevention and community development. The purpose is to work with community members in designing, implementing, and evaluating health promotion projects that build on local strengths, leadership, expertise, and traditions.

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Appendix I

List of Registered Conference Delegates

Name	Affiliation/ Location	
Agduma, Marley	Student, University of Victoria/ Kwantlen College	
Amos, Gail	FNNHC-Vancouver	
Amos, Gerald	FNNHC-Vancouver	
Amos, Morris	FNNHC-Kitamaat	
Andrews, Brenda	Student, UBC, Vancouver	
Bishop, Julie	Snuneymuxw First Nation, Nanaimo	
Blanchet, Michele	Canadian Diabetes Association, Vancouver	
Bolton, Rhoda	Heiltsuk First Nation, Waglista	
Bolton, Vern	Haisla First Nation, Vancouver	
Brown, Lauren	First Nations Chiefs Health Committee	
Carvill, Andy	Carcross/Tagish First Nation, Carcross	
Chan, Jennifer	FNNHC-Vancouver	
Chiu, Daniel	Concerned citizen, Vancouver	
Chow, Sharon	Sierra Club BC, Victoria	
Chuah, David	Omega Cancer Research, Surrey	
Culley, Hazel	Concerned citizen, Vancouver	
Devereaux, Fiona	Royal Jubilee Hospital, Victoria	
Eastman, Jenny	Concerned citizen, Victoria	
Estrada, Imee	Student, University of Victoria/ Kwantlen	
George, Nikki	SW Ontario Aboriginal Health Centre, London	
Gill, Ian	EcoTrust Canada, Vancouver	
Gordon, Michael	MR Gordon Associates, Halfmoon Bay	
Griffiths, Doris	Kwakwelth First Nation, New Westminster	
Hans, Rosie	Nuxalk First Nation, Bella Coola	
Hanson, Grant	Concerned citizen, Vancouver	
Harvey, Thelma	Nuxalk First Nation, Bella Coola	
Henry, Karen	Student, University of Victoria, Victoria	
Hall, Gordon	Osoyoos Indian Band, Penticton	
Hall, Jean Esther	Osoyoos Indian Band, Penticton	
Hill, Candace		
Hilland, Louise	Nuxalk First Nation, Bella Coola	
Hunksman, Maggie	Snuneymuxw First Nation, Nanaimo	
Hlus, Cindy	Cowichan Band, Duncan	
Hobbs, Chuck		
Howard, Liz	Nuxalk First Nation, Bella Coola	
Hwitsum, Lydia	First Nations Summit, North Vancouver	
Isaac, David	Student, University of Victoria, Victoria	
Jacob, Colleen	Arrows to Freedom Cultural Society, Burnaby	
Joe, Debbie	Kwikwetlem First Nation, Coquitlam	

John, Ida	Sto:Lo First Nation, Chilliwack	
John, Yvette	Sto:LoFirst Nation, Chilliwack	
Johnson, Suzanne	Penticton Indian Band, Penticton	
Kararoff, Eileen	Vancouver Native Health, Vancouver	
Kuhnlein, Harriet	McGill University, Ste Anne de Bellevue, Quebec	
Lardon, Cecile	University of Alaska, Fairbanks, Alaska	
Levi, Elisa	Yukon Government, Whitehorse, Yukon	
Lewis, Flo	Kwakwelth First Nation, Vancouver	
Lucas, Simon	Hesquiaht Tribe, Nul-Chu-Nulth Nation	
Mack, Melvina	Nuxalk First Nation, Bella Coola	
Mackenzie, Don	Spirit of Aboriginal Youth magazine, Vancouver	
Maclowick, Arlene	FNNHC-Ottawa	
Maracle, Dawn	Cancer Care Ontario, Toronto	
Mercredi, Ovide	Former Grand Chief, Assembly of First Nations	
Miller, Sarah	Health Canada, Ottawa	
Mitchell, Renee	Kwakiutl District Council, Campbell River	
Nelson Moody, Erin		
Nicholas, Laurie	Akwesasne Mohawk Territory	
Nyce, Nancy	FNNHC-Kitamaat	
Paone, Sergio	David Suzuki Foundation, Victoria	
Park, Kathy	Cowichan Band, Duncan	
Pretty, Kathy		
Pretty, Kathy Ravensdale, David	Carcross/Tagish First Nation, Carcross	
Pretty, Kathy Ravensdale, David Salomons, Kia	Carcross/Tagish First Nation, Carcross Student, University of British Columbia, Vancouver	
Pretty, Kathy Ravensdale, David Salomons, Kia Seo, Martina	Carcross/Tagish First Nation, Carcross Student, University of British Columbia, Vancouver BC Hydro, Vancouver	
Pretty, Kathy Ravensdale, David Salomons, Kia Seo, Martina Silva, Geraldine	Carcross/Tagish First Nation, Carcross Student, University of British Columbia, Vancouver BC Hydro, Vancouver	
Pretty, Kathy Ravensdale, David Salomons, Kia Seo, Martina Silva, Geraldine Smith, Fran	Carcross/Tagish First Nation, Carcross Student, University of British Columbia, Vancouver BC Hydro, Vancouver	
Pretty, Kathy Ravensdale, David Salomons, Kia Seo, Martina Silva, Geraldine Smith, Fran Sneddon, Jennifer	Carcross/Tagish First Nation, Carcross Student, University of British Columbia, Vancouver BC Hydro, Vancouver Health Canada, Ottawa	
Pretty, Kathy Ravensdale, David Salomons, Kia Seo, Martina Silva, Geraldine Smith, Fran Sneddon, Jennifer Stephens, Jan	Carcross/Tagish First Nation, Carcross Student, University of British Columbia, Vancouver BC Hydro, Vancouver Health Canada, Ottawa Sechelt Band, Sechelt	
Pretty, Kathy Ravensdale, David Salomons, Kia Seo, Martina Silva, Geraldine Smith, Fran Sneddon, Jennifer Stephens, Jan St. Pierre, Cari	Carcross/Tagish First Nation, Carcross Student, University of British Columbia, Vancouver BC Hydro, Vancouver Health Canada, Ottawa Sechelt Band, Sechelt Université de Montréal, Montréal	
Pretty, Kathy Ravensdale, David Salomons, Kia Seo, Martina Silva, Geraldine Smith, Fran Sneddon, Jennifer Stephens, Jan St. Pierre, Cari Thomas, Owen	Carcross/Tagish First Nation, Carcross Student, University of British Columbia, Vancouver BC Hydro, Vancouver Health Canada, Ottawa Sechelt Band, Sechelt Université de Montréal, Montréal Snyneymuxw First Nation, Nanaimo	
Pretty, Kathy Ravensdale, David Salomons, Kia Seo, Martina Silva, Geraldine Smith, Fran Sneddon, Jennifer Stephens, Jan St. Pierre, Cari Thomas, Owen Tilston, Cara	Carcross/Tagish First Nation, Carcross Student, University of British Columbia, Vancouver BC Hydro, Vancouver Health Canada, Ottawa Sechelt Band, Sechelt Université de Montréal, Montréal Snyneymuxw First Nation, Nanaimo Student, North Island College, Campbell River	
Pretty, Kathy Ravensdale, David Salomons, Kia Seo, Martina Silva, Geraldine Smith, Fran Sneddon, Jennifer Stephens, Jan St. Pierre, Cari Thomas, Owen Tilston, Cara Towers, Neil	Carcross/Tagish First Nation, Carcross Student, University of British Columbia, Vancouver BC Hydro, Vancouver Health Canada, Ottawa Sechelt Band, Sechelt Université de Montréal, Montréal Snyneymuxw First Nation, Nanaimo Student, North Island College, Campbell River University of British Columbia, Vancouver	
Pretty, Kathy Ravensdale, David Salomons, Kia Seo, Martina Silva, Geraldine Smith, Fran Sneddon, Jennifer Stephens, Jan St. Pierre, Cari Thomas, Owen Tilston, Cara Towers, Neil Turner, Nancy	Carcross/Tagish First Nation, Carcross Student, University of British Columbia, Vancouver BC Hydro, Vancouver Health Canada, Ottawa Sechelt Band, Sechelt Université de Montréal, Montréal Snyneymuxw First Nation, Nanaimo Student, North Island College, Campbell River University of British Columbia, Vancouver University of Victoria, Victoria	
Pretty, Kathy Ravensdale, David Salomons, Kia Seo, Martina Silva, Geraldine Smith, Fran Sneddon, Jennifer Stephens, Jan St. Pierre, Cari Thomas, Owen Tilston, Cara Towers, Neil Turner, Nancy Wata	Carcross/Tagish First Nation, Carcross Student, University of British Columbia, Vancouver BC Hydro, Vancouver Health Canada, Ottawa Sechelt Band, Sechelt Université de Montréal, Montréal Snyneymuxw First Nation, Nanaimo Student, North Island College, Campbell River University of British Columbia, Vancouver University of Victoria, Victoria Kawatiul First Nation, Fort Rupert	
Pretty, Kathy Ravensdale, David Salomons, Kia Seo, Martina Silva, Geraldine Smith, Fran Sneddon, Jennifer Stephens, Jan St. Pierre, Cari Thomas, Owen Tilston, Cara Towers, Neil Turner, Nancy Wata White, Robert	Carcross/Tagish First Nation, Carcross Student, University of British Columbia, Vancouver BC Hydro, Vancouver Health Canada, Ottawa Sechelt Band, Sechelt Université de Montréal, Montréal Snyneymuxw First Nation, Nanaimo Student, North Island College, Campbell River University of British Columbia, Vancouver University of Victoria, Victoria Kawatiul First Nation, Fort Rupert Snuneymuxw First Nation, Nanaimo	
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Pretty, Kathy Ravensdale, David Salomons, Kia Seo, Martina Silva, Geraldine Smith, Fran Sneddon, Jennifer Stephens, Jan St. Pierre, Cari Thomas, Owen Tilston, Cara Towers, Neil Turner, Nancy Wata White, Robert Whittaker, Colleen Willie, Lousia Wong, Al	Carcross/Tagish First Nation, Carcross Student, University of British Columbia, Vancouver BC Hydro, Vancouver Health Canada, Ottawa Sechelt Band, Sechelt Université de Montréal, Montréal Snyneymuxw First Nation, Nanaimo Student, North Island College, Campbell River University of British Columbia, Vancouver University of Victoria, Victoria Kawatiul First Nation, Fort Rupert Snuneymuxw First Nation, Nanaimo Heiltsuk First Nation, Waglista FNNHC-Vancouver	
Pretty, Kathy Ravensdale, David Salomons, Kia Seo, Martina Silva, Geraldine Smith, Fran Sneddon, Jennifer Stephens, Jan St. Pierre, Cari Thomas, Owen Tilston, Cara Towers, Neil Turner, Nancy Wata White, Robert Whittaker, Colleen Willie, Lousia Wong, Al Wong, Brian	Carcross/Tagish First Nation, Carcross Student, University of British Columbia, Vancouver BC Hydro, Vancouver Health Canada, Ottawa Sechelt Band, Sechelt Université de Montréal, Montréal Snyneymuxw First Nation, Nanaimo Student, North Island College, Campbell River University of British Columbia, Vancouver University of Victoria, Victoria Kawatiul First Nation, Fort Rupert Snuneymuxw First Nation, Nanaimo Heiltsuk First Nation, Waglista FNNHC-Vancouver	
Pretty, KathyRavensdale, DavidSalomons, KiaSeo, MartinaSilva, GeraldineSmith, FranSneddon, JenniferStephens, JanSt. Pierre, CariThomas, OwenTilston, CaraTowers, NeilTurner, NancyWataWhite, RobertWhittaker, ColleenWillie, LousiaWong, AlWong, Christine	Carcross/Tagish First Nation, Carcross Student, University of British Columbia, Vancouver BC Hydro, Vancouver Health Canada, Ottawa Sechelt Band, Sechelt Université de Montréal, Montréal Snyneymuxw First Nation, Nanaimo Student, North Island College, Campbell River University of British Columbia, Vancouver University of Victoria, Victoria Kawatiul First Nation, Fort Rupert Snuneymuxw First Nation, Nanaimo Heiltsuk First Nation, Waglista FNNHC-Vancouver FNNHC-Vancouver	

Appendix II

Conference Menu

	Thursday, June 19, 2003	Friday, June 20, 2003
Morning	Haisla	Sto:Lo
Health	• Water (Kitamaat)	• Water (Sto:Lo)
Break	• Alder bark tea (Kitamaat)	• Devil's club tea (Sto:Lo)
Lunch	South Coast • Water (Kitamaat) • Ts'wan (St'at'imc) • Smoked salmon (Kwakiutl) • Dried seaweed (Kwakiutl)	 North and South Coast Water (Kitamaat) Prawns (Kitamaat) Clams (Cowichan) Salmon eggs (Kwakiutl)
Afternoon	Sto:Lo	Nuxalk
Health	• Water (Sto:Lo)	• Water (Nuxalk)
Break	• Soapberry drink (Sto:Lo)	• Pu7yaas tea (Nuxalk)
Dinner	South and North Coast • Water (Kitamaat) • Halibut (Kwakiutl) • Herring roe (Heiltsuk) • Ling Cod (Cowichan) • Seaweed (Heiltsuk) • Yalo (Sto:Lo) • Crabs (Cowichan) • Cockles (Kwakiutl)	 North and South Coast Water (Kitamaat) Spring salmon (Sto:Lo) Seaweed (Bella Bella) Clams (Kwakiutl) Oysters (Cowichan) Oolichan grease (Kitamaat and Kwakiutl) Tsk-tsk (Sto:Lo)
