ABSTRACTS: ORAL PRESENTATIONS

ASSESSMENT OF CONTAMINANT AND DIETARY NUTRIENT INTERACTIONS IN THE INUIT HEALTH SURVEY

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The Inuit Health Survey (IHS) provides a snapshot and baseline data on the health status of Inuit people across the North in Nunavut, Inuvialuit and Nunatsiavut. This project was developed as a component of HIS that would incorporate contaminants research within broader health research studies. We obtained funding support from the Northern Contaminant Program to measure the amount of environmental contaminants in the bodies of the participants, and to access the risks and benefits associated with the traditional food diet and the relationship between contaminants and health outcomes of the participants. Survey and sample collection was conducted in Nunavut on board the research icebreaker the CCGS Amundsen in 2007 and 2008. This was a participatory research study with full partnership between the Inuit organizations and the regional health departments. All necessary measures will be undertaken to increase the capacity of the communities and local health professionals. The key research question is, “How do the diets and contaminants affect the health of the Inuit?” Results of the study will provide useful information to assist health professionals and policymakers at the Territorial, national and international levels in developing environmental health policies and aid Inuit in making informed dietary choices. We will present an overview of the project and discuss the significance of the expected results in determining the well-being of the Inuit in the Canadian Arctic.

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MERCURY IN FISH AS A RESULT OF THE JAMES BAY HYDROELECTRIC DEVELOPMENT: PERCEPTIONS AND REALITIES

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The hydroelectric development scheme known as the La Grande Complex began in the 1970s in the James Bay region of Quebec, Canada. Because of flooding, pre-existing mercury associated with vegetation and soils was mobilized, biologically methylated and migrated through the aquatic food web. Mercury in some fish was above the existing Canadian and World Health Organization (WHO) fish consumption guidelines. Considerable debate, rancour and fear within and between the several stakeholders resulted in much publicity and several measures to monitor and mitigate the potential health risk of fish consumption.

Unlike many contaminants (e.g., DDT and PCBs), mercury is also naturally present in both the environment and the fish therein. Furthermore, mercury has a long and well-publicized history, with several catastrophic episodes of human poisoning from contaminated foods.

This case examines three important issues. First, knowledge of an elevated presence of mercury in fish in the James Bay Region, particularly in the reservoirs and diverted water courses of the La Grande Complex, may or may not have been the direct cause of the decreased use of the fisheries by the Cree, as other societal changes were occurring simultaneously. Second, irrespective of the cause for the decline in fish consumption, the avoidance of fish and thus mercury is attended with increased consumption of nutritionally inferior foods and decreased intakes of n-3 polyunsaturated fatty acids. Third, many of the traditional foods in the Arctic contain multiple potential toxicants. However, the fish in the James Bay Region predominately contain only mercury and fish is virtually the only source of mercury in humans; thus, this case is much.
simpler than multiple contaminants in multiple foods as occurs in much of the circumpolar North. This case emphasizes a holistic view of the potential risk of mercury exposure versus the real risks in avoidance of fish.

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CONTAMINANTS, HEALTH AND EFFECTIVE RISK ASSESSMENT AND COMMUNICATION IN THE CIRCUMPOLAR NORTH

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There is growing recognition of the importance of Indigenous knowledge and the incorporation of Indigenous perspectives and perceptions in environment and health research today. There have been certain challenges when assessing and communicating environmental health risk information with northern communities in the past due to an incomplete understanding of how the information would be viewed by Indigenous communities. Differences in culture, language, the politicization of information and cross-cultural misunderstandings can all act to undermine the best intentions of health and environment professionals. While there has been an increasing awareness of these difficulties, this has not necessarily translated into more effective action taken to address these challenges. There is little research showing how environment and health benefit-risk assessment and communication have been developed at the local level in communities, what things have been affecting this process or evaluation of the success of such efforts to date. A CIHR-funded circumpolar review will conduct case study reviews on the topics of Indigenous environmental health benefit-risk assessment and communication associated with contaminant exposure through traditional food consumption in one community of each of the following regions: Yukon, Alaska, Greenland and the Russian North. It is hypothesized that common key factors at the individual and community scale influence the success (as measured by community reception, retention, comprehension, compliance to messages and perception of issues) of risk assessment and communication events related to contaminants, country foods and health in circumpolar Inuit communities. As well, identifying and understanding these common factors can improve the assessment and communication of health risks and benefits for environmental health issues in Arctic regions.

This project also includes a master's thesis subproject that asks the question: What are the current and possible contributions of Indigenous knowledge to environmental health benefit-risk management processes in northern Indigenous communities? The thesis research will focus on understanding how perceptions, assessment and communication of benefits and risks associated with food safety issues are and can be enriched by the involvement of Indigenous knowledge and perspectives (e.g., exposure to long-range transport contaminants through traditional diet).

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FOOD SECURITY REFERENCE GROUP: BUILDING THE EVIDENCE TO SUPPORT DECISION-MAKING AT POLICY AND COMMUNITY PLANNING LEVELS AND IMPROVE FOOD SECURITY FOR FIRST NATIONS AND INUIT

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Available data demonstrate that food insecurity is much higher among Aboriginal populations than non-Aboriginal populations in Canada, and is of particular concern in northern and isolated communities. To date, there has been little conceptualization of what food security might mean for First Nations and Inuit, and little consideration of what policies or practices might enable the achievement of this important social determinant of health.

To help address these needs, the Food Security Reference Group (FSRG) was established in 2005. The FSRG brings together Inuit Tapiriit Kanatami, the Assembly of First Nations, the federal government, academics and others for the purposes of sharing information, discussing strategies and opportunities and setting priorities for collective action to improve food security in First Nations and Inuit communities.

Achievements of the FSRG include a compre-
hensive literature review and an evidence-based interventions framework, and review and documentation of community-based initiatives. These outputs have helped to better define food security issues for First Nations and Inuit, highlight policy and research gaps and conceptualize how food security can be promoted in First Nations and Inuit communities.

Future directions of the FSRG include identifying opportunities for advancing food security at both policy and community planning levels through positioning and building on the tools developed and information gathered by the FSRG, and continuing to build the evidence to support decision-making at these levels.

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COMMUNICATION PATHWAYS: HOW YOUNG INUIT WOMEN IN NUNATSIAVUT GET INFORMATION ON NUTRITION, HEALTH AND ENVIRONMENTAL CONTAMINANTS

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Inuit are sustained by the animals, birds, plants and fish of their region. Research has shown that Inuit are exposed to contaminants via their traditional diet of these wild foods. Contaminants (chemicals/compounds related to global industrial and agricultural activities) are present in the local ecosystem and food web, eventually being consumed by humans. Based on our current understanding, humans in developmental phases (prenatal and neonatal) are at greatest risk from this exposure; any developmental anomalies may have significant long-term impacts on health. This means that women who are in their child-bearing years are vulnerable to contaminants.

The levels of contaminants in wild food and the potential health effects they may have are of concern to Inuit. These concerns threaten confidence in the safety and value of wild food and affects food security. Meanwhile, social and cultural benefits associated with a traditional diet and related activities are important to the fabric of community life. Therefore, it is vital that communication about the risks of contaminant exposure be accurate, while recognizing the possibility of unnecessarily raising fears. Poor risk communication has been linked to confusion, mistrust and in some cases negative changes in diet behaviour.

This study reviewed risk communication networks in Nunatsiavut for the dissemination of information related to contaminants exposure through traditional food consumption. Key informant interviews, focus groups and document review were used to identify existing communication pathways (formal and informal) delivering this information. Focus groups were carried out with young women to learn about their experience of the communication process around health and nutrition.

This research will inform new strategies for communicating about health priorities with Inuit communities, so that Inuit can make informed and balanced decisions that can positively influence their health. The results are of interest to other circumpolar communities who are facing similar health communication challenges.

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LEVELS OF ARSENIC, CADMIUM, LEAD, MERCURY, SELENIUM AND ZINC IN VARIOUS TISSUES OF MOOSE HARVESTED IN THE DEHCHO, NORTHWEST TERRITORIES

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Moose is an important traditional food for residents of the Dehcho who want to know what the contaminant levels are in the country foods they consume. As part of moose monitoring program involving local First Nations, between 1 September 2004 and 31 March 2007 we collected a tooth, one kidney and a sample of liver from moose (n=46) harvested by local residents and teeth (n=17), kidney (n=18), liver (n=13) and muscle (n=7) samples from moose taken by sport hunters in the southern Mackenzie Mountains. We measured the levels of arsenic, cadmium, lead, mercury, selenium and zinc in the tissue samples; teeth were used to determine animal age. Levels of cadmium, mercury and zinc were higher in moose harvested from the southern Mackenzie...
Mountains. In contrast, levels of arsenic were lower in moose harvested from the southern Mackenzie Mountains. For moose harvested in the southern Mackenzie Mountains the mean level of cadmium in kidneys was 222.5 mg/g (wet wt) and for livers 30.9 mg/g (wet wt). In contrast, for moose harvested in the Mackenzie and Liard River drainages, the mean level of cadmium in the kidneys and livers was 26.8 and 2.7 µg/g (wet wt), respectively. These findings resulted in a public health advisory for the consumption of moose organs. Levels of cadmium in the muscle (0.1 mg/g, wet wt) and levels for all other elements were similar to those reported elsewhere and were not of a human health concern. There was a positive relationship of cadmium and zinc levels in moose organs with moose age. Bioaccumulation of cadmium by willows in areas with high naturally occurring geologic sources of cadmium is a likely hypothesis for the high renal cadmium levels reported in moose harvested in the southern Mackenzie Mountains.

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THE INFLUENCE OF PSYCHOSOCIAL FACTORS ON FOOD-RELATED BEHAVIOURS AMONG INUIT COMMUNITIES IN NUNAVUT: RESULTS FROM HEALTHY FOODS NORTH

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Objective: To describe the food acquisition and preparation behaviours of the Inuit, and to address the gap in research on the psychosocial factors affecting these behaviours.

Setting: Three remote communities in the Arctic region of Nunavut, which vary in terms of size, isolation and access to traditional foods.

Methods: Cross-sectional random household surveys were conducted among Inuit adults. Descriptive statistics were generated for sociodemographic, psychosocial (i.e., food knowledge, self-efficacy and intentions), and behavioural (i.e., healthy food-getting, unhealthy food-getting and healthiness of food preparation) dependent and independent variables. Their associations were analysed using multivariate linear regression in Stata.

Results: The response rate was approximately 70%–90%. Among the 261 participants (aged 19–89 years), unhealthy foods (e.g., potato chips, pop) were obtained two to three times more frequently than healthier foods. Neutral cooking methods and those adding fat were more frequently used than healthier methods that reduced fat content. Food intention was the psychosocial factor most significantly associated with the food behaviours. Intention was negatively correlated with healthiness of food preparation methods (-0.95, p<0.05) and unhealthy food-getting (-0.25, p<0.001), and positively associated with healthy food-getting (0.23, p<0.001). Higher levels of food knowledge and self-efficacy were associated with greater intentions (0.24, p<0.001, and 0.5, p<0.001), respectively.

Conclusions: These results fill the research gap on the impact of psychosocial factors on food acquisition and preparation among Nunavut Inuit. By incorporating food knowledge, self-efficacy, and intentions into its nutrition educational activities, the community-based Healthy Foods North (HFN) program will positively impact the food acquisition and preparation behaviours of Inuit.

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A COMMUNITY BASED INITIATIVE TOWARDS A SUSTAINABLE FOOD SECURITY STRATEGY FOR THE COMMUNITY OF OLD CROW, YUKON

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In this presentation we will describe the challenges the community of Old Crow are facing in relation to “Our Changing Homelands, Our Changing Lives.” Old Crow is the northernmost community in the Yukon, with a population of 280, of which 90%–95% are Vuntut Gwitchin First Nation citizens. It is a small village situated 130 km above the Arctic Circle, home to the Vuntut
Gwichin people, which in the Gwichin language means “People of the Lakes.” The Gwichin life and culture have traditionally been based on the Porcupine Caribou herd, the people’s main source of food, tools and clothing. Fish and other animals have supplemented their diet in nutritionally and traditionally important ways. This life is changing every day before their very eyes. The mainstay of their traditional diet - the caribou and the salmon - are rapidly declining in numbers. The cost of living is extremely high as there are no roads to Old Crow, so all supplies must be flown in year round. Changes to the land and water are taking their toll on the very existence of the Gwichin people. The environment that the people travelled on, the waterways and the land have changed quite drastically in a very few years. This research is linked to health in the most fundamental way – without sustainable and adequate nutrition, the Vuntut Gwichin will not survive. The primary research question is, How will the Vuntut Gwichin people of Old Crow adapt their food security strategies to maintain their health in the face of declining traditional food species resulting from climate change?

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WHAT DOES “FOOD SECURITY” MEAN TO INUIT? INPUT INTO AN INUIT STRATEGY FOR INUIT OF NUNAAT

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It is generally accepted that the term “food security” means, in the simplest terms, “access to nutritious food.” Inuit health and well-being are directly linked to food security and, in particular, to their relationship to customary “country food”: community sharing, cultural continuity, intergenerational communication. References in the media relate food (in)security to war and mass-migration that result from political unrest. Meanwhile, many Inuit face pervasive, systemic food insecurity within Canada.

In Inuit Nunavut (“Inuit Homeland”), the increasing widespread impacts of climate change, concern over environmental contaminants and changing socio-economic conditions have all had a tremendous effect on the ability of Inuit to access fresh and nutritious foods. Procuring country foods has become costly (money is required for vehicles, fuel, guns, ammunition) and the seasonal hunting cycle is not reflective of work schedules and schooling. Meanwhile, food purchased at stores is also increasingly costly in the Arctic and can often be of poor quality and nutritional value. The impact of climate change on country food sources (e.g., changes in migration/birthing patterns of animals; instability of ice for travel) has been identified as a priority by Inuit.

Food security encompasses many aspects of well-being in Inuit Nunavut, and therefore discussions on this topic cannot disregard the interconnectedness of environment and health, as well as culture, custom and local economics. Inuit Tapiriit Kanatami (ITK), Canada’s national Inuit organization, has a unique opportunity to encourage the dialogue on food security in this broader context. The presentation will include a summary of the upcoming strategy on food security, based on input from the Inuit regions of Inuvialuit, Nunavut, Nunavik and Nunatsiavut. The Food Security Team of ITK in partnership with representatives from communities in Inuit Nunavut will share their direct experiences of how food security relates to them.

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FROM SURVIVAL TO NECESSITY: FOOD STORIES FROM THREE GENERATIONS OF LABRADOR INUIT-MÉTIS

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Research Question: This qualitative study posed the question: How do people who live in one Labrador Inuit-Métis community experience and understand their relationships to food in the context of global change?

Objective: This presentation explores the influence of socio-economic, political and environmental changes on the transmission of generational knowledge surrounding traditional foods in one Labrador Inuit-Métis community.

Methods: Using an ethnographic approach, this study collected stories and photographs from three generations of men and women in one Labrador Inuit-Métis community. A total of 10
one-on-one interviews, 7 two-person interviews and 1 focus group session were conducted with 24 community members during the winter of 2008.

Findings: The means through which food is obtained has changed dramatically over the course of three generations of people who live in one Labrador Inuit-Métis community. Where once a generation relied entirely upon their natural surroundings for survival, today, the activities associated with procuring foods remain a vital part of the local culture, but the means to continue these activities are becoming reliant upon a market economy. This presentation explores the way that knowledge about foods is passed on to younger generations when they no longer have the same relationship with their natural surroundings as their parents and grandparents once did.

Conclusions: Ultimately, food has always, and will continue to be, necessary for survival. As such, the knowledge about food-related activities held by older generations of Labrador Inuit-Métis is vital for understanding local ecologies in which foods are procured. Maintaining and strengthening the transmission of generational knowledge related to food ensures that future generations remain connected to, and respectful of, their natural surroundings. The challenge is to respect and understand the different ways in which younger generations are interacting with their natural surroundings, while continuing to strengthen and build upon the understandings of older generations.

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INDIGENOUS PEOPLES’ FOOD SYSTEMS FOR HEALTH: THREE CANADIAN INUIT AND FIRST NATIONS PROJECTS

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Dr. Harriet Kuhnlein, founding director of CINE, and Chief Bill Erasmus have led a project on Indigenous peoples’ food systems for health for 12 Indigenous peoples from as far away as Japan, Thailand, India, Pohnpepi, two African locations, Peru and Columbia to here in Canada: Gwichin in the Northwest Territories; Nuxalk Nation in British Columbia; and Inuit in Pangnirtung, Nunavut.

Research in each Indigenous community area has an academic partner and community leader partners who act as principal investigators. We have matched the scientific work and the Indigenous peoples’ traditional knowledge on foods of our ancestors.

We have been fortunate to have had funding that brought us together once a year to present and address our respective projects and to discuss how we can link the work to policies and further create templates for intervention.

With Dr. Harriet Kuhnlein introducing the background project, Chief Bill Erasmus will present on the Fort MacPherson project in the NWT with the Gwichin, Bill Tallio will present on the Nuxalk Nation project and, Loee Okalik on the Baffin Island Inuit project – all in relation to Indigenous peoples’ food systems and health promotion.

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ORAL HISTORY CONTRIBUTIONS TO UNDERSTANDING FOOD SECURITY TRENDS AND ADAPTATIONS: VUNTUT GWITCHIN FIRST NATION, YUKON, CANADA

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Climate change has been recognized as a key driver behind a decrease in traditional food security for members of the Vuntut Gwitchin First Nation (VGFN) whose subsistence is largely dependent on their close relationship with the land and, in particular, the Porcupine Caribou herd. Northern environmental systems have always been dynamic and Aboriginal populations have shown a consistent ability to adapt. However, the increasing rate of climate change and the projected extent of impacts both challenge these abilities and require concerted adaptation efforts to strengthen traditional food systems in times of high uncertainty. Drawing on oral history provides insight into the resilient nature of Aboriginal populations, illuminating past adaptation strategies and existing cultural assets. This study examines how the adaptability of VGFN members to changing food
security has evolved over the past century in the northern Yukon by analysing key historical relationships between land, food, climate and adaptation. Methods include a qualitative analysis of oral history transcripts recorded since the 1970s, which form part of a database maintained and updated by the VGFN Heritage Branch in Old Crow, Yukon. A subset of interviews was selected for analysis based on the density of keywords relevant to food security as identified in the database index. Results provide insight into the factors that have challenged food security for community members in the past (most specifically relating to food availability) and human adaptation strategies used to respond to food shortages. Existing cultural assets that support adaptive capacity are also identified. In combination with other IPY research results relating to food security and wildlife trends, this work provides a foundation upon which to forecast possible response strategies and identify important cultural assets for strengthening adaptive capacity in the face of future change.

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PROMOTING HEALTHIER FOOD OPTIONS IN CONJUNCTION WITH HEALTH FOODS NORTH: A RETAIL PERSPECTIVE

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Objective: To measure the impact of Healthy Foods North (HFN) on consumer purchasing patterns in select North West Company (NWC) stores.

Background: Increasing consumption of healthier food options is an integral part of influencing positive health outcomes for Indigenous populations in Northern Canada. The NWC, operating under the North Mart and Northern banners, is a key retailer supplying goods to remote communities in Canada. NWC’s corporate Healthy Living (HL) team, consisting of a dietitian and pharmacist, partnered with HFN to provide support of the retail-based component of the intervention. The support provided by the team included: program planning, logistical and operational support, marketing resources and program evaluation assistance.

Setting: Two Northern and North Mart Grocery stores located in the NWT and Nunavut.

Methods: Consumption of targeted food products and ease of program implementation was measured in the four HFN program communities and two delayed intervention communities. An internal database system was used to compile quantitative purchase data on the specific products offered during the seven intervention phases. Direct observation reports from HFN interventionists coupled with an online survey on program execution in the stores will be completed by NWC management and staff.

Results: It is anticipated that the presence of HFN in NWC stores will have a positive impact on the promoted items, with repeated items demonstrating greater impact. Results from the online survey will provide insight on operational execution of HFN in NWC stores.

Conclusions: Implications of these findings will be used to demonstrate the importance of cross-institutional partnerships in influencing dietary changes in the North. Holistically, these partnerships have the synergistic ability to improve the impact and execution of community-based programs such as Healthy Foods North.

Acknowledgements: We would like to thank the North West Marketing Department, the North West local store managers for their cooperation and, mostly, the Healthy Foods North team for making this intervention a reality.

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BUILDING CULTURAL PRIDE WITH TRADITIONAL FOODS (VIDEO)

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This is a film of Dene elders from the Yellowknives Dene and the Tlicho region cooking with educators from many of the regions of the Northwest Territories in Canada. The elders are sharing their knowledge about getting wild game and preparing it for eating in the Ecole Sir John Franklin High School Foods’ lab. This was filmed during the Northwest Territories Educators’ conference held in Yellowknife, 16–18 February 2009.

One of the elders, Muriel Betsina, teaches
the participants how her father cooked caribou head and we see the process from the beginning, preparing the head for the oven to carving the cooked head and eating it. Muriel also demonstrates different methods of cleaning fish: loch (freshwater cod) and whitefish, two fish that are harvested in Great Slave Lake in the Northwest Territories. She demonstrates the cleaning and gutting method for drying fish by hanging them on sticks or from lines during the early summer. Joyce Caines is the nutrition educator for the event and she informs the discussion with the nutrient value of some of the game and some of the market food additions used in the cooking methods.

This was filmed by two students from École Sir John Franklin High school, Tyler Heale and Matthew Fournier.

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FACTORs INFLUENCING DIET AND THE FOOD ENVIRONMENT IN TWO INUIT COMMUNITIES IN NUNAVUT: QUALITATIVE FORMATIVE RESEARCH RESULTS FROM HEALTHY FOODS NORTH

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Objective: To explore multiple community perspectives on the barriers and enhancing factors affecting food procurement and food stocking in stores for Inuit populations of Nunavut, which could be targeted by Healthy Foods North, a community-based nutritional intervention program.

Setting: Two remote Inuit communities in the Arctic region of Nunavut.

Methods: Observational data were collected, and semi-structured in-depth interviews were conducted with Inuit adults representing key people in the communities. The data were analysed using the qualitative statistical software program N6 QSR NUD*IST.

Results: Forty-five Inuit participants (29 from community A, 16 from community B) were interviewed. Traditional “country” foods acquired through harvesting were considered the healthiest by community members, but multiple factors inhibited their procurement, including high cost of gas and loss of traditional knowledge. The main barriers perceived by community members to purchasing healthy foods at the stores included expense and quality. The community leaders and health staff identified multiple barriers to eating healthy in the community, such as lack of skills to prepare store-bought foods. Store managers identified several challenges to providing fresh produce and other foods, such as long transportation and arctic temperatures. They also cited factors influencing their decisions to stock and discontinue stocking foods, such as customer request and media promotion of foods.

Conclusions: Several factors inhibit healthy eating for Inuit populations living in remote communities as identified by multiple community stakeholders. To ensure effectiveness and sustainability, Healthy Foods North will address these factors, as well as utilize those factors that promote healthy food acquisition and consumption.

Acknowledgements: The research was supported by the American Diabetes Association Clinical Research Award Grant # 1-08-CR-57.

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CLIMATE CHANGE IMPACTS AND ADAPTATION: IMPLICATIONS FOR DIET AND HEALTH IN TWO FIRST NATION COMMUNITIES IN THE YUKON, CANADA

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Northern Aboriginal communities are particularly vulnerable to climate change because of their reliance on traditional food. Climate change can affect food security by influencing species distribution, population abundance, morphology, behaviour and community structure of animal and plant species. Studying the effects of climate change in the North on Aboriginal peoples’ ability to locate and procure physically, socially, spiritually, mentally and economically important food sources is critical.

This project aims to determine if there have been changes to diet and health as a result of climate change and, if so, what strategies have people used to adapt to these changes. Four focus
The territory of Nunavut has the highest incidence of food insecurity in Canada, where over 50% of Inuit households are believed to experience difficulties in obtaining sufficient food. This significantly exceeds the Canadian average of 9.2%. Food insecurity is manifest when food systems are stressed such that adequate nutrition is not accessible, available and/or of sufficient quality. Several studies have reported food systems to be negatively affected by economic, social and cultural transformation and climate change. Inuit women have been identified to be particularly vulnerable to food insecurity and more at risk to climate change. Food insecurity can have serious implications for women’s physical and mental health and social well-being, resulting in increased susceptibility to infection and chronic health afflictions. This paper explores ways in which a rapidly changing climate in the High Arctic impacts the food security of Inuit females in the community of Igloolik, Nunavut. Using a community participatory research approach, various determinants of food security were identified, and the role of current and future climate change was assessed. Over 30 Inuit women from the community of Igloolik, Nunavut, were interviewed. Health professionals, hamlet representatives, store managers and local organization members were also interviewed to get different perspectives on this complex and multidisciplinary problematic. Preliminary results highlight multilevel interactions between biophysical and human determinants of food security, with multiple stresses interacting to create acute food insecurity among certain community members. The identification of pathways through which climate affects female food insecurity in the context of other stresses is particularly important for policy responses to strengthen Inuit food security.

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INUIT WOMEN AND CLIMATE CHANGE

Pauktuutit Inuit Women of Canada
Canada

Pauktuutit Inuit Women of Canada facilitated a dialogue with Inuit women from across Inuit Nunavut about how climate change is affecting their lives. This gathering, held in Iqaluit, Nunavut, in March 2009, created an opportunity for Inuit women from all regions to share their insights and stories about how their lives have been impacted. The discussions were also intended to develop research questions on gender and climate change in the Canadian Arctic for further in-depth examination. This presentation will include major issues and research questions that were identified by the participants such as the impacts of climate change on food security, gender roles, traditional knowledge and activities such as harvesting and clothing production, as well as recommendations for future actions.

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PREVALENCE AND DETERMINANTS OF FOOD SECURITY AMONG INUIT HOUSEHOLDS WITH PRESCHOOL AGED CHILDREN

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A high prevalence of food insecurity has been noted in the few Arctic communities which have participated in a food security assessment raising concerns regarding the prevalence of food security throughout the Arctic where unemployment rates and market food costs are extremely high. Therefore, the prevalence and determinants of food security was assessed using the child component of the IPY Inuit Health Survey.

The child survey was a cross-sectional survey of preschool children, aged 3–5 years, recruited through local health centre vaccination lists. A total of 383 Inuit children and their parents/guardians from 16 Nunavut communities participated in the survey between August 2007 and September 2008. Bilingual and trained interviewers conducted interviews with the child’s caregiver and completed questionnaires about the child’s diet, health history, household conditions and food security. Food security was assessed using a USDA questionnaire that had been slightly modified by Indian and Northern Affairs Canada through consultation with Inuit community members. Correlates of food insecurity evaluated included household crowding, age and gender distribution of household members, social assistance and other socioeconomic indicators, access to and consumption of traditional food, region, and measures of child growth.

Results are embargoed until presentation to communities is completed in May of 2009. Full details of results will be provided at the ICCH. The data highlight the prevalence of food insecurity for Arctic households with young children and provide meaningful information on the risk factors for food insecurity in Arctic communities.

HEALTH BELIEFS AND DIETARY COMPOSITION AMONG INUIT LIVING IN NUNAVUT, CANADA

Healthy Environments and Consumer Safety Branch, Health Canada

Health professionals are challenged to provide culturally appropriate and relevant dietary advice in response to a number of environmental changes from climate change to environmental contaminants in traditional foods. In order to provide culturally relevant and effective dietary advice, health professionals must have the best available data. The objective of this paper is to examine the relationship between health beliefs and diet selection. In-depth semi-structured interviews (n=101) were conducted with residents of Nunavut. The results of this study show that the consumption of a traditional diet as well as the process associated with harvesting traditional food are integral to the Inuit concept of health and well-being. Access was identified as the major barrier to traditional food consumption. The results of this research complement existing studies and could be integrated to develop more effective dietary advice and health promotion activities for people living in Arctic Canada.

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IS HEAT A MORTALITY RISK IN THE CANADIAN ARCTIC? WILL IT BE?

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While heat waves have been recognized as a significant risk to life in warm and even temperate climates, the effect of heat on the health of northern residents has been shown only recently. In Moscow, a V-shaped function applies when the daily temperature is plotted against the level of daily deaths, with the each of the “V’s” notches at 18°C. Similar mortality nadirs have been shown for Finland and Stockholm as well, but at 12°C and 11°C, respectively. Large temperature
shifts during the day present an independent risk factor in the Moscow analyses.

Heat-mortality functions have been constructed for several Canadian cities: stronger effects have been shown for the elderly, for high temperatures occurring earlier during the summer and for built-up areas offering less shade. So far, no such analyses have been conducted for northern Canadian settlements.

Temperature-mortality relationships for Prince George, BC, will be presented, based on a time series dating from 1087 to 2007, along with similar analyses for Yellowknife and Whitehorse, given data availability.

Pan-European studies have modelled the effect of a warmer climate on the basis of documented population responses to summers warmer than the mean. Coupling these mortality responses with climate change model predictions will allow for estimation of heat-related mortality in northern settlements should warming continue to follow its current rapid course.

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CLIMATE CHANGE IMPACT ON PUBLIC HEALTH IN THE RUSSIAN ARCTIC:
FIRST ASSESSMENT

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Negative impacts of climate change for public health in the Arctic region are more pronounced than in other territories. A UN Arctic initiative, with the support of UNDP, WHO, UNEP and AMAP, organized the first meeting of experts for analysis of this problem in 2008. Russian Arctic (RA) supports more inhabitants (6.7 million people) than any other Arctic territory. There are 46 cities and rural settlements, large metallurgy plants, mines and other industrial facilities in the Russian Arctic, which is characterized by large social and economic disparities. Most climate change models predict considerable warming of the Arctic climate. For example, air temperature in Yakutia may rise by 2.7°C by 2020. Climate warming will bring about a rise in the temperature of the permafrost, which may lead to major breakdowns of water mains and sanitation networks. This, in turn, may cause outbreaks of enteric fevers. Breaks along oil pipelines will cause contamination of drinking water supplies (Kochina, Kushnikova, 2008). Climate warming will cause the habitats of tick-borne encephalitis to move northwards. The activity periods of ticks will become longer. One study reported a causal link between climate change and the number of ticks in the Krasnoyarsk Region. The incidence of tick-borne encephalitis has increased in the Archangelsk Region. When the annual average temperature increases by 1.5 °C or more, the number of people bitten by ticks sharply increases (Tronin et al., 2008). Hemorrhagic fevers steadily propagate further north. Isolated cases of West Nile fever have been registered in the Novosibirsk Region (Platonova et al., 2006). Climate warming is a risk factor for the proliferation of dangerous infections, which previously did not exist in the Russian Arctic. There are more than 200 burial grounds for cattle that died from the Siberian plague in the Yakutia Republic, where the disease has been registered in 240 settlements (Kershengoltz et al., 2008). There are potential pockets of tularemia, leptospirosis, listeriosis and pseudotuberculosis in the Russian Arctic. Coordinated efforts of experts in different fields of science are needed during the development of programs to prevent the negative effects of climate change from harming public health in the Russian Arctic.

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CLIMATE CHANGE IMPACT ON HUMAN EXPOSURE TO PERSISTENT CONTAMINANTS IN ARCTIC RUSSIA

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Two-thirds of Russia's territory is represented by permafrost lands populated by 11 million residents. About 0.5% of those formally belong to Indigenous minorities. Over 20% of Russia's GNP is provided by the economy of Arctic regions based on enormous concentration of unique natural resources. Some past mining, industrial and transport activities were associated with large environmental pollutions involving persistent contaminants. Although the presence of elevated
human exposure to POPs in the Arctic regions are confirmed by many international studies, the ecotoxicological and consequences, especially those associated with climate change impact, still remain largely unknown. Human reproduction appears to be of greater concern in terms of the exposure to certain contaminants such as PCBs.

There are a number of urgent questions to be clarified: How large is the climate change impact on global transfer, behaviour, fate, distribution, exposure intensity and health effects of POPs? How significant is such impact? What should be done to reduce risks associated with the climatically modified human exposure to POPs?

A limited follow-up study of an Arctic indigenous cohort of 30 mother-child pairs and 30 male adults for the period 2001 to 2007 showed that there is a statistically significant decrease in blood concentrations of those persistent contaminants coming into the Arctic mostly through global transfers of DDT, HCH, chlordane, toxiphens and mirex. At the same time, an obvious increase in levels of contaminants presumably originated from local sources such as PCBs is observed among children and men. Enhancement of surface/air exchange, altered contaminant fractionation, corrosion of metallic containers/drums/tanks leading to accelerated mobilization of contaminants from wastes buried in permafrost lands are discussed as contributing factors to increased human exposure associated with climate change.

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SEASONAL VARIATIONS OF MORTALITY FROM CLIMATE-RELATED CAUSES IN ARCTIC CITIES

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Climate change may influence mortality rates in the Arctic in many different ways. Public health experts have hypothesized that mortality from climate-related causes might both increase and decrease. To test these hypotheses, one needs to conduct a preliminary exploratory analysis of seasonal patterns of morality rates. For this purpose, we analysed 76,500 deaths in four cities in the Russian Arctic, from the Norwegian border (Murmansk) to West Siberia (Norilsk) and East Siberia (Yakutsk and Magadan). We analysed several cardio-respiratory causes and all-cause mortality, in the age groups 30–64 years and 65+. Seasonal variations were measured after smoothing of daily mortality counts with a 60-day window. For example, in Yakutsk, seasonal variations of daily mortality have been established for all causes, except respiratory diseases in the age group 65+. Two principally different annual distributions of mortality were established: single-modal and bimodal. A single-modal distribution (established for the two respiratory causes) has a smooth profile which consists of the two sinusoidal half-waves. The half-wave of elevated mortality lasts from September to January, and annual maximum of daily mortality is observed in the beginning of autumn, instead of mid-winter. The half-period of reduced mortality is observed from February till August, and daily mortality reaches its minimum in the middle of summer. Bimodal distribution (established for all other studied causes) has two maximums and two minimums each year. The greater maximum is observed in late summer or early fall; the secondary maximum takes place in winter. Such peaks coincide with summer and winter temperature extremes in Yakutsk. The greater maximum in the age group 65+ precedes the same maximum in the age group 30–64, by one or two months.

We are planning to use regression analysis of a time-series of daily mortality to quantify its relationships with meteorological factors.

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THE HEALTH OF ARCTIC POPULATIONS:
DOES COLD MATTER?

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Background: The effects of cold on human health and performance is well documented. With climate change increasingly affecting the Arctic, the association between climate and population health status in Arctic regions is of public health significance.

Objective: To examine whether cold temperatures are associated with poorer health in diverse Arctic populations.

Methods: Mean January and July temperatures were determined for 27 Arctic regions based on weather station data for the period 1961–1990 and their association with a variety of health outcomes assessed by correlation and multiple linear regression analyses.

Results: The mean January temperature was inversely associated with infant and perinatal mortality rate, age-standardized mortality rate from respiratory diseases and age-specific fertility rate for teens and directly associated with life expectancy at birth in both males and females, independent of a variety of socio-economic, demographic and health care factors. The mean July temperature was also associated with infant mortality and mortality from respiratory diseases, and with total fertility rate.

Conclusions: Cold temperatures are significantly associated with higher mortality and fertility of Arctic populations and should be recognized in public health planning and health-risk management.

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PEOPLE DO NOT EAT N-3 FATTY ACIDS, THEY EAT MEALS

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Introduction: In studies of the effects of diet on cardiovascular disease and diabetes among the Inuit, there has for years been a tendency to reduce the variation paradigm of Inuit diets to a simple question of more or less intake of marine fatty acids. This approach somewhat arbitrarily focuses on the role of n-3 fatty acids and does not sufficiently acknowledge the fact that a traditional food pattern is composed of many nutrients with specific effects on cardiovascular health and diabetes. Food patterns are also associated with many non-dietary risk factors.

Design: In a cross-sectional design, we studied diet and risk factors for cardiovascular disease and diabetes among 2,247 Inuit in Greenland. From a 67-item Food Frequency Questionnaire, six dietary patterns were identified by factor and cluster analysis. The intake of n-3 fatty acids, saturated fat, fruit, vegetables, alcohol, sugar, fibers and glycemic load was computed. Non-dietary risk factors included obesity, physical activity, hypertension, smoking, socio-economic position and Inuit ancestry. Associations were analysed in General Linear Models and logistic regression adjusted for age and sex.

Results: The six dietary patterns comprised two patterns with significant shares of traditional food (n=548) and four patterns with predominantly imported food (n=1485). All dietary and non-dietary risk factors, except hypertension, differed significantly among the six dietary groups (p<0.001 to 0.01). A traditional diet differed significantly from an imported diet with respect to the intake of n-3 fatty acids, fruit, vegetables, dietary fibers, sugar and glycemic load. A traditional diet was furthermore associated with a high level of physical activity, high prevalence of smoking, poverty and Inuit ancestry.

Conclusions: Some risk factors associated with a traditional diet reduce and some increase the risk for cardiovascular disease and diabetes. Epidemiological studies of the association of diet
with cardiovascular disease and diabetes among the Inuit must take the complexities of the diet and the confounding by non-dietary risk factors into consideration.

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DETERMINANTS OF CHANGE IN FAT CONSUMPTION PATTERNS IN NAIN, NEWFOUNDLAND

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Inuit communities are reporting changes in individual attitudes towards traditional fats and contemporary fats. Given the potential health effects of these changes, a better understanding of how choices are made is needed.

This study is investigating the changing nature of perspectives on traditional and contemporary fats and the impacts of these perspectives on diet and other behaviours among Inuit in one community of the Nunatsiavut Settlement area, Canada.

This research project supports the role of Inuit health organizations in providing information and nutrition education tailored to local needs and preferences, on matters of food, nutrition and health. This project is being conducted in collaboration with the Nunatsiavut government under the IPY funded project on marine fats and Inuit health: UROSUK.

The project aims to develop and apply a survey tool to increase our understanding of fat choice behaviour and to determine what Inuit residents believe is necessary and possible to ensure food security for future generations.

To build this tool, in July 2008, 9 focus groups were conducted with participants 14–70 years of age (23 women, 26 men). Of these, 78% participated in harvesting activities.

Preliminary results indicate that participants have noticed changes in fat thickness in country food species over time. Observations were primarily associated with caribou and birds. Differences in thickness of seal fat were attributed to seasonal changes and, possibly, climate variations. Contrary to our preliminary hypothesis, it is not only among younger participants that behaviours to cut down or stay away from “fat” in the diet were mentioned but also and even more so among participants 30 years and older. Furthermore, participants reported that fat was cut off from store foods but very rarely from country foods. Based on these results, a quantitative survey is being developed to investigate the representation of these perspectives among the community population in 2009.

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THE ASSESSMENT OF BONE MINERAL DENSITY, CALCIUM AND VITAMIN D INTAKE AND EXPOSURE IN BRITISH ANTARCTIC SURVEY PERSONNEL

The British Antarctic Survey & SCAR Expert Group

In order to maintain correct bone mineralization, adequate amounts of vitamin D, calcium and exercise are required. Although vitamin D can be found in food products such as oily fish, the primary source of our intake is from sun exposure (photoactivation). It is estimated that worldwide a billion people are vitamin D deficient, where latitude and subsequent sun exposure are playing a significant role in the epidemiology of this problem.

In order to establish how reduced sun exposure is affecting the bone mineral density (BMD) of healthy individuals, this research will look at healthy personnel based in the sun-deprived continent of Antarctica in the winter months, and compare the subsequent BMD loss incurred against a healthy UK-based control group. Vitamin D deficiency as a result of a lack of sun exposure has never been studied in British Antarctic Survey (BAS) personnel before. The possible health implications for such a deficiency are potentially huge.

Antarctica is a unique environment, where fit and healthy medically screened BAS employees spend up to two years on the continent. Their exposure to UVB radiation as well as their diet and exercise levels will be monitored. Blood tests assessing bone turnover markers will be taken every three months. Furthermore, DXA bone scans will be undertaken prior to leaving, and on their return from Antarctica, allowing the effects...
of a low vitamin D status on BMD to be assessed. This group can therefore provide valuable information regarding the extent to which latitude and sun exposure are truly influencing vitamin D status.

It is hoped that the International Congress on Circumpolar Health will provide a forum to discuss the possibility of running parallel studies in the Arctic, where the BMD of people residing at high northern latitudes can be assessed alongside those in Antarctica.

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AN ASSESSMENT OF DIETARY INTAKE IN AN INUVIALUIT POPULATION TO HIGHLIGHT FOODS FOR A NUTRITIONAL INTERVENTION PROGRAM TO IMPROVE DIETARY INTAKE: RESULTS FROM HEALTH FOODS NORTH

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Objectives: (1) To characterize food and nutrient intake; (2) to highlight foods for a nutritional intervention program; and (3) to develop a Quantitative Food Frequency Questionnaire (QFFQ) to evaluate the program and monitor nutrition transition for the Inuvialuit population in the Northwest Territories (NWT), Canada.

Setting: Two communities in the NWT: one larger but less traditional and one smaller and more traditional.

Methods: A cross-sectional dietary study was conducted among Inuvialuit adults using 24-hour dietary recalls.

Results: Forty-eight men and 53 women (mean age 49 and 45 years, respectively) aged 19–88 years completed the recalls. The response rate was approximately 70%–90%. Mean energy intake was 2,352 kcal and 1,739 kcal for men and women, respectively. Mean daily intakes of many nutrients including dietary fiber, calcium and vitamins A, C and E, and total folate were much lower than recommended. Mean daily intake of fruits and vegetables was low. The greatest contributors to energy were sugar added to tea and coffee, sweetened juices/drinks and pop. Butter and margarine were the highest contributors to total fat intake. Traditional foods were only significant contributors to protein, iron and zinc. A 145-item QFFQ was developed based on the dietary recall data.

Conclusions: This study has provided dietary intake data previously unavailable for this population, and highlighted nutrients and foods to be targeted for the nutritional intervention program. The QFFQ developed for Inuvialuit is culturally appropriate and up to date.

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FOOD AND NUTRIENT INTAKE OF INUIT ADULTS AND THE DEVELOPMENT OF A QUANTITATIVE FOOD FREQUENCY QUESTIONNAIRE TO EVALUATE A NUTRITIONAL AND LIFESTYLE INTERVENTION PROGRAM AIMED AT IMPROVING DIETARY INTAKE AND HEALTH: RESULTS FROM HEALTHY FOODS NORTH

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Objectives: To characterize the diets of adult Inuit, to highlight foods for a nutritional and lifestyle intervention program and to develop a Quantitative Food Frequency Questionnaire (QFFQ) to evaluate the program and monitor changes in dietary intake in this population over time.

Setting: Two remote communities in Nunavut, Canada.

Methods: A dietary survey using single 24-hour dietary recalls was conducted among randomly selected Inuit adults.

Results: A total of 87 (42 men and 45 women) Inuit adults aged 19–87 years participated with a response rate of approximately 70%–90%. Mean energy intake for men and women was 2,278 and 1,668 kcal, respectively. The intakes of dietary fiber and the majority of vitamins and minerals...
examined (especially vitamins A, D and E, total folate and calcium) were far below those recommended. The most commonly reported items were all store-bought foods, including coffee, white bread, sugar, juice, tea, butter or margarine, coffee mate, chips and pops, which were reported as being consumed by between 29% and 70% of respondents at least once per day. Traditional foods contributed 40% and 42%, respectively, to protein and iron intakes. We highlighted foods high in fat and sugar that will be targeted and replaced by healthier, more nutrient-dense alternatives to address the dietary inadequacies as part of the Healthy Foods North nutritional intervention program. A 153-item QFFQ was developed and pilot tested based on the recall data.

**Conclusions:** These findings highlighted foods to be targeted for a nutritional intervention program aimed at improving dietary intake and health.

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**QUALITY ASPECTS OF THE INUIT DIET IN GREENLAND**

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**Background:** Greenland is undergoing a dietary transition, which together with other factors has led to an increase in the prevalence of obesity and lifestyle diseases among the Inuit. Dietary quality indexes have been found to be a useful indicator of nutritional quality of diet in many populations. This study aims to investigate how the dietary quality varies by sex, age, urbanization and occupational level.

**Methods:** Data are from a cross-sectional study among Inuit >18 years in west Greenland. Data were collected by food frequency questionnaire and interviews. In the analyses, we included men and women with a daily consumption of 3350-70 000 kJ and 2100-15 000 kJ, respectively. Eligible individuals totalled 2,034 (43% men). We constructed a dietary quality index based (range 0-100, 100=best quality) on gram dietary fiber/MJ and energy percentage of saturated fat. The dietary quality score (DQS) was calculated for each item based on the dietary content of the component compared to the Danish nutritional recommendations. Using logistic regression, we examined whether age, sex, urbanization and occupation influenced DQS constructed as a dichotomized variable: the highest 25% of DQS and the lowest 25% of DQS.

**Results:** Women had significant higher chance of a high DQS than men (OR=2.4; 95%CI: 1.8-3.2). Inuit living in towns had the highest dietary quality (OR=1.3; 95%CI: 1.0-1.9) compared to the capital and villages. Fishermen and hunters (OR=0.2; 95%CI: 0.1-0.5) and the unemployed (OR=0.5; 95%CI: 0.3-0.8) had significantly higher risk of a low DQS compared to those employed where education at middle-high level was required.

**Conclusions:** As in other populations, women had a higher DQS than men. It seems that not having a continuous occupation leads to a higher risk of low dietary quality. Analysis could be expanded with data on household income in order to investigate this association further. Preferably, we should test other dietary quality indexes in order to find the best suitable index for an Inuit population.

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**INFLUENCE OF CASUAL WEAR AND EVERYDAY DIET ON HEALTH**

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The research was carried out in December 2008 among the students of the Institute of Physical Culture and Sports of Yakut State University. Thirty-two students (among them 12 girls) were asked to write a free-form short story about themselves. The story had to touch upon three things: what they wear in winter, where and what they eat, what they do when they fall ill. The anal-
ysis was based on comparing students' “ideals” and their everyday practice.

By the students' admission, during the winter term they often get cold and their chronic diseases (kidney, joints, heart, etc.) become more acute. Being cold is considered an ordinary thing, and they stay on their feet or practice autotherapy. Among the reasons for not seeking medical assistance are lack of time, queues in clinics, unwillingness not to attend classes, a doctor in the family, relatives' and friends' advice, possibility of self-treatment (taking advertised drugs).

However, the majority of students are not inclined to connect their health problems with wearing synthetic fabric clothes, though many mentioned the necessity of warm winter clothing and the fact of being cold in their casual wear.

The analyses makes it possible to conclude on differences between imagined and usual practice. At first, the dietary regime and differences in rations cannot be explained by the students' lack of money. Other possible reasons include defects both in the curriculum (timetable of classes and coaching) and in the everyday life of an individual student. Secondly, we must keep in mind that the choice of clothing is made of synthetic fabric that is of little use in winter climate conditions in areas with permafrost.

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FOOD SECURITY AND INDIGENOUS WELLNESS: KNOWLEDGE TO ACTION

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In this workshop, participants who are interested in Indigenous wellness and the impacts of food security will have the opportunity to discuss the next steps – moving research and knowledge into action as we journey towards food security for all. A guided discussion format will be used.