

Dietary adequacy and alcohol consumption of Inuvialuit women of childbearing age in the Northwest Territories, Canada

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Background: Aboriginal Health in Canada

- Aboriginal population has been growing faster than non-aboriginal population
 - Increased 45% (vs 8% for non-Aboriginal) from 1996-2006
- Median age of Aboriginal population is 27 years compared to 40 years for non-Aboriginal population
- Life expectancy of Inuit at least 12 years lower than national average².
- Diabetes prevalence rate in Aboriginal peoples is 3-5 times that of the general population.³

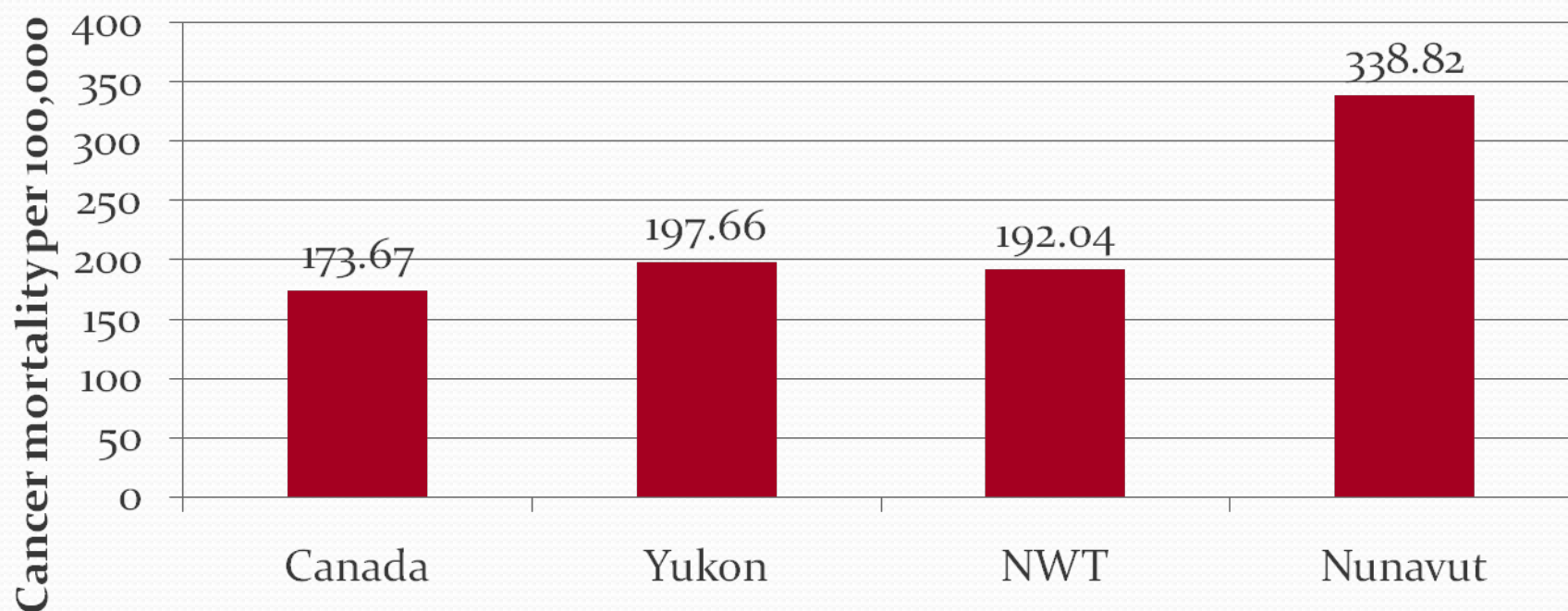
¹Statistics Canada. CYB Overview 2008.

²Wilkins R, Uppal S, Finès P, et al. Life expectancy in the Inuit-inhabited areas of Canada, 1989 to 2003. Health reports / Statistics Canada, Canadian Centre for Health Information . 2008; 19(1):7-19.

³Young TK et al. Type 2 DM in Canada's FN: status of an epidemic in progress.CMAJ.2000; 163(5):561-6.

Background: Aboriginal Health

Age-standardized rates of cancer mortality
(per 100,000 population) in Canada, 2004



Source: Health Canada. http://dsol-smed.phac-aspc.gc.ca/dsol-smed/cancer/d_time_e.html Accessed on January 18, 2010

Inuit hunting, NWT, 1949
(photo by Richard Harrington)



Seal Hunting



Transition in lifestyle and diet in the Canadian Arctic



- Nomadic, hunter-gatherers
- Traditional foods part of Inuit identity



- Largely protein-based traditional diet
- Consists of diverse locally gathered foods

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Transition in lifestyle and diet in the Canadian Arctic



- Replacement of traditional with non-nutrient-dense market foods
- More sedentary



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Background: Alcohol Consumption

- In the past year, 66% of Aboriginal students consumed alcohol compared to 48.1% of non-Aboriginal students (grades 7-12).¹
- About 28.3% of Aboriginal students consumed alcohol to be considered “hazardous or harmful” compared to 12.8% of non-Aboriginal students.²
- About 13.4% of Aboriginal pregnant women drank alcohol as compared to 3.7% of non-Aboriginal pregnant women.³

1- The Alberta Youth Experience Survey 2008: Technical report. 2009. Edmonton, Alberta, Canada, Alberta Health Services Addiction and Mental Health.

2-Johnson D, Jin Y, Truman C. Influence of aboriginal and socioeconomic status on birth outcome and maternal morbidity. *J Obstet Gynaecol Can* 2002;24:633-640.

3-Alberta 2002-2003 Regional Longitudinal Health Survey Report. 2007. Alberta First Nation Participant Communities. First Nations Adult and Higher Education Consortium (FNAHEC). 9-4-0013.

Biological Risks of Alcohol Use

- Inhibits small intestinal absorption of many nutrients
 - Monosaccharides, several L-amino acid residues, and some fatty acids and vitamins
- Metabolism of ethanol in the liver by microbial enzymes generates compounds that promote oxidative stress, a known risk factor for chronic disease development
- Frequent high-risk drinking presents a risk to birth outcomes (i.g FASD) for women who
 - do not know they are pregnant
 - fail to stop drinking during pregnancy

Healthy Foods North combined **behavioural** and **environmental** strategies.

Community-based activities
Multi-institutional partnerships
Store-centered intervention

Community engagement
Capacity building & employment
Knowledge translation

HFN objectives

- Increase traditional food consumption
- Increase nutrient-dense shop-bought foods
- Promote healthy food preparation methods
- Decrease consumption of processed foods (high sugar, fat, & salt)
- Increase physical activity

The aim of this presentation is to Compare dietary adequacy among alcohol drinkers versus nondrinkers, as well as heavy drinkers and non-heavy drinkers among Inuvialuit women of childbearing age

Community A

- One big community of 3500 people
- Semi-remote, with road access nine months of the year
- \$64 000 median income with 60% employment in the Aboriginal population



Communities B & C

- Two smaller communities; populations under 1000
- Comparatively more remote than Community A
- Median incomes <\$40 000, employment rates 35% and 50%, respectively
- Activities, such as hunting and fishing, are more a part of daily life







Methods

- Homes were randomly selected in three communities in the NWT using local housing maps
- Subjects were chosen to participate in the study provided that they
 - were women aged 19–44 years
 - had lived in the community for at least 6 months
 - were the main food preparers and shoppers for their household
- Pregnant and breastfeeding women were excluded as a result of their different nutritional requirements

Quantitative Food Frequency Questionnaires (QFFQ)

- Participants were asked to report frequency of consumption over a 30-day period (categories ranged from 'never' to '2≥times per day')
- Trained staff collected dietary data
- QFFQ was culturally appropriate & developed specifically for the study population and consisted of 142 food items

How often during the last 12 months did you USUALLY eat the following foods and how much do you USUALLY eat at one time		In Season Only	Usual amount	Never	<1x per mo.	1-3x per mo.	1x/ wk	2-3x a wk	4-6x a wk	1x/ day	≥ 2x/ day
MEATS, POULTRY, and FISH (not including meats in soups, stews, or stir fries) Remember seasonality! Remember to praise the participant!											
29	Moose, caribou, reindeer or musk ox meat, fried	Y AllYR	K	1	2	3	4	5	6	7	8
30	Moose, caribou, reindeer or musk ox meat, baked, boiled, grilled, raw, or frozen	Y AllYR	K	1	2	3	4	5	6	7	8
31	Moose, caribou, reindeer or musk ox, dried	Y AllYR	K	1	2	3	4	5	6	7	8
32	Fat or bone marrow from moose or caribou	Y AllYR	Tbsp	1	2	3	4	5	6	7	8
33	Liver or heart from moose or caribou	Y AllYR	K	1	2	3	4	5	6	7	8
34	Beaver or buffalo meat (not in soup or stew)	XXXXXX	K	1	2	3	4	5	6	7	8

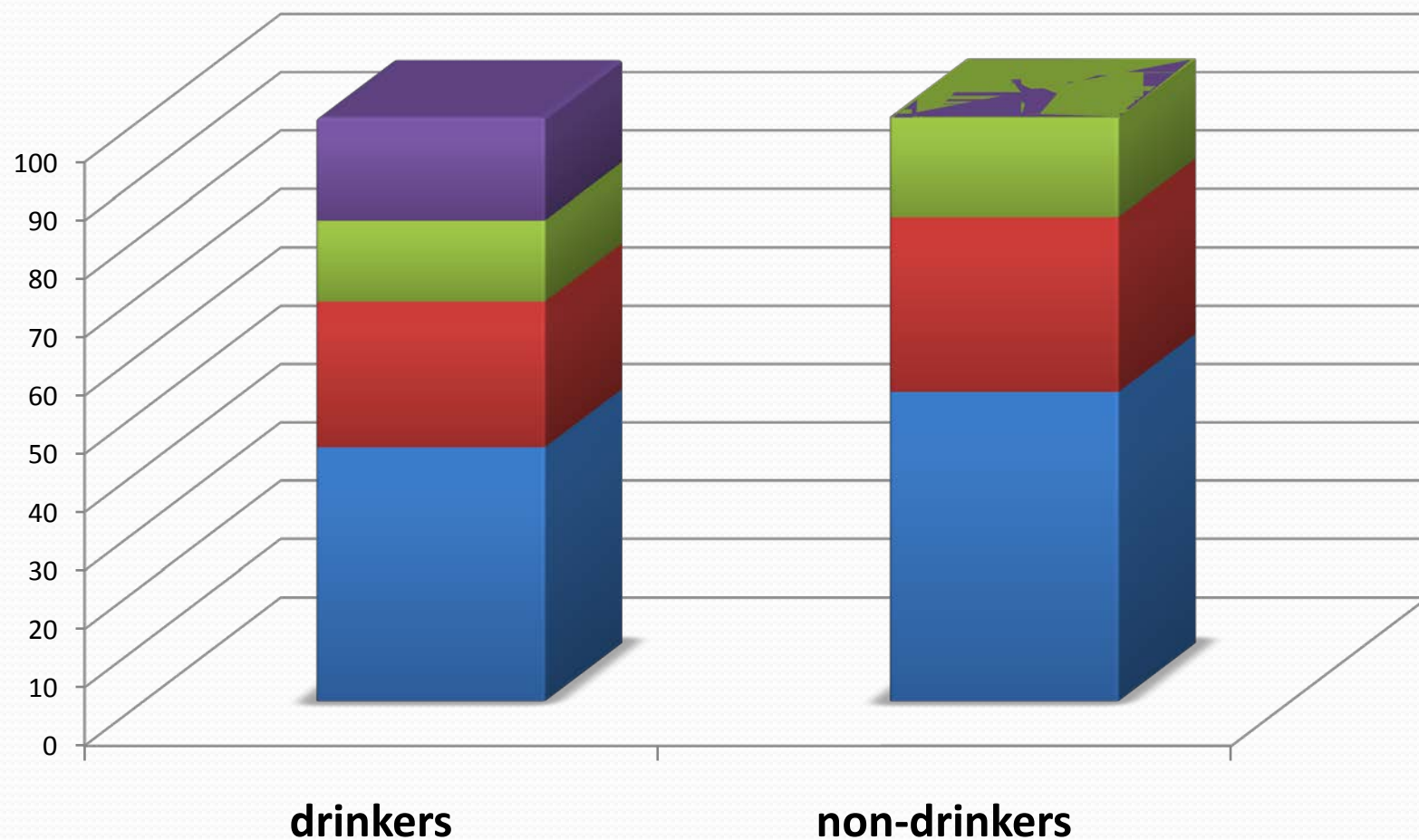
Data Analyses

- Nutrient intake was calculated per person using NUTRIBASE software
- Dietary adequacy was calculated using the age and sex specific Estimated Average Requirements (EARs)
- The nonparametric Wilcoxon Rank Sum Test was used to determine statistically significant differences
 - between alcohol drinkers and non-drinkers
 - between heavy drinkers and non-heavy drinkers
 - Heavy drinkers defined as those who drink more than five standard drinks on one occasion (68 g), 12 or more times per year

Results

- Mean energy intakes were high among all women
 - Significantly higher among drinkers (4106 kcal) compared to nondrinkers (3183 kcal)
- Alcohol consumers and non-consumers were not significantly different in terms of mean age, BMI, smoking status, marital status, education, number of people in the household with income, and the number of people self-employed between the groups

Percent daily energy intake from protein, fat, CHO and alcohol : Drinkers vs. non-drinkers



■ % energy from CHO ■ % energy from fat ■ % energy from protein ■ % energy from alcohol

Mean daily alcohol intake by type among drinkers

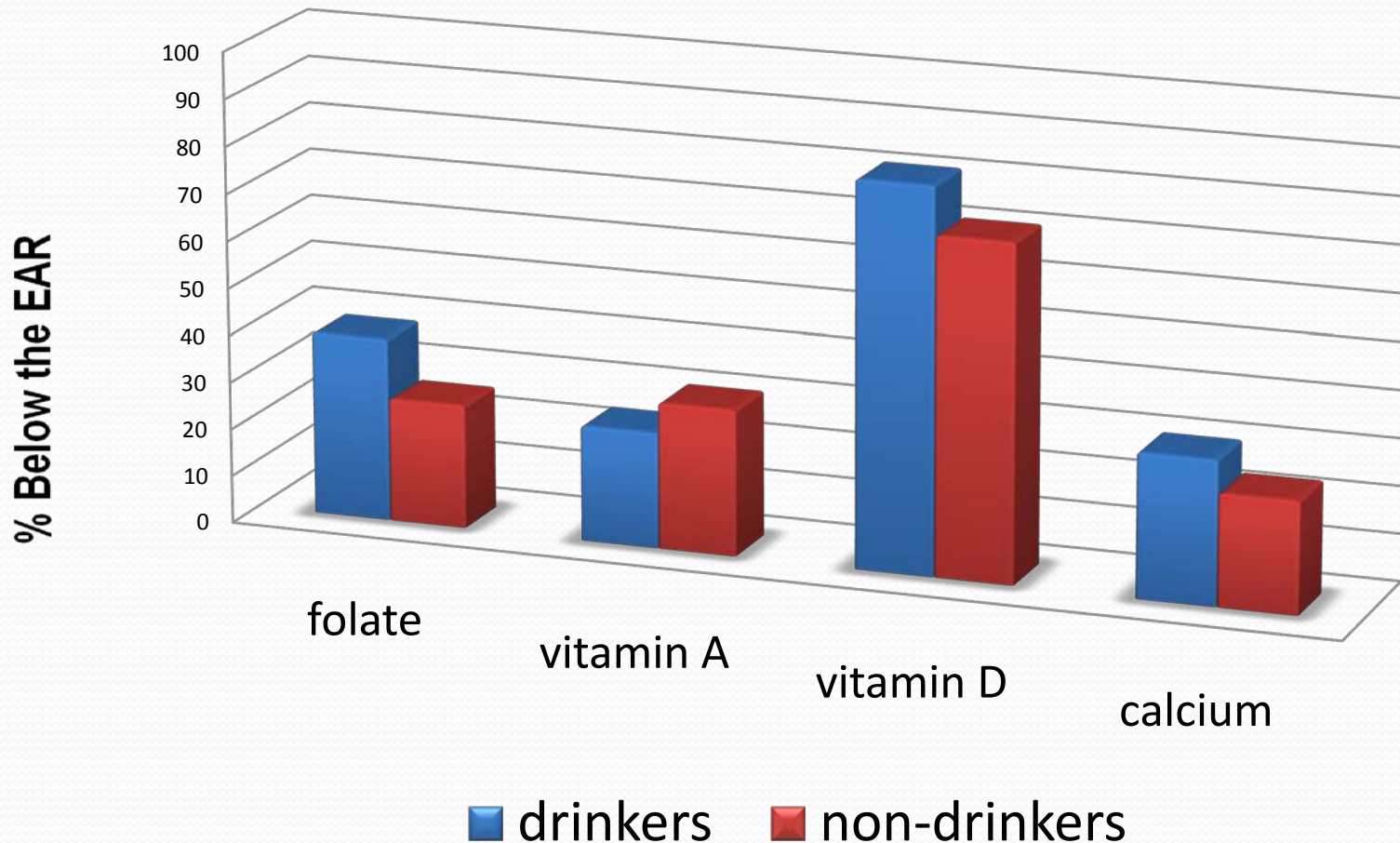
Alcohol	Mean intake among drinkers (g/day)
Liquor	11.7
Beer	11.6
Wine	4.3
Total alcohol	20.1

54% of childbearing women were drinkers

Results

- Many women, regardless of alcohol consumption, were below the EAR for most micronutrients
 - >60% below recommendations for dietary fibre, vitamins D and E
- Alcohol drinkers had a lower nutrient density (grams of nutrient per 1000 kcal) for most nutrients including B vitamins, zinc, Iron, calcium and folate
- Among drinkers, heavy drinkers had a significantly lower nutrient density for most nutrients compared to non-heavy drinkers

Percentage of participants below the Estimated Average Requirements (EARs) : Drinkers vs. non-drinkers.



Nutrient density per 1,000 kcal for selected nutrients among Inuvialuit women of childbearing age who are alcohol drinkers versus nondrinkers

Nutrients	Alcohol drinkers (n=50)			Alcohol nondrinkers (n=42)			<i>p value</i>
	Mean	SD	Median	Mean	SD	Median	
Carbohydrate (g)	108.8	33.6	115.5	132.5	24.5	130.5	0.001
Fat (g)	27.7	8.0	28.2	33.5	6.1	34.2	0.001
Protein (g)	34.8	13.3	32.1	42.7	14.7	41.3	0.004
Sugar (g)	58.2	28.4	53.0	72.4	28.4	68.0	0.012
Fibre (g)	5.9	2.9	5.7	7.2	2.8	6.8	0.002
Folate (µg) ¹	124.6	75.7	113.3	152.9	48.5	147.8	0.001
Cholesterol (mg)	125.3	52.3	116.5	135.8	52.7	133.9	0.302

¹Dietary Folate Equivalent

. Nutrient density per 1,000 kcal for selected nutrients among Inuvialuit women of childbearing age who are alcohol drinkers versus nondrinkers

Nutrients	Alcohol drinkers (n=50)			Alcohol nondrinkers (n=42)			<i>p value</i>
	Mean	SD	Median	Mean	SD	Median	
Vitamin A (µg)	223.8	95.4	209.5	249.8	127.9	219.1	0.520
Vitamin B1 (mg)	0.7	0.3	0.6	0.8	0.2	0.8	0.0003
Vitamin B2 (mg)	1.3	1.1	1.1	1.4	0.4	1.4	0.006
Vitamin B3 (mg)	10.3	4.4	9.9	12.2	3.6	11.7	0.006
Vitamin B6 (mg)	0.8	0.4	0.8	0.9	0.3	0.9	0.018
Vitamin B-12 (µg)	3.7	2.1	3.3	4.4	2.4	4.0	0.118

Nutrient density per 1,000 kcal for selected nutrients among Inuvialuit women of childbearing age who are alcohol drinkers versus nondrinkers

Nutrients	Alcohol drinkers (n=50)			Alcohol nondrinkers (n=42)			<i>p value</i>
	Mean	SD	Median	Mean	SD	Median	
Vitamin C (mg)	68.9	45.5	61.7	65.6	52.5	53.9	0.461
Vitamin D (µg) ³	1.6	0.9	1.5	2.2	2.1	1.7	0.147
Vitamin E (mg) ⁴	1.2	0.5	1.2	1.6	0.6	1.5	0.011
Calcium (mg)	350	124	327	455	176	420	0.003
Sodium (g)	1.3	0.4	1.2	1.7	0.6	1.5	0.0004
Iron (mg)	6.4	2.7	5.8	8.0	2.9	7.3	0.003
Selenium (µg)	45.4	28.0	39.2	57.0	38.4	47.9	0.030
Zinc (mg)	5.0	2.0	4.9	6.1	2.2	5.8	0.004

³As cholecalciferol in the absence of adequate exposure to sunlight

⁴As alpha-tocopherol

Conclusions

- Among drinkers, 20.1 g/day was the mean amount of alcohol reportedly consumed
 - drinking >5 g of alcohol at a time is considered high-risk
- Liquor is frequently consumed
- High-risk drinking are exhibited among women of childbearing age

Conclusions

- Energy intake among women of childbearing age was above the dietary recommendations
- No difference in total nutrient intake between alcohol drinkers and nondrinkers
- Nutrient density was significantly lower among drinkers compared to nondrinkers
- Heavy drinkers had a significantly lower nutrient density for most nutrients compared to nonheavy drinkers

High-Risk Behaviours

- Studies on the long-term effects of high-risk drinking behaviour have reported increased negative alcohol-related consequences on the social, educational and economic status as well as health risk
- Patterns of high-risk drinking have been associated with increased central adiposity in women
- Drinkers were found to eat less fruit and consume more calories not only from alcoholic beverages, but also from foods high in unhealthy foods high in fat and sugars

Limitations

- Inherent limitations in the QFFQ instrument
 - over- or under-reporting
 - interviewer/interviewee bias
- Under-reporting of alcohol consumption may have occurred by participants in dry communities where alcohol is prohibited

Future Community Involvement

- Aboriginal populations consists of close strong social connections and family ties, which promote opportunities for the development of nutritional educational programmes
- Effective intervention strategies that include collaborative action and community involvement could improve the health of women and future generations

Sources of funding and key supporters

American Diabetes Association Clinical Research Award Grant # 1-o8-CR-57

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Healthy Foods North Team, in Nunavut and NWT

All participants



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Assessment of dietary intake and physical activity to develop, implement, and evaluate a nutrition and lifestyle intervention program to reduce risk of chronic disease and improve dietary adequacy in Aboriginal populations in Arctic Canada

Lead Author: Professor Sangita Sharma
Endowed Chair and Professor in
Aboriginal and Global Health
Department of Medicine,
University of Alberta, Canada



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 **WILEY-
BLACKWELL**

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Thank You!

Questions?

