Store Outside Your Door
Indigenous Food and Health for Alaska Native People

Gary Ferguson, BS, ND
Senior Director
Community Health Services
Alaska Native Tribal Health Consortium
OUR VISION:

Alaska Native people are the healthiest people in the world.
Store Outside Your Door

Hunt • Fish • Gather • Grow

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www.youtube.com/anthcstoreoutside

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1933 Dr. Westin Price travelled to remote Alaskan villages in the YK Delta

“...examples of physical excellence and dental perfection such as has seldom been excelled by any race in the past or present.”
“...strong rugged babies”
Virtually NO dental decay, until...

...villages with trading posts...”store grub” ...

“A typical effect of modernization on a growing girl was shown in a case in which the central incisors and 16 other teeth were attacked by dental caries. Sixty-four per cent of her teeth had tooth decay.”
1st generation of children born after adoption of ‘store grub’

- Dental arch deformities
- Crooked Teeth
- Changed facial form

“We have few problems more urgent or more challenging than reversing these trends.”

Weston A. Price, 1933
Loss of ancestral diet: dental health plummeted, with defects in next generation with switch to processed foods
Helping Ourselves to Health: Addressing Factors that Contribute to Obesity Among Alaska Native People

Tim Gilbert, MPH
Desiree Bergeron RD, LD
Gary Ferguson ND

This research was supported by the National Research Initiative of the USDA National Institute of Food and Agriculture, grant #2007-55215-17923
Characteristics of the rural Alaska Native men and women in Alaska, United States (n=127)

- Participants from four communities (total= 8 men and 119 women)
- Aged between 19-77 years
- Mean age for men and women 51 years and 43 years, respectively
- No participants were excluded due to extreme energy intake (<500kcal/day or >7,000kcal/day)
Assessing dietary intake of Yup’ik people of western Alaska

- Processed store-bought foods, high in fat and sugar, were reported **more frequently** than traditional foods.
- **7 of the top 26 foods** most frequently reported were traditional foods.
- A **150-item QFFQ** was developed based off of 400 24 hour recalls from the **Alaska Native Dietary and Subsistence Food Assessment Study (ANDSFAP) 2001-2004.**
Dietary patterns and nutritional adequacy among rural Yup’ik women in western Alaska

- The majority of women (90-100%) fell below the recommendations for dietary fiber, vitamin D, vitamin E and calcium. More than 50% of women fell below the recommendations for vitamin A and more than one-third were below for zinc, and vitamins C and B-6.
- Store-bought foods, such as juices/pres and coffee, were the most frequently reported food items. Sweetened beverages and pop were the main contributors to energy, carbohydrate and sugar intake.
- Traditional foods provided 34% of protein, 27% of iron, 23% of vitamin A, 21% of zinc, 6% of carbohydrate intake and <5% of total energy intake.
Percentage of people who adhered to DRI for nutrient intake (n=127)

Based on age and sex adjusted EAR (Estimated Average Requirements)
Percentage of people who adhered to DRI for nutrient intake (n=127)

Based on age and sex adjusted EAR (Estimated Average Requirements)
Study: Rickets and Vitamin D Deficiency in Alaska Native Children

Background and Methods:
• Concern about increasing reports of vitamin D deficiency and rickets in Alaska Native children led ANTHC providers to conduct an epidemiologic study with two components:
  – Data analysis of rickets hospitalizations in Alaska Native children and US child population
  – Case control study of Alaska Native children with rickets/vitamin D deficiency and matched controls

Institutions:
• Alaska Native Tribal Health Consortium
• Arctic Investigations Program – CDC

Investigators:
• Rachel Lescher MD
• Rosalyn Singleton MD
• Robert Holman MS
• Bradford Gessner MD
• Timothy Thomas MD
• Thomas Hennessy MD
• Matthew Benson MD
• John Rosenfeld
• Dana Haberling
• Lisa Bulkow MS
• Anthony Kretz
• Gail Thompson RN
• James Tiesinga MD
• Michael Bruce MD
Study Results: Rickets and Vitamin D Deficiency in Alaska Native children

- Rickets inpatient and outpatient visits were more common in Alaska Native children than in the US or other IHS sites.

- Rickets diagnosis increased with:
  - Increasing latitude
  - Diagnosis of malnutrition

- Rickets and vitamin D deficiency occurred in both breastfed and formula fed infants.

- Rickets and vitamin D deficiency were more common in infants who did not receive vitamin D supplementation.

- Confirms importance of AAP recommended vitamin D supplementation of newborn infants to prevent vitamin D deficiency.

American Academy of Pediatric guidelines:
Regardless of sunlight and food intake, all breastfed infants/children and those receiving < 1 Liter per day of infant formula receive 400 IU/day of vitamin D supplementation.

Above 37 degrees latitude from Nov.–Feb.: 80-100% decrease in the number of ultraviolet B photons reaching earth’s surface.
Study Results: Rickets Incidence by Latitude, Alaska Native children <10 years, 1999-2010
Serologic Survey of Biomarkers for Traditional Marine Diet and Vitamin D Levels in YK Delta Childbearing-aged Women

• **Objective:** Explore how intake of traditional marine foods and serum Vitamin D levels have changed from 1960’s through the present

**Method:**
• Test representative Alaska Area Specimen Bank serum samples of YK Delta women 20-29 years old at points in time from 1960s to 1990s, for biomarkers of traditional marine diet ($\delta^{15}$N) and 25-OH vitamin D levels

• Diane O’Brien PhD, University of Fairbanks, Center for Alaska Native Health Research (CANHR)
• Rosalyn Singleton MD, ANTHC
• Ken Thummel PhD, U Wash, Pharmacy, CANHR
• Bert Boyer PhD, U of Fairbanks, CANHR
• Lisa Bulkow MS, AIP-CDC
• Joseph Klejka MD, YKHC
A Biomarker of Traditional Marine Food Intake – $\delta^{15}N$

- Fish and marine mammals are naturally enriched in the heavy stable isotope of nitrogen

- As fish and marine mammal intake increases, so does the nitrogen isotope ratio ($\delta^{15}N$) in blood and hair

- A person with no marine diet intake would have a $\delta^{15}N$ of ~8‰

- Each increase of 1‰ (unit of relative enrichment) corresponds to an increase in traditional food intake of ~7% of total energy

- Validated by Diane O’Brien’s group at UAF (CANHR)
Serum Vitamin D and $\delta^{15}$N values, YK Women, 1960s to 1990s

<table>
<thead>
<tr>
<th></th>
<th>Decade</th>
<th>p-value</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>1960s</td>
<td>1970s</td>
</tr>
<tr>
<td>n</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Vitamin D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>49.7</td>
<td>61.3</td>
</tr>
<tr>
<td>Median</td>
<td>43.3</td>
<td>54.7</td>
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<tr>
<td>min, max</td>
<td>20.6, 102.7</td>
<td>28.1, 115</td>
</tr>
<tr>
<td>GMT</td>
<td>45.2</td>
<td>56.3</td>
</tr>
<tr>
<td>≥20 ng/ml</td>
<td>25 (100%)</td>
<td>25 (100%)</td>
</tr>
<tr>
<td>≥50 ng/ml</td>
<td>11 (44%)</td>
<td>16 (64%)</td>
</tr>
<tr>
<td>Delta 15 N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>13.4</td>
<td>12.2</td>
</tr>
<tr>
<td>Median</td>
<td>13.4</td>
<td>12.1</td>
</tr>
<tr>
<td>min, max</td>
<td>10.5, 16.9</td>
<td>10.1, 13.8</td>
</tr>
<tr>
<td>GMT permil</td>
<td>13.2</td>
<td>12.2</td>
</tr>
</tbody>
</table>

Significant decline in both Vitamin D and $\delta^{15}$N levels from 1960s to 1990s
Serum Vitamin D and $\delta^{15}$N values, YK Women, 1960s to 1990s
Summary: Vitamin D and $\delta^{15}N$

- Both vitamin D levels and intake of traditional marine foods decreased in YK child-bearing aged women during 1960-1990s. Levels plateaued since 1990s
- Vitamin D levels highly correlated with traditional marine food intake
- Marine dietary intake by women of child-bearing age was very high in the 1960’s – similar to that of current Yup’ik elders - but has dropped to low levels
- Decreased marine food intake and vitamin D levels in pregnant women could put their infants at risk for vitamin D deficiency/rickets
- The young age of Alaska Native children with rickets suggests that inadequate vitamin D levels in pregnant women could put their infants at risk for vitamin D deficiency and rickets.
## Calcium and Vitamin D content of some traditional foods

- **Chum Salmon, canned with bone (3 oz)**
  - 212mg Calcium
  - 328 IU Vit D
- **Sockeye Salmon, canned (3 oz)**
  - 197 mg Calcium
  - 715 IU Vit D
- **King Salmon, with skin, kippered (3oz)**
  - 39mg Calcium
  - 44 IU Vit D
- **Beluga Whale Oil**
  - 51 IU Vit D
- **Seal Flesh (100g)**
  - 5mg Calcium
- **Seal Oil (100g)**
  - 1mg Calcium
  - 30 IU Vit D
- **Caribou (3oz)**
  - 19mg Calcium

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Salmon has one of the highest vitamin D contents of any food. Southwest Alaska Native people <30 years eat less salmon than their elders.
Researchers identify cause of gastrointestinal disorder affecting Inuit

ANDRÉ PICARD - PUBLIC HEALTH REPORTER
THE GLOBE AND MAIL
Last updated Monday, Dec. 01 2014, 6:48 PM EST

Congenital sucrase-isomaltase deficiency (CSID)
Clues emerging about Arctic gene, diet and health

Yereth Rosen | Alaska Dispatch News | November 29, 2014
CPT1A Arctic Variant

Photo Credit: American Renaissance
Metabolic Syndrome in Yup'ik Eskimos: The Center for Alaska Native Health Research (CANHR) Study

Bert B. Boyer¹,*, Gerald V. Mohatt¹, Rosemarie Plaetke¹, Johanna Herron¹, Kimber L. Stanhope², Charles Stephensen²,³, Peter J. Havel¹,² and CANHR Project Team

Article first published online: 6 SEP 2012
DOI: 10.1038/oby.2007.302

2007 North American Association for the Study of Obesity (NAASO)
Lower Prevalence of Impaired Glucose Tolerance and Diabetes Associated With Daily Seal Oil or Salmon Consumption among Alaska Natives

1. Amanda I Adler, MD, PHD,
2. Edward J Boyko, MD, MPH,
3. Cynthia D Schraer, MD and
4. Neil J Murphy, MD
136% increase in diabetes in Alaska Native people. (2)
Fry Bread and Spam
By Dr. Sioux
ALASKA SPORTSMAN: THE BEST HUNTING SPOTS

The Store Outside Their Door
Can Natives Sustain the Subsistence Lifestyle?
Time of Contact for Alaska Native Groups

- Aleut/Unangan: 1740-1780
- Yup’ik: 1780-1840
- Inupiaq: 1850-1870
- Tlingit/Haida/Tsimshian (Interior): 1840-1860
- Tlingit/Haida/Tsimshian (Coast): 1775-1800
Pre-contact:
- High, healthy protein diet
- High, healthy fat diet
- Diet Low in Carbohydrates
“Let foods be your medicine”

-Hippocrates
MASLOW’S HIERARCHY OF NEEDS (INFORMED BY BLACKFOOT NATION (ALTA))

Western Perspective

First Nations Perspective

Huiett, 2004; Blackstock, 2008; Wadsworth,
<table>
<thead>
<tr>
<th>Resolution</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>14-1</td>
<td>A resolution supporting protections, including a community fishing association, for Gulf of Alaska fishery dependent coastal communities from the North Pacific Fisheries Management Council as the council develops the Gulf of Alaska trawl groundfish bycatch management program (rationalization program)</td>
</tr>
<tr>
<td>14-2</td>
<td>Call for Alaska Native self-determination in the management of their hunting, fishing, trapping, and gathering rights and resources</td>
</tr>
<tr>
<td>14-6</td>
<td>To support the swift enactment of regulations governing the procedures for the federal subsistence board to determine rural/tribal community status under Title VIII of the Alaska National Interest Lands Conservation Act</td>
</tr>
<tr>
<td>14-41</td>
<td>Subsistence rights priority over commercial and sports uses for fish and game</td>
</tr>
<tr>
<td>14-42</td>
<td>Protection of Alaska Native traditional resource management practices</td>
</tr>
<tr>
<td>14-43</td>
<td>Re-establish indigenous subsistence rights in Alaska</td>
</tr>
</tbody>
</table>

2014 AFN Convention Resolutions
ELECTRONIC ARTICLE

Prenatal and Postnatal Flavor Learning by Human Infants

Julie A. Mennella, PhD, Coren P. Jagnow, MS, Gary K. Beauchamp, PhD

+ Author Affiliations

ABSTRACT

Background. Flavors from the mother's diet during pregnancy are transmitted to amniotic fluid and swallowed by the fetus. Consequently, the types of food eaten by women during pregnancy and, hence, the flavor principles of their culture may be experienced by the infants before their first exposure to solid foods. Some of these same flavors will later be experienced by infants in breast milk, a liquid that, like amniotic fluid, comprises flavors that directly reflect the foods, spices, and beverages eaten by the mother. The present study tested the hypothesis that experience with a flavor in amniotic fluid or breast milk modifies the infants' acceptance and enjoyment of similarly flavored foods at weaning.
Traditional Foods Infant Feeding
Maternal insulin resistance changes pancreas development, increases risk of metabolic disorders in offspring

Date: December 2, 2014
Source: American Physiological Society (APS)

Summary: Changes to a mother’s metabolism can lead to increased risk of insulin resistance, obesity and other problems in offspring. “Since insulin resistance alters the metabolic status in the affected individuals, its presence in women during pregnancy has the potential to be detrimental to growth and metabolism in the offspring. Thus, insulin resistance directly impacts pregnant women and also their offspring,” researchers note.

A growing proportion of women of childbearing age are among the estimated one in three Americans who have insulin resistance -- a metabolic disorder that can be a precursor to a number of health problems, including diabetes, heart disease and cancer. Metabolic changes in the mother during pregnancy have been linked to impaired fetal development and an increased risk of obesity, diabetes and cardiovascular problems as children reach adulthood, but the physiological origins of these changes in children are unknown.

According to researchers from the Joslin Diabetes Center and the Department of Medicine at Harvard Medical School, “Since insulin resistance alters the metabolic status in the affected individuals, its presence in women during pregnancy has the potential to be detrimental to growth and metabolism in the offspring. Thus, insulin resistance directly impacts

Related Topics
Health & Medicine
- Diabetes
- Hypertension
- Hormone Disorders
- Pregnancy and Childbirth
- Diet and Weight Loss
- Fitness

Related Articles
- Diabetes
- Insulin
- Diabetes mellitus type 2
- Low-carb diet
KNOW YOUR HISTORY, IT GIVES YOU STRENGTH

-our elders
Traditional Food Guide

For Alaska Native Cancer Survivors

Alaska Native Tribal Health Consortium
Cancer Program
Fiddlehead Fern

NATIVE NAMES: Četuguar (Yup’ik)

Fiddlehead ferns are also known as the “trailing wood” fern. Fiddleheads are the coiled edible spring growth of ferns. They can be found from the Brooks Range southward toward the Aleutian Islands, and on the Alaska Panhandle. To harvest them, pick the tightly coiled fiddleheads in early spring. Fiddlehead fern rootstock can be harvested in early spring or fall.

CAUTION: Pick fiddleheads only when they are young and tightly coiled, as the mature ferns are toxic.

PREPARATION: Fiddleheads should always be cooked before eating. The tighter the head the tastier it will be. Fiddleheads can be prepared by steaming, boiling, or baking. Before cooking fiddleheads, rub off the bitter brown chaff on the stalks and rinse them with water.

“In the early spring one year, the people ran out of food. They divided into two groups, one moving into the higher country to dig ferns, and the other to the salt water to dig clams. Those people who lived on ferns received back their strength and gained weight, while those that lived on clams barely survived.”

– Tanaina Plantlore

FIDDLEHEAD FERN NUTRITION INFORMATION

Fiddlehead ferns are an excellent source of fiber and Vitamin A, and a good source of Vitamin C.

HEART FRIENDLY
• Low in fat
• Very low in sodium

<table>
<thead>
<tr>
<th>FIBER</th>
<th>VITAMIN A</th>
<th>VITAMIN C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Cup</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NUTRITION INFORMATION

Per serving, 1 cup, raw

- Calories: 51
- Protein: 7 g
- Carbohydrate: 8 g
- Fat: 1 g
- Calories from fat: 11%
- Saturated fat: N/A
- Dietary Fiber: 6 g
- Cholesterol: 0
- Sodium: 2 mg
- Vitamin A: 5426 IU
- Vitamin C: 40 mg
- Iron: 2 mg

*Not Tested
FIREWEED NUTRITION INFORMATION

Fireweed is an excellent source of Vitamins A & C, and a good source of fiber.

HEART FRIENDLY
- Fat free
- Very low in sodium

NUTRITION INFORMATION
Per serving - 1 cup: raw

<table>
<thead>
<tr>
<th>Nutrient</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td>Calories</td>
<td>24</td>
</tr>
<tr>
<td>Protein</td>
<td>2 g</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>3 g</td>
</tr>
<tr>
<td>Fat</td>
<td>0</td>
</tr>
<tr>
<td>Calories from fat</td>
<td>0 %</td>
</tr>
<tr>
<td>Saturated fat</td>
<td>NT*</td>
</tr>
<tr>
<td>Dietary Fiber</td>
<td>3 g</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>NT*</td>
</tr>
<tr>
<td>Sodium</td>
<td>28 mg</td>
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<tr>
<td>Vitamin A</td>
<td>3146 IU</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>55 mg</td>
</tr>
<tr>
<td>Iron</td>
<td>1 mg</td>
</tr>
</tbody>
</table>

*Not Tested
Country food is good for you and your family.
Comparison of berries

- Lingonberry: 203 uMTE/g
- Highbush Cranberry: 174 uMTE/g
- Blue huckleberry: 111 uMTE/g
- Pomegranate (Lower 48): 105 uMTE/g
- Crowberry: 94 uMTE/g
- Dwarf Blueberry: 85 uMTE/g
- Red Bearberry: 79 uMTE/g
- Bog Blueberry: 77 uMTE/g
- Alaska Blueberry: 76 uMTE/g
- Wild blueberry (Lower 48): 61 uMTE/g
- Northern Black Currant: 66 uMTE/g
- Nagoonberry: 51 uMTE/g
- Kinnikinnick: 49 uMTE/g
- Red Raspberry: 47 uMTE/g
- Bog cranberry: 45 uMTE/g
- Cloudberry: 29 uMTE/g
- Cult. blueberry (Lower 48): 24 uMTE/g
- Red currant: 23 uMTE/g
- Watermelon berry: 19 uMTE/g
Alaskan Plants as Food and Medicine Past, Present, Future

PRESERVING our BOUNTY
5th Annual Alaskan Plants as Food & Medicine Symposium
Save the Dates: September 11-13, 2016

Gary Ferguson, BS, ND
Senior Director, Community Health Services
Alaska Native Tribal Health Consortium
Artemisia Annua, Artemisinin & 2015 Nobel Prize in Medicine – Cancer Treatments: from Research to Application

CANCERTREATMENTSRESEARCH.COM
PLANTS
THAT WE EAT

Nauriat Niğiñaqtuat

From the traditional wisdom of the Inupiat Elders of Northwest Alaska

Anore Jones
Inuvialuit Nautchiangit
relationships between people and plants
Decolonizing Healthcare
"The doctor of the future will give no medicine but will interest his patients in the care of the human frame, in diet and in the cause and prevention of disease." Thomas Edison
“We are free to be who we are – to create our own life out of our past, and out of the present. We are our ancestors. When we heal ourselves, we also heal our ancestors – our grandmothers, our grandfathers, and our children. When we heal ourselves, we heal Mother Earth.”
~Dr. Rita Pitka Blumenstein