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EPIDEMIOLOGY
UNIVERSITY of WASHINGTON

Better Understanding Diet, Physical Activity, & Cardio-Metabolic Health in American Indians

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January 24, 2024
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On whose land do you stand/sit?:
https://native-land.ca/

I'd like to acknowledge broken treaties and the stolen land that we now stand on —land taken from Coast Salish peoples, the land which touches the shared waters of all tribes and bands within the Duwamish, Puyallup, Suquamish, Tulalip and Muckleshoot Nations.

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Outline

- Background
- Strong Heart Study (methods)
- Strong Heart Study (key findings)
- Cheyenne River Sioux Tribe Cooking for Health Study

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Burden of Cardio-Metabolic Diseases in American Indians

- Prevalence of obesity and related disorders (e.g., diabetes) high among American Indians

- In the Strong Heart Family Study (median age: 39):
  - -58% obesity
  - -23% diabetes

- High burden may be at least partly attributable to changes in lifestyle (as well as other social factors)

Strong Heart Study

- Largest & longest on-going multi-tribal study of cardio-metabolic disease in American Indians
- 12 participating tribes from 4 states: Arizona, Oklahoma, North Dakota & South Dakota
- Measure rates of heart disease and its risk factors in American Indian populations

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Strong Heart Study

Original Strong Heart Study

> 4549 American Indians; aged 45-74 years
> 59% female
> 3 examinations over 10 years (1989-1999)

Strong Heart Family Study

> 3665 American Indians from 96 large families; aged 14-93 years
> 60% female
> 2 examinations over 8 years (2001-2003; 2007-2009)

Both cohorts

> Examination on-going (started November 2022-present)
> On-going surveillance (1989-present)

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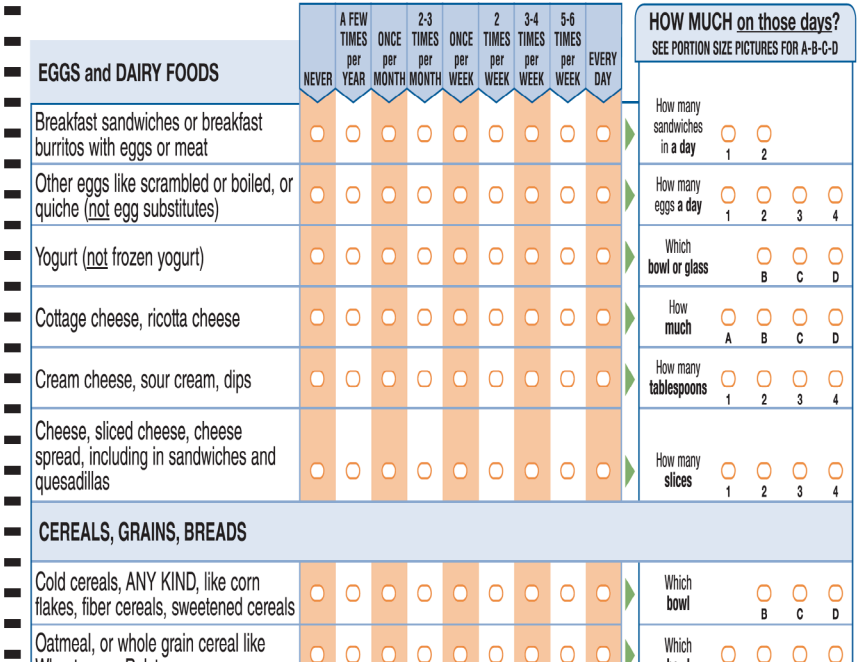
Strong Heart Study: Data Collection

- Demographics
- Biomarkers (many!)
- Heart function (e.g., ECGs, cardiac ultrasound)
- Diet (24-h diet recalls, FFQs)
- Physical activity (questionnaires, pedometers)
- Psycho-social metrics (depression, locus of control, social support, cultural questionnaires)

Lifestyle Assessment Tools: Diet

- Interview-administered past-year 119-item Block FFQ plus additional American Indian foods supplement
- Ascertained frequency & portion size
- Block database (Block Dietary Systems, Berkley, CA) used to calculate average macronutrient intakes



EGGS and DAIRY FOODS	NEVER	A FEW TIMES per YEAR	ONCE per MONTH	2-3 TIMES per MONTH	ONCE per WEEK	2 TIMES per WEEK	3-4 TIMES per WEEK	5-6 TIMES per WEEK	EVERY DAY	HOW MUCH on those days? SEE PORTION SIZE PICTURES FOR A-B-C-D
Breakfast sandwiches or breakfast burritos with eggs or meat	○	○	○	○	○	○	○	○	○	How many sandwiches in a day ○ 1 ○ 2
Other eggs like scrambled or boiled, or quiche (not egg substitutes)	○	○	○	○	○	○	○	○	○	How many eggs a day ○ 1 ○ 2 ○ 3 ○ 4
Yogurt (not frozen yogurt)	○	○	○	○	○	○	○	○	○	Which bowl or glass ○ B ○ C ○ D
Cottage cheese, ricotta cheese	○	○	○	○	○	○	○	○	○	How much ○ A ○ B ○ C ○ D
Cream cheese, sour cream, dips	○	○	○	○	○	○	○	○	○	How many tablespoons ○ 1 ○ 2 ○ 3 ○ 4
Cheese, sliced cheese, cheese spread, including in sandwiches and quesadillas	○	○	○	○	○	○	○	○	○	How many slices ○ 1 ○ 2 ○ 3 ○ 4
CEREALS, GRAINS, BREADS										
Cold cereals, ANY KIND, like corn flakes, fiber cereals, sweetened cereals	○	○	○	○	○	○	○	○	○	Which bowl ○ B ○ C ○ D
Oatmeal, or whole grain cereal like	○	○	○	○	○	○	○	○	○	Which

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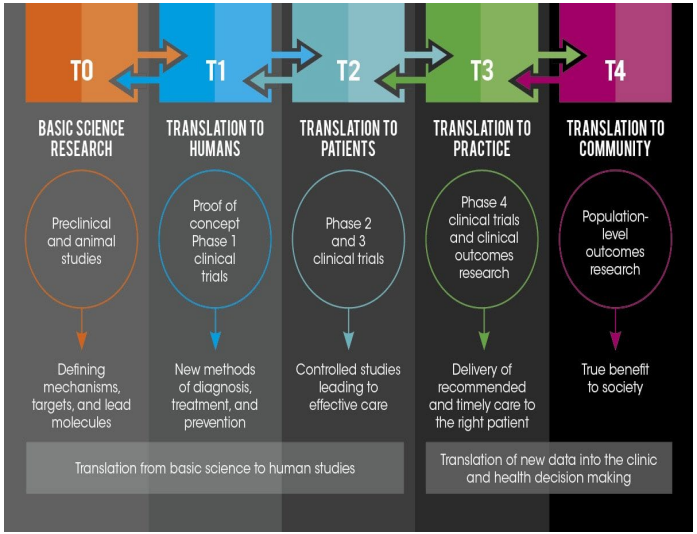
Lifestyle Assessment Tools: Physical Activity

- Yamax SW200 pedometers
- Valid/reliable in previous studies
- Pedometer worn 7 days (5 weekdays + weekend)
- Documented steps taken per day in diary

Community-Based Research

- 30+ year partnership
- Tribes/participants involved in all aspects of the study (design, data collection, dissemination, etc)
- Tribes help to guide study goals



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Key Findings from the Strong Heart Study: CVD & Diabetes

- Rates of coronary heart disease higher than other US populations
- Very high rates of insulin resistance and diabetes
- Diabetes as a major risk factor for CVD
- Diabetes in young adults leads to abnormalities of heart function detectable before CVD diagnosis

Cardiac Geometry and Function in Diabetic or Prediabetic Adolescents and Young Adults

The Strong Heart Study

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are associated with cardiac alterations independently of major confounders in a population-based sample of adolescents and young adults.

CONCLUSIONS—In a population of adolescents and young adults, DM is independently associated with early unfavorable cardiovascular phenotype characterized by increased left ventricular mass, concentric geometry, and early preclinical systolic and diastolic dysfunction; early cardiovascular alterations are also present in participants with prediabetes.

Diabetes Care 34:2300–2305, 2011

Circulation
JOURNAL OF THE AMERICAN HEART ASSOCIATION

American Heart Association.

Rising Tide of Cardiovascular Disease in American Indians: The Strong Heart Study

Barbara V. Howard, Elisa T. Lee, Linda D. Cowan, Richard B. Devereux, James M. Galloway, Oscar T. Go, William James Howard, Everett R. Rhoades, David C. Robbins, Maurice L. Sievers and Thomas K. Welty

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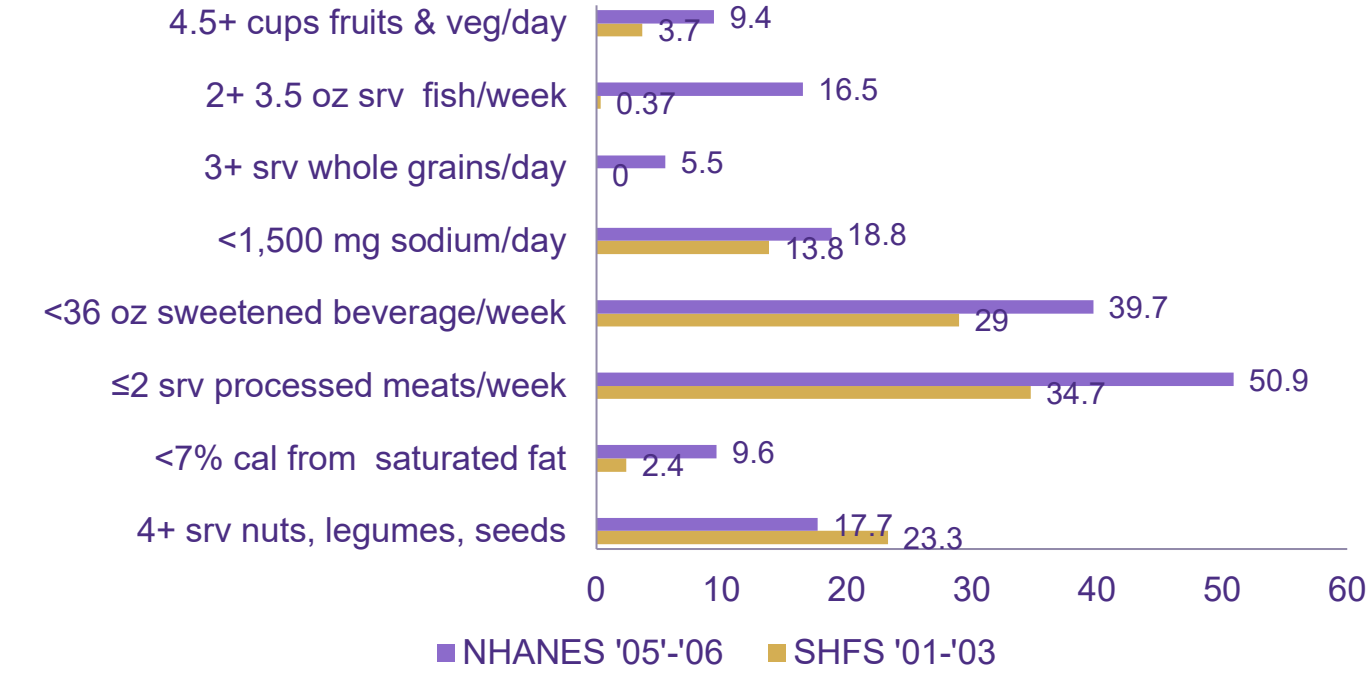
Baseline Characteristics of Study Participants: Strong Heart Family Study

Female, %	59
Age, yrs, median (IQR)	34 (23, 44)
BMI, kg/m^{2,} median (IQR)	32 (26, 36)
Obesity, %	57
Education, yrs, median (IQR)	12 (11, 13)
Prevalent Diabetes, %	23%

Achievement of American Heart Association Life's Simple 7 Goals: Strong Heart Family Study	
Physical Activity (10,000 + steps/day)	12.4%
Healthy Diet (achieve at 4+ dietary goals)	0
BMI (<25 kg/m^2)	17%
Smoking (Never or quit>12 months)	56%
Total Cholesterol (<200 mg/dl, no medication)	70%
Blood Pressure (<120/<80 mm Hg, no medication)	39%
Fasting Glucose (<100 mg/dl, no medication)	57%

Achievement of the American Heart Association Life's Simple 7 Diet Goals: Strong Heart Family Study



Fretts AM, Howard BV, McKnight B, Duncan GE, Beresford SAA, Mete M, Zhang Y, Siscovick DS. Life's Simple 7& Incidence of Diabetes in a Population at High Risk for Cardio-Metabolic Diseases: The Strong Heart Family Study. Diabetes Care. 2014 Aug; 37(8): 2240-5.

NHANES data from Roget VL et al. *Heart Disease & Stroke Statistics—2011 Update. A Report From the American Heart Association.* Circulation, 2011. **123**: e 118-209.

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Summary

- Need for wide-spread improvements in diet, physical activity, and obesity prevention among American Indians
- Better understand barriers & facilitators to physical activity, diet, and other factors that influence cardio-metabolic health
- Community-based interventions

Outline

- Background
- Strong Heart Study (methods)
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Timeline

- **Healthy Food Healthy Families Feasibility Study,** 2016-2017
- **Cooking for Health---Clinical Trial Design,** 2018-2020
- **Cooking for Health—Launch,** February 27, 2020-March 11, 2020
- **COVID-19 pandemic shut-down**, March 12, 2020-April 15, 2021
- **Cooking for Health--Recruitment,** May 2021-October 2022
- **Cooking for Health--End Follow-Up**: November 29, 2023

Cheyenne River Sioux Tribe Healthy Food Healthy Families Feasibility Study

- Characterize local food environment
- Better understand decision-making processes underlying family food-purchasing patterns
- Develop an intervention to promote healthy food choices

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Cheyenne River Sioux Tribe Healthy Food Healthy Families Feasibility Study

- 4th largest reservation in the USA
- 4,200 square miles (size of state of CT)
- 8,000 people
- Ziebach & Dewey Counties, SD

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Mobridge
Isabel
Timber Lake
Dupree
Eagle Butte
Swiftbird
Gettysburg
Pierre
29
90
90
29
Tribal Headquarters (Eagle Butte)

Characterize Local Food Environment

- Assess availability, price, and variety of foods offered at retail food stores in the community (90 mile radius of town center)

- USDA Foods Store Environment Survey

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USDA Foods Store Environment Survey

Food Item	Brand/ Variety	Item Weight/ Unit (Desired)	Item Weight/ Unit (Actual)	Price (Lowest Cost)
Fruit—fresh				
Apples, any variety (bagged or loose)		Per lb		
Bananas		Per lb		
Grapes (green or red)		Per lb		
Melon (cantaloupe, honeydew, or watermelon)		Per lb		
Oranges, any variety (bagged or loose)		Per lb		
Vegetables—fresh				
Carrots, unpeeled (bagged or loose)		1-lb bag		
Celery, bunch		Per lb		
Green pepper		Per lb		
Lettuce, leaf (green or red)		Per lb		
Onions, yellow (bagged or loose)		Per lb		
Tomatoes (any variety)		Per lb		
Potatoes, any variety		5-lb bag		
Fruit, canned				
Oranges, mandarin (juice or light syrup)		15-oz can		

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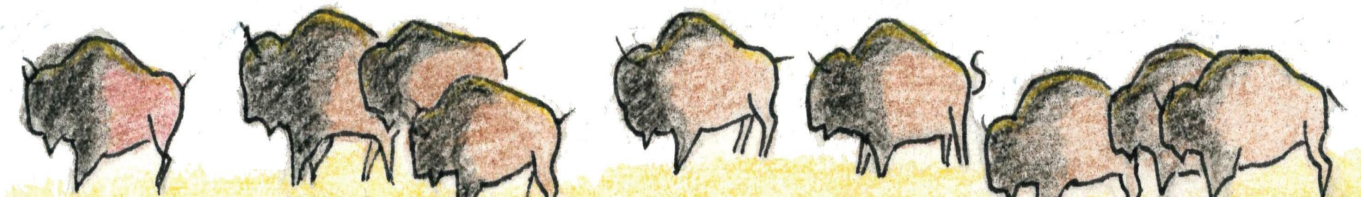
Barriers/Facilitators of Healthy Diet

- Focus groups & key-informant interviews to gather information on key barriers & facilitators of healthy dietary decisions
- Audio recordings transcribed
- Uploaded/coded in Atlas.ti



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Results: USDA Foods Store Environment Survey

- Identified 30 stores that sell food within 90 miles of town-center of community
  - 15 convenience stores/gas stations
  - 3 discount/dollar stores
  - 1 large discount supermarket (89 miles away)
  - 11 grocery stores

Surveyed all but 2 convenience stores and 1 grocery store

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Results: USDA Foods Store Environment Survey

Table 1. Availability & Price of Foods that Comprise the United States Department of Agriculture Nutrition Environment Measurement Survey at Stores within a 90 Mile Radius of an American Indian Reservation in the North-Central United States (January thru February 2016)

Store-Type	Convenience N=13		Dollar/Discount N=3		Grocery N=10		Discount Supermarket N=1
Food Group (total items in food group)	Median Foods Available (%)	Range	Median Foods Available (%)	Range	Median Foods Available (%)	Range	Median Foods Available (%)
Fresh fruit & vegetables (12)	0 (0)	0-1	0 (0)	0-0	11 (92)	10-12	12 (100)
Canned or frozen fruit & vegetables (10)	0 (0)	0-5	5 (50)	4-6	10 (100)	10-10	10 (100)
Breads, cereals, and grains (15)	0 (53)	0-8	7 (47)	4-8	15 (100)	13-15	15 (100)
Dairy (6)	2 (33)	0-5	5 (83)	1-6	6 (100)	5- 6	6 (100)
Fresh meat & meat alternatives (7)	0 (0)	0-5	3 (43)	0-4	6 (86)	4-7	7 (100)
Frozen or canned meat & meat alternatives (5)	0 (0)	0-3	0 (0)	0-2	5 (100)	4-5	5 (100)
Fats, oils, sugar, and sweets (13)	1 (8)	0-11	6 (46)	5-8	13 (100)	4-4	13(100)
Cost Thrifty Food Plan, dollars*	NA		NA		178.93	146.32-199.98	152.91

* Nationwide, the average price of purchasing all foods that comprise the Thrifty Food Plan was $151.20.

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Table 1. Characteristics of Focus Group Participants (n=31)	
Female	87.1
Age	
18-29 years	25.8
30-39 years	45.2
40+ years	29.0
Adults in household	2.2 (1-5)
Children in household	3.0 (1-6)
Education	
Completed high school/GED	35.5
Some college	25.8
College degree (assoc. or higher)	32.2
Distance from Closest Grocery	
<5 miles	77.4
5-10 miles	3.2
11+ miles	19.4
Transportation to store	
Own car/bike	64.5
Walk	12.9
Ride from friend/family	22.6

Cheyenne River Sioux Tribe Healthy Food Healthy Families Feasibility Study

- Consistently identified five major topics related to shopping and eating patterns:

  external: cost, availability, and quality

  internal: taste, food knowledge

Public Health Nutrition: 22(14), 2653–2661 doi:10.1017/S1368980019001095

Characterizing the local food environment and grocery-store decision making among a large American Indian community in the north-central USA: qualitative results from the Healthy Foods Healthy Families Feasibility Study

Meagan C Brown[1], Umit Shrestha[2], Corrine Huber[3], Lyle G Best[3], Marcia O'Leary[3], Barbara Howard[4], Shirley Beresford[5] and Amanda M Fretts[5,*]
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Submitted 23 June 2018: Final revision received 3 January 2019: Accepted 28 February 2019: First published online 24 May 2019

Abstract
Objective: Perceptions of social-contextual food environments and associated factors that influence food purchases are understudied in American Indian (AI) communities. The purpose of the present study was to: (i) understand the perceived local food environment; (ii) investigate social-contextual factors that influence family food-purchasing choices; and (iii) identify diet intervention strategies.
Design: This qualitative study consisted of focus groups with primary household shoppers and key-informant interviews with food retailers, local government food

lth Nutrition

PREVENTING CHRONIC DISEASE
PUBLIC HEALTH RESEARCH, PRACTICE, AND POLICY

Availability and Cost of Healthy Foods in a Large American Indian Community in the North-Central United States

Print

ORIGINAL RESEARCH — Volume 15 — January 4, 2018

Amanda M. Fretts, PhD[1]; Corrine Huber, MS[2]; Lyle G. Best, MD[2]; Marcia O'Leary, MS, BSN[2]; Laurel LeBeau[2]; Barbara V. Howard, PhD[3]; David S. Siscovick, MD[4]; Shirley A. Beresford, PhD[1]
(VIEW AUTHOR AFFILIATIONS)

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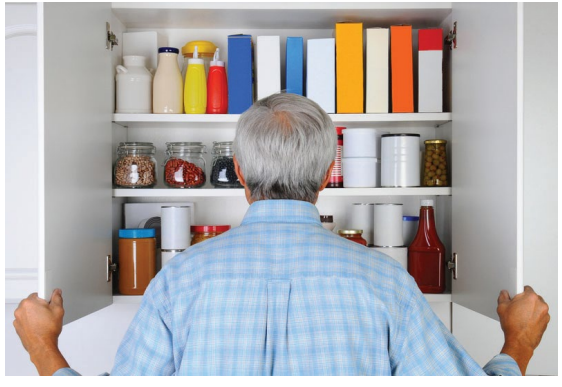
Major Focus Group Theme: Food Cost

> Many types of fruits, vegetables, and meats expensive

> Canned items are cheaper

> Hard to budget for fresh foods for entire month



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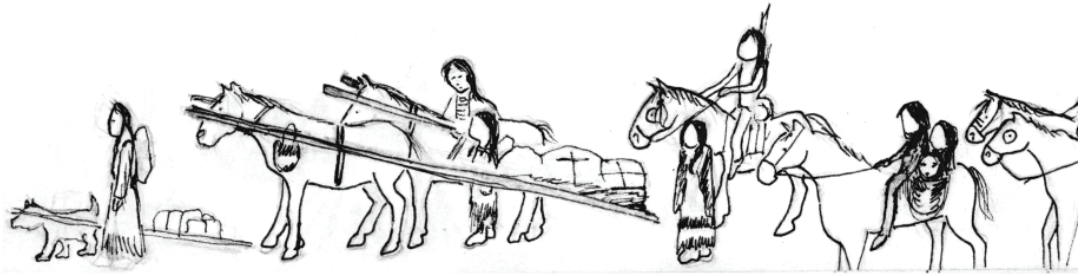
Major Focus Group Theme: Food Cost

"On the tenth [tenth of the month], everybody's EBT rolls in at midnight. So that night, on the ninth, they open the store backup at 11:00 pm until 2:00 AM so you can go get your shopping done. Most people have run out of food and are hungry. They are waiting for the tenth."



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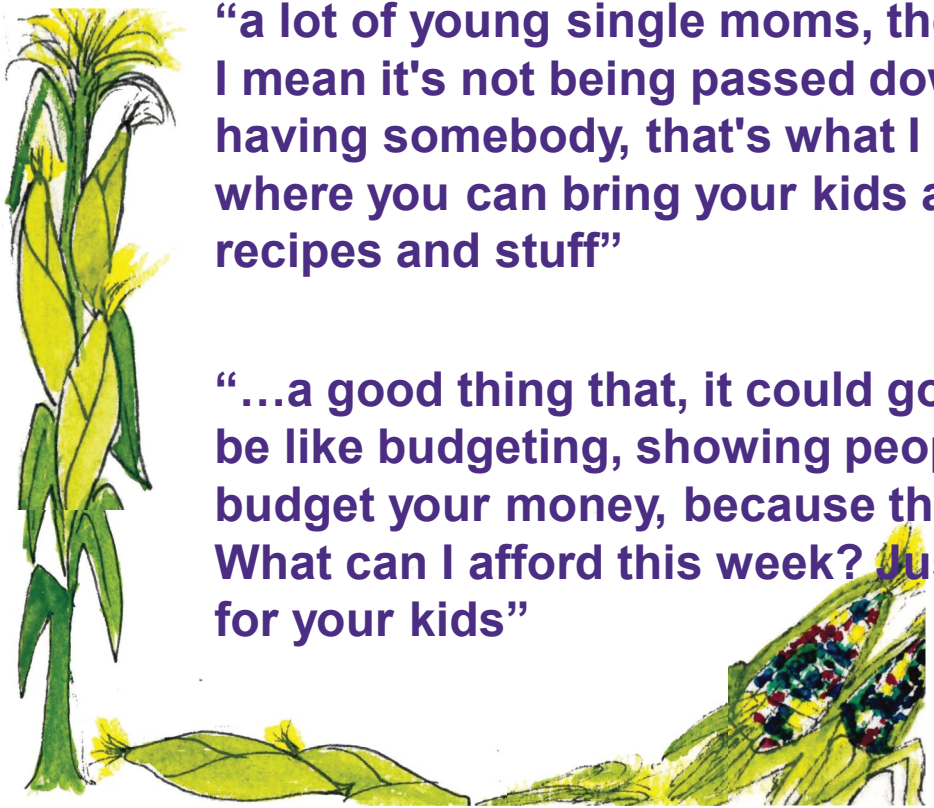
Major Focus Group Theme: Food Knowledge



"a lot of young single moms, they were never taught that by their moms. I mean it's not being passed down, like how it used to be, and so just having somebody, that's what I want to do is do like cooking classes where you can bring your kids and stuff and you know bring new recipes and stuff"

"…a good thing that, it could go along with the cooking classes would be like budgeting, showing people in the class that – teach you how to budget your money, because that is a big part of it, too, is your budget. What can I afford this week? Just try to make it as healthy as possible for your kids"

Key Informant Interviews

> 13 key informant interviews

-Managers of small and large grocery stores & convenience stores

-USDA Commodity Foods Program

-Women, Infants, and Children Nutrition Program

-Food bank

-Dieticians

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Key Informant Interviews

- Many people buy pre-packaged food that they can heat up in a microwave
- Best sellers at store: pop and chips
- People more likely to gravitate towards sales on packaged foods than fresh foods

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Challenges in Developing Intervention

- Designing interventions in resource-limited settings (e.g., limited internet, long-travel distances, etc)
- Sustainability of interventions (must aim to incorporate successful interventions into local programing)
- Competing risks

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Literature Review: Knowledge Gaps

- Diet interventions that target:
  - rural communities
  - American Indians
  - resource-limited communities

- Diet interventions focused on optimizing health in those with diabetes and/or CVD

Cooking Matters as Guiding Framework

- Cooking Matters SNAP-approved curriculum developed to teach cooking/healthy eating on a limited budget
- does not address unique logistical & cultural barriers to eating healthy faced by American Indians in rural/resource limited communities
  - -adapt to be culturally-relevant to AIs with diabetes
  - - add lessons on grocery store literacy/numeracy
  - -focus on distance learning

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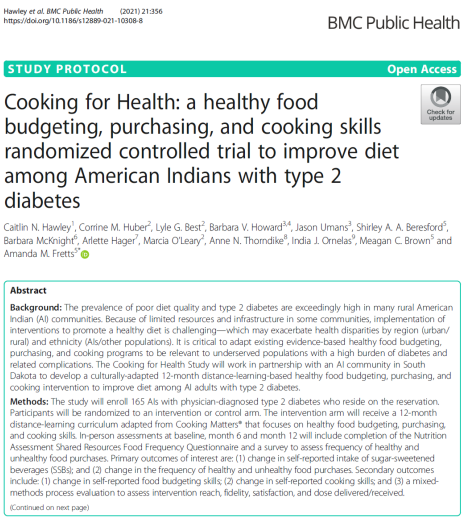
Development of Cheyenne River Cooking for Health

In partnership with the Tribal Diabetes Program:

- Conduct RCT to determine if a culturally-tailored healthy food budgeting, purchasing, and cooking intervention influences diet and cardio-metabolic health
  - -Differences in diet (sugar-sweetened beverages, processed foods) and food budgeting at months 0, 6 & 12
  - -Differences in diabetes control (HbA1c) and BMI at months 0, 6, 12

- Mixed methods process evaluation to assess intervention reach, fidelity, participant satisfaction, and effectiveness



Hawley et al. BMC Public Health (2021) 21:356
https://doi.org/10.1186/s12889-021-10308-8

BMC Public Health

STUDY PROTOCOL Open Access

Cooking for Health: a healthy food budgeting, purchasing, and cooking skills randomized controlled trial to improve diet among American Indians with type 2 diabetes

Caitlin N. Hawley[1], Corrine M. Huber[2], Lyle G. Best[2], Barbara V. Howard[3,4], Jason Umans[3], Shirley A. A. Beresford[5], Barbara McKnight[6], Arlette Hager[7], Marcia O'Leary[7], Anne N. Thorndike[8], India J. Ornelas[9], Meagan C. Brown[1] and Amanda M. Fretts[2*]

Abstract

Background: The prevalence of poor diet quality and type 2 diabetes are exceedingly high in many rural American Indian (AI) communities. Because of limited resources and infrastructure in some communities, implementation of interventions to promote a healthy diet is challenging—which may exacerbate health disparities by region (urban/rural) and ethnicity (AIs/other populations). It is critical to adapt existing evidence-based healthy food budgeting, purchasing, and cooking programs to be relevant to underserved populations with a high burden of diabetes and related complications. The Cooking for Health Study will work in partnership with an AI community in South Dakota to develop a culturally-adapted 12-month distance-learning-based healthy food budgeting, purchasing, and cooking intervention to improve diet among AI adults with type 2 diabetes.

Methods: The study will enroll 165 AIs with physician-diagnosed type 2 diabetes who reside on the reservation. Participants will be randomized to an intervention or control arm. The intervention arm will receive a 12-month distance-learning curriculum adapted from Cooking Matters® that focuses on healthy food budgeting, purchasing, and cooking skills. In-person assessments at baseline, month 6 and month 12 will include completion of the Nutrition Assessment Shared Resources Food Frequency Questionnaire and a survey to assess frequency of healthy and unhealthy food purchases. Primary outcomes of interest are: (1) change in self-reported intake of sugar-sweetened beverages (SSBs); and (2) change in the frequency of healthy and unhealthy food purchases. Secondary outcomes include: (1) change in self-reported food budgeting skills; (2) change in self-reported cooking skills; and (3) a mixed-methods process evaluation to assess intervention reach, fidelity, satisfaction, and dose delivered/received.

(Continued on next page)

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Development of Cheyenne River Cooking for Health

Eligibility:

- 18+ years
- Diagnosed type 2 diabetes
- Reside on the Cheyenne River reservation or surrounding border town
- Self-identify as primary household shopper and/or meal preparer

Randomized to intervention arm or delayed intervention arm

Intervention Activities

- N=176 enrolled (½ intervention & ½ control arm)

Intervention Arm

- Written material (in binder) & videos (tablet)
- Traditional foods, foods available locally, budgeting skills, shopping skills
- Engagement (raffles, grocery gift certificates, refer a friend)

- If effective, use as part of the Tribal Adult Diabetes Program for Diabetes Management

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Intervention Activities

✓ Check off lessons completed:

		Month
☐	Introduction	1
☐	Getting Healthy Foods	2
☐	Vegetables	3
☐	Fruits	4
☐	Protein/Meat	5
☐	Dairy	6
☐	Grains	7
☐	Food Budgeting and Meal Planning	8
☐	Empty Calories	9
☐	Snacks and Eating on the Go	10
☐	Traditional Foods	11
☐	Celebrating Healthy Eating!	12

Challenge Yourself!

Set a Goal

Choose (kaȟníǧa) one of the goals below (or set your own) to try during the next month:

- ❒ I will try low-fat milk, cheese, and yogurt.
- ❒ I will try whole grain bread, cereal, and pasta that is on sale or inexpensive.
- ❒ I will read labels to find lean meats.
- ❒ I will practice measurement skills by creating one of this month's recipes.
- ❒ I will: _____

_____

_____

_____

_____

Lakota Values

Wičhózaŋni Étkiya Lol'íwaȟ'aŋ
(Cooking for Health)

Wówauŋšila (Compassion) for my family and friends to stay healthy

Wóksape (Wisdom) to make healthier choices to live a long and prosperous life

Wóyuonihaŋ (Respect) our bodies and the gift of food by eating healthy

Wóuŋšiičiye (Humility) to recognize the importance of my health and better manage my diabetes through good nutrition

Wówačhaŋtognake (Generosity) to promote wellness for my family, friends, and others

Wóohitike (Courage) to educate the truth about the dangers of diabetes and eating unhealthy foods

Wówačhiŋthaŋka (Patience) for me and my family to make healthy food choices

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MY NATIVE PLATE

Fruit

Water

Grain/
Starch

Vegetables

Protein

Use your plate as a guide to help you eat in a healthy way!

1. Fill half of your plate with vegetables
2. Fill the other half of your plate with a grain/starch and a protein
3. Add a side of fruit

Pictured here:

- Mixed berries
- Cooked spinach
- Baked squash with peppers and herbs
- Steamed wild rice
- Baked deer meat with sage
- Water

Take a picture with your cell phone. Look at the picture. Take it once a month!

Produced by:
Indian Health Service, Division of Diabetes Treatment and Prevention
07/2010

Remember:

- Stay active
- Drink water
- Use a 9-inch plate

Notes:

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The 4 Food Way

The 4 Food Way uses the Medicine Wheel and reflects a traditional diet.

The traditional diet eaten by our ancestors consisted of meat sources (mostly buffalo) and was rounded out with vegetables, fruits, and other plant foods.

Protein	Fruits & Vegetables	Grains & Starchy Vegetables	Healthy Drinks
Traditional:	**Traditional:**	**Traditional:**	**Traditional:**
Buffalo	Chokecherries	Wild Turnips	Water
Elk	Wild Onion	Wild Potatoes	Mint Tea
Deer	Dried Corn	Wild Rice	Chokecherry Juice
Antelope	Buffalo Berries	Beans	**Non-Traditional Alternatives:**
Non-Traditional Alternatives:	Wild Strawberries	**Non-Traditional Alternatives:**	Lemon Water
Turkey	Wild Raspberries	Brown Rice	Lime Water
Chicken	Blueberries	Potatoes	Water Flavored with Natural Fruit Slices
Fish	Cranberries		Tea (no sweetener)
	Non-Traditional Alternatives:		Coffee (no sweetener)
	Carrots		
	Peas		
	Green Beans		
	Corn		

- Tatanka - the most important food source for the Lakota was the buffalo Buffalo meat has less fat than beef. If overcooked, it can get very tough and hard to eat.
- Canpa Sapa – the Lakota name for chokecherries. Chokecherries were often dried for use in the winter months.
- Tinpsila – the Lakota name for the prairie turnip. The prairie turnip was gathered and dried for use in the winter months.
- Mni – Water is the first medicine of the Lakota. Water sustains life. Remember to drink plenty of water.

Source: Great Plains Tribal Chairmen's Health Board – Good Health and Wellness Program who adapted The 4 Food Way from a concept developed by Kibbe Conti, Registered Dietitian, I.H.S.

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Baseline Characteristics of Study Participants (n=176)		
	Control (n=87)	Intervention (n=89)
Age, years	48	51
Age, % Female	66%	79%
Income, % $18,000+	9%	14%
Use of Federal or Tribal Assistance Programs, %	97%	97%
Obesity, %	67%	65%
Hypertension, %	71%	72%
Hyperlipidemia, %	61%	64%
Cardiovascular diseases, %	21%	16%
Asthma, %	24%	31%
Adequate sleep, 7+ hours per night	49%	48%
Food Security High food security Marginal food security Food insecure	 28% 31% 41%	 30% 25% 45%

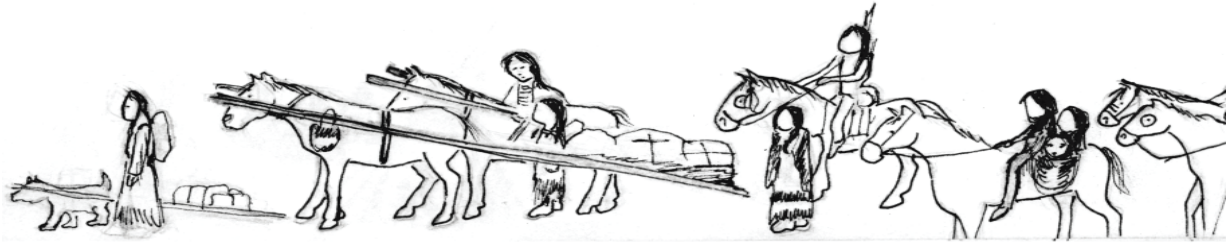
Complementary Work on Cheyenne River & Future Directions

On-going work

- USDA GUS-NIP Program (Produce Prescription Program)
- Strong Heart Study

Opportunities for Future Research

- Continue building partnerships with local organizations focused on food
- If effective, expand/adapt Cooking for Health with other Tribal Nations



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Academic-Community Partnership

Strong Heart Study

Barbara Howard
Lyle Best
Jason Umans
SHS tribes/communities

University of Washington

Shirley Beresford
India Ornelas
Barbara McKnight
Meagan Brown
Caitie Hawley
Sarah Green

Missouri Breaks Industries Research/CRST Adult Diabetes Program

Corrine Huber (on-site PI)
Rae O'Leary (on-site PI)
Marcia O'Leary
Arlette Hager
Wendy Lawrence
Rebecca White Bull
Tomi Smith

Cooking Matters

Funders

NIH-NIMHD (NIMHD R01MD011596): CFH
NIH NHLBI: Strong Heart Study
NIH NCATS: pilot work
Collaborative Research Center for American Indian Health (pilot work)

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