NIH Supported Native American Health and Childhood Obesity Research

The following selected list highlights the National Institutes of Health (NIH) supported Native American health and childhood obesity research. This list was compiled for the NIH federal partner webpage of the *Let's Move!* in Indian Country website hosted by the Indian Health Service.

Native Youth Obesity Interventions

- **Web-based Family Intervention for Pediatric Obesity**
  - Background: One of the challenges in reducing pediatric overweight is that most overweight children do not receive formal, family-based behavioral weight control interventions.
  - Approach: With NIH support, researchers at the Oregon Research Institute have created and tested a science-based website, designed to increase families' and overweight children's awareness of the problem of obesity and to increase their motivation for lifestyle changes, through adoption of healthy diet and physical exercise habits. Their expectation is that pediatricians who identify overweight children in their practices will refer them and their parents to the website. A substantial proportion of the child and family subjects in this research are Native American.
  - Key Findings: A one-month trial of the site found that children using it frequently had significant reductions in their body-mass index, a key measure of body fat, together with improvements in health behaviors and self-efficacy.
  - Next Steps Include:
    - Working with a national leader in the use of technology for health promotion to modify and adapt the prototype into a complete intervention program for use in primary pediatric and home settings.
    - Video components and interactive games will be added to the prototype and investigators will test this version in a six-month trial before developing final versions for marketing to pediatricians.
    - Given the health costs stemming from obesity, health insurance companies are also a target market for the final versions.

- **Bright Start: Obesity Prevention in American Indian Children** (Story M, et al. *Obesity* (Silver Spring). 2012;20(11):2241-2249)
  - Approach: Developed and tested the effectiveness of a school environment intervention, supplemented with family involvement, to reduce excessive weight gain by increasing physical activity and healthy eating among kindergarten and first-grade American Indian children.
  - Key Findings:
    - The intervention was not associated with statistically significant changes in mean levels of BMI, BMI-Z, skinfolds or percentage of body fat.
    - The intervention was associated with statistically significant net decrease of 10% in the prevalence of overweight.

        - The intervention significantly reduced parent-reported mean child intakes of sugar-sweetened beverages, whole milk and chocolate milk.
    - What Bright Start Adds to Our Understanding of Native Youth Health:
        - Fewer children in the Bright Start intervention group were overweight than children in the control (non-intervening) group (13.4% versus 24.8%).
        - The Bright Start intervention appears to be effective at reducing the consumption of sugar-sweetened beverages, whole milk and chocolate milk.
        - More research is needed to find the most effective approaches to treat or prevent obesity in American Indian children.

- **Child Health Initiative for Lifelong Eating & Exercise (CHILE)**
    - Approach: Used a socioecological approach to implement and evaluate a developmentally appropriate intervention to reduce the risk of overweight/obesity and diabetes among rural American Indian and Hispanic children in Head Start programs in New Mexico that includes a classroom curriculum, teacher and food service training, family engagement, grocery store participation and health care provider support.
    - Key Findings:
        - Head Start is an important setting for preventing obesity (Cruz, TH, et al. *J Prim Prev*. 2014;35(3):135-149).
        - CHILE is a feasible intervention that can be incorporated into Head Start curriculum (Davis, SM, et al. *J Sch Health*. 2013;83:223-229).
        - Participatory research and formative assessments can help build trust in academic/community partnerships (Sussman, AL, et al. *Am J Health Educ*. 2010;41(4):244-249).
    - What the CHILE Study Adds to Our Understanding of Native Youth Health:
        - Integrating principles of community engagement and a variety of recruitment strategies can help ensure the success of an obesity prevention project in Head Start childcare centers.

- **Pathways**
  - Approach: A landmark study that took place between 1994 and 1996 and used a multi-site, school-based randomized controlled trial involving 1,704 third to fifth grade children in 41 schools among seven American Indian communities in Arizona, New Mexico and South Dakota to examine the use of behavioral and environmental approaches for the prevention of obesity. The intervention involved four components: (1) physical activity, (2) classroom curriculum, (3) school food service and (4) a family intervention.
  - Key Findings:
    - No significant reduction in percentage body fat was reported but a significant reduction in the percentage of energy from fat was observed in the intervention schools (Caballero B, et al. *Am J Clin Nutr*. 2003;78:1030-1038).
    - The school food lunch intervention was feasible and resulted in lowering the percent of energy from fat as part of a coordinated obesity prevention program (Story M, et al. *Prev Med*. 2003;37:S35-S45).
    - Several positive impacts on obesity-related knowledge, attitudes and behavior were reported (Stevens J, et al. *Prev Med*. 2003;37:S70-S79).
    - The intervention contributed to valuable insights about developing, implementing and evaluating school-based interventions with American Indian communities (Gittelsohn J, et al., *Prev Med*. 2003;37:S107-S112).
  - What Pathways Adds to Our Understanding of Native Youth Health:
    - A multicomponent program for obesity prevention in elementary schools serving American Indian communities is possible and resulted in several positive changes in fat intake and in food- and health-related knowledge and behaviors.
    - More research is needed to explore if more intense or longer interventions can help reduce or prevent obesity among Native American school-aged children.

Native Youth Obesity Studies

- **Increasing Economic Resources and Obesity: A Quasi-Experimental Study** (Jones-Smith JC, Dow WH, Chicolowska, K. Association between casino opening or expansion and risk of childhood overweight and obesity. *JAMA*. 2014;311(9):929-936)
    - Prevalence of overweight or obesity among American Indian children decreased in tribal communities after the opening or expansion of a casino, according to a suggestive new study of the possible impacts on childhood weight in California tribal communities. Obesity is known to be more common among lower-income families.
    - The new study, comparing tribal communities with and without casinos in California, found higher family incomes associated with the opening or expansion of casinos, and the authors speculate that increased income may have improved children's access to healthy foods and recreational opportunities to increase physical activity.
    - The study's finding of an association between casinos and better childhood weight control is not direct proof that the casinos cause this beneficial effect and investigators called for further research.
- **Obesity and Cardiac Risk in American Indian Children**
    - Approach: A three phase collaborative participatory research project with two Wisconsin tribal communities focused on reducing the disease burden in their communities by decreasing obesity and CVD risk factors in their children. The project:
        1) Assessed obesity prevalence and cardiac risk factors in American Indian children ages 0-7;
        2) Conducted growth modeling of the familial and environmental determinants of obesity; and
        3) Worked in partnership with the communities to design community-based early intervention strategies to prevent childhood obesity.
    - Key Findings:
        - 47% of the 471 American Indian children (ages 5-8) from three Wisconsin tribes assessed were overweight or obese. Analysis of growth trajectories showed that children's BMI category was largely determined within the 1 year of life. Significant predictors of children's BMI category at age 1 included macrosomia (OR 4.38), excess gestational weight gain (OR 1.64) and early termination of breastfeeding (OR 1.66). Children who were overweight/obese at age 1 had greater odds of being overweight (OR 3.42) or obese (OR 3.36), and having unhealthy levels of body fat (OR 2.95) and LDL cholesterol (OR 1.64) at ages 5-8 (Lindberg SM, et al. *Matern Child Health J*. 2012;16(9):1879-1886).
        - 45% of children assessed in a cross-sectional design of 581 American Indian children, aged 3-8 years old were overweight or obese. Boys were significantly more obese and higher levels of body fat than girls. Boys participated in significantly more weekly sports than girls and sports participation was somewhat higher in younger children. Body mass index and waist circumference were not significantly correlated with TV/screen

time or with the 3 activity measures used in this study. Hours of outdoor play significantly predicted child body fat percentage controlling for maternal body mass index and child age and gender (Adams & Prince. *J Public Health Manag Pract*. 2010;16(5):394-400).
    - Shares lessons learned from the Wisconsin Nutrition and Growth Study about community and family barriers to physical activity in American Indian children (Adams. *J Public Health Manag Pract*. 2010;16(5):401-403).
    - Most care givers did not recognize overweight children or associate excess weight with increased risk of disease (Adams et al. *Obes Res*. 13(1):146-152).

- **Partnerships to Prevent Childhood Obesity on the Flathead Indian Reservation**
    - Approach: The project aims to use a community-based participatory approach to develop partnerships that establish memoranda of understandings between Flathead Tribal Health, Salish Kootenai College, The University of Montana and at least two community organizations for the purpose of developing research projects, negotiating IRB protocols, developing culture review protocols and submitting research applications. Additional aims will determine a collaborative agenda that identifies community needs and priorities in preventing childhood obesity through an iterative process; educate the public about national guidelines and behavior change strategies for preventing childhood obesity through evidence-based health education and health promotion activities; and evaluate the reach, adoption, implementation and maintenance of the project by collecting social network analyses data. In addition, survey data, attendance and review of timeline and procedures by an Advisory Board will be used to evaluate the project.
- **Addressing Unanswered Questions About the Home Environment and Childhood Obesity Disparities**
    - Approach: The primary objective of this study is to identify how familial factors, including interpersonal relationships that exist between family members, of racially/ethnically and socioeconomically diverse children act as risk or protective factors for predicting childhood obesity. To achieve this objective, a two-phased incremental mixed-methods approach will be used. Phase I (yrs. 1-2) will include in-home observations of diverse families (n=120; 20 each of African American, American Indian, Hispanic, Hmong, Somali and white families) to identify individual, dyadic (i.e., parent/child; siblings), and familial factors that are associated with, o moderate associations with, childhood obesity. The in-home observations, using our community-based participatory research partners, will include: (1) an interactive observational family task and family interview; (2) ecological momentary assessment (EMA) 17 of parent stress, mood and parenting practices; and (3) child accelerometry and 24-hour dietary recalls. Using state-of-the-art measures, such as EMA, will allow for identifying within-day fluctuations in parenting practices or parent stress levels, which may help to identify nuances within the home environment that amplify or exacerbate childhood obesity risk. Results from the in-home observations will be used for rich analyses and to inform the development of a culturally-appropriate survey in Phase II (yrs. 3- 5).

Native Youth and Adult Obesity Prevention Project

- **Omnicity: Joining Circles Academic-Community Partnership Conference Series**
  - A community-based project focused on youth and adults in state-recognized American Indian tribes in Virginia.
  - Includes community meetings, collaborative workshops, trainings and educational opportunities for public health professionals and community members with a goal of identifying the community's priorities in addressing disparities in health related to obesity.
  - With the oversight of a Community Advisory Board, including two senior high school students (with appropriate parental and tribal permissions), a community-based team and university-based investigators will design and conduct health data collection activities; such data do not now exist for the 11 tribal communities in Virginia.
  - Other activities include identifying data collection tools that are culturally appropriate (or adaptation of existing instruments), with collection done by trained community members.
  - Activities joining traditional healing and cultural practices with scientific best practices in health promotion and education will be employed to engage youth and adults in tribal communities.

Native Youth Cardiovascular Risk Reduction Interventions

- *Community-Responsive Interventions to Reduce Cardiovascular Risk in American Indians*
  - Funded five trials; the following trials specifically tested the effectiveness of interventions targeting children to promote healthy behaviors that are known to impact biological cardiovascular risk factors (Jobe J, et al. *J Primary Prevent*. 2012;33:153-159):
    - *Healthy, Children, Strong Families* Intervention was a two-year, community-driven, family-based randomized controlled trial of a healthy lifestyle intervention conducted in partnership with four Wisconsin American Indian tribes (Adams A, et al. *J Primary Prevent*. 2012;33:175-185);

- Community Advisory Boards can be highly effective action teams capable of improving tribal community environmental barriers to health (Adams, et al. *Prev Chronic Dis*. 2014;11:E160).
- Average nutrient intakes met recommendations among preschool-aged children living in rural American Indian communities, whereas food group intakes did not. Mean fruit and vegetable intakes for 2- to 3-year-olds were 0.36 c/day fruit and 0.45 c/day vegetables and, for 4- to 5-year-olds, 0.33 c/day fruit and 0.48 c/day vegetables. Both age groups reported consuming more than 50 g added sugar, exceeding the recommendation of 16 g. Overweight vs normal weight children reported significantly more sweetened beverage intake (8.0+/-0.10 vs 5.28+/-0.08 oz/day, P<0.01). On average, all children reported watching television 2.0 hours/day and significant differences were observed for total television viewing and nonviewing time between overweight and normal weight children (8.52+/-0.6 vs 6.54+/-0.6 hours/day, P<0.01). All children engaged in <20 minutes/day of moderate or vigorous activity (LaRowe, et al. *J Am Diet Assoc*. 110(7):1049-1057).
- The Healthy Children, Strong Families educational curriculum can serve as a nutrition and physical activity model for health educators that can be adapted for other American Indian preschool children and their families or as a model for development of a culturally specific curriculum (LaRowe, et al. *Prev Chronic Dis*. 2007;4(4):A109).

- *Project həli?dx^{w}/Healthy Hearts Across Generations* was an American Indian and Alaska Native-run, tribally-based randomized controlled trial designed to evaluate a culturally appropriate cardiovascular risk prevention program for American Indian parents residing in the Pacific Northwest of the United States. The control intervention focused on increasing family cohesiveness, communication and connectedness (Walters KL, et al. *J Primary Prevent*. 2012;33:197-207); and
- *The Prevention of Toddler Obesity and Teeth Health Study* (PTOTS) was a community-partnered randomized controlled trial designed to prevent obesity beginning at birth in American Indian children and developed to test the effectiveness of a multi-component intervention designed to promote breastfeeding, reduce sugar-sweetened beverage consumption, appropriately time the introduction of healthy solid foods and counsel parents to reduce sedentary lifestyles in their children. This study tested a common risk factor approach that simultaneously intervened on factors that are associated with both obesity and with tooth decay (Karanja N, et al. *J Primary Prevent*. 2012;33:161-174).

Food Environment Research among Tribal Communities

- **Multilevel Program and Policies to Reduce Chronic Disease for American Indians**
  - Background: Intervention trials aimed at modifying the food environment in American Indian communities have shown positive results, such as increasing the purchase and consumption of healthy foods. The current challenge is to facilitate the development of evidence-based policies in order to improve the sustainability of environmental interventions.
  - Approach: The study will take place in six American Indian communities located in Wisconsin and New Mexico. This project builds directly on previous successful work in five American Indian communities where this study team conducted a multilevel obesity prevention trial (OPREVENT) targeting food stores, worksites and schools. This proposed trial (OPREVENT2) complements and expands upon the previous one, by fostering the development of relevant policies among tribal leaders which is key for sustainability. OPREVENT2 is also piloting a social media component. The specific aims of OPREVENT2 are to:

    1) Conduct formative research to describe tribal policy development and enactment in participating AI communities, in order to support tribal health policy makers to identify effective policies to sustain obesity and chronic disease prevention/reduction programs, by building capacity and collaborative partnerships;
    2) Develop a community-based CD prevention program for AI communities informed by our earlier trials, formative research from Aim 1 and best-practices from the scientific literature; and
    3) Evaluate the impact of the CD related policies and programs on adiposity, psychosocial factors and obesity risk behaviors, including dietary quality (e.g., fruit and vegetable servings), nutrient intake, and PA in a community- randomized controlled trial.
- **THRIVE study (Tribal Health and Resilience in Vulnerable Environments)**
  - Approach: Led by Dr. Valerie Jernigan, a member of the Choctaw nation in Oklahoma, this study uses community-based participatory research and aims to:
    1) Assess correlates (sociodemographics, health behaviors and perceived food environment) and outcomes (dietary intake including vegetables and fruits, Body Mass Index (BMI), diabetes and hypertension) of food insecurity in the Chickasaw and Choctaw nations in Oklahoma;
    2) Design, implement and evaluate a convenience store intervention to increase the availability and intake of vegetables and fruits among tribal members; and
    3) Create a multimedia manual, co-developed with tribal members, guiding tribes in food environment changes, and disseminated over a free and open source website allowing for tribal user-created content.
  - Key Findings:
    - Presented a case study describing a community-clinic-academic partnership with the goal of building tribal capacity and infrastructure to conduct health disparities research (Jernigan, et al. *Am J Public Health*. 2015;105(Suppl 3):S424-S432).

        - Nine participants from three tribes attended workshops to help CDC supported Communities Putting Prevention to Work grantees to analyze, write and publish their findings (Jernigan, et al. *Prev Med*. 2014;67(Suppl 1):S51-S57).
    - Listen to Dr. Jernigan discuss her interesting and diverse career path including her work on this study.
- **The American Indian Healthy Eating Project**
    - Funded in part by Healthy Eating Research, a national program of the Robert Wood Johnson Foundation (ID #66958) and the National Institutes of Health University of North Carolina-Chapel Hill Interdisciplinary Obesity Training Grant (T 32 MH075854), this innovative project developed policy and planning strategies to improve access to healthy eating within North Carolina tribal communities that were shared widely with participating tribal leaders and throughout Indian County in a toolkit known as "*Tools for Healthy Tribes*". Building on the partnerships and evidence-base developed through the American Indian Healthy Eating Project, the Kate B. Reynolds Charitable Trust (KBR) provided support for a two-year grant awarded to the North Carolina Commission of Indian Affairs that provided funding directly to tribes and urban Indian organizations in North Carolina to develop, implement and evaluate community changes around active living and healthy eating known as Healthy Native North Carolinians (HNNC). As described in *Healthy Native North Carolinians: Advancing Native Health through Community Changes, Capacity Building and Collaborations*, participating tribes and organizations leveraged direct support and capacity building resources to advance Native health by focusing on the broader communities in which their people live, pray, study, eat and play. Now led by the American Indian Center at the University of North Carolina-Chapel Hill and supported by KBR for another two years, twelve tribes and urban Indian organizations in North Carolina continue to work together on meaningful changes and collaborations.
- **Emerging Opportunities for Registered Dietitian Nutritionists to Help Raise a Healthier Generation of Native American Youth**
    - This commentary aims to increase awareness of emerging opportunities for registered dietitian nutritionists (RDNs) to help raise a healthier generation of American Indian and Alaskan Native children and adolescents.

Native Youth Physical Activity Review

- To address research gaps and help inform tribally led community changes that promote physical activity, this review examined the methodology and current evidence of physical activity interventions and community-wide initiatives among Native youth (Fleischhacker, et al. *J Racial Ethnic Health Disparities*. 2015;November:1-17).
    - 20 unique interventions (described in 76 articles) and 13 unique community-wide initiatives (described in 16 articles) met the study criteria.
    - Four interventions noted positive changes in knowledge and attitude relating to physical activity but none of the interventions examined reported statistically significant improvements on weight-related outcomes.

- Only six interventions reported implementing environmental, policy, and system approaches relating to promoting physical activity and generally only shared anecdotal information about the approaches tried.
- Using community-based participatory research or tribally driven research models strengthened the tribal-research partnerships and improved the cultural and contextual sensitivity of the intervention or community-wide initiative.
- Few interventions or community-wide initiatives examined multi-level, multi-sector interventions to promote physical activity among Native youth, families, and communities.

Native Youth Prevention Curriculum Research

- **Health is Life in Balance**
  - Approach: This project is researching, developing, and field testing a culturally appropriate science-based prevention curriculum for K-12 tribal schools; providing the necessary training for teachers to implement the curriculum; stimulating the interest of students in diabetic science and related health careers; and collaborating with key stakeholders in the development of said curriculum.

Native Adult Diabetes Research

- The **Diabetes Prevention Program (DPP)**
  - Approach: A major multicenter clinical research study aimed at discovering whether modest weight loss through dietary changes (reduced fat and calorie intake) and increased physical activity or treatment with the oral diabetes drug metformin (Glucophage) could prevent or delay the onset of type 2 diabetes in study participants (n=3,234 individuals at risk for type 2 diabetes including Native Americans).
  - Relevant Findings:
    - DPP found lifestyle modification lowered risk of diabetes incidence compared to placebo by 58% while metformin medication lowered risk by 31% (Diabetes Prevention Program Research Group. *New Eng J Med.* 2002;346:393-403).
    - Effects persisted over 10 years of follow-up (Diabetes Prevention Program Research Group. *Lancet*. 2009;374:1677-1686).
  - Related Studies:
    - The "Pima Pride" pilot study indicated that Pima Indians may find a less direct, less structured and more participative intervention more acceptable than a direct and highly structured approach (Venkat Narayan, KM, et al. *Diabetes Med*. 1998;15:66-72).
    - The Special Diabetes Program for Indians Diabetes Prevention (SDPI-DP) demonstration project implemented the DPP lifestyle intervention among 36 health care programs serving 80 tribes with a total of 2,553 participants with pre-diabetes and demonstrated the feasibility and potential of translating the lifestyle intervention in diverse American Indian and

Alaska Native communities (Jiang, L, et al. *Diabetes Care*. 2013;36(7):2027-2034).

- A community-based participatory approach was used to identify culturally relevant ways to translate the DPP to youth among tribally enrolled members of two Montana American Indian reservations and results suggested the resulting *Journey to Native Youth* program was feasible to implement and has the potential to impact behaviors and weight gain associated with risk for type-2 diabetes in Native American youth (Brown, BD, et al. *Diabetes Educ*. 2010;36(6):924-935; Brown B, et al. *Diabetes Educ*. 2013;39(1):109-118).

- **Yup'ik Perceptions of Body Weight and Diabetes**
  - Approach: This study will conduct vital formative research to elucidate Yup'ik beliefs about body weight and diabetes in the context of remote village life. Such an understanding will move us toward future intervention research and prevention planning that can be tailored to the strengths and constraints of the village lifeworld and respectful to the values and local knowledge of Yup'ik peoples.
  - Key Findings:
    - Improvement is needed in hypertension awareness as about 64% of patients surveyed reported awareness and only 39% with hypertension were controlled on medication (Jolly, et al. *J Clin Hyperstens*. 2015;17(10):812-818).
    - Eating a greater frequency of processed foods was associated with an increased cardiometabolic risk while a reduced cardiometabolic risk was associated with eating greater frequency of subsistence foods (Ryman, et al. *Nutr Metab Cardiovasc Dis*. 2015)
- **Addressing Diabetes/CVD Health Disparities Among American Indians**
  - Approach: This study aims to

    1) Determine whether introduction of 2 electronic devices leads to decreased risk for diabetes and CVD among overweight/obese AI/ANs;
    2) Assess the social determinants of resultant changes in diabetes and CVD risk using sociobehavioral theories; and
    3) Place the investigations of effectiveness (aims 1 and 2) in a larger translational framework by exploring aspects of reach, adoption, and implementation in order to understand issues of viability and sustainability of this and comparable interventions.
- **Supporting AI/AN Mothers and Daughters in Reducing Gestational Diabetes Risk**
  - Background: Gestational diabetes mellitus (GDM) has escalated to epidemic proportion and can cause maternal and child complications. GDM is a significant maternal risk factor for subsequent development of type 2 diabetes (T2D) and places the fetus at increased risk for congenital morbidity/mortality and for future onset of diabetes. American Indian and Alaska Native women are twice as likely to develop GDM and T2D.
  - Approach: This study will target girls starting at the age of 12 to coincide with both the Coming-of-Age rituals for American Indian and Alaska Native girls during which many receive womanly advice from elder female family members,

and the American Diabetes Association recommendation that preconception counseling in all females should start at puberty. The study team will adapt their current intervention (validated for teens with diabetes) using a sequential mixed-method design with a multi-tribal American Indian and Alaska Native community-based participatory research (CBPR) approach (e.g., Navajo, Cherokee, 40 Oklahoma tribes; 8 project members are AI/AN) by first using focus groups of teens, mothers, health care providers, and Tribal leaders; and then test this culturally adopted intervention among American Indian and Alaska Native adolescent females 12 to <20yrs at risk for GDM (e.g., pre-diabetes or BMI> 85%).

Native Adult Cardiovascular Risk Reduction Research

- **Community-Responsive Interventions to Reduce Cardiovascular Risk in American Indians**
    - Funded five trials; the following trials specifically tested the effectiveness of interventions targeting adults to promote healthy behaviors that are known to impact biological cardiovascular risk factors (Jobe J, et al. *J Primary Prevent*. 2012;33:153-159):
        - *The Balance Study* was a randomized controlled trial designed to reduce cardiovascular disease risk in 200 American Indian participants with metabolic syndrome who reside in southwestern Oklahoma. Participants were randomly assigned to one of two groups—a guided or self-managed group. The guided group attended intervention meetings that comprise education and experience with the following components: diet, exercise, American Indian culture and attention to emotional well-being (Lee ET, et al. *J Primary Prevent*. 2012;33:187-196); and
        - *The Lakota Oyate Wicozani Pi Kte* (LOWPK) trial was designed to determine whether a web-based diabetes and nutritional intervention can improve risk factors related to cardiovascular disease among a group of remote reservation-dwelling American Indian men and women with type 2 diabetes who are at high risk for cardiovascular disease (Henderson JA, et al. *J Primary Prevent*. 2012;33:209-222).
- **The Strong Heart Study**
    - The Strong Heart Study (SHS) is a study of cardiovascular disease and its risk factors among American Indian men and women supported by the National Heart, Lung, and Blood Institute (NHLBI) since October 1, 1988 and is the largest epidemiologic study of American Indians ever undertaken. The SHS, which uses standardized methodology, is designed to estimate cardiovascular disease mortality and morbidity and the prevalence of known and suspected cardiovascular disease risk factors in American Indians and to assess the significance of these risk factors in a longitudinal analysis. This population includes a group in which the epidemic of obesity and diabetes has impacted people at very young ages, permitting analysis of genetic and environmental effects on these conditions with limited confounding by age effects.

  - Featured study using data from the Strong Heart Study:
    - **Innovative Multigenerational Household Intervention to Reduce Stroke and CVD**
      - Approach: With study partners, the study team has designed the "Family Intervention in the Spirit of Motivational Interviewing" (FITSMI), a program delivered at the household level to encourage lifestyle changes that transform the home environment and reduce stroke risk for all residents. FITSMI uses a "talking circle" format in which facilitators guide participants to identify goals for change and create a tailored plan for sustainable implementation that may target smoking, exercise, diet, or medication adherence. FITSMI requires just 2 sessions (baseline and 1 month post-baseline), with text messaging used to boost long-term adherence. The study aims to recruit 360 households where Strong Heart Family Study members aged 45 and older reside.

- **Diet Intervention for Hypertension Adaption and Dissemination to Native Communities**
  - Background: American Indians (AIs) have disproportionate CVD morbidity and mortality, and they have higher burdens of hypertension, diabetes, and smoking than other races. Yet AIs are rarely represented in national studies on hypertension management. Most interventions targeting CVD have focused on reservation-based AIs, even though 71% of AIs live in urban areas.
  - Approach: The study team designed an eight-week DASH intervention to improve BP control in hypertensive urban American Indians known as the American Indian Five Nuts and Beans Project (AI-5). This project includes culturally tailored DASH education that emphasizes low sodium intake, traditional Native foods, and maintaining healthy eating habits, plus a $30 weekly credit for home delivery of groceries that meet DASH guidelines. The control condition will receive printed educational materials and a $30 weekly credit for grocery delivery, with no purchasing restrictions. This randomized trial will test AI-5 in a total of 400 adult AIs with inadequately controlled systolic BP (140-159 mmHg). The study team will recruit and randomize 200 participants from each of 2 urban clinics: one in Spokane, WA, the other in Oklahoma City, OK.
- **Technology Innovations for Supporting Health in Alaska Native People**
  - Approach: This study will evaluate the efficacy of two culturally-tailored technology- mediated disease prevention interventions for supporting change in multiple risk behaviors in rural Alaska Native men and women. Directly informed by the research team's fieldwork over the past six years in rural Alaska, continued community partnership with the tribes, and ethnographic research, the interventions will be tailored to Alaska Native health needs and values to target 5 of the American Heart Association's 7 Strategic Impact Goals for 2020.

- **The Native Proverbs 31 Health Project**
  - Approach:
    1) Collaboratively developed a community-based, culturally appropriate CVD intervention program for Lumbee Indian women in Robeson County, NC, focusing on the health-related messages in biblical passage in Proverbs 31;
    2) Implemented a 6-month CVD intervention program in four Lumbee Indian churches in Robeson County, NC, using a community health / lay health educator model; and
    3) Evaluated the community-based, culturally appropriate CVD intervention program on diet, physical activity and tobacco use among Lumbee women using a two-armed randomized trial with a cluster design and delayed intervention for control churches.
  - Key Findings:
    - Churches are resources in developing and implementing culturally tailored health promotion programs among Christian populations in Robeson, North Carolina, the traditional homeland of the Lumbee Indian tribe (Kimes, et al. *Prev Chronic Dis*. 2014;11:E59).

Native Adult Cancer Prevention Project

- The *Spirit of Eagles*
  - A community network multidisciplinary project that works on culturally appropriate, long-range, comprehensive cancer control activities and supported community-based participatory research in 38 communities including developing and disseminating culturally appropriate cancer education materials and creating a number of training programs.

Native Adult Obesity and Substance Abuse Project

- **Yappalli Choctaw Road to Health**
  - Background: The importance of addressing obesity and alcohol and other drug use simultaneously is supported in part by recent research linking the brain mechanisms that fuel drug addiction and compulsive eating behaviors. Although alcohol and other drug use abstention and abuse patterns vary considerably by region and tribe, American Indian drug-related deaths are 1.5 times higher than for all other ethnic groups in the US. AI women in particular exhibit significant disparities with other women in obesity and alcohol and other drug use prevalence and higher rates of premature mortality and morbidity as a result.
  - Approach: The study team has developed the Yappalli Choctaw Road to Health, a culturally focused, strengths-based outdoor experiential obesity-alcohol and other drug use risk prevention and health leadership program. The three-month intervention (i.e., 3 individual meetings; 8 group-sessions + 2-day culture boot camp + 10-day Choctaw Trail of Tears walk) includes activities consistent with Motivational Interviewing and leadership development principles. This study will evaluate the program among 150 at-risk adult Choctaw women across 5 regions of the Choctaw Nation of Oklahoma.