

# **IHS Report to Congress: Obesity Prevention and Control for American Indians and Alaska Natives**

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**Presented to the President of the United States of America and to the  
Congress of the United States of America**

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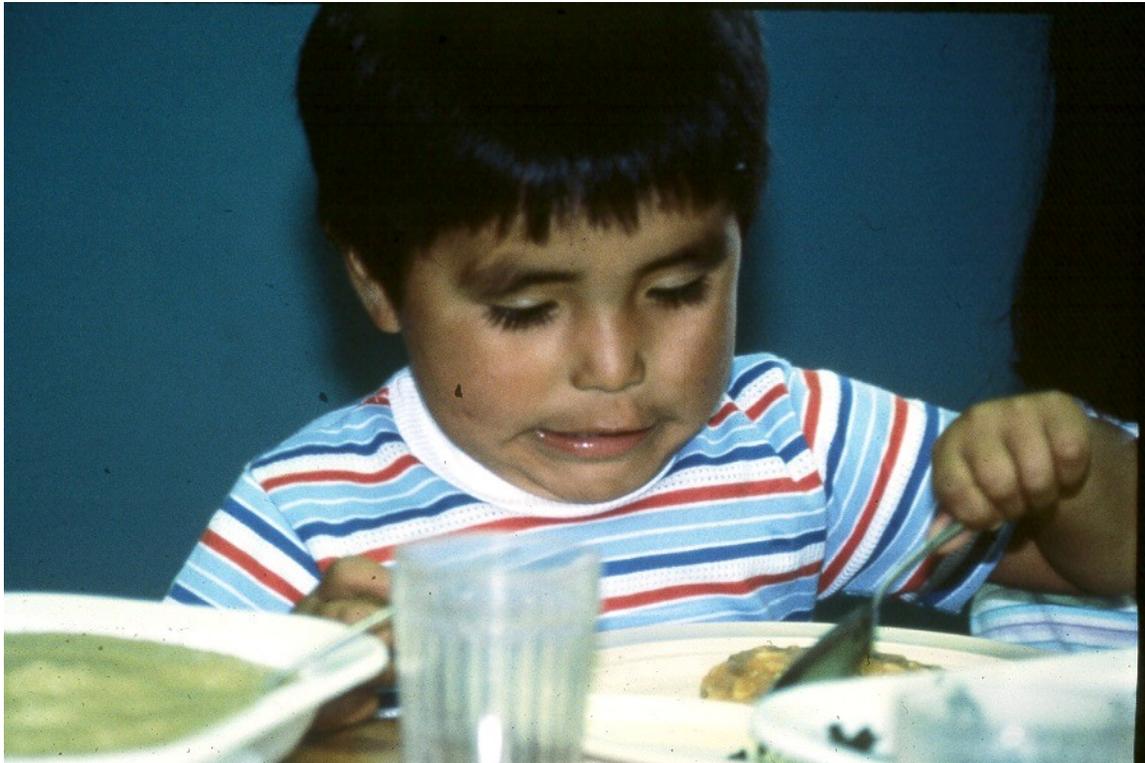


*The grandfathers and grandmothers taught us things. They ate according to what they should eat, the Indian way, the traditional way. They taught us how to gather these foods and eat them. And they were strong...My grandfather, No Two Horn was 107 when he died. And he had a cane but he used it just now and then. And he would take it and put it above his head and run in the mornings. **Zona Loans Arrow, Standing Rock Sioux, 72 years old, diagnosed with diabetes at age 34.***

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*I know that Education is the key and we need more money for education. This wasn't done (education) in my younger time. I really didn't know what diabetes was, how it affects you in the later years. I guess if I had a little more education on it, I probably wouldn't be sitting here without my limbs. **Lawrence Bedeau, Red Lake Band of Chippewa, 55 years old.***

*Knowledge is more powerful than pharmaceuticals. **Former Surgeon General Everett Koop, MD.***

# **Obesity Prevention and Control for American Indians and Alaska Natives**

## **Executive Summary**

The prevalence of obesity in American Indian and Alaska Native (AI/AN) populations has increased dramatically over the past 30 years and in AI preschool and school-age children, is up to three times higher than the rate in the U.S. population. About 40 percent of AI children are overweight. Obesity is a risk factor for diabetes that now affects over one quarter of the adult AI population and the number of AI people with diabetes has doubled in the past 5 years. Precise data on obesity rates among AI/AN populations are limited partially because there are over 500 federally recognized tribes in the United States. The current epidemics of obesity in children and adults and obesity-associated morbidity, including type 2 diabetes, cardiovascular disease, and some cancers, have profound implications for AI/AN communities.

Although genetic factors may create a predisposition toward obesity, behavioral and lifestyle conditions related to diet and physical activity play a critical role in the development and extent of obesity. Most AI/AN populations developed obesity only in the past few generations – a change probably related to the relative abundance of modern foods, accompanied by relatively rapid changes from an active to a sedentary lifestyle.

Diets historically high in complex carbohydrate/high fiber foods have been replaced by foods that are high in refined carbohydrates (especially sugars), fat, and sodium, and low in fruits and vegetables. The recent proliferation of fast-food restaurants and convenience food stores on and near reservations also encourages the consumption of foods high in fat and sugar.

The poverty rate for AI/AN is higher than any other racial/ethnic category. Consequently, Federal nutrition assistance has become an integral part of life on and off the reservation. Approximately 68 percent of AIs living on reservations receive either food commodities or food stamps. The foods offered meet or exceed the RDA for food energy and many key nutrients, and the USDA has made significant improvements to the nutritional profile of these foods. An important missing element, however, is education that would build participant skills in healthy food selection and preparation, and participation in physical activity.

Obesity is very difficult to treat. Research data on effective ways to prevent and treat obesity in AI/AN communities is limited. Comprehensive obesity-prevention programs beginning early in childhood are necessary if the epidemics of obesity and diabetes among AI/AN populations are to be reversed. Research-based school and community interventions that are culturally oriented and family centered are needed to encourage lifelong healthy eating and regular physical activity. Expanded partnerships to maximize the use of available resources will avoid duplication of efforts and services.

Several promising obesity prevention or diabetes management programs have been implemented in AI/AN communities to promote physical activity and weight loss through fitness events and

nutrition education. Although evaluative research to determine program effectiveness on health outcomes is lacking, an analysis of these and other programs has helped determine components of this IHS plan for obesity prevention and control. Local tribal community intervention programs to address these problems have developed a number of successful strategies that include “ownership” of a project to foster local leadership and community support, coalition building for sharing resources, training leaders about program goals, content, and implementation, family involvement in school programs to reinforce healthy messages for children, and a long-term outlook.

The need for these strategies was confirmed by tribal input during eight regional meetings conducted to help create an action plan to reduce diabetes as part of the planning work for the IHS Special Diabetes Program for Indians. In addition, evaluation of the diabetes program provides planners with recommendations to better address the physical activity and nutrition components of community programs.

### **Major Recommendations**

1. Recognize Tribal governments and work collaboratively with Tribal governments to:
  - Address obesity prevention and treatment in AI/AN children and adults.
  - Enable Tribal governments, communities, and tribal members to take ownership of health and obesity interventions, possibly including the development, implementation, and evaluation of obesity treatment and prevention, and weight loss maintenance programs.
  - Develop cross-program initiatives at the national, state, regional, and tribal community levels to reach AI/AN.
2. Develop a “Healthy Weight and Physical Activity Program for American Indians and Alaska Natives” to potentially plan, implement, and evaluate obesity prevention and control programs in AI/AN communities.
3. Work with other government agencies and departments to possibly develop interventions to reduce obesity among AI/AN communities:
  - Collaborate with the CDC Division of Nutrition and Physical Activity to potentially
    - expand use of the IHS Resource Patient Management System (RPMS) for basic surveillance of obesity and related health status markers (e.g., serum cholesterol, blood pressure, diabetes management).
    - Collaborate with CDC to target interventions to reduce obesity among AI/AN communities.
  - Develop a joint strategic plan with NIH to collaborate on new research and to evaluate the success of ongoing and new activities.
  - Collaborate with HRSA programs, including Bright Futures in Practice, Bureau of Primary Health Care, Community/Migrant Health Centers.
  - Partner with the USDA’s Food and Nutrition Service, Department of Interior, and Department of Education, and other departments, to develop collaborative projects.
  - Coordinate whenever possible this IHS plan with both Healthy People 2010 and the pending National Action Plan on Overweight and Obesity.
4. Maintain or increase health care provider expertise and access to nutrition services:
  - Train health care professionals and community health workers about obesity prevention and management.

- Maintain efforts to recruit and retain dietitians to serve AI/AN.
  - Maintain or increase current nutrition services for the AI/AN.
5. Consider implementation of “best practices” regarding obesity prevention and management in AI/AN communities:
    - Identify and disseminate a kit of research-based best practices.
    - Select and build upon successful components of the Pathways Study, Diabetes Prevention Program, National Diabetes Education Program, Weight Information Network, and other effective NIH, CDC, or other programs.
  6. Support or encourage clinical behavioral research and evaluation of public health approaches in partnership with tribes by NIH, CDC, and IHS to prevent and treat obesity in AI/AN populations.
  7. Establish a yearlong planning period to develop a detailed plan to address the obesity epidemic in AI/AN populations.

## 1. Introduction

The Indian Health Service (IHS) was instructed to prepare a report to the Congress that presents the magnitude of the obesity problem among American Indians and Alaska Natives (AI/AN) and recommends interventions to reduce the toll of obesity and to improve health in these populations (see **Appendix 1**).

Although genetic factors may create a predisposition toward obesity, behavioral and lifestyle conditions related to diet and physical activity play a critical role in the development and extent of obesity.<sup>1</sup> Most AI/AN populations developed obesity only in the past few generations, and this change is believed to be related to the relative abundance of foods high in fat and sugar, accompanied by changes from an active to a sedentary lifestyle.<sup>2 1</sup>

Health education interventions are vital to public health efforts to prevent disease and promote healthy behaviors particularly since most of the major health problems of AI/AN are preventable through diet modification and increased physical activity. Relatively few interventions, however, have focused on healthful behaviors or obesity among AI/AN, or have been reported in the literature.<sup>3</sup> Studies are usually of specific tribes, often with small sample sizes. Although there are similarities among tribes regarding nutrition-related behaviors and health concerns, there are also differences, and we must be aware of tribal heterogeneity. This report presents known limited data about obesity and associated morbidity and mortality in AI/AN populations. IHS recommendations to address the problem, and strategies to accomplish goals are outlined. Budgetary considerations are not included. Summary information about existing programs that could guide the development of “best practices” for implementation in AI/AN communities is presented.

## 2. The Magnitude of the Problem

### A. The Prevalence of Obesity in AI/AN Communities

The prevalence of obesity in AI/AN populations has increased dramatically over the past 30 years. **Table 1** presents a review of selected studies of the prevalence of overweight and obesity in AI/AN compared to the total U.S. population. Overall, these studies demonstrate that obesity begins early for AI/AN children and also is a significant problem for the adult population.

Over 60 percent of AI/AN adult women under 60 years of age are likely to be overweight or obese, compared to 55 percent of the total adult U.S. population. In AI/AN preschool and school-age children, the prevalence of obesity is up to three times higher than the rate among other children in the United States at all ages and both sexes. In 1990, 40 percent of school age AI/AN children were found to be obese compared to 11 percent in the total population of children in the U.S.<sup>4</sup> Since obesity in childhood often persists into adulthood and is associated with significant morbidity, this has major implications for the health of AI/AN populations.

Both maternal obesity and high birth weight have been shown to be strong predictors of obesity in early childhood.<sup>5</sup> Breast-feeding is associated with a lower prevalence of type 2 diabetes in breast-fed Indians.<sup>6</sup> Both non-pregnant and pregnant breast-fed Pima Indians

studied had lower plasma glucose concentrations at ages 20-24 years. Breast-feeding, therefore, could be viewed as a potential preventive strategy for type 2 diabetes.

**Table 1**

Review of selected studies on the prevalence of overweight and obesity in American Indians and Alaska Natives, compared to U.S. all races.

Population, year, and reference	Age of subjects	Sample size	Percentage overweight or obese		
			Male	Female	Both
<b>Preschool children</b>					
American Indian, AZ, 1990 <sup>7</sup>	1-4	622	–	–	12.0 <sup>a</sup>
American Indian, national, 1994 <sup>8</sup>	2-4	23,009	–	–	11.9 <sup>a</sup>
Mohawk, Akwesasne, NY <sup>9</sup>	2-5	–	–	–	24-39 <sup>b</sup>
U.S. all races, 1994 <sup>10</sup>	2-4	–	–	–	8.1 <sup>a</sup>
<b>School-age children</b>					
Winnebago and Omaha, NE, 1990 <sup>11</sup>	7-17	499	32.7 <sup>b</sup>	34.4 <sup>b</sup>	–
American Indian, national, 1990-91 <sup>8</sup>	5-18	9,464	–	–	39.3 <sup>a</sup>
Navajo Health and Nutrition Survey, 1991-1992 <sup>12</sup>	12-19	160	35.0 <sup>b</sup>	40.0 <sup>b</sup>	–
Winnebago and Omaha, NE, 1992 <sup>13</sup>	3-19	1,141	–	–	27.0 <sup>b</sup>
American Indian, SD, ND, IA, NE 1995-96 <sup>14</sup>	5-17	12,559	39	38	–
U.S. all races, 1988-94 <sup>10</sup>	School-aged	–	–	–	13.7 <sup>d</sup>
U.S. all races, 1988-94 <sup>10</sup>	Adolescents	–	–	–	11.5 <sup>d</sup>
<b>Adults</b>					
Navajo Health and Nutrition Survey, 1991-1992 <sup>15</sup>	20-39	380	37.0 <sup>b</sup>	62.0 <sup>b</sup>	–
Navajo Health and Nutrition Survey, 1991-1992 <sup>15</sup>	40-59	233	50.0 <sup>b</sup>	69.0 <sup>b</sup>	–
Navajo Health and Nutrition Survey, 1991-1992 <sup>15</sup>	≥60	164	9.0 <sup>b</sup>	61.0 <sup>b</sup>	–
Alaska Natives (Eskimo/Athabaskan) 1992 <sup>16</sup>	>40		31.5 <sup>b</sup>	56 <sup>b</sup>	–
Alaska Natives (Inupiat/Yupik/Eskimo) 1994 <sup>17</sup>	≥25	–	36.2	27.9	–
Strong Heart Study 1989-1992 <sup>18,19</sup>					
Pima, Maricopa/Papago, AZ	45-74	1446	67.0	80.0	75.0
7 Oklahoma Tribes, OK	45-74	1449	65.0	71.0	70.0
3 Lakota Tribes, ND, SD	45-74	1409	54.0	66.0	62.0
U.S. all races 1976-1980 <sup>20</sup>		11,207			47.0
U.S. all races, 1988-94 <sup>10</sup>	≥20	–	–	–	54.9 <sup>d</sup>

<sup>a</sup>Weight-for-height > 95<sup>th</sup> percentile of National Center for Health Statistics (NCHS) reference population<sup>21</sup>

<sup>b</sup>BMI > 85<sup>th</sup> percentile of Second National Health and Nutrition Survey reference population<sup>20</sup>

<sup>c</sup>Self-reported height and weight

<sup>d</sup>BMI > 85<sup>th</sup> percentile of Third National Health and Nutrition Survey reference population<sup>10</sup>

## **B. Morbidity and Mortality Associated with Obesity**

Poor nutrition contributes substantially to the burden of preventable illness, disability, and premature death in the United States. Of the six leading causes of death among AI/AN adults – heart disease, malignant neoplasms, accidents/injury, diabetes mellitus, chronic liver disease and cirrhosis, and cerebrovascular disease – all are diet-related except for accidents/injury.<sup>22</sup>

Among the general U.S. population, and probably among AI/AN, the health risks of obesity increase with severity and reach significance at a body mass index (BMI) greater than 27.<sup>23</sup> Known obesity-related health risks for adults include type 2 diabetes, hypertension, cardiovascular disease, and problems with lipid levels.<sup>24</sup> These risks are higher for people with centralized body fat than for people with peripheral fat distribution.<sup>25 26</sup> Mortality from gallbladder cancer, endometrial cancer in women, and colorectal cancer in men is also increased.<sup>24</sup>

### **Diabetes**

The diabetes epidemic among AI/AN populations is strongly associated with the increasing prevalence of obesity.<sup>18 2</sup> A striking example is seen with the Pima Indians, who have the highest rates of type 2 diabetes in the world, with a prevalence of about 50 percent in adults older than 35 years.<sup>27</sup> Obesity is also more common among children of diabetic parents.<sup>27</sup> Obesity and parental diabetes increase diabetes incidence rates synergistically, with the highest rates occurring in obese subjects with at least one parent with diabetes.

A study by the Centers for Disease Control and Prevention (CDC) of the IHS national outpatient database found a nearly 30 percent increase in diabetes diagnoses among the AI/AN populations between 1990 and 1997. During this time period prevalence among women was higher than among men, but the rate of increase was higher among men than women (37 percent v. 25 percent). The increase in prevalence was highest in Alaska, where it rose 76 percent, and lowest in the Northern Plains region of the United States, where it rose by 16 percent.<sup>28</sup> Another study in AN found that the prevalence of diabetes increased for Yupik from 1.7 percent in 1962 to 4.7 percent in 1992 and for Indians in Alaska from 1.8 percent in 1969 to 10.0 percent in 1992.<sup>16</sup>

A study of AI/AN elders who receive Federal nutrition services, found that 54 percent had a BMI in excess of 27, and 42 percent of congregate meal participants and 32 percent of home delivered meal participants had been diagnosed with diabetes.<sup>29</sup>

It is estimated that half of all type 2 diabetes is preventable by obesity control.<sup>30</sup> A recent study found that intentional weight loss reduced mortality by 26 percent in overweight people with diabetes.<sup>31</sup>

### **Cancer and fat and alcohol intake**

It is estimated that approximately 35 percent of cancer deaths may be related to diet.<sup>24</sup> A high intake of fat has been associated with cancers of the breast, colon, rectum, and prostate

and possibly with those of the pancreas, uterus, and ovary. Populations consuming diets rich in vegetables, fruits, and grain products have significantly lower rates of cancer of the colon, breast, lung, oral cavity, larynx, esophagus, stomach, bladder, uterine cervix, and pancreas. High alcohol consumption has been associated with cancers of the buccal cavity, pharynx, larynx, esophagus, liver, large bowel, breast, head, and neck.<sup>24</sup>

### **Obesity-related Risk Factors in Children**

Child health and nutritional status in AI/AN communities have changed markedly over the past 30 years. Childhood under-nutrition, a problem prior to 1970, has now been replaced with obesity, that presents a major health problem among AI/AN children.<sup>11, 32 33</sup>

A few studies have examined risk factors for type 2 diabetes and cardiovascular disease in AI children and adolescents. Gilbert et al. reported high normal (>90th percentile) blood pressures in 10 percent of adolescent Navajo boys and 6 percent of girls.<sup>34</sup> There was a positive relationship between body weight and blood pressure. Of those with high normal blood pressure, 36 percent of the boys and 64 percent of the girls were overweight. Data from another study suggest that obesity associated with elevated lipid levels begins at an early age in AI children.<sup>35</sup> For more information about childhood obesity in AI/AN children see **Appendix 2**.



### **C. Economic Cost of Obesity**

Although the cost burden of obesity for AI/ANs is not known, this cost for the general population has been estimated. Over \$68-70 billion are spent each year on direct health care related to obesity, representing 6 to 9.4 percent of total U.S. health care expenditures.<sup>36 37</sup>

Gorsky et al. used an incidence-based analysis to estimate the 25-year direct health care and medication costs associated with women who are currently 40 years of age and who will remain overweight through age 65 years.<sup>38</sup> The analysis compared the expected rates of coronary heart disease, diabetes, and other conditions, and their associated costs. The authors estimated that when compared with the non-overweight cohort of 10,000 women, the cohort of 10,000 women who were overweight over a 25-year period incurred excess costs of

\$22 million and 212 excess deaths. They estimated that \$16 billion would be spent during the next 25 years treating health outcomes associated with overweight in middle-aged women in the United States.

A study by Oster et al. concluded that sustained modest weight loss (10 percent of fat weight) among obese persons would yield substantial health and economic benefits. Expected lifetime medical care costs for hypertension, elevated cholesterol, type 2 diabetes, cardiovascular disease, and stroke would decrease by about \$3,300 to \$3,800 per person.<sup>39</sup> Using these figures, the potential cost saving for sustained modest weight loss among obese AI/AN is \$30.7 – 35.3 million. Additionally, quality of life would be likely to improve.

#### **D. Behavioral and Lifestyle Factors Affecting Obesity**

Although moderate physical activity reduces the risk of coronary heart disease, diabetes, and colon cancer,<sup>40, 41</sup> more than 60 percent of American adults are not sufficiently active.<sup>42</sup> Approaches to encourage sedentary people to exercise are becoming better understood. Applying the model of the stages and processes of change to exercise adoption and maintenance can provide guidance for both individual and public health physical activity programs.<sup>43</sup>

A recent study by Ravussin et al. assessed the probable effect of the environment on the prevalence of obesity and type 2 diabetes.<sup>44</sup> The Pima Indians of Arizona were compared to members of a population of Pima ancestry who separated 700-1,000 years ago, living in a remote mountainous location in northwestern Mexico, whose lifestyle contrasts markedly with that of Arizona Pimas. The authors found that both obesity and possibly type 2 diabetes were less prevalent among people of Pima heritage living a "traditional" lifestyle than among Pimas living in an "affluent" environment. These findings suggest that, despite a similar potential genetic predisposition to these conditions, a more traditional lifestyle, characterized by a diet including less fat and more complex carbohydrates and by greater energy expenditure, may protect against the development of obesity, type 2 diabetes, and cardiovascular disease.

Gilbert et al. documented that Navajo adolescents consumed sugared carbonated beverages at more than twice the national average.<sup>34</sup> A recent study found one group of overweight AI/AN children consumed 402 more calories per day than children who were not overweight.<sup>9</sup> Other researchers assessed physical activity in Pima and Caucasian children and found that Pima children spent more time watching television and were less involved in sports than Caucasian children.<sup>45</sup>

Behavioral interventions in the treatment of obesity have been successful in helping individuals lose weight, but most people gradually regain to baseline weight.<sup>46</sup> A promising obesity treatment strategy involves shifting the primary focus in behavior modification programs from weight loss to optimizing long-term psychological and physical health.<sup>47</sup> The most promising weight maintenance program appears to be a combination of behavioral methods with extended therapist contact, social influence in peer groups, and aerobic exercise. The skills of registered dietitians and psychologists or behaviorists are important for program development and implementation.

### **3. IHS Plan to Reduce the Obesity Epidemic Among AI/AN**

#### **A. Obtaining AI/AN Input to Identify Issues**

##### **Planning Conference Held**

On October 23-24, 2000 a planning conference was held to identify issues and concerns, and to select priorities for addressing obesity in AI/AN populations. A list of individuals invited to the conference is in **Appendix 3**. At the conference, the Inter Tribal Council of Arizona Program presented an issue paper which is summarized in **Appendix 4**. The Council's recommendations are reflected throughout this IHS report to Congress. On December 18, 2000 a draft of the IHS report was mailed to all persons invited to the conference for review, and comments were incorporated into the report.

##### **Input from the Planning Conference and Current Diabetes Programs**

The participants in the October 2000 planning conference made a number of recommendations to IHS concerning a national obesity plan. In addition, Tribal recommendations for a national obesity plan were obtained during eight regional meetings conducted in the fall of 2000 by the IHS Special Diabetes Program for Indians. The planner of the National Diabetes Prevention Center located in Gallup, New Mexico also sought tribal input concerning obesity prevention and management. The recommendations from the October planning conference, the regional diabetes meetings, and the Gallup Program were consistent and are combined and summarized in **Appendix 5**. These groups identified the following major issues that the IHS plan to reduce obesity could address.

- Obesity prevention is the concern of highest priority, and interventions should target young children, because of the alarming increase in obesity in this age group in AI/AN. Promotion of breastfeeding should be a primary intervention.
- Schools and communities are integral to the prevention of obesity as vehicles for reaching the young with healthy meals and physical activity programs, coupled with messages about healthy eating, exercise, and not smoking. Currently there are no comprehensive school health programs; school cafeterias often serve fast foods; school vending machines offer unhealthy food choices; and convenience and fast food outlets are often located near schools.
- Developing a community and school relationship for non-tribal schools which could assist in coordinating existing educational objectives with desired health initiatives.
- Interventions need to enhance empowerment and self-determination in participants.
- Strategies to reach adults and children should be multidisciplinary and include Tribes, community members, registered dietitians, behavioral scientists, educators, exercise physiologists, housing, law enforcement, health care providers, outreach workers, public and private nutrition assistance providers, grocers, restaurant owners, parks and city/village planners, and others.
- Tribally directed community interventions that interact with non-Tribal agencies, organizations, and facilities, hold the greatest promise for success. Because tribes are heterogeneous, strategies should be tailored for the specific tribes targeted. The specific assets and barriers to achieving and sustaining healthy behaviors must be assessed for each community.
- Build tribal capacity to recruit and retain health professionals, especially registered dietitians. Build the capacity of tribes to utilize local role models (for examples

- Obesity should be viewed as a chronic disease and weight loss maintenance should be managed long-term. Regaining weight should be viewed as a failure of treatment rather than an individual's personal failing.
- There is a lack of proven strategies for effective prevention and treatment of obesity. Nutritional and weight data on AI/AN that programs can utilize in planning and evaluation is limited. Future plans should evaluate program success, therefore maintain current efforts to build the capacity of tribes in the area of program evaluation.

## **B. IHS Recommendations**

Seven recommendations are proposed by IHS to address the obesity epidemic and achieve healthy weights and healthy lifestyle habits in AI/AN communities. Each recommendation is followed by a list of proposed strategies to accomplish goals.

### **Recommendation 1**

**Work collaboratively with Tribal governments to:**

- Address obesity prevention and treatment in AI/AN children and adults.**
- Enable Tribal governments, communities, and tribal members to take ownership of health and obesity interventions, including the development, implementation, and evaluation of obesity treatment and prevention, and weight loss maintenance programs.**
- Develop cross-program initiatives including non-Native services and populations, at the national, state, regional, and tribal community levels to reach AI/AN.**

#### **Strategies**

- Conduct formal tribal consultation through local/regional meetings with AI/AN Tribal leaders, and for meetings with scientific advisors on the science and intervention research on obesity prevention and control. Seek guidance and advice from tribal leadership and AI/AN communities related to obesity prevention and treatment.
- Continue to build and support tribal capacity by providing consultation, technical assistance, training, coordination, and collaboration among various partners including tribal schools and Head Start, public schools, law enforcement, housing, health care facilities, worksites, breastfeeding promotion programs, childcare programs exercise facilities, grocery stores, restaurants/food service, tribal enterprises, federal/state/local agencies and others.
- IHS Headquarters will continue to provide consultation to regional and local programs.
- Partner agencies and communities could receive training to develop the ability to take over and manage programs for themselves and foster local tribal leadership, including leadership in young people. Trainers may be trained to implement community mobilization efforts. Networking and collaborative efforts will be promoted.

*We may never see the results of what we're doing here today as tribal leaders, but... we are here for the future good of the tribes we represent...How can we best do something for the future generations? That's what we're here to talk about...There are some people that are already gone, we've lost them. But it's those that we can stop (from getting this disease) that we can help, we can talk about prevention. Those are the ones we need to be thinking about...that group of young people. Alvin Windy Boy, Chippewa Cree, Councilman, Chair, Tribal Leaders Diabetes Committee*

## **Recommendation 2**

**Develop a “Healthy Weight and Physical Activity Program for American Indians and Alaska Natives” to potentially plan, implement, and evaluate obesity prevention and control programs in AI/AN communities.**

### **Strategies**

- The design of this program should complement the Special Diabetes Program for American Indians and Alaska Natives.
- Results of the NIH NIDDK Diabetes Prevention Program may be reviewed and may be utilized in ongoing planning when released in 2002.
- NIH Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report may be used or adapted as appropriate for the development of initiatives for the AI/AN populations.<sup>48</sup>
- Obesity Evaluation and Treatment: Expert Committee Recommendations, may be used or adapted as appropriate for the development of initiatives for AI/AN children and adolescents.<sup>49</sup>
- Research-based interventions for AI/AN children and adolescents may be developed in collaboration with CDC and NIH.
- A multidisciplinary behavioral intervention for an obesity/physical activity program that includes behavioral methods, dietary strategies, social influence/peer support, and moderate aerobic exercise may be selected and implemented.
- A cost-effective screening program may be developed to identify and provide services to children and their families, who are at high risk for becoming obese or developing diabetes.
- Culturally appropriate behavior modification programs incorporating traditional foods for both AI/AN adults and children/families may be developed. Food preparation demonstrations will be part of the programs. Strategies for life-long weight loss maintenance may be identified and incorporated.
- A plan for prenatal care to provide breastfeeding, infant feeding, and child nutrition information to expectant and young families may be established.

## **Recommendation 3**

**Work with other government agencies and departments to potentially develop interventions to reduce obesity among AI/AN communities:**

- a. Collaborate with the CDC Division of Nutrition and Physical Activity to potentially expand use of the IHS Resource Patient Management System (RPMS)**

for basic surveillance of obesity and related health status markers (e.g., serum cholesterol, blood pressure, diabetes management).

- Collaborate with CDC to possibly target interventions to reduce obesity among AI/AN communities.
- b. Develop a joint strategic plan with NIH to possibly collaborate on new research and to evaluate the success of ongoing and new activities.
- c. Collaborate with HRSA programs, including Bright Futures in Practice, Bureau of Primary Health Care, Community/Migrant Health Centers.
- d. Partner with the USDA's Food and Nutrition Service, Department of Interior, and Department of Education, and other departments, to potentially develop collaborative projects.
- e. Coordinate whenever possible this IHS plan with both Healthy People 2010 and the pending National Action Plan on Overweight and Obesity.

#### **Strategies**

- Ask each DHHS and USDA agency or program, such as USDA WIC, DHHS CDC and NIH, etc. to indicate what is being done now to help AI/AN populations prevent and treat obesity, and what is being planned to address disparities in obesity prevention and treatment in these populations in the FY 2001-2003.
- Develop interventions to further improve the nutritional quality of government food assistance programs.
- Partner, whenever possible, with the CDC Division of Nutrition and Physical Activity (DNPA) to address obesity in AI/AN populations. DNPA proposes to develop a surveillance system based on the existing RPMS system for those tribes that participate in RPMS.
- Collaborate with CDC to target interventions to reduce obesity among AI/AN communities.

Projects could include interventions focused on physical activity, diet, or a combination of the two, with the explicit goal of primary prevention of weight gain, weight loss, or maintenance of target weight in a defined target segment of the population.

Applicants could be required to include a mechanism for start-up and continuation of interventions, such as the development of partnerships in the community to sponsor programs supporting the interventions. In all cases, developing community commitment and capacity to independently maintain interventions would be a primary goal.

#### **Recommendation 4**

**Maintain or increase health care provider expertise and access to quality nutrition services:**

- a. **Train health care professionals and community health workers about obesity prevention and management.**

- b. Maintain efforts to recruit and retain registered dietitians to work with AI/AN people.**
- c. Maintain or increase current level of access to nutrition services for the AI/AN.**

**Strategies**

- Maintain or increase the number of health professionals who work with AI/AN by maintaining or increasing recruitment and mentoring efforts in tribal schools/colleges, and maintaining or increasing the number of scholarships and loan repayment slots in public health nutrition.
- Continue efforts to partner with Indian Tribal colleges and universities to offer health education, nutrition, and physical fitness courses either on-site or satellite to tribal community health care providers.
- Continue efforts to partner with AI/AN educational organizations and agencies to promote physical activity and good nutrition in schools serving AI/AN.
- Partner with HRSA’s provider training programs in Maternal Child Health Bureau and Bureau of Health Professions.
- Maintain or increase the current professional nutrition services by registered dietitians employed or contracted nationwide by the IHS, Tribes, or Urban Programs to provide fully qualified and culturally competent nutrition services to 15 percent of AI/AN or approximately 207,000 AI/AN.

**Shortterm:** Plan to conduct training of health care professionals and community health workers about obesity prevention and management.

**Longterm:** Maintain or increase AI/AN access to qualified nutrition services.

- Conduct training of health care professionals and community health workers about obesity prevention and management.
- Expand nutrition services as planned and arranged by individual tribes.
- Continue to use the loan repayment program as an incentive to fill positions in remote and isolated locations.
- Continue to provide scholarships for bachelor level AI/AN registered dietitians and/or masters level public health nutritionists, who would return to their communities or other tribal communities (often remote and isolated) after completing their college coursework and clinical or field internships. A long-term goal is to have one AI/AN community member trained as a registered dietitian per tribal group.

**Recommendation 5**

**Support or encourage the implementation of “best practices” regarding obesity prevention and management in AI/AN communities:**

- a. Identify and disseminate a kit of research-based best practices.**
- b. Select and build upon the successful components of the Pathways Study, Diabetes Prevention Program (DPP), National Diabetes Education Program, Weight Information Network (WIN) and other effective NIH, CDC, or other programs.**

**Strategies**

- Continue to collaborate with the IHS Head Start’s Healthy Children, Healthy Families, Healthy Communities Initiative’s pilot sites.
- Identify best practices in the national programs noted above as well as in current local tribal community intervention programs, and nutrition intervention studies such as the Zuni Pueblo program, the Southwestern Cardiovascular Curriculum in New Mexico, The Intensive Lifestyle Intervention, and Minnesota’s Work Out Low Fat program. These programs are discussed in sections 7 and 8 in this report.
- Prioritize for possible implementation available guidelines for physical activity and provider/patient interactions concerning obesity discussed in section 4 of this report.

### **Recommendation 6**

**Support clinical behavioral research and evaluation of public health approaches conducted in partnership with tribes by NIH, CDC, and IHS to prevent and treat obesity in AI/AN populations.**

#### **Strategies**

- **National Institutes of Health (NIH)**  
Tribes, IHS and NIH could create a strategic plan to reduce obesity among AI/AN communities. Potentially, this could include research at multiple sites throughout the United States. The research would investigate the effectiveness of specific innovative obesity prevention strategies that target schools, worksites, housing, groceries, restaurants, media, law enforcement, health centers, and other environmental factors that have an effect on weight and health.
- In collaboration with tribes, IHS and others could collect national actual height and weight data from AI/AN school-aged children, preschoolers, toddlers, and infants, in order to provide follow-up data to the 1991 AI/AN School-age Height/Weight Survey. This information could assist in planning and evaluation of obesity prevention and treatment services and strategies.
- Provide epidemiological training to select IHS, Tribal, and Urban Program nutritionists and health professionals to participate in the national height weight survey of AI/AN children.

*“It is impossible to blaze a new trail when we are unsure of where we are. Nutritional surveillance is crucial for effectively targeting the health care resources available to AI/ANs, so that we can effectively impact the escalating rates of obesity and diabetes. A national AI/AN Height/Weight Study would be timely, in that it would indicate what changes have occurred (if any) since that last national height/weight study. It would also provide data utilizing real measures of a representative sample with clear quality assurance parameters rather than existing data such as the Indian Health Service’s RPMS data.”* **Tim Gilbert (Unupiaq/Tsimpian), MPH, Health Systems Network Specialist, Anchorage, Alaska**

### **Recommendation 7**

**Develop a more detailed plan to address the obesity epidemic in AI/AN populations.**

#### **Strategies**

- Create a planning committee to conduct tribal consultation meetings and obtain comments from scientists, lay experts, AI/AN people, AI/AN

- A multidisciplinary planning group should include: health professionals, registered dietitians, mental health professionals, public health educators, public health nurses, exercise physiologists, school teachers, school administrators, food service managers, students, and parents.
- Planning meetings should be conducted in multiple locations to obtain tribal input into a comprehensive plan.

## **C. Activity Details**

### **Nutrition Staff Capacity: Direct Care**

Currently, approximately 95 registered dietitians (RD) work for the Indian Health Service and another 45 RDs work for tribal or urban Indian health programs. Additionally, about 90 RDs work with tribal/USDA Women, Infants, and Children's Supplementary Food Programs. A total of approximately 230 RDs, therefore, serve Indian people. It should be noted that tribal RDs might work part-time – for example, a few days per month. Although national data is lacking on the exact number of obese and overweight AI/AN, 40 percent AI/AN school-age children were found to be obese in 1991. It is estimated that these RDs can currently provide nutrition services to approximately 15 percent of the AI/AN population or about 207,000 individuals. It appears that 600,000 AI/AN people (40 percent of the population) may need medical nutrition therapy that can be provided by an RD.

Access to professional nutrition services is important. Studies show that people with diabetes have improved control of their blood glucose when an RD counsels them. There are also studies that show that nutrition counseling from an RD helps people improve their blood lipid levels. Results of the Diabetes Guidelines Cost Effectiveness Study show that over 60 percent of the people with type 2 diabetes who received medical nutrition therapy from an RD, achieved a 20 percent reduction in their blood sugar. People who saw an RD more often had the best results. There was also a significant weight loss noted and an improvement in lipid levels.

Results from the 1994–1998 Hyperlipidemia Outcomes of Medical Nutrition Therapy Survey which was conducted on the Warm Springs Indian Reservation in the northwest, highlight the fact that nutrition therapy by an RD was effective in improving blood lipids in 74 percent (45/61) of the patients. The average decrease in total cholesterol/HDL ratio was 18 percent. Importantly, the Warm Springs Tribe's Health Center is currently staffed by two IHS masters level RDs. These reductions in blood sugar, cholesterol levels, and weight help prevent illness, improve quality of life and well being, and decrease health care costs. Increasing access to nutrition services may be an important step in reversing the escalating rates of obesity among AI/AN. There is a paucity of evaluative data on community obesity interventions.

In addition to providing medical nutrition therapy, RDs teach group classes, develop nutrition education materials, and organize community programs to help individuals, families, and communities to improve their nutrition and exercise habits.

### **Nutrition Staff Capacity: National Headquarters**

AI/AN obesity and diabetes rates have been escalating. Consistent with the tribal self-determination policy, IHS Headquarters and Area ability to provide nutrition consultation/technical assistance to tribes and to build tribal capacity has been delegated to local communities. Since the early the 1990s, IHS Headquarters nutrition staff has been reduced from 5 to 1 full-time staff. (The national diabetes nutrition specialist, deputy national nutrition consultant, national nutrition and dietetics training program chief, public health nutrition training officer, and dietetics training officer positions were not filled when vacant.) During this same period, IHS regional nutrition staff decreased by 93 percent (14 regional nutritionists decreased to one). Building tribal capacity to provide nutrition services is a pressing priority, particularly in the area of diabetes and obesity.

The planning group named obesity prevention as the highest priority for this plan. A “Healthy Weight and Physical Activity Center” for American Indians and Alaska Natives” is one possible strategy that would build and support tribal capacity by providing consultation, technical assistance, training, coordination, and collaboration among various partners including tribal schools and daycare, public schools, law enforcement, housing, health care facilities, worksites, breastfeeding promotion programs, exercise facilities, grocery stores, restaurants, tribal enterprises, and others. Consultation and technical assistance activities could include coordinating the national height/weight survey of AI/AN school-age/preschool children with partners, potentially CDC and NIH. Increasing the knowledge of health care providers who serve AI/AN people in the area of pediatric and adult obesity treatment, as well as public health obesity prevention strategies could also be offered by such a center. Offering nutrition and physical activity education/training for paraprofessionals primarily through grants and partnerships with American Indian Community Colleges is also a possible strategy.

## **4. Available Guidelines For Physical Activity and Provider/Patient Interactions Concerning Obesity**

### **A. Physical Activity Recommendations**

Physical activity is a key factor in the prevention of obesity and chronic disease. Many children, adolescents, and adults are sedentary. Goals for evidence-based obesity prevention interventions in children involving physical activity and improved eating would be to:

- Help children reap immediate health and societal benefits by preventing stress on their metabolic and skeletal systems
- Affect critical growth periods and improve adult health
- Modify risk factors in childhood and result in reduced risk factors in adulthood
- Carry over healthy behaviors of childhood into adulthood.<sup>50</sup>

Multifaceted approaches to increase physical activity and improve eating habits may have the greatest chance for success. The Child and Adolescent Trial for Cardiovascular Health (CATCH) demonstrated that school based health promotion can increase physical activity among children and improve their dietary intakes.<sup>51 52</sup> The CATCH intervention’s strategy included changes in teacher training, school lunch program, student physical education classes, and family intervention classes. Schools are key players in a community intervention for obesity prevention.

CDC in collaboration with experts from universities from national, federal, and voluntary agencies and organizations has developed recommendations to promote a lifetime of healthy physical activity.<sup>42</sup> These recommendations will guide the IHS strategies to increase the level of physical activity among AI/AN populations and are in **Appendix 7**.

## **B. Recommendations for Provider/Patient Interactions Concerning Obesity**

The Maternal and Child Health Bureau, Health Resources and Services Administration, Department of Health and Human Services convened a conference in Washington, DC on March 18-19, 1997 to develop guidance for health professionals and others who care for overweight children. The Expert Committee for Childhood Obesity Evaluation and Treatment noted the value the dominant U.S. society places on physical appearance and the common belief that obesity results from laziness or lack of willpower. As a result, overweight children and their families often feel embarrassed and ashamed. The Committee made the following recommendations concerning the language and demeanor of clinicians that will guide planned obesity interventions:

- Clinicians who care for these families must treat them with sensitivity, compassion, and a conviction that obesity is an important, chronic medical problem that can be treated.
- Questions about food consumption and activity should be framed in objective, non-accusatory language.
- Clinicians can create an alliance with the family by focusing questions on behaviors rather than on the characteristics of the child or family.
- By taking the time to understand each family's particular living situation, schedule, and values, clinicians can refine treatment recommendations and provide sympathetic support to the family's efforts.
- Because obesity is a chronic disease, frequent visits, continuous monitoring, and reinforcement enhance the likelihood for success.
- Clinicians who lack the time required to implement these suggestions, or find themselves annoyed or easily frustrated by obese children, or the parents of obese children, should refer these patients elsewhere for care to avoid the potential adverse effect the clinician's response may have on the child and family.<sup>49</sup>

Clinicians should be offered training opportunities to enhance their interviewing and teaching skills with obese patients and their families.

## **C. Mental Health and Obesity Issues in AI/AN**

An area that has been relatively overlooked by researchers is the impact of psychological factors on obesity as well as the effects of obesity on mental health. A review of the limited published literature on the subject is summarized below and discussed in more detail in **Appendix 8**.

Kozak examined health attitudes and perceptions of people with type 2 diabetes and suggested that the impact of history and culture has been overlooked in biomedical research, thus leaving an incomplete model for understanding the disease process and experience of illness in AI/AN communities.<sup>53</sup> The author speculated that this may be the reason that

clinical interventions to manage diabetes have generally failed. The author suggested that attention to symbolic meaning and emotion is warranted and proposed that instilling an understanding that the disease is preventable and treatable as well as developing multidisciplinary and community-based collaboration will increase treatment efficacy.

Huttlinger also noted the importance of cultural beliefs and sociological understanding of the chronic disease process in AI/ANs.<sup>54</sup> The author suggested that better understanding is needed of tribes' difficulty integrating the disease concept of diabetes into their lives – a difficulty that often leads to AI/AN being termed “noncompliant” with medical treatment.<sup>54</sup>  
<sup>55 56 57</sup> Study results indicated that a sample of Navajos described diabetes as a disease that results from “forces beyond the individual that come from the realm of the supernatural.”<sup>54</sup>

A body of research examines the importance of culture in the healing process, and includes the wide acceptance of traditional healers' roles in medical and psychological treatment.

Neumark-Sztanier, et al. found that very overweight children perceived their health as fair or poor. Differences in body dissatisfaction, low body pride, and weight concerns were also noted in these children.<sup>58</sup> These findings suggest that it is important for obese youth to be both convinced and enabled to make successful lifestyle modifications to prevent excessive weight gain. The authors suggest that culturally sensitive educational and environmental interventions that take psychosocial factors into account are paramount for behavior change.

*Just don't assume that we know. We don't. You need to show us. You have to show me. You can tell me. You can give me brochures to read. I'll read those later and suddenly say “well what is this doing in here or where did I get this?” The diabetes is a constant struggle because my husband never did believe that he was sick. He says “There is nothing wrong with me,” but the toll that diabetes has taken on him...He's blind, he has an amputation below the knee, and lost a toe on the other leg. **Juanita Atone, Kiowa, husband has diabetes, married 52 years***

## 5. Risks of Obesity Treatment

The prevention and treatment of obesity is a multifaceted, long term process with potential risks that should be taken into account. Physical activity and playing sports may include health risks for injury; however, the health risks of obesity are greater.<sup>59</sup> Weight loss also holds some health risk.<sup>60</sup> The most aggressive medical strategies for weight loss, such as pharmacological treatment, surgery, and liquid diets, do carry some degree of health risk, including death. Popular diets implemented without sufficient scientific evidence or qualified medical supervision, also carry an unknown degree of health risk.

Some individuals practice dangerous weight control techniques, such as smoking. Smoking cessation and tobacco education should be part of a comprehensive school health curriculum and health center patient education programs.

People with eating disorders such as bulimia, and anorexia often “diet” unnecessarily to lose weight. A national survey by Story, et al. of 13,454 seventh- through 12th-grade AI youth found that AI youth, particularly girls, are dissatisfied with their weight and are worried about being overweight, and that unhealthy weight control practices are common. In the year

surveyed, 48 percent had been on a weight-loss diet, and 27 percent reported that they had self-induced vomiting at some time to try to lose weight. The high prevalence of body weight dissatisfaction and the potentially harmful weight-loss practices underscore the importance of ensuring appropriate weight management practices among adolescents.<sup>61</sup>

People who are not overweight and/or those with eating disorders should be screened from weight loss programs and directed to appropriate medical and mental health resources. Current scientific evidence supports the practice of healthy dietary and exercise habits to increase an individual's likelihood of having a healthier life.<sup>49</sup>

## **6. Studies of Dietary Intake**

### **A. Studies Reporting Nutrient Intakes for AI/AN**

Despite widespread obesity in AI/AN, there is a paucity of data on dietary and exercise patterns among these groups and on the relationships among physical activity, dietary patterns, and obesity.<sup>11</sup> Several dietary practices may contribute to obesity, including the wide use of butter, lard, whole milk, fry bread, and fried meats and vegetables, as well as the generous use of fats in the preparation of beans. Sweets and snacks may account for high calorie intakes in some groups.<sup>34</sup>

An extensive review of the 1980-98 literature by Story et al,<sup>62</sup> found 13 studies reporting nutrient intakes in 20 tribal groups. Dietary intake information was collected using 24-hour dietary recalls, multiple-day food records, and food frequency questionnaires. All of the studies used visual guides such as pictures, cardboard shapes, or measuring utensils to quantify serving sizes. Nutrient values for traditional native foods, when available, were used in the analysis. Major findings were as follows:

- Dietary fat intake was high.
- In all of the studies, mean protein intake met the RDA.
- Vitamin C was adequate in all groups except adolescent Cherokee (North Carolina) boys.
- Mean intakes of vitamin A were below the RDAs for all age groups and both genders in the Navajo Health and Nutrition Survey.
- The RDA for iron was not met for most of the groups of females.
- Calcium intake was below the RDA for most of the groups.

In all of the studies, dietary fat intake was above the recommended level of 30 percent of total calories, ranging from 31 percent to 47 percent. In the 11 studies in which dietary fat was reported, half of the study groups had intakes of 30-35 percent of calories from fat and half had intakes greater than 35 percent from fat. In one study the percentage of calories from fat exceeded 40 percent.

### **B. Traditional and Contemporary Foods**

During the past century, dietary patterns among the various AI/AN tribes have changed drastically. Diets historically high in complex carbohydrate/high fiber foods have been replaced by high-fat modern foods.<sup>63</sup> Concomitant with these dietary changes have been dramatic increases in obesity and diabetes. Before the turn of the twentieth century, however, the diabetes was virtually nonexistent. During the past fifty years, the amount of wild and homegrown foods in the AI/AN diet has greatly diminished, and a significantly

greater proportion of food is processed and commercially prepared, a trend also seen among the general U.S. population.

In general, the diets of AI/AN today are high in refined carbohydrates (especially refined sugars), fat, and sodium, and low in fruits and vegetables.<sup>64 65</sup> The Navajo Health and Nutrition Survey found that fruits and vegetables were each consumed less than once per day per person, as were dairy products. Fry bread and Navajo tortillas, home-fried potatoes, mutton, bacon and sausage, soft drinks, coffee and tea provided 41 percent of the energy and 15 – 46 percent of the macronutrients consumed.<sup>66</sup>

Traditional foods are an integral part of numerous celebrations, feast days, powwows, and religious ceremonies. Most traditional foods are low in fat and sugar, with relatively high nutritive value. Today, AI/AN populations are being encouraged to incorporate more of their traditional foods into their diet. For further information about traditional and contemporary food see **Appendix 9**.

### **C. Food Assistance Programs**

The poverty rate for AI/AN (25.9 percent) is higher than any other racial/ethnic category. Consequently, federal nutrition assistance has become an integral part of AI/AN life on and off the reservation. Low-income households living on or near Indian reservations are able to receive supplemental nutrition assistance from several programs administered by USDA. These programs include the School Lunch and Breakfast Programs, the Supplemental Food Program for Women, Infants, and Children (WIC), the Food Distribution Program on American Indian Reservations (FDPIR), and the Food Stamp Program. Federal nutrition services are also provided to AI/AN elders through both Title III and Title VI of the Older Americans Act. These include both congregate and home-delivered meals. Collectively, these programs contribute significantly to AI/AN diets.

FDPIR and the Food Stamp Program are most widely used by AI. Approximately 68 per cent of the tribes located in the continental United States participate in FDPIR, a program not available in Alaska. In 1999, an average of 129,466 individuals received commodities under FDPIR each month, while approximately 103,500 AI/AN participated monthly in the Food Stamp Program.<sup>67</sup> Eligible households may participate in either FDPIR or the Food Stamp Program each month, but they cannot participate in both programs simultaneously.

Congress established FDPIR in 1977 as a replacement for the Needy Family Program, which was created in 1936 to distribute commodity agricultural products to households in need of food assistance. Although national participation in the Needy Food Program had declined as the Food Stamp Program expanded in the 1960's and early 1970's, Congress was concerned that AI/AN nutrition assistance needs could not be adequately addressed by the Food Stamp Program. The focus of concerns was that the remote location of many reservations made it difficult for many AI/AN to participate in the Food Stamp Program, either because of the distance to food stamp offices, or if certified to receive food stamps, the difficulty of using them due to the scarcity of authorized food stores or the distance to them. Thus, FDPIR represents an alternative to the Food Stamp Program for households living on or near reservations where access may be a problem.

A 1990 report evaluating FDPIR addressed the nutrition-related health problems among FDPIR households.<sup>72</sup> More than half (53.9 percent) of all FDPIR household had at least one adult (over 16 years of age) with one or more nutrition-related health problems (e.g., diabetes, hypertension, obesity, heart disease, or cancer). One out of four FDPIR households reported having at least one member who was prescribed a special diet (e.g., sugar free, low salt, low cholesterol, or low fat). As a result, USDA has made significant improvements to the nutritional profile of commodities offered under FDPIR. The level of fat, sodium and sugar has been reduced in many of the products.

In addition, USDA is continuing to work closely with the tribes and health professionals to provide a food package that includes a variety of nutritious foods while appealing to the food preferences of tribes with distinct cultures and traditions. Participants may select from a monthly food package that contains over 70 products, including frozen and canned meats, canned fruits and vegetables, ready-to-eat and cooked cereals, evaporated and nonfat dry milk, low-sodium canned soups, macaroni and cheese, spaghetti sauce, pasta and rice, flour and bakery mix, peanut butter and peanuts, low-sodium crackers, dehydrated potatoes, dried fruit, canned juices, dry and canned beans, all purpose egg mix, cheese, shortening, oil and corn syrup. Recently, bison meat has been provided to program participants. Also, tribes may opt to receive fresh produce, which is distributed to households in lieu of canned fruit and vegetables each month. To date, approximately 72 percent of the Indian Tribal Organizations participating in FDPIR have elected, and been approved, to participate in the fresh produce program. Increased nutrition education for participants that promotes utilization of these improved food items in healthy recipes is desirable.

## **7. Nutrition-Related Intervention Studies**

Comprehensive obesity-prevention programs beginning early in childhood are necessary if the epidemics of obesity and diabetes among AI/AN populations are to be reversed. School- and community-based interventions are needed to encourage lifelong healthy eating and regular physical activity. IHS and tribal nutritionists have conducted community-based nutrition education activities including adult diabetes camps, cooking classes, community fun walks, youth health camps, and nutrition education via the supermarket, community aerobic classes, and 100-mile walking clubs.<sup>68</sup> While these activities tend to be culturally appropriate, their effectiveness has not been established. Promising programs are summarized below. For more information on the Zuni Pueblo and Pathways programs see **Appendix 10**.

- The Zuni Pueblo, a southwest AI community with high rates of obesity and diabetes, has succeeded in developing community-based diabetes and wellness programs to promote physical activity and weight loss through fitness events, nutrition education, and weight loss competitions in adults.<sup>69</sup> The results showed improved metabolic control in individuals with type 2 diabetes and modest weight loss.
- The Southwestern Cardiovascular Curriculum Project in New Mexico was a comprehensive, culturally oriented curriculum designed to increase knowledge and promote healthy behavior changes in fifth-grade Navajo and Pueblo Indian children. Preliminary

- The Intensive Lifestyle Intervention is one of three interventions to be examined by the NIH conducted Diabetes Prevention Program (DPP). It focuses on dietary changes and increased physical activity to promote weight loss in adults with impaired glucose tolerance. Each participant receives individual and group training in diet, exercise, and behavior modification skills. Goals are personalized to meet individual needs and be flexible and sensitive to cultural differences. Four AI tribal communities are participating in the national DPP trial. Results are anticipated in 2002.
- "Pathways" is a school based primary prevention study of obesity in AI school children funded by the NIH. This six-year multi site study involves seven AI Nations/Tribes, five universities, 41 schools, and families.<sup>72</sup> Results from the study are anticipated early in 2001. The intervention involved:
  - 1). A classroom curriculum focused on healthy lower-fat eating patterns and increased physical activity.
  - 2). Modification of school meals.
  - 3). A physical education program in school.
  - 4). Family involvement.
- Minnesota's Work Out Low Fat – WOLF program is an eight-week curriculum for children in grades 1-4 that promotes AI traditional lifestyle to encourage greater physical activity and less consumption of dietary fat. The program began with funding from the National Institute of Diabetes, Digestive, and Kidney Diseases of NIH for primary prevention of diabetes for AI youth. In 1997, the Minnesota state legislature funded a Tribal Task Force to take the WOLF program to AI communities throughout the state.

Although intervention studies such as these are promising, more effort is needed to develop and evaluate other culturally appropriate health education interventions. The active involvement of the AI/AN community is critical when planning, conducting, and evaluating interventions.

## **8. Local Tribal Community Intervention Programs**

A select number of innovative local tribal strategies were reviewed when preparing this IHS plan.

### **A. Ho-Chunk Nation Youth Fitness Program, Wisconsin**

The Ho-Chunk Nation's Youth Fitness Program, located in Wisconsin, was funded by a HRSA Office of Rural Health Policy grant. In 2000, the program was initiated to address increasing rates of diabetes and obesity. The aim of the program is to empower 6-18 year olds and their families to improve their fitness and nutritional habits with a strategy that combines fun and exercise. The health program works closely with local schools that refer participants to the program. The staff includes an exercise specialist and pediatric registered dietitian. The program involves nutritional assessment and counseling; healthy habit activities; low fat cooking classes; fitness classes; nutrition and health education; and

encouragement. Participants receive incentives and also earn rewards while working toward their goals. Students earn extra points for parental involvement. Cultural sensitivity has been key to the program, which has received support from elders in the community.

This initiative brings together a network consisting of the Ho-Chunk Nation Department of Health, Black Falls Health Care Center, Wisconsin Dells House of Wellness, Ho-Chunk Nation Youth Services Program, The University of Wisconsin Madison Pediatric Fitness Clinic, Baraboo School District, Black River Falls School District and Wisconsin Dells School District.

Representatives from the Ho-Chunk Nation Department of Health participated in the IHS Nutrition and Dietetics Training Program Community Mobilization Workshop addressing diabetes prevention and control in AI communities, in 1997.

## **B. “Community Mobilization to Beat Diabetes” in Six Tribal Communities**

This 1997 project began with the development of a workshop to train a number of key community people about the art of community mobilization. Attendees included community members, registered dietitians, health educators, tribal government and school employees, emergency medical service workers, and social workers.

Tribal community and individual ownership of the project is a key feature, as community members identify problems and act upon common goals. This approach fosters local leadership development. Community members are enlisted to develop health strategies to reduce the escalating rates of diabetes. Community mobilization is consistent with tribal self-determination. Utilizing existing resources to target a pressing health issue among community members and coalition building is emphasized. The project planners look at community assets to draw upon and select strategies to overcome the barriers to healthy habits and exercise. Sustaining behavior change is an underlying goal of the program. The strategy builds and supports local health programs and the “Gathering Of Native Americans” (GONA) programs.

Coordination occurs at all levels and between divisions and programs within the IHS including: Nutrition, Tribal Affairs, Health Education, Community Health Representatives, Nursing, and the Diabetes Program. Health care providers are utilized as advisors and consultants. An AI instructor was recruited to teach the training workshop. The IHS Headquarters Nutrition and Dietetics Training Program coordinated the workshop arrangements.

Six tribal communities were selected for the project: Jemez (New Mexico); Ho-Chunk (Wisconsin); Blackfeet (Montana); Eastern Band of Cherokee (Nashville); Seminole (Nashville); and Kayenta (Navajo). The training may have been instrumental in increasing the success of future projects, for example, the IHS Nashville area nutrition consultant observed that the community mobilization efforts provided structure for the community’s efforts when grant dollars were received. Participants requested further help, for example in grant writing.

**Tribal participants in the “Community Mobilization to Beat Diabetes” program in six tribal communities made the following comments about the program:**

- “Returns a sense of hope”
- “Can plan with co-workers”
- “Used small tasks”
- “Modified to our needs”
- “Emphasized responsibility on others”
- “Don’t have to do all alone”
- “Going home with a plan – not just information”
- “Useful in many life and work situations”
- “High caliber, concerned (faculty) staff”

**C. St. Regis Mohawk Tsitewatakari:tat “Let’s Get Healthy” Program**

This program began in 1993 as a collaborative activity by the Akwesasne Tribe of NY and University of Vermont health scientists, with funds from NIH NIDDK, as a school-based primary prevention of obesity and diabetes program, Pre-K to Grade 6, and a community-based intervention. The initiative includes a comprehensive range of interventions including a curriculum, community exercise classes, diabetes education in-services, teacher interviews, and body fat measurements. At the start of the program in 1994, more than 50 percent of children were overweight, and at the end of the program in 1998, 90 percent of those children continued to be overweight (10 percent became less and 18 percent became more overweight). The investigators concluded that a healthy lifestyle involving an energy balanced diet with enough activity to avoid excessive weight gain has not been achieved for at least half the children in Akwesasne.

In 1998, the program was expanded to a community and clinic-based intervention to target people with or at risk for type 2 diabetes, using funds from the Special Diabetes Grants for Indians.

*The Tsitewatakari:tat-Let’s Get Healthy Program is a long-term initiative to enable Mohawk people to sustain community wide programs that promote healthy lifestyles among Mohawk children as they become adolescents. It is a genuine commitment by many hearts working to improve the health of our Mohawk children and families at Akwesasne. Some of the benefits have been the formation of a community-wide coalition to promote nutrition and fitness activities including increased fruit and vegetable consumption, neighborhood walks, and reduced soda pop and television viewing campaigns. **Janine Rourke, RN, BSN, Diabetes Grant Coordinator, St. Regis Mohawk Tribe, Akwesasne, NY.***

**9. Current National Program Activities**

**A. IHS Special Diabetes Program for Indians Interim Report to Congress, January 2000**

The Balanced Budget Act of 1997 provided \$150 million over 5 years to the IHS to establish a Special Diabetes Program for Indians focused on the prevention and treatment of diabetes. The Consolidated Appropriations Act of FY2001 extended and increased the diabetes funding for IHS to FY 2003 at \$100 million per year. The findings of the interim report to Congress for the diabetes program will be helpful during the planning phase recommended by this obesity report to Congress.

The IHS was instructed to conduct an evaluation of the grant program and provide an interim (Year 2000) and final (Year 2002) report to Congress. The accomplishments noted in the interim report include tribal consultation with full participation from tribes, urban AI organizations, and IHS staff; and 318 grants were awarded. The grant programs place emphasis on addressing preventive health measures in adults who are overweight (71.4 percent), people with high blood pressure (70 percent), children who are overweight (56 percent), and tobacco users (42.6 percent). The magnitude of the diabetes epidemic among AI/AN has prompted many tribes to first address urgent diabetes treatment and care issues, including the high cost of medications, availability of staff to treat patients with diabetes, access to equipment and supplies for self-monitoring of blood glucose, and specialty medical care. The need for primary prevention, such as obesity prevention, remains crucial. The report states that the grant opportunities have allowed tribal communities to move further along their paths to wellness and diabetes prevention. However, the report also states that five years is not nearly enough time to accomplish the goal of diabetes prevention.

Most of the grant programs include components for young people, especially children and teenagers. Many programs for children and adolescents are designed to teach awareness of the health dangers associated with obesity. Goals are to improve dietary habits and encourage physical activity. Currently, 21 percent of the programs propose classes to promote physical fitness; 18 percent of the programs propose individual training; 17 percent intend to use grant funds to purchase exercise equipment; and 6 percent propose programs to train exercise instructors. Further strengthening of these physical activity and nutrition education components of grantee programs may be instrumental in decreasing obesity rates.

Nutrition activities are important for grant programs. Currently, 32 percent are targeting the whole community with healthy cooking classes, and 60 percent report developing or enhancing individual nutrition sessions for people with diabetes. More than half of the grant programs (56 percent) are providing education in the healthy use of commodity foods. About one-third of grantees used group or individual sessions with Head Start and WIC families. Many grantees used traditional approaches in their diabetes programs, including story telling (34 percent), talking circles (35 percent), and use of traditional herbs or medicines (28 percent). Traditional approaches help support and influence positive diabetes self-management behaviors within communities.

Few programs (3.2 percent) are targeting infants. However, promising research shows that infants who are breastfed for at least two months are at reduced risk for developing type 2 diabetes later in life, even if one or both of their parents have type 2 diabetes. About nineteen percent of the grant programs target Head Start or preschool children. This is

important because children ages 0-5 years of age are a key group for obesity prevention interventions, because of the high rates of obesity seen in AI/AN children 6-18 years of age.

Programs report that personnel barriers affect their programs. Remoteness of locations, salary scales, and recruitment techniques, may play a role in the ability of tribes to hire and retain fully qualified staff. Hiring new staff has been a barrier for 126 (45.5 percent) of the reporting programs. Ninety-two (33 percent) tribal grantees report difficulty obtaining nutrition services from a registered dietitian. Sixty-nine (24.9 percent) tribal grantees report that staff turnover is a barrier for their program. Almost half of the reporting grantees (44.4 percent) report that office space is a problem for their programs. One recommendation is to implement a Healthy Weight and Physical Activity Program to address the need for primary prevention.

### **B. IHS Head Start Initiative “Healthy Children, Healthy Families, Healthy Communities: A Focus on Diabetes and Obesity Prevention”**

A new diabetes and obesity prevention initiative targets AI/AN Head Start Programs, which serves ages 0-5 years. In 1998 the planning process for this initiative began when twenty people representing tribal Head Start Programs, IHS, USDA, and university public health advisors met to draft a plan to address escalating obesity and diabetes rates in AI/AN communities. The group agreed that long-term interventions to promote healthy living would be appropriate, while interventions that label and target overweight individuals would be inappropriate.

The focus, therefore, is long term, and stresses healthy habits. These habits include nutritionally sound food choices and regular physical activity. Community mobilization and ownership of the program is key to the program’s success. Each local Head Start program and community will be charged with the development of its own program. Continuing or establishing partners to collaborate on this effort will be an important part of the program.

In October 2000, five pilot Head Start grantees were selected to participate\*. In November 2000 an orientation for pilot sites was held in Albuquerque, NM. Sites outlined the type of technical assistance they would require to begin work on the initiative. Two nutrition workshops have been held for the pilot sites. The workshop attendees were provided a booklet, Bright Futures in Practice: Nutrition, for a reference.<sup>73</sup> The pilot sites will operate programs for at least two years, be evaluated, be revised as necessary, and introduced nationwide to all IHS Head Start grantees. Because this is a joint tribal/IHS initiated initiative, collaborations and partnerships are vital.

- \* -Cherokee Tribal Childcare Services, Qualla Boundary Head Start Program, Cherokee, NC
- Northern Cheyenne Head Start Program, Lame Deer, MT
- Red Cliff Tribal Early Head Start Program, Bayfield, WI
- San Felipe Pueblo Head Start Program, NM
- Winnebago Head Start and Whirling Thunder Diabetes Prevention Program, NE.

### **C. NIH Diabetes Prevention Program (DPP)**

NIDDK is conducting the DPP to investigate whether the onset of type 2 diabetes can be prevented or delayed. Four AI tribes are participating in the DPP multicenter study, which includes an intensive diet and physical activity component and medication. The Pima Indian population of Gila River Indian Community of Arizona is expected to participate in a 2001 NIDDK Study of Health Outcomes of Weight-Loss (SHOW) clinical trial – a national multicenter, randomized study to determine whether interventions designed to produce sustained weight loss in obese individuals with type 2 diabetes improve health and prevent complications.

## 10. Summary

The escalating costs of obesity in terms of dollars and human suffering in AI/AN populations demand that action steps are taken. The proposed IHS national strategy to reduce the epidemic among AI/AN includes prevention, treatment, and weight loss maintenance as part of a long-range plan. Most resources would be targeted for prevention - the most cost effective strategy. Promoting healthy eating and exercise in AI/AN communities, particularly in young people, has the greatest potential for a lasting effect. This prevention strategy requires the partnership of numerous key players who need to be involved in the development, planning, implementation, and evaluation of the IHS plan.

Interventions must be culturally sensitive, grounded in cultural values and traditions that promote health and well being, and developed with full participation of the AI/AN communities. This report to Congress therefore recommends that a nationwide plan involve collaborative partnerships among Tribal governments, local native and non-native communities, and government agencies. Developing a Healthy Weight and Physical Activity Program for AI/AN would enable sound, coordinated planning, implementation, and evaluation of obesity prevention and control programs in AI/AN communities.

Expanded recruitment and retention of registered dietitians would increase access to nutrition services. The identification and implementation of “best practices” would enable local communities to implement effective obesity prevention and management programs. Clinical behavioral research, and evaluation of public health approaches, would provide new information and methods for reducing obesity and related morbidity. A yearlong planning period would enable planners to obtain input from all partners to develop detailed plans to address the obesity epidemic.



## References

1. Bouchard C. Current understanding of the etiology of obesity: genetic and nongenetic factors. *Am J Clin Nutr* 1991; 53:1561S-1565S.
2. Welty TK. Health implications of obesity in American Indians and Alaska Natives. *Am J Clin Nutr* 1991; 53:1616S-1620S.
3. LeMaster PL, Connell CM. Health education interventions among Native Americans: a review and analysis. *Health Educ Q* 1994; 21:521-38.
4. Strauss K. American Indian school children height and weight survey. *Primary Care Provider* 1993; 18:137-42.
5. Gallaher MM, Hauck FR, Yang-Oshida M, Serdula MK. Obesity among Mescalero preschool children. Association with maternal obesity and birth weight. *Am J Dis Child* 1991; 145:1262-5.
6. Pettitt DJ, Roumain J, Hanson R, et al. Lower glucose in pregnant and nonpregnant Pima Indians who were breast fed as infants. *Diabetologia* 1995; 38 (suppl 1):A61.
7. Maternal and Child Health Branch, Division of Nutrition, Centers for Disease Control and Prevention. *Pediatric Nutrition Surveillance System Annual Report, 1994*. Atlanta, GA: Centers for Disease Control and Prevention, 1996.
8. Jackson MY. Height, weight, and body mass index of American Indian schoolchildren, 1990-1991. *J Am Diet Assoc* 1993; 93:1136-40.
9. Harvey-Berino J, Wellman A, Hood V, Rourke J, Secker-Walker R. Preventing obesity in American Indian children: when to begin. *J Am Diet Assoc* 2000; 100:564-6.
10. National Center for Health Statistics. *The Third National Health and Nutrition Examination Survey*. Hyattsville, MD: National Center for Health Statistics, Centers for Disease Control and Prevention, 1996.
11. Broussard BA, Johnson A, Himes JH, et al. Prevalence of obesity in American Indians and Alaska Natives. *Am J Clin Nutr* 1991; 53:1535S-1542S.
12. Freedman DS, Serdula MK, Percy CA, Ballew C, White L. Obesity, levels of lipids and glucose, and smoking among Navajo adolescents. *J Nutr* 1997; 127:2120S-2127S.
13. Stuart CA, Smith MM, Gilkison CR, Shaheb S, Stahn RM. Acanthosis Nigricans among Native Americans: an indicator of high diabetes risk. *Am J Public Health* 1994; 84:1839-42.
14. Zephier E, Himes JH, Story M. Prevalence of overweight and obesity in American Indian School children and adolescents in the Aberdeen area: a population study. *Int J Obes Relat Metab Disord* 1999; 23 Suppl 2:S28-30.
15. White LL, Ballew C, Gilbert TJ, Mendlein JM, Mokdad AH, Strauss KF. Weight, body image, and weight control practices of Navajo Indians: findings from the Navajo Health and Nutrition Survey. *J Nutr* 1997; 127:2094S-2098S.
16. Murphy NJ, Schraer CD, Bulkow LR, Boyko EJ, Lanier AP. Diabetes mellitus in Alaskan Yup'ik Eskimos and Athabascan Indians after 25 yr. *Diabetes Care* 1992; 15:1390-2.
17. Risica PM, Ebbesson SO, Schraer CD, Nobmann ED, Caballero BH. Body fat distribution in Alaskan Eskimos of the Bering Straits region: the Alaskan Siberia Project. *Int J Obes Relat Metab Disord* 2000; 24:171-9.
18. Lee ET, Howard BV, Savage PJ, et al. Diabetes and impaired glucose tolerance in three American Indian populations aged 45-74 years. *The Strong Heart Study*. *Diabetes Care* 1995; 18:599-610.
19. Welty TK, Lee ET, Yeh J, et al. Cardiovascular disease risk factors among American Indians. *The Strong Heart Study*. *Am J Epidemiol* 1995; 142:269-87.
20. National Center for Health Statistics. *Anthropometric reference data and prevalence of overweight: United States, 1976-80*. Washington, DC: US Government Printing Office, 1987.
21. Hamill PV, Drizd TA, Johnson CL, Reed RB, Roche AF, Moore WM. Physical growth: National Center for Health Statistics percentiles. *Am J Clin Nutr* 1979; 32:607-29.
22. Indian Health Service Program Statistics Team. *Trends in Indian Health*. Rockville, MD: Indian Health Service, 1997.
23. Pi-Sunyer FX. Health implications of obesity. *Am J Clin Nutr* 1991; 53:1595S-1603S.
24. National Research Council Committee on Diet and Health. *Diet and Health: Implications for Reducing Chronic Disease*. Washington, DC: National Academy Press, 1989.
25. Knowler WC, Pettitt DJ, Saad MF, et al. Obesity in the Pima Indians: its magnitude and relationship with diabetes. *Am J Clin Nutr* 1991; 53:1543S-1551S.

26. Howard BV, Lee ET, Cowan LD, et al. Coronary heart disease prevalence and its relation to risk factors in American Indians. The Strong Heart Study. *Am J Epidemiol* 1995; 142:254-68.
27. Knowler WC, Saad MF, Pettitt DJ, Nelson RG, Bennett PH. Determinants of diabetes mellitus in the Pima Indians. *Diabetes Care* 1993; 16:216-27.
28. Burrows NR, Geiss LS, Engelgau MM, Acton KJ. Prevalence of diabetes among Native Americans and Alaska Natives, 1990-1997: An increasing burden. *Diabetes Care* 2000; 23:1786-90.
29. United States Department of Health and Human Services. *Serving Elders at Risk: The Older Americans Act Nutrition Program's National Evaluation of the Elderly Nutrition Program, 1993-1995*. Washington, DC: Office of the Assistant Secretary for Aging, Office of the Assistant Secretary for Planning and Evaluation, July 1996.
30. McGinnis JM, Foege WH. Actual causes of death in the United States. *Jama* 1993; 270:2207-12.
31. Williamson DF, Thompson TJ, Thun M, Flanders D, Pamuk E, Byers T. Intentional weight loss and mortality among overweight individuals with diabetes. *Diabetes Care* 2000; 23:1499-504.
32. Owen GM, Garry PJ, Seymoure RD, Harrison GG, Acosta PB. Nutrition studies with White Mountain Apache preschool children in 1976 and 1969. *Am J Clin Nutr* 1981; 34:266-77.
33. Story M, Strauss KF, Zephier E, et al. Nutritional concerns in American Indian and Alaska Native children: Transitions and future directions. *Journal American Dietetic Association* 1998; 98:170-6.
34. Gilbert TJ, Percy CA, Sugarman JR, Benson L, Percy C. Obesity among Navajo adolescents. Relationship to dietary intake and blood pressure. *Am J Dis Child* 1992; 146:289-95.
35. Blackett PR, Taylor T, Russell D, Lu M, Fesmire J, Lee ET. Lipoprotein changes in relation to body mass index in Native American adolescents. *Pediatr Res* 1996; 40:77-81.
36. Wolf AM. What is the economic case for treating obesity? *Obes Res* 1998; 6 Suppl 1:2S-7S.
37. Colditz GA. Economic costs of obesity and inactivity. *Med Sci Sports Exerc* 1999; 31:S663-7.
38. Gorsky RD, Pamuk E, Williamson DF, Shaffer PA, Koplan JP. The 25-year health care costs of women who remain overweight after 40 years of age. *Am J Prev Med* 1996; 12:388-94.
39. Oster G, Thompson D, Edelsberg J, Bird AP, Colditz GA. Lifetime health and economic benefits of weight loss among obese persons. *Am J Public Health* 1999; 89:1536-42.
40. Hu FB, Sigal RJ, Rich-Edwards JW, et al. Walking compared with vigorous physical activity and risk of type 2 diabetes in women: a prospective study. *JAMA* 1999; 282:1433-9.
41. Andersen RE, Wadden TA, Bartlett SJ, Zemel B, Verde TJ, Franckowiak SC. Effects of lifestyle activity vs structured aerobic exercise in obese women: a randomized trial. *JAMA* 1999; 281:335-40.
42. U.S. Department of Health and Human Services. *Physical activity and health: A report of the Surgeon General*. Atlanta, GA: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, 1996.
43. Marcus BH, Rossi JS, Selby VC, Niaura RS, Abrams DB. The stages and processes of exercise adoption and maintenance in a worksite sample. *Health Psychol* 1992; 11:386-95.
44. Ravussin E, Valencia ME, Esparza J, Bennett PH, Schulz LO. Effects of a traditional lifestyle on obesity in Pima Indians. *Diabetes Care* 1994; 17:1067-74.
45. Fontvieille AM, Kriska A, Ravussin E. Decreased physical activity in Pima Indian compared with Caucasian children. *Int J Obes Relat Metab Disord* 1993; 17:445-52.
46. Goodrick GK, Foreyt JP. Why treatments for obesity don't last. *J Am Diet Assoc* 1991; 91:1243-7.
47. Foreyt JP, Goodrick GK. Behavioral interventions in the management of obesity. *Clinical Diabetes* 1995.
48. National Institutes of Health. *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report*. Bethesda, MD: National Institutes of Health, National Heart Lung, Blood Institute, September, 1998.
49. Barlow SE, Dietz WH. Obesity evaluation and treatment: Expert Committee recommendations. The Maternal and Child Health Bureau, Health Resources and Services Administration and the Department of Health and Human Services. *Pediatrics* 1998; 102:E29.
50. Baranowski T, Mendlein J, K. R, Frand E, Cullen K, Baranowski J. Physical activity and nutrition in children and youth: An overview of obesity prevention. *Preventive Medicine* 2000; 31:S1-S10.
51. McKenzie TL, Nader PR, Strikmiller PK, et al. School physical education: effect of the Child and Adolescent Trial for Cardiovascular Health. *Prev Med* 1996; 25:423-31.
52. Lytle LA, Stone EJ, Nichaman MZ, et al. Changes in nutrient intakes of elementary school children following a school-based intervention: results from the CATCH Study. *Prev Med* 1996; 25:465-77.
53. Kozak DL. Surrendering to diabetes: An embodied response to perceptions of diabetes and death in the Gila River Indian community. *Omega* 1997; 35:347-59.

54. Huttlinger. A Navajo perspective of diabetes. *Family and Community Health* 1995; 18:9-16.
55. Allen SN. Psychological assessment of post-traumatic stress disorder. *Psychometrics, current trends, and future directions. Psychiatr Clin North Am* 1994; 17:327-49.
56. Duran E. Considerations of dealing with suicide as a front line health provider in Indian country. *Suicide Handbook: Prevention and Intervention with Native Americans*. San Francisco: Indian Health Service, 1989.
57. Ellis A. Post-traumatic stress disorder (PTSD): A rational emotive behavioral theory. *Journal of Rational Emotive Cognitive Behavior* 1994; 12:3-19.
58. Neumark-Sztainer D, Story M, Resnick MD, Blum RW. Psychosocial concerns and weight control behaviors among overweight and nonoverweight Native American adolescents. *J Am Diet Assoc* 1997; 97:598-604.
59. Berg FM. Special report: Health risks of obesity. *Obesity and Health* 1993.
60. Berg FM. Health risks of weight loss. *Healthy Weight Journal* 1995.
61. Story M, Hauck FR, Broussard BA, White LL, Resnick MD, Blum RW. Weight perceptions and weight control practices in American Indian and Alaska Native adolescents. A national survey. *Arch Pediatr Adolesc Med* 1994; 148:567-71.
62. Story M, Strauss K, Gilbert TJ, Broussard B. Nutritional Health and Diet-Related Conditions. In: Rhoades ER, ed. *American Indian Health*. Baltimore, MD: The Johns Hopkins University Press, 2000.
63. Boyce VL, Swinburn BA. The traditional Pima Indian diet. Composition and adaptation for use in a dietary intervention study. *Diabetes Care* 1993; 16:369-71.
64. Porter J. *Native Americans: Nutrition and Diet-Related Diseases*. Washington, D.C.: Congressional Research Service Report for Congress, July, 1987.
65. Pearce J. Dietary changes in a northern Minnesota Indian community in the last fifty years. *IHS Primary Care Provider* 1990; 15:127-31.
66. Ballew C, White LL, Strauss KF, Benson LJ, Mendlein JM, Mokdad AH. Intake of nutrients and food sources of nutrients among the Navajo: findings from the Navajo Health and Nutrition Survey. *J Nutr* 1997; 127:2085S-2093S.
67. U.S. Department of Agriculture FaNS. *Participation in Food Programs by Race (FNS-101 Report)*. Washington DC: U.S. Department of Agriculture, 1999.
68. Burhansstipanov L, Dresser C. *Documentation of the Cancer Research Needs of American Indians and Alaska Natives*. Bethesda, MD., National Institutes of Health, 1993.
69. Heath GW, Wilson RH, Smith J, Leonard BE. Community-based exercise and weight control: diabetes risk reduction and glycemic control in Zuni Indians. *Am J Clin Nutr* 1991; 53:1642S-1646S.
70. Davis S, Gomez Y, Lambert L, Skipper B. Primary prevention of obesity in American Indian children. *Ann N Y Acad Sci* 1993; 699:167-80.
71. Davis S, Lambert L, Gomez Y, et al. Southwest cardiovascular curriculum project: study findings for American Indian elementary students. *Journal Health Education* 1995; 26:S72-S81.
72. Caballero B, Davis S, Davis CE, et al. Pathways: A school-based program for the primary prevention of obesity in American Indian children. *Journal Nutrition and Biochemistry* 1998; 9:535-43.
73. Story M, Holt K, Sofka D. *Bright Futures in Practice: Nutrition*. Washington, DC: National Center for Education in Maternal and Child Health, Georgetown University, 2000.
74. Sugarman JR, White LL, Gilbert TJ. Evidence for a secular change in obesity, height, and weight among Navajo Indian schoolchildren. *Am J Clin Nutr* 1990; 52:960-6.
75. Centers for Disease Control and Prevention. *1994 Pediatric Nutrition Surveillance System*. Atlanta, GA: US Department of Health and Human Services, 1996.
76. Goran MI, Kaskoun M, Johnson R, Martinez C, Kelly B, Hood V. Energy expenditure and body fat distribution in Mohawk children. *Pediatrics* 1995; 95:89-95.
77. Hauck FR, Gallaher MM, Yang-Oshida M, Serdula MK. Trends in anthropometric measurements among Mescalero Apache Indian preschool children. 1968 through 1988. *Am J Dis Child* 1992; 146:1194-8.
78. Pettitt DJ, Baird HR, Aleck KA, Bennett PH, Knowler WC. Excessive obesity in offspring of Pima Indian women with diabetes during pregnancy. *N Engl J Med* 1983; 308:242-5.
79. U.S. Department of Health and Human Services. *Healthy People 2010*. In *National Health Promotion and Disease Prevention Objectives*. Washington, D.C.: U.S. Government Printing Office, January 2000.
80. Bhadha H. *Mimicry and/as identity: Cultural poetics of the habitus. Mapping Colonialism*. Berkeley: University of California Press, 1988.

81. U.S. Department of Agriculture Food and Nutrition Service. Evaluation of the Food Distribution Program on Indian Reservations. Vol 1, Final Report. Washington, D.C.: USDA, Food and Nutrition Service Office on Analysis and Evaluation, 1990.
82. Broussard BA, Sugarman JR, Bachman-Carter K, et al. Toward comprehensive obesity prevention programs in Native American communities. *Obes Res* 1995; 3 Suppl 2:289s-297s.
83. Aspenland S, Pelican S. Traditional food practices of contemporary Taos Pueblo. *Nutrition Today* 1992; 27:6-12.
84. Wolfe WS, Weber, C.W., Arvisto KD. Use and nutrient composition of traditional Navajo foods. *Ecol Food Nutr* 1985; 17:323-344.
85. Terry RD, Bass MA. Food practices of families in an eastern Cherokee township. *Ecol Food Nutr* 1984; 14:63-70.
86. Brown AC, Brenton B. Dietary survey of Hopi Native American elementary students. *J Am Diet Assoc* 1994; 94:517-22.
87. Nobmann ED, Byers T, Lanier AP, Hankin JH, Jackson MY. The diet of Alaska Native adults: 1987-1988. *Am J Clin Nutr* 1992; 55:1024-32.
88. Lang GC. "Making sense" about diabetes: Dakota narratives of illness. *Medical Anthropology* 1989; 11:305-27.

## APPENDIX 1

### Senate Report No. 106-312 on FY 2001 Interior Appropriations

The Committee notes that obesity and related health disorders from heart disease to diabetes to colon cancer is a leading killer of Americans, and is a particular problem among Indian and Native populations. The Committee directs the Indian Health Service to work with the National Institutes of Health to develop a multi-disciplinary, long-range plan to address this public health problem. The plan, which would be submitted to the House and Senate Committees on Appropriations no later than March 1, 2001, should address nutrition and physical education for both children and adults to prevent obesity; treatment programs including medical and psychological support; and maintenance programs for those who successfully lose weight.



## APPENDIX 2

### Obesity in AI/AN Children

#### 1. Health Risks of Obesity in Children

As in adults, overweight has emerged as the major nutrition-related health issue affecting AI/AN children.<sup>8 11 74</sup> In 1990, 40 percent of school age AI/AN children were found to be obese.<sup>4</sup> Since obesity in childhood persists into adulthood and is associated with significant morbidity, this has major implications for the health of AI/AN adults.

##### A. Increasing Trend of Obesity in Children

Data suggest that there has been a secular change in height, weight, and obesity among AI/AN children.<sup>11</sup> Over the past 35 years, obesity has increased in Navajo schoolchildren. Compared with data from 1955, mean weights increased 29 percent among boys and 19 percent among girls across all age groups.<sup>74</sup> Pima children are also significantly heavier than children measured at the turn of the century. In 1905, Pima boys who were 165 cm in height weighed an average of 58 kg. During the period 1981-88, Pima boys of the same height weighed an average of 69 kg, an increase of approximately 11 kg.<sup>25</sup>

##### B. Obesity in Preschool Children

A high weight-for-height (greater than the 95th National Center for Health Statistics percentile) is indicative of being overweight. AI children have consistently exhibited the highest prevalence of overweight of all ethnic groups in the Pediatric Nutrition Surveillance System (PedNSS) of the Centers for Disease Control and Prevention (CDC). In the 1994 PedNSS, 11.9 percent of AI children two to four years old were overweight. This rate is similar to that for same-age Hispanic children (11.7 percent ) but considerably higher than that for White children (6.2 percent ).<sup>75</sup> Other studies have also indicated a high prevalence of overweight among young AI children.<sup>76 11 77</sup> Overall, these studies demonstrate that obesity begins early for AI children.

##### C. Obesity in School-aged Children and Adolescents

In 1990, a national survey of the height and weight status of 9,464 AI schoolchildren ages 5-18 living on or near AI reservations was conducted by the IHS, CDC, and tribal nutrition programs in nine IHS areas.<sup>8</sup> Data for height, weight, and body mass index (BMI) of the schoolchildren were compared with two national reference data sets, the second National Health and Nutrition Examination Survey (NHANES II) and the Mexican-American population of the Hispanic Health and Nutrition Examination Survey (HHANES-MA).

Although the three populations were similar in height, the AI children had significantly higher BMIs for nearly every age and sex group compared to the reference populations. The overall prevalence of overweight in the AI children (exceeding the 85th percentile of the reference population) was 39.3 percent compared with the NHANES II population and 28.6 percent compared with the HHANES-MA population. These data indicate that overweight is much more prevalent among AI children than among other children in the United States at all ages and in both sexes.

In 1995-1996, a regional survey of AI children in South Dakota, North Dakota, Iowa, and Nebraska was conducted by IHS to estimate the prevalence of overweight and obesity. Thirty-nine percent of males and 38 percent of females were found to be overweight in this comprehensive survey of 12,559 children aged 5-17 years. Even at the youngest school ages, overweight is more than twice as likely as national patterns and obesity is more than three times as prevalent.<sup>14</sup>

## **2. Relationships Between Weight and Chronic Disease Risk Factors in Children**

A few studies have examined risk factors for type 2 diabetes and cardiovascular disease in AI children and adolescents. Gilbert et al. reported high normal (>90th percentile) blood pressures in 10 percent of adolescent Navajo boys and 6 percent of girls.<sup>34</sup> There was a positive relationship between body weight and blood pressure. Of those with high normal blood pressure, 36 percent of the boys and 64 percent of the girls were overweight.

Data from another study suggest that obesity associated with elevated lipid levels begins at an early age in AI children.<sup>35</sup> Blackett and colleagues explored the interrelationships between weight, BMI, lipids, apolipoproteins, insulin, and glucose in 103 Oklahoma Indian children between the ages of 4 and 19 years.<sup>35</sup> BMI increased with age in boys and girls and tended to be higher than in Caucasian children. Children 10 to 14 years old in the highest quartile for BMI had higher triglyceride levels and lower high-density lipoprotein cholesterol when compared with those in the lower quartiles. In contrast, 15-19-year olds in the highest quartile for BMI had higher cholesterol and apolipoprotein B levels. The mean fasting insulin levels were not related to BMI.

Centrally distributed body fat is associated with several chronic diseases, including hypertension, heart disease, gallstones, diabetes, and some types of cancer. Two studies have shown that AI/AN children have increased central body fat.<sup>34 76</sup> Whether the pattern of central distribution of body fat continues from childhood to adulthood is not well established, but it is reasonable to expect that it does.

## **3. Determinants of Childhood Obesity**

### **A. Maternal Obesity**

Both maternal obesity and high birth weight have been shown to be strong predictors of obesity in early childhood.<sup>5</sup> It has also been speculated that the metabolic milieu of the intrauterine environment may play a role in the etiology of obesity. Infants born to Pima mothers who were diabetic during pregnancy were much more likely to later become obese than were their siblings born before the full manifestation of their mother's diabetes.<sup>78</sup>

### **B. Breast-feeding and Type 2 Diabetes in Offspring**

Breast-feeding is associated with a lower prevalence of type 2 diabetes in breast-fed AI.<sup>6</sup> Both non-pregnant and pregnant breast-fed Pima Indians studied had lower plasma glucose concentrations at ages 20-24 years. Breast-feeding, therefore, could be viewed as a potential preventive strategy for type 2 diabetes.

Data from the 1994 PedNSS indicate that 36 percent of low-income children were breast-fed on hospital discharge, and 18 percent were consuming some breast milk at six months of age. Across the ethnic groups, AI and Asian mothers had the highest prevalence of breast-feeding initiation and duration, with 44 percent of AI mothers breast-feeding at hospital discharge and 24 percent breast-feeding at six months postpartum.<sup>75</sup> This is still below the Healthy People 2000 and 2010 goals: at least 75 percent of mothers breast-feed their babies in the early postpartum period, and at least 50 percent breast-feed through 5-6 months of age.<sup>79</sup> Greater effort is needed to promote breast milk as the preferred source of nutrition for young infants.

**APPENDIX 3**  
**IHS Planning Conference to Reduce Obesity Among AI/AN**  
**October, 2000**  
**Conference Invitees**

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## APPENDIX 4

### **\*Inter Tribal Council of Arizona Programs (ITCA) – Input into the October 2000 Planning Conference**

ITCA presented an issue paper to the planning group for this report at a meeting held October 23-24, 2000 in Rockville, MD, and the Council's recommendations are summarized here.

- 1). The Department of Health and Human Services must recognize tribal communities as the critical arena for effective public health interventions. Cross-program initiatives should be developed at the national, state and tribal levels to better reach target populations.
- 2). Targeted funds to adequately address obesity in AI throughout the United States need to be allocated. Tribes must be allowed access to funds for obesity prevention and treatment that are made available to states so that community-directed, community-based strategies can be developed, implemented, and evaluated in tribal communities.
- 3). Public health organizations such as CDC should integrate their programs with tribal governments.
- 4). Strategies for obesity prevention by government programs should address:
  - Breastfeeding of infants throughout the first year of life.
  - Wellness counseling for the postpartum women and infants.
  - Coordination of efforts with tribal, government, and other health programs
- 5). Technical assistance is needed from the IHS, CDC, NIH, state health departments, and other agencies to develop appropriate community-based prevention programs.
- 6). Research efforts that focus on identified behavioral and social barriers to effective interventions should be developed and funded.
- 7). There is a need for specialized staff in each AI community in the areas of nutrition, physical activity, education, parent-child interactions and community change to develop, implement, manage, and evaluate obesity prevention programs.
- 8). Obesity prevention projects could incorporate obesity prevention programs into existing programs, expand school curricula to include health promotion information, work with school food service programs to provide recommended foods, create community and family-based programs, identify and work with high-risk groups, such as children of parents who are overweight, children from a diabetic pregnancy, and people with a family history of diabetes.
- 9). Obesity treatment projects could include:
  - Monitoring growth in children to identify at-risk children at an early age.
  - Developing educational programs for weight management that include family involvement for adults and children.
  - Developing tracking systems to ensure appropriate follow-up management.
  - Implementing clinically based activities such as Staged Diabetes Management to improve diabetes care and prevent complications.
  - Establishing weight management teams that include physicians, dietitians, family therapists, etc.

\*This paper represents the views of the ITCA and do not necessarily reflect the views of the US Government or Indian Health Service.

## APPENDIX 5

### **Input from the Planning Conference and Current Diabetes Programs**

The IHS planning group for this report to Congress agreed that an action plan to reduce obesity should capitalize on the assets present in AI/AN communities, as well as be cognizant of the existing barriers, and address those barriers when possible. An assessment of both assets and barriers would assist planners to match needs and resources appropriately to address the obesity epidemic. As a result, a planning conference was held October 23-24, 2000. The participants in the October 2000 planning conference made a number of recommendations to IHS concerning a national obesity plan.

Similarly, the IHS National Diabetes Program held eight regional meetings during the fall of 2000 to obtain tribal input from centers supported by funding from the IHS Special Diabetes Program for Indians. These eight regional meetings identified successes as well as gaps or problems in diabetes prevention efforts. Obesity prevention and treatment is a key strategy in diabetes prevention.

In addition, the planner of the National Diabetes Prevention Center located in Gallup, New Mexico sought tribal input concerning obesity prevention and management.

The recommendations from the October planning conference, the regional diabetes meetings, and the Gallup Program were consistent and are combined and summarized below.

### **Obesity Prevention And Treatment**

#### **1). Potential Assets**

##### **Infrastructure Assets**

- Partners with whom collaborative relationships could be developed include: Universities, Native American Fitness Alliance, American Council on Exercise, American Association Indian Physicians, Schools, Tribal Health Departments, IHS DM Program, Head Start, Rehabilitation Programs, Exercise Centers, American Indian Colleges, YWCA, Weight Watchers.
- Schools have a captive audience, provide at least one meal per day to students, and have the ability to incorporate a healthy lifestyle curriculum into ongoing classes.
- Community members who are supportive to health promotion efforts can be identified.
- Ann Wolf has done research on the cost of obesity, and perhaps Navajo or Pasqua Yaqui data exist.
- The Resource Patient Management System (RPMS) data surveillance system is available and used at many tribal health care facilities and can provide obesity prevalence and incidence data. Many tribes now use this database to report obesity prevalence and incidence data for the Special Diabetes Grants Program for Indians.
- Casinos have provided increased revenue for some tribes, thereby increasing economic resources for communities. Available resources include social services, mental health services, alcohol treatment programs, financial assistance programs, temporary assistance for needy families, Head Start, WIC, child support, Medicaid, elders, CIHS services,

##### **Community Assets**

- AI/AN communities have possible celebrity and local role models including Notah Begay, Billy Mills, Vanessa Shortbull, and Seminole leader James Billie.
- Some AI/ANs have been trained as fitness instructors.
- Some tribes have exercise facilities.

- Traditional stories involving physical fitness and strength could help motivate AI/AN communities.
- Traditional forms of exercise that could generate interest in physical activity include traditional or fancy dancing, and games such as stickball, canoe racing, and running.
- Community health promotion and obesity prevention programs in schoolchildren include CATCH, Pathways, IHS Head Start Initiative, “Healthy Children, Healthy Families, and Healthy Communities.
- The Pascui Yaqui tribe has a model diabetes intervention and risk reduction program.
- Successful community programs that have been documented include: Community Gardens (Billings, MT); Strong Women Stay Slim (Blackfeet); St Regis Mohawk Community Program; Zuni Program; Gila River Program; Holiday Eating Learning Plan (HELP); and numerous summer camps that promote healthy behaviors.
- Tribal health fairs offer collaborative health promotion opportunities.
- Tribal runs or walking events include Pow Wows, Breast Cancer Prevention, Walk Across TX or AZ, and Outrun Diabetes.
- Many AI/AN enjoy sports such as Native American basketball teams, golf, cross country, and bowling.

## **Media**

- AI/AN media outlets include *Health for Native Life Magazine*, and *Native America Calling Radio Talk Show*.
- A popular program in Nashville called “Telling My Story” involves tribal members who have overcome barriers.

## **Data and Research**

- RPMS collects data from some tribes.
- The Strong Heart Study has published results.
- The National Diabetes Center in Gallup potentially can provide research opportunities.
- The NIH/USDA/IHS is conducting nutrient analysis of indigenous/traditional foods.
- Obese people can have positive health benefits with a 10 or 15 pound weight loss.

## **2). Potential Barriers**

### **Limited Research and Data**

- There is a lack of science upon which community strategies or individual interventions can be based. Programs are rarely pre-tested before implementation. Many tribes do not have the data they need to plan and evaluate local programs.
- There is no national, standardized AI/AN database, and outcome evaluation is limited.
- AI/ANs on reservations are not included in CDC’s NHANES and BRFSS national surveys; AI/ANs are not included in the USDA’s CSFII survey.
- Local tribal resources available to dedicate to data collection are limited.
- Clients who are very obese with very high BMIs of 40 or 45, may not qualify for study assessments or data collection.
- Indian communities may have had limited study input in the past and are suspicious of being studied.
- RPMS data is collected from clinic patients, rather than the total AI/AN population
- RPMS anthropometric measures are not standardized

### **Birth Control Pills**

- Use of the birth control pill is associated with weight gain.
- Young girls using birth control pills increase their risk for weight gain.

### **Self Efficacy and Denial**

- AI/ANs believe that they will get diabetes no matter what they do, and that diabetes is not preventable.
- AI/ANs who have diabetes, or at high risk for diabetes, don't want to take diabetes seriously.
- Some have difficulty accepting diabetes until complications make it a "visible" disease.
- Many people at risk for diabetes feel hopeless and helpless.
- Making behavioral changes is difficult.
- The community should have ownership of health behavior programs.

### **Health Provider Challenges**

- Providers do not consider obesity an urgent problem.
- Some providers have a negative attitude toward obesity.
- Many health care providers need to know how to empower patients for self-care.
- Many health care providers are unable to incorporate early screening or intervention into their practices.
- More training in diabetes prevention, treatment, and obesity management would have a positive effect.
- . In some locations health professionals, for example, Registered Dietitians, are not available, which effects multidisciplinary health care.
- Diabetes educators are usually overworked mbursed.
- 
- More could be done to train current staff on cultural competence.
- There is a shortage of health professionals in nutrition, nursing, dentistry and medicine, who work with American Indian/Alaska Native people.
- Registered dietitians may not be perceived as valuable or necessary by health administrators.

### **School Challenges**

- There is no comprehensive school health program involving nutrition, exercise, and smoking cessation.
- Health is a low priority in school curricula with few physical education classes offered.
- There are no home economics classes in schools that teach life skills, time management, or money management classes.
- School cafeterias often serve fast food; school vending machines offer unhealthy food choices; and convenience and fast food outlets are often located near schools.
- School facilities are not available at night or weekends for student or community use.
- American Indian Colleges are not utilized or involved in healthy lifestyle interventions.

### **Physical Activity Issues**

- Competitive sports do not serve the needs of all children and adolescents.
- Many Indian families and tribal communities do not have resources for sports equipment and uniforms.
- Qualified leaders to organize sports or games are lacking.

- IHS is a health care organization, therefore, staff does not include coaches and exercise specialists.

### **Parental Issues**

- Parental issues include conflicting priorities; work priorities; lack of control of children; child abuse; and child neglect.
- Lack of parental knowledge about healthy lifestyles and nutrition, cooking, breast feeding, and infant feeding.
- Alcohol and substance abuse are significant problems in some families.
- Opportunities or places to exercise, play basketball, or other sports are limited.
- Safety is an issue when there are no sidewalks, no street lights, and roads must be shared with cars, walkers, bikers, gangs, and unleashed dogs.
- Cost is a barrier for families.
- Television and video games reduce children's participation in sports or physical activity.

### **Psychosocial Factors**

- Depression, eating disorders, family stress, and emotional issues are all concerns for the AI/AN population.
- Learning styles of AI/ANs differ from those of the general population.
- Behavior change is difficult.
- Peer or social support is limited.
- Trust and confidentiality must be present for interventions to be effective.
- Culturally appropriate materials and community programs are needed for AI/ANs.
- Fear or poor self-esteem are not motivating factors for weight loss or control.

### **Media Issues**

- There are very few AI/AN role models to encourage healthy lifestyles.
- Healthy practices are not shown on TV or in movies.
- Fast food and soda advertisements encourage poor nutrition.

### **Community Issues**

- Although tribes have some similarities, values and traditions are heterogeneous and interventions need to be tailored to meet tribal needs.
- No centralized data have been compiled for American Indian Colleges that offer nutrition courses.
- Lack of coordination between programs can lead to duplication of efforts, conflicting messages, gaps in content, unawareness of resources, and lost opportunities for collaboration.
- Community members may not see obesity as a problem.
- Many individuals often smoke to lose or control weight.
- Opportunities or space to exercise are limited.
- Communities have no knowledge or skills regarding research or evaluation methods.
- Community change is complex and time consuming.
- AI/AN populations are unfamiliar with strategies that engage tribal communities.

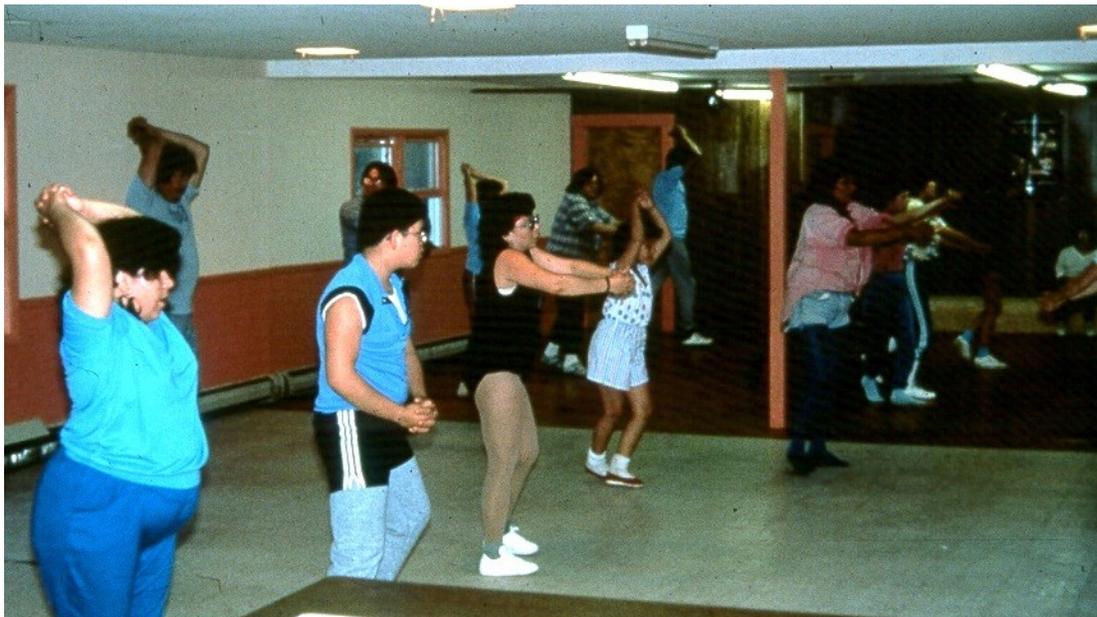
### **Infrastructure**

- Only 33 percent of IHS diabetes grant programs focus on preschoolers, and 32 percent focus on tertiary diabetes prevention.
- Shortage of trained nutrition professionals and health care providers to mentor in order to cultivate career development of AI/AN youth, who may later serve their own communities.

- Commission Corp dietitians are not mobile and often work in urban areas rather than in remote (high need) locations, e.g., Santa Fe, NM or Phoenix, AZ, rather than Eagle Butte or Rosebud, SD.
- Insurance companies do not reimburse obesity prevention or weight maintenance services.
- Staff time for nutrition education competes with Children's Health Insurance Program, and voter registration, in programs such as the Supplemental Food Program for Women, Infants .
- The IHS scholarship program does not reserve paybacks for registered dietitians in remote locations.
- There are few treatment programs for the morbidly obese in IHS.
- There are no national standards or guidelines for pharmacological or surgical interventions for obesity within the IHS.
- Healthy foods in remote locations may be limited and high cost.

### **Economic Barriers**

- Significant poverty is present on reservations.
- Literacy levels must be considered.
- Employers do not allow time off for medical appointments.
- Fast food is low cost and popular.
- 
- Few health interventions or materials target low-income populations.
- Self-prescribed weight control efforts are low cost, unproven, or unsafe, such as over-the-counter pills, smoking, and skipping meals.
- Competent childcare to enable clinic visits or exercise is limited for low-income families.
- Absence of transportation may limit access to clinic services.
- Healthy food may be more expensive than unhealthy foods.
- Outreach is difficult when families do not have phones.



## APPENDIX 6

### **CDC Division of Nutrition and Physical Activity (DNPA) Proposal to Collaborate with IHS**

IHS could partner with DNPA to address obesity in AI/AN populations. Potential collaboration may include:

**1). Use the IHS Resource Patient Management System (RPMS) for basic surveillance of obesity and related health status markers (e.g., serum cholesterol, blood pressure, diabetes management) for tribes that participate in RPMS.**

DNPA could develop a surveillance system based on the existing RPMS system for those tribes that participate in RPMS. The CDC is committed to helping AI/AN partner agencies or communities develop the ability to take over and manage programs for themselves.

**2). Targeted interventions to reduce obesity among AI/AN communities.**

The interventions could include the collection of community-representative baseline data that would contribute to the surveillance goals of the IHS and would serve as baseline for evaluation of the interventions. Successful baseline and follow-up data collection activities could serve as templates for developing surveillance systems in other tribes or regions.

Projects could include interventions focused on physical activity, diet, or a combination of the two, with the explicit goal of (1) primary prevention of weight gain, (2) weight loss, or (3) maintenance of target weight in a defined target segment of the population. DNPA would require each applicant to include a mechanism to cover start up costs and continuation of interventions after the end of the intervention period, such as the development of partnerships in the community to sponsor programs supporting the interventions. In all cases, developing community commitment and capacity to independently maintain interventions would be a primary goal of the interventions.

DNPA views this program as an opportunity for capacity building in AI/AN communities. The CDC-sponsored Physical Activity and Public Health Training Course, or other appropriate training programs, could be attended by tribal people. A goal of the interventions could be to permit the communities to continue surveillance and evaluation activities after the completion of the intervention. CDC would provide both data management and analysis support and training to enable communities to become more competent in data management and analysis.

## APPENDIX 7

### CDC Recommendations to Promote a Lifetime of Healthy Physical Activity

#### Recommendations For School And Community Programs Promoting Physical Activity Among Young People:

1. Policy: Establish policies that promote enjoyable, lifelong physical activity among young people.
2. Environment: Provide physical and social environments that encourage and enable safe and enjoyable physical activity.
3. Physical Education: Implement physical education curricula and instruction that emphasize enjoyable participation in physical activity and that help students to develop knowledge, attitudes, motor skills, behavioral skills, and confidence needed to adopt and maintain physical active lifestyles.
4. Health Education: Implement health education curricula and instruction that help students develop the knowledge, attitudes, behavior skills, and confidence needed to adopt and maintain physically active lifestyles.
5. Extracurricular Activities: Provide extracurricular physical activity programs that meet the needs and interests of all students.
6. Parental Involvement: Include parents and guardians in physical activity instruction and in extracurricular and community physical activity. programs and encourage them to support their children's participation in enjoyable physical activities.
7. Personnel Training: Provide training for personnel in education, coaching, recreation, health-care, and other school and community personnel that impart the knowledge and skills needed to effectively promote enjoyable, lifelong physical activity among young people.
8. Health Services: Assess physical activity patterns among young people, counsel them about physical activity, refer to them to appropriate programs, and advocate for physical activity instruction and programs for young people.
9. Community Programs: Provide a range of developmentally appropriate community sports and recreation programs that are attractive to all young people.
10. Evaluation: Regularly evaluate school and community physical activity instruction, programs, and facilities.

## APPENDIX 8

### Mental Health Issues and Obesity in AI/AN

An area that has been relatively overlooked by researchers is the impact of psychological factors on obesity as well as the effects of obesity on mental health. Following is a review of the limited published literature on the subject.

Kozak examined health attitudes and perceptions of people with type 2 diabetes and suggested that the impact of history and culture has been overlooked in biomedical research, thus leaving an incomplete model for understanding the disease process and experience of illness in AI/AN communities.<sup>53</sup> The author speculated that this may be the reason that clinical interventions to manage diabetes have generally failed. In discussing how a community at risk of becoming sick perceives health and well being, the author considered how type 2 diabetes has led to changes in the individual and collective emotional response to the disease that can be defined as “surrender.” This term is not to be confused with learned helplessness or a fatalistic response. The author defined surrender as the creation by people with diabetes of a “hypothetical life history of themselves where they expect to be sickened by, and to die from, diabetes because the weight of day-to-day experience throughout their lifetime reveals this to be an appropriate and accurate assessment of reality.”

Kozak conducted qualitative thematic and narrative analysis. Four categories of a “death theme” were delineated: inevitability, uncontrollability, inheritability, and death sentence. Results indicated that participants attached symbolic and sociocultural meaning to the type 2 diabetes disease process. The author suggested that further attention to symbolic meaning and emotion is warranted and proposed that instilling an understanding that the disease is preventable and treatable as well as developing multidisciplinary and community-based collaboration will increase treatment efficacy.

Huttlinger used ethnographic interview techniques to study Navajos, and also noted the importance of cultural beliefs and sociological understanding of the chronic disease process in AI/ANs.<sup>54</sup> The author suggested that better understanding is needed of the tribe’s difficulty integrating the disease concept of diabetes into their lives – a difficulty that often leads to Navajos being termed “noncompliant” with medical treatment. Huttlinger correlated diabetes mellitus with postcolonial activities, and with posttraumatic stress disorder in Navajos. Colonialism refers to the establishment of Western thought as legal, institutional, and cultural domination over others.<sup>80 56</sup> Posttraumatic stress disorder can be defined as the “result of a dramatic environmental change, including involuntary displacement or relocation or a natural disaster; as a result of physical, sexual, emotional, or spiritual assault, abuse or neglect; as a result of war-like conditions, including experience in battle, internment as a prisoner of war, civil imprisonment, involuntary subjugation at a boarding school, internment in a concentration camp, or experience as a hostage; or as a result of the death of a close friend or relative.”<sup>54</sup> (page 13)<sup>55 56 57</sup> Study results indicated that this sample of Navajos described diabetes as a disease that results from “forces beyond the individual that come from the realm of the supernatural.”<sup>54</sup> (p. 14).

Neumark-Sztanier, et al. conducted a cross-sectional survey assessing psychosocial, health, and weight-specific concerns; disordered eating; and health-promoting behaviors.<sup>58</sup> Of particular interest are the results from the psychosocial concerns measure - an 11-item scale. Perception of health status differed significantly for non-overweight, moderately overweight, and very overweight boys and girls. Very overweight children perceived their health as fair or poor. Differences in body dissatisfaction, low body pride, and weight concerns were also noted among these groups. These findings suggest that it is important for obese youth to be both convinced and enabled to make successful lifestyle modifications to

prevent excessive weight gain. The authors suggest that culturally sensitive educational and environmental interventions that take psychosocial factors into account are paramount for behavior change.

A body of research examines the importance of culture in the healing process, and includes the wide acceptance of traditional healers' roles in medical and psychological treatment. The importance of culture-specific beliefs for the treatment of diabetes and obesity warrants further study.

## APPENDIX 9

### Traditional and Contemporary Foods

During the past century, dietary patterns among the various AI/AN tribes have changed drastically. Diets historically high in complex carbohydrate/high fiber foods have been replaced by high-fat modern foods.<sup>63</sup> Concomitant with these dietary changes have been dramatic increases in obesity and diabetes. Before the turn of the twentieth century, however, the diabetes was virtually nonexistent. For at least 500-1,000 years, the Pima lived in the Sonoran Desert, cultivating crops irrigated by an intricate canal system, hunting, fishing, and gathering foods from the desert. As the area became more settled in the 1880s, the upstream waters of the Gila River were diverted and farming in the desert was no longer possible. Eventually, food from subsistence farming, hunting, and gathering was replaced with food from trading posts and government food programs. It has been estimated that the traditional Pima diet of one hundred years ago was 70-80 percent carbohydrate, 8-12 percent fat, and 12-18 percent protein. By the 1950s the Pima diet comprised about 61 percent carbohydrate, 24 percent fat, and 15 percent protein. The current diet of the Pima is about 47 percent carbohydrate, 35 percent fat, 15 percent protein, and 3 percent alcohol.<sup>63</sup>

During the past fifty years, the amount of wild and homegrown foods in the AI/AN diet has greatly diminished, and a significantly greater proportion of food is processed and commercially prepared, a trend also seen among the general U.S. population. However, many AI/AN families are still involved in some aspect of home food production. A 1990, U.S. Department of Agriculture study of program participants in the Food Distribution Program on Indian Reservations, found that about half of all households reported producing some of their food themselves, including growing fruits and vegetables, maintaining livestock for dairy and meat, raising poultry for eggs, and hunting and fishing.<sup>81</sup>

In general, the diets of AI/AN today are high in refined carbohydrates (especially refined sugars), fat, and sodium and low in fruits, and vegetables.<sup>64 65</sup> The Navajo Health and Nutrition Survey found that fruits and vegetables were each consumed less than once per day per person, as were dairy products. Fry bread and Navajo tortillas, home-fried potatoes, mutton, bacon and sausage, soft drinks, coffee and tea provided 41 percent of the energy and 15 – 46 percent of the macronutrients consumed.<sup>66</sup> Traditional preparation over direct heat has been replaced with pan frying or deep fat frying. The recent proliferation of fast-food restaurants and convenience food stores on and near reservations also encourages the consumption of high-fat, high-sugar foods.<sup>82</sup> It is generally conceded that poverty in Indian communities further limits access to a healthy food supply.

Several reports have examined both traditional and contemporary food use among tribal groups.<sup>65 83 63 84</sup><sup>85</sup> Although all report use of traditional foods, most of these foods seem to be consumed only occasionally. The declining use of traditional foods among the Hopi was noted by Brown and Brenton,<sup>86</sup> who found that less than 25 percent of dietary recalls from 420 children and female homemakers included at least one traditional food in the daily diet. The most popular Hopi-grown traditional foods continue to be corn and beans, which are ancient dietary staples.<sup>86</sup> Nobmann and colleagues found that native foods such as salmon and other fish were used frequently by Alaska Natives.<sup>87</sup> Traditional fermented foods, including seasonally consumed heads and eggs of salmon and other fish, seal, beaver, caribou, and whales were reported by 23 percent of those surveyed.

For many AI/AN, foods regarded as traditional often have particular spiritual and social value and represent purity, healthfulness, and strength - symbols of a pre-reservation (and pre-European contact) life and culture. These foods are held in high regard and are seen as having healthful properties, in contrast to

the modern-day diet.<sup>88</sup> Traditional foods are an integral part of numerous celebrations, feast days, powwows, and religious ceremonies. Most traditional foods are low in fat and sugar, with relatively high nutritive value. Today, Indian populations are being encouraged to incorporate more of their traditional foods into their diet.

Many traditional belief systems include the concepts of harmony and balance respecting food, and these can be useful concepts in motivating individuals and communities to increase their use of traditional foods and adopt healthier lifestyles. It is possible to reproduce the composition of the native diet reasonably well with traditional foods and certain commercially available foods.<sup>63</sup> When traditional foods are not available, healthy substitutes may be suggested, such as carrots for wild roots, spinach for wild greens, and fresh fruit for wild berries.



## APPENDIX 10

### Nutrition Intervention Studies

#### Zuni Pueblo

The IHS has partnered with Zuni Pueblo, NM, a southwest AI community with high rates of obesity and diabetes, to develop community-based diabetes and wellness programs to promote physical activity through fitness events, healthful eating through nutrition education, and weight loss through weight loss competitions in adults.<sup>69</sup> The results showed improved metabolic control in individuals with type 2 diabetes and modest weight loss. The exercise program consisted of several 1-hour aerobic sessions offered during the week. Zunis who were trained in exercise and group leadership methods helped coordinate the program and build community ownership. After participating in aerobic sessions through the program, 43 percent of the participants began and maintained an at-home exercise program, whereas only 18 percent of a comparison group of previously sedentary non-participants with type 2 diabetes did so.<sup>69</sup> The Zuni Diabetes and Wellness Program continues today, and a picture of the Tribal Wellness Center, Lea Lewis, MPH Director, is featured in the US News and World Report, Dec 25, 2000 issue and an article about the Zuni Center, under the heading of "Innovations 2001: The Best Minds at Work."

#### Pathways

Pathways is a school based primary prevention study of obesity in AI third, fourth, and fifth grade children funded by National Heart, Lung, and Blood Institute of NIH. After three years' implementation of the feasibility study in four schools, NHLBI extended funding to expand the program to 41 schools for a three-year intervention. The project is the result of a unique collaboration among AI nations, universities, schools, and families. This multi site study involves seven American Indian Nations/Tribes and five universities.<sup>72</sup> The seven AI nations are the (Dine) Navajo Nation, the Gila River Indian Community, the Tohono O'odham Nation, the White Mountain Apache Tribe, the San Carlos Apache Tribe, the Oglala Lakota Nation, and the Sicangu Lakota Nation. Results from the study are anticipated early in 2001. The intervention program promotes increased physical activity and healthful eating behaviors for AI children through the following:

- 1). Curriculum.** The Pathways curriculum consists of culturally appropriate school-based lessons that promote healthful eating behaviors and increased physical activity.
- 2). Physical Activity.** The intervention is focused primarily on increasing children's activity and energy expenditure in school by increasing the frequency and quality of physical education classes and activity breaks, including recess periods.
- 3). School Food Service.** The goal is to lower the amount of fat in the breakfast and lunch school meals to a healthful level of fat.
- 4). Family.** Pathways builds a supportive collaboration for obesity prevention among teachers, food service personnel, school administrators and family. Pathways involves a school-family advisory team, Family Fun Nights at each school, and Family Packs – education materials taken home by students to their parents.