

EXECUTIVE SUMMARY

Introduction

The prevalence of obesity in American Indian/Alaska Native (AI/AN) populations has increased dramatically over the past 30 years. Although AIs are not a homogeneous group, all tribes throughout the U.S. have suffered adverse effects from the high prevalence of obesity (Story et al, 2000)). Overall, studies demonstrate that obesity begins early for AI/AN children and also is a significant problem for the adult population (IHS, 2001). Many chronic diseases such as type 2 diabetes, heart disease, stroke, arthritis, and breathing problems are associated with the increasing prevalence of obesity in AIs (DHHS, 2001, Story et al, 1999).

The problem of obesity is not unique to AI/ANs. Overweight and obesity have reached epidemic proportions both nationwide and globally (Ogden et al, 2006; Washington, Post, 2006). The existence of these epidemics indicate that in addition to personal responsibility, societal factors such as convenience technology and engineering; food production and marketing patterns; and powerful social and cultural forces that have shaped our communities, our lifestyles and ultimately our bodies play an important role in this problem (McGinnis, 2004).

The purpose of this study is to provide information that will help to understand the high rates of obesity among the AI/ANs, the nature of a variety of preventive interventions and their efficacy, and directions for future research that may involve research collaborations among government agencies and other organizations.

The report is organized into four major sections: 1) a literature review that synthesizes research findings pertaining to the prevalence of obesity and examines what is known about the major determinants and consequences of obesity as well as the nature and findings of various types of clinical and community-based interventions; 2) activities of selected federal agencies in the area of obesity and AI/ANs; 3) summary of a site visit to the Gila River Indian Community; and 4) directions for future research.

I. Literature Review

Prevalence

Available data indicate that the prevalence of overweight and obesity in AI/AN preschoolers, school-aged children and adults is higher than the respective U.S. rates for all races combined (Zephier et al, 2006; Denny et al, 2003; CDC, 2005), and trends over long periods of time indicate increasing rates of overweight and obesity for both school-aged children and adults (Zephier, 2006; White et al, 1997). Although the precise time period is not yet clear, obesity in AI/AN children generally begins in early childhood, in the preschool years. While breastfeeding may be protective against obesity in AI/ANs (Thomas & Cook, 2005), factors that contribute to the problem include prepregnancy and gestational diabetes, the weight of the mother, and childhood obesity (Salbe et al, 2000; Moum et al, 2004; Gallaher et al, 1991).

Studies have found regional and tribal variation in prevalence rates for both school-aged children and adults (Caballero et al, 2003; Denny et al, 2003). Findings on prevalence of obesity for school-aged children by gender are mixed and vary by age (Eisenmann et al, 2003; Zephier, 1999, 2006; Caballero et al, 2003). For adults, some studies indicate higher prevalence of obesity/overweight in women, while other studies show no difference, and this prevalence may also vary by age (Gray et al, 2000; Giuliano et al, 1998). Although 64 percent of AI/ANs live in urban areas, many of the prevalence studies do not include them (U.S. Census, 2006).

Contributing Factors

Nutrition and Diet. The shift in Indian Country from traditional occupations such as hunting, gathering and farming to a cash economy occurred in the early 1900's and forced family members to leave home in search of paid employment (Michel, 2004). As a result, the amount of wild and homegrown foods in the AI/AN diet has diminished, and a greater proportion of food is processed and commercially prepared, a trend also seen among the whole U.S. population. Diets historically high in complex carbohydrate/high fiber foods and lower in fat have been replaced by foods high in refined carbohydrates (e.g. refined sugars), fat, sodium, and low in fruits and vegetables (IHS, 2001). In a review of several reservation-based studies, Story et al (2000) found that current dietary fat intake was above the Recommended Dietary Allowances (RDA) of 30 percent of total calories, ranging from 31-47 percent.

High rates of poverty (23 percent in 2001-2003) and unemployment limit access to purchased sources of a healthy food supply and promote reliance on special federal commodity programs for Indian tribes (PRC, 2004). Tribal administrators of the commodity programs have noticed improvements in the content, quality, and variety of foods offered, but say that the ingredients of the products could still be made healthier (Finegold, 2005). Pareo-Tubbeh et al (2000) explored the variety, affordability and availability of healthful foods at convenience stores and trading posts on the Navajo Reservation. They found that while there were improvements in the availability of healthful foods from previous studies, a limited number of such foods were available at the local trading posts that are the primary, and in many cases, the only readily accessible sources of purchased food.

Socioeconomic Factors. Kumanyika and Grier (2006) review evidence that indicate the higher rates of obesity in racial and ethnic minority and low income communities are associated with a plethora of unfavorable influences – economic stresses, reduced access to affordable healthful foods, opportunities for safe and varied physical activity, overexposure to targeted advertising, and marketing of energy-dense foods.

AI/ANs face these types of socioeconomic circumstances which affect their general living conditions, their ability to find employment, the types of foods they are able to purchase, resources available for exercise and recreational activities, and overall physical and emotional health. While the circumstances of each tribe are unique, most tribes have experienced economic, education, housing, health and other problems at levels of severity rarely seen in most other American communities (Hillabrant et al, 2001).

Psychosocial Factors. Historical trauma and grief are sometimes cited as factors impacting psychological and physical health and contributing to the health disparities between AI/ANs and other groups. Historical trauma refers to the collective emotional and psychological injury both over the life span and across generations resulting from the history of difficulties that Native Americans as a group have experienced in America (Steinman, 2005). Furthermore, Brave Heart and DeBruyn (1998) point out that understanding historical trauma also involves keeping in mind the actual day-to-day traumatic losses experienced by many AI/ANs. These losses involve interpersonal, non-interpersonal and witnessed traumas such as alcohol-related accidents, homicide, and suicide.

An additional psychosocial factor that has not been carefully examined is AI/ANs perception of obesity/overweight as a problem. Some studies (White et al, 1997; Teufel & Dufour, 1990; Kumanyika, 1995) as well as anecdotal comments from Gila River Indian Community members indicate that AI/ANs view overweight/obesity as normal and healthy. Finally, while depression has not been examined in studies pertaining to AI/ANs and obesity, a few studies have found that being AI increases the likelihood of posttraumatic stress disorder (Arehart-Treichel, 2006) or of having a major depressive disorder (Hasin et al, 2006); additional research is required to determine if these conditions are associated with obesity/overweight. The relationship between obesity and depression may involve both cause and effect; while depression may be a contributor to obesity, it can also be a consequence of obesity in both adults and children (Daniels, 2006).

Genetic Factors. The role of genetics in relation to the environment is complex and is an issue where there is some disagreement. Ravussin (1995) explains that when whole populations are studied, the prevalence of obesity appears to be largely determined by environment (e.g., the Mexican Pimas compared to the Arizona Pimas), but among individuals within a given environment, variability in body size is largely influenced by genes. However, research evidence on the whole appears mixed regarding genetic factors in relation to obesity in AI/ANs. Story et al (2003) noted that there was little evidence to support a role of energy expenditure in the development of childhood obesity, as neither energy expenditure or metabolic rate is significantly different between AI or White children; however, other researchers have identified three metabolic predictors of obesity in Pima Indians, a group with a very high prevalence obesity and diabetes (Walston et al, 1995; Ravussin, 1995). Several researchers (Ravussin, 1995; Story et al, 2003; Harrison & Ritenbaugh, 1992) have pointed out that genetic and environmental factors may interact in AI/ANs. The environment plays a role either by compounding a genetic tendency toward weight gain or by mitigating it.

Physical Activity. Physical activity is protective against obesity and other health risks, but in the process of acculturation, AI/ANs have shifted from a traditional subsistence lifestyle to a more sedentary one that involves much less physical activity (Mendlein et al, 1997; Sugarman, 1992). Several studies (Mendlein et al, 1997; Yurgalevitch et al, 1998) have found low physical activity levels among those living in reservation-based communities as well as AI/AN urban youth (Gray and Smith, 2003). These studies suggested that environmental interventions are needed to increase opportunities for physical activity and to address barriers on reservations; for example,

family-oriented physical activities or child care to allow adults with children to exercise, community centers, outdoor walking trails, and school gymnasiums open for community use (Harnack et al, 1999). And, in a school-based obesity prevention intervention with AI/ANs, Thompson et al (2001) found a lack of facilities, equipment and trained physical education staff and before or after class activities held at the school.

Consequences of Obesity

Physical Health Consequences. Known obesity-related health risks for AI/NA adults include increased likelihood of type 2 diabetes, hypertension, cardiovascular disease (CVD), and problems with lipid levels (NRCCDH, 1989). There has been a recent significant increase in prevalence of type 2 diabetes among U.S. AI youth; this condition is now commonly seen in AI children aged 10 and over (Dabelea et al, 1998; Fagot-Campagna et al, 2000). Furthermore, childhood overweight increases the risk of adult overweight, the clustering of other CVD risk factors, coronary calcification in adulthood, and all cause CVD mortality (Power et al, 1997).

Psychosocial Consequences. Overweight and obese individuals may suffer from social stigmatization, discrimination and poor body image (U.S. DHHS, 2001; Strauss & Pollack, 2006). It is believed that these psychosocial consequences result from societal value placed on thinness as the ideal body form. However, the majority of studies in this area have been done with White populations; thus, it is unclear whether and to what degree there may be adverse psychosocial effects related to obesity in AI adults or youth (Story, 2003).

Research findings pertaining to AI/ANs indicate that adults and children understand that obesity, diabetes, heart disease and hypertension are related to dietary behavior and that physical exercise is valuable (Harnack et al, 1995; Sherwood et al, 2000; Rinderknecht & Smith, 2002). Additionally, AI children and adults are concerned about their weight, are dissatisfied with being overweight, and engage in practices to lose weight, particularly those who are overweight (Harnack et al, 1999; Story et al, 2001). However, Neumark-Sztainer et al (1997) found that among AI youth, overweight status is not consistently associated with suicidal ideation or future job or peer concerns suggesting either greater social acceptance of overweight in the AI/AN culture or at least that overweight has a limited impact on psychosocial health. Finally, in studies involving both adults and children, some AIs were found to engage in undesirable dieting practices such as binge dieting or self-induced vomiting (Sherwood et al, 2000; Story et al, 2001).

Critical barriers to weight loss reported on in these studies included: preferences for high fat foods and their ready availability, desire for large servings, a lack of confidence for personal lifestyle change, a lack of skills needed to bring about this change, and a lack of social support for these efforts (Hood et al, 1997).

Economic Consequences. There is little information about the economic costs of obesity that is specific to AI/ANs. However, we know that obesity and overweight among all Americans are associated with both direct (e.g., preventive, diagnostic and treatment services) and indirect costs

(e.g., value of lost wages). Most of these costs are due to type 2 diabetes, coronary heart disease and hypertension (Wolf & Colditz, 1998; Wolf, 2001; Wolf, 1998).

Intervention Research

Intervention research in the area of obesity prevention is in its infancy; there are only a limited number of published studies pertaining to AI/ANs. All of the interventions reviewed were implemented using Native American culture and traditions. A clinical intervention study of major importance was the *Diabetes Prevention Program (DPP)* that included AI/ANs, but was not limited to them. This study found that the Lifestyle Balance intervention was significantly more effective in reducing the incidence of diabetes and resulted in greater weight loss and increase in leisure physical activity than the placebo or the drug metformin (DDP Research Group, 2000a).

Several of the AI/AN school and/or community-based approaches reviewed did not find significant changes in youth overweight/obesity (Hood et al, 1997; Paradis et al, 2005; Davis et al, 2003). However, findings from these studies did indicate changes in mediating variables involving knowledge, attitudes or behaviors such as: increase in healthy food choices at school, additional classroom diabetes-prevention activities, positive changes in the school nutrition policy, addition of community walking paths, changes in high calorie beverage consumption, increased physical activity while at school, or reduced TV watching.

In both the clinical and community-based intervention studies that were reviewed, key Native values, culture and traditions were creatively incorporated as part of the interventions. These interventions (described in this report) have utilized various means to do this; for example, through the use of traditional Talking Circles; indigenous peer educators; community coalitions; culturally integrated curricula; or the use of traditional stories, games, music artwork, foods, or family activities.

Several emerging trends were apparent in reviewing intervention studies *currently* being implemented by federal agencies, although many of these projects have not yet completed a formal evaluation. First, in addition to behavioral approaches, several studies have focused on environmental interventions (i.e., walking trails, diet sodas in vending machines, etc.). Next, many current studies are multi-level and/or multi-component interventions that involve more than one level of the social-ecological model (i.e., community, school, individual, family) as well as more than one key strategy (i.e., physical activity, nutrition education, breastfeeding). And, finally, approaches for urban Indian women need to be less traditional than those for persons living on reservations and must adapt to the current social realities of these women.

II. Federal Agency Activities

Indian Health Service (IHS). IHS has an internal obesity workgroup that has delineated goals and action steps to address this issue. Selected activities of IHS pertaining to obesity prevention include:

- *Special Diabetes Program for Indians (SDPI)*. This Congressionally-established program has funded approximately 399 grants in 35 states focusing on the prevention and treatment of diabetes in AI/ANs. It includes 66 *competitive Targeted Demonstration Projects* focusing on primary prevention of type 2 diabetes and CVD risk reduction.
- *IHS Obesity Data*. IHS uses a Resource and Patient Management System (RPMS) clinical software application called the Clinical Reporting System for national reporting and local and Area monitoring of Government Performance Results Act (GPRA) clinical performance measures, including measures pertaining to obesity.
- *On the T.R.A.I.L. (Together Raising Awareness for Indian Life) to Diabetes Prevention*. IHS, the National Congress of American Indians, Boys and Girls Clubs, Nike, and FirstPic Inc. collaborate in conducting this diabetes prevention program that takes place at Boys and Girls Clubs located in 40 Native American communities.
- *Bodyworks*. The IHS Division of Diabetes Treatment and Prevention and the Office of Women's Health (DHHS) have adapted a Bodyworks toolkit that is used in group sessions with AI/AN mothers and adolescent girls for the purpose of obesity prevention.

National Institutes of Health. The NIH supports a broad spectrum of obesity-related research and established an Obesity Research Task Force in 2003. Selected initiatives pertaining to obesity prevention include the following:

- *The Diabetes Prevention Program (DPP)* funded by the National Institute of Diabetes, Digestive and Kidney Diseases (NIDDK) (completed in 2001) and its follow-up study, the *Diabetes Prevention Program Outcomes Study (DPPOS)*, that examines the long term effect of various interventions, are clinical intervention studies that include AI/ANs (in addition to other groups) and examine treatment effects by race.
- *Sharing Wisdom*, a randomized controlled trial conducted to test a lifestyle educational intervention for non-diabetic urban-dwelling AI women funded by NIDDK.
- *Diabetes Education in Tribal Schools (DETS) Program*. Tribal colleges and universities are developing a K-12 diabetes-science prevention curriculum for AI/AN students. NIDDK is lead agency collaborating with IHS and CDC.
- *National Diabetes Education Program (NDEP)*. This public awareness and education campaign is sponsored by NIDDK and CDC and has a specialized component that tailors messages to AI/ANs.
- *Community-Responsive Interventions to Reduce Cardiovascular Risk in AI/ANs*. The National Heart Lung and Blood Institute (NHLBI) has initiated cooperative agreements in AI/AN communities for the purpose of testing the effectiveness of behavioral and/or environmental interventions to promote the adoption of healthy lifestyles.

Centers for Disease Control and Prevention (CDC). Selected activities pertaining to obesity prevention include:

- *Native Diabetes Wellness program (NDWP).* The Division of Diabetes Translation sponsors the NDWP, a collaboration with IHS that sponsors various activities including the DETS Program (noted above). Additionally, cooperative agreements have been awarded to tribal communities for the purpose of testing community environmental adaptations for diabetes prevention.
- *PedNSS and PNSS.* The Division of Nutrition and Physical Activity operate the Pediatric Nutrition surveillance System (PedNSS) and the Pregnancy Nutrition Surveillance System (PNSS), program-based systems that monitor the nutritional status of low-income infants, children and women in federally funded programs, including AI/ANs.
- *Well-Integrated Screening and Evaluation for Women Across the Nation (WISEWOMAN) Program.* The Division for Heart Disease and Stroke Prevention funds this screening and lifestyle intervention program for low income women that addresses risk factors for heart disease including obesity and includes two programs serving ANs.

United States Department of Agriculture (USDA). Selected activities of USDA include:

- *National Research Initiative: Human Nutrition and Obesity.* The USDA has a cross-cutting competitive grant program that funds research projects pertaining to various topic areas including obesity prevention with a focus on populations at risk; for example, the *Seven Generations of Health: A Transgenerational Approach to Human Nutrition and Obesity Intervention in Indian Country* was funded. The purpose of this project is to disseminate culturally relevant information about obesity prevention in Indian Country and to establish a community-based infrastructure for healthy lifestyles in four Native American communities that reflects differing generations.
- *Food Distribution Program on Indian Reservations (FDPIR).* FDPIR provides commodity foods (e.g., canned vegetables, cereal, evaporated milk, fruit juice) to low income households located on Indian reservations.

III. Site Visit to Gila River Indian Community

This section of the report includes information gathered during a site visit to the Gila River Indian Community of the Gila River Indian Reservation (40 miles south of Phoenix) in January 2006. The community is composed of members of the Pima and Maricopa Tribes. The purpose of this visit was to learn about obesity treatment and prevention activities. Interviews were held with staff from the Health Corporation, the tribe's Department of Human Resources and the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) researchers based in Phoenix. The site visit report covers: background information, food availability, recreational facilities, attitudes about obesity, psychosocial issues, intervention programs, and NIDDK research studies conducted with this tribe.

IV. Directions for Future Research

Additional studies that are specific to AI/AN and obesity are needed in many areas. A list of these areas along with some key knowledge gaps follows:

- *Prevalence.* Longitudinal studies are needed to determine growth patterns over time so that critical intervention points can be identified. Factors contributing to regional differences in obesity rates also need to be examined. Further study can explore the prevalence of obesity in AI/ANs living in urban areas. Improved surveillance systems need to be established so that data can be shared with tribal communities.
- *Nutrition and Diet.* Studies that examine how USDA's Food and Nutrition service can most effectively deliver nutrition education to the tribes would be useful. Among those

AI/ANs who are the consumers of the Food Stamp and FDPIR programs, the question of why the participation rate in the FDPIR program has decreased in recent years needs exploration. Studies of nutrition and physical activity patterns among AI/AN children may be useful in terms of learning more about obesity prevention.

- *Psychosocial Factors.* Studies that examine obesity in terms of its relationship to stress, mental illness and depression, psychosocial factors, environmental factors, and attitudes about obesity in AI/ANs are needed.
- *Genetics.* Continued research is needed to examine the interactions between genetic and environmental factors in the AI/AN population.
- *Intervention Research.* Intervention research can be used to explore a variety of questions such as: 1) How can intervention programs successfully address constraints to program participation?; 2) What AI/AN at-risk groups should be targeted for early intervention to prevent obesity?; 3) What family processes and behaviors contribute to obesity?; 4) What are the key mediating variables that need to be addressed in community and school-based interventions?; 5) What type of interventions focusing on the macro-environment have had successful outcomes?; and 6) How can participatory research be used to study obesity prevention in AI/AN communities?

References

The references used in the Executive Summary are located in the corresponding reference sections of the main sections of this report.