

Type 2 diabetes in Native Hawaiians and Pacific Islanders in Hawaii

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Abstract

There is significant disparity between the prevalence of diabetes in Native Hawaiians and Pacific People (includes Pacific Islanders and Filipinos) in comparison with other ethnic groups in Hawaii. In this article, prevalence, risk factors, complications and intervention studies are reviewed.

Native Hawaiians and Pacific People have significantly higher prevalence rates of diabetes in comparison to other ethnic groups in Hawaii. They also have higher prevalence rates for the risk factors and complications associated with diabetes, such as obesity and end stage renal disease, respectively. Although the reasons for these disparities are complex and not clearly understood, literature suggests that genetics, acculturation, lifestyle, and cultural beliefs may be related.

There is also a lack of specific research on diabetes in Native Hawaiians and Pacific people. Future research needs to include the collection of more comprehensive data on age, ethnic group and socioeconomic status. (PHD, 2005 Vol 12 No 2 Pages 103 - 110)

glycemic control, and hence to develop the medical complications associated with diabetes.

Of Hawaii's 1.2 million residents, 23% of residents identify themselves as Native Hawaiian or Pacific Islanders, and 23% identify as Filipinos.⁴ In total, 46% of Hawaii residents are considered Native Hawaiians or Pacific People (includes Pacific Islanders and Filipinos). There has been long standing concern about the disproportionate burden of type 2 diabetes in these ethnic groups. As early as 1963, Native Hawaiians and Filipinos were found to have higher prevalence rates of type 2 diabetes than Caucasians in Hawaii.⁵ The results from the Native Hawaiian Health Research Project (NHHRP), a cross-sectional clinical diabetes screening project conducted during the mid 1990s, confirmed that a disproportionate burden of Native Hawaiians have diabetes. The NHHRP recruited participants in two rural communities in Hawaii through a door-to-door approach. This comprehensive method was especially successful in identifying individuals with diabetes, who had not previously been diagnosed. The NHHRP determined the age-adjusted prevalence rate of type 2 diabetes for Native Hawaiian adults, age 30 or older, to be 20%, four times higher than that of the U.S. population.⁶

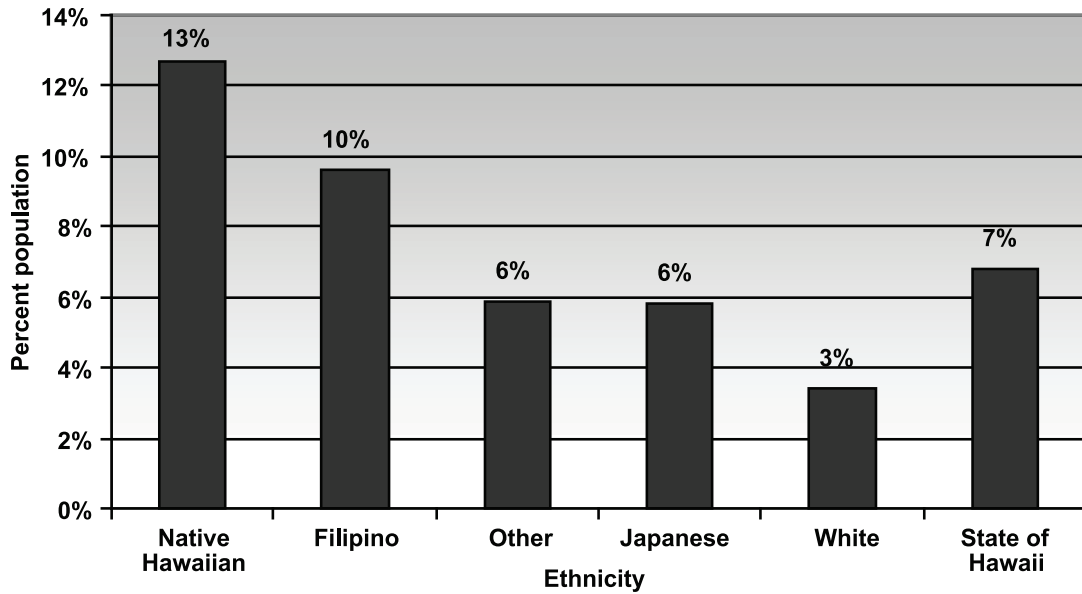
The 2004 Behavior Risk Surveillance Survey (BRFSS), conducted by the Hawaii State Department of Health (DOH) determined that Native Hawaiians and Filipinos have the highest second highest rates of diabetes in the state, 13% and 10% respectively (Figure 1).⁷ However, the BRFSS methodology has limitations, particularly with representing Native Hawaiians and Pacific People.

Prevalence of Diabetes

Type 2 diabetes is a global epidemic. The Centers for Disease Control and Prevention (CDC) estimates that there are 18.2 million individuals (6.3% of the population) with diabetes in the United States.¹ Approximately 1 in 5 adults over the age of 65 has diabetes.¹ The prevalence rate of diabetes mellitus in Hawaii is higher than the U.S. prevalence rate.^{1,2} The Hawaii State Department of Health estimates that 72,000 to 100,000 (6-8%) Hawaii residents have diabetes.³⁻⁴

A critical issue with diabetes is the high rate of individuals who have not been diagnosed. Of the projected 18.2 million people with diabetes in the United States, only approximately 13.0 million people have been diagnosed, while 5.2 million individuals are unaware they have the disease.^{1,4} Similarly, of the projected 72,000 to 100,000 Hawaii residents that have diabetes, over 25,000 individuals are thought to be undiagnosed.³ Undiagnosed diabetics are more likely to have poor

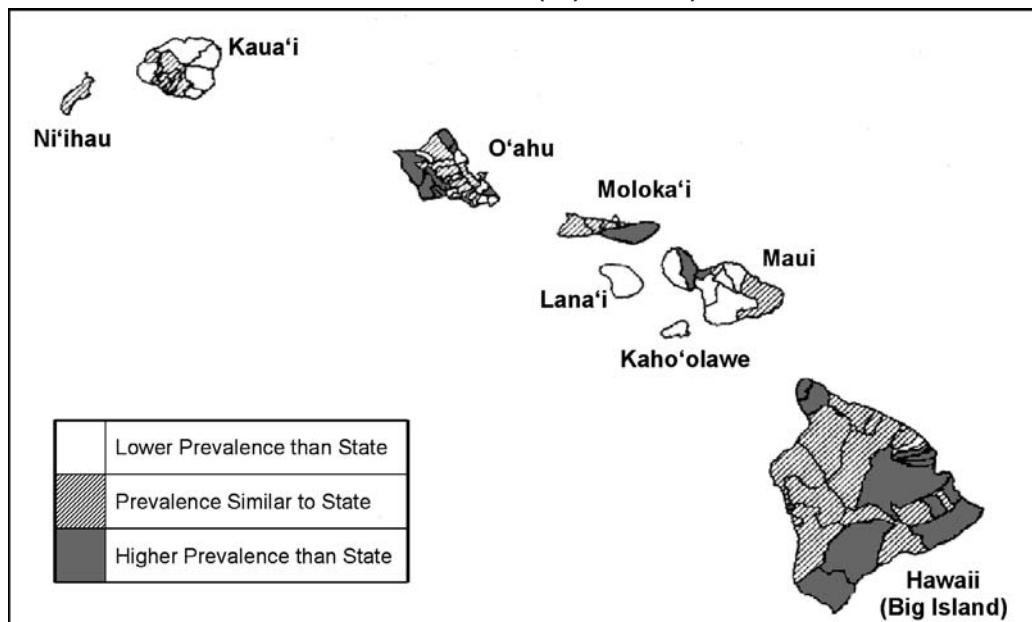
Figure 1: Prevalence of Diabetes in Adults by Self Report, Hawaii, 2004⁷



First, it does not separately identify Pacific-based ethnic groups, other than Native Hawaiian and Filipino. Second, the BRFSS collects data through a telephone survey and, therefore, may not be able to reach Native Hawaiians and Pacific People adequately. Third, the BRFSS survey asks participants if they have ever been told by a doctor that they have diabetes. Consequently, the BRFSS does not report the number of people who have diabetes that have not been diagnosed. Thus, the BRFSS results should be reviewed with caution.

Another diabetes prevalence study, based on commercial insurance and Medicaid claims data, reported a diabetes prevalence rate consistent with that of the BRFSS for the state of Hawaii. This study collected data from 66% of the Hawaii's population and used zip codes to map the prevalence of diabetes by geographic region. The researchers noted the occurrence of high diabetes prevalence in areas that had a high concentration of Native Hawaiian residents, including Waimanalo, the West coast of Oahu, and the East end of Molokai (Figure 2).⁸

Figure 2: Prevalence of diabetes, by zip code area, Hawaii, 1992-1994 (Adapted from Maskarinec G. Diabetes in Hawaii: Estimating Prevalence from Insurance Claims Data. American Journal of Public Health, 1997; 87(10): 1717-20)⁸

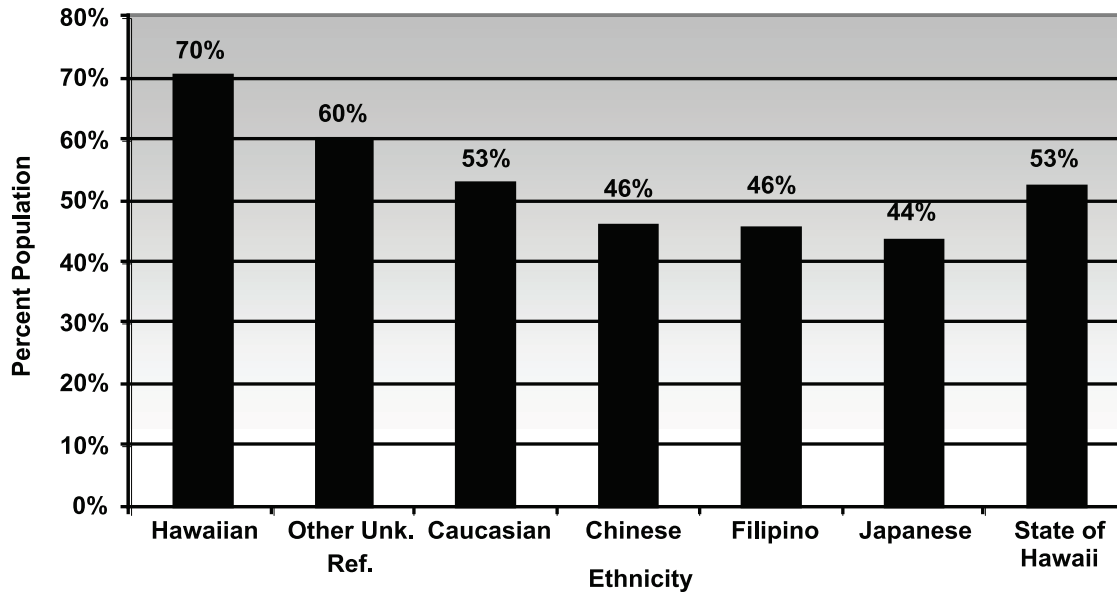


Risk Factors of Type 2 Diabetes

There are several factors that increase the risk of developing type 2 diabetes, including genetic susceptibility, obesity, and low levels physical activity.¹ The connection between genetic risk factors and diabetes is not clearly understood. However, a family history of diabetes and ethnicity are major risk factors for developing the disease. African Americans, Hispanics, Latinos, American Indians, Asians, Pacific Islanders, and Native Hawaiians are at a higher risk for developing

A cardiovascular study conducted in a rural community in the late 1980s determined that 63% of Native Hawaiian women and 57% of Native Hawaiian men were overweight or obese.¹³ The Hawaii State Department of Health's 2003 Hawaii Health Survey (HHS) reported a higher rate of obesity and overweight in Native Hawaiians (70%) (Figure 3).¹⁴ The high prevalence of overweight and obesity in Native Hawaiians approximately correlates to the disproportionate burden of diabetes observed in this population.

Figure 3: Prevalence of overweight and obesity in adults Hawaii, 2003¹⁴



type 2 diabetes than other ethnic groups.¹ The thrifty genotype theory suggests that the disproportionate burden of obesity and type 2 diabetes observed in these ethnic groups may be due to a metabolic evolutionary adaptation. The thrifty genotype is thought to increase an individual's ability to store dietary energy as fat tissue, thereby enabling them to survive famines, such as seasonal food shortages or extended ocean voyaging. Although once an evolutionary advantage, research suggests that the thrifty genotype, in combination with a sedentary lifestyle and a high calorie diet, is related to the epidemic of obesity and type 2 diabetes in some minority groups.⁹ However, it is unlikely that genetics is the cause of the escalating diabetes prevalence rates. Instead, the current epidemic of type 2 diabetes is more likely due to decreased physical activity and increased calorie consumption.¹⁰

Obesity is a major risk factor for type 2 diabetes among all ethnicities and age groups. According to the National Institute of Diabetes and Digestive and Kidney Disease (NIDDK), 67% of individuals diagnosed with type 2 diabetes are either overweight or obese.¹¹ The prevalence of obesity has been steadily increasing in the United States, as well as in Hawaii and is a key factor in the parallel upsurge of type 2 diabetes.¹²

SIDEBAR/SIDE HEADING: Obesity in Children

Obesity is also a major risk factor for type 2 diabetes in children and adolescents. Approximately 85% of children with type 2 diabetes are overweight or obese when diagnosed.¹⁵

Research findings indicate significant ethnic disparities in the rate of childhood and adolescent overweight and obesity.¹⁶ The reasons for these disparities are complex and not fully understood. However, studies suggest that genetics, acculturation, lifestyle, cultural beliefs, socioeconomic status, and insurance status are factors.¹⁷

A recent study examined the prevalence of overweight and obesity in a school district in Hawaii. The prevalence of overweight and obesity in children and adolescents from this area was significantly higher (24%) than the U.S. average (11%) determined by the National Health and Nutrition Examination Surveys (NHANES) III. Twenty-seven percent of Native Hawaiian and 22% of non-Hawaiian children and adolescents ages six to 19 were overweight or obese.¹⁸ This suggests that slightly more Native Hawaiian children and adolescents are overweight or obese compared to their non-Hawaiian counterparts and hence at a higher risk for developing

weight-related health problems, including type 2 diabetes.

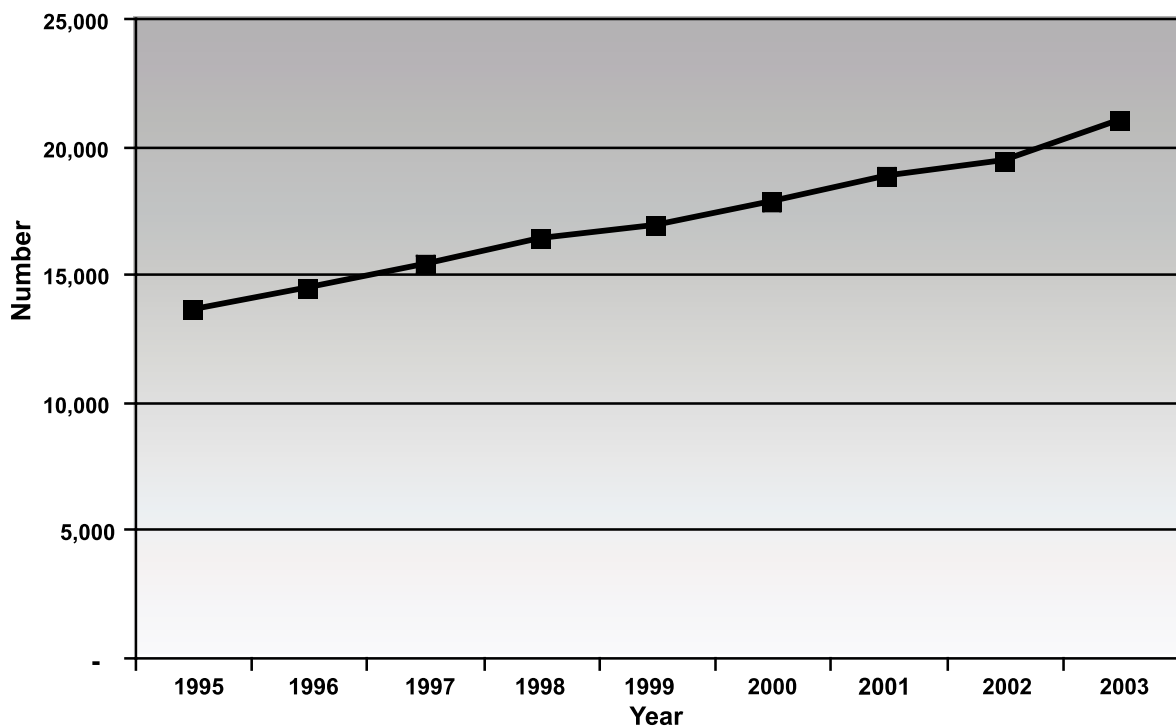
SIDEBAR/SIDEHEADING: Body Image and Culture
 Findings from the Native Hawaiian Health Research Project demonstrate that cross-cultural differences exist in attitudes toward body type. Of the four ethnic groups surveyed, including Native Hawaiian, Filipino, Japanese, and Caucasian, Native Hawaiians had the highest acceptance of a larger body size.¹⁹ The acceptance of larger body type implies an increased acceptance of being overweight, a potential contributing factor in the high rate of overweight and obesity seen in this group. A higher acceptance of large body size was also identified in another Polynesian population. A small study comparing body perception of overweight and obese women in Western Samoa and Australia found that Samoan women felt fitter, stronger and more attractive than their Australian counterparts of the same weight.²⁰ These results suggest that cultural perceptions of body size contribute to the complexity of addressing

diet that is high in calories, protein, fat, and processed carbohydrates.^{22,23} The high prevalence of obesity and type 2 diabetes observed in Native Hawaiians and Pacific People may be attributed to these changes.²³

Medical Complications

Diabetes can be a disabling disease that is associated with a broad spectrum of medical complications that can be life-threatening. In Hawaii, hospitalizations due to diabetes are increasing at an alarming rate. In 2003, over 20,000 individuals were hospitalized for diabetes in Hawaii (Figure 4).²⁴ The most common medical complications of diabetes include blood vessel damage, nerve damage, cardiovascular disease, stroke, blindness, kidney failure, and amputation. Cardiovascular disease is the leading cause of diabetes-related deaths. People with diabetes are two to four times more likely to die from heart disease or have a stroke, than people without diabetes.¹ In addition, over 70% of adults with diabetes have high blood pressure ($\geq 130/80$ mmHg) or use prescription medications for hypertension.¹

Figure 4: Hospitalisation due to diabetes, Hawaii 1995 - 2003²⁴



obesity and associated diseases in Native Hawaiians and Pacific People.

In addition to weight control, the CDC also recommends a healthy lifestyle, including moderate exercise and a low-fat diet, to reduce the onset of type 2 diabetes.²¹ Colonization, migration, and urbanization of Native Hawaiians and Pacific People have resulted in decreased physical activity and the abandonment of traditional plant and fish-based diet. Many Native Hawaiians and Pacific People have adopted a sedentary lifestyle and a

Diabetes results in three visual complication, glaucoma, cataracts, and retinopathy, and is the leading cause of impaired vision and blindness among adults age 20 to 74 years.^{1,25} People with diabetes are 40% more likely to suffer from glaucoma and are 60% more likely to develop cataracts.²⁵ Retinopathy, the most severe visual diabetes complication, causes up to 24,000 cases of blindness per year in the United States.¹ Over 80% of people with diabetes for 15 years or longer have retinopathy.²⁵

One third of all patients with diabetes mellitus may eventually suffer from kidney failure, or end-stage renal disease (ESRD), requiring kidney dialysis or transplantation. Type 2 diabetes is the leading cause of ESRD, accounting for over 40% of all cases in the United States and over 50% of all cases in Hawaii.²⁶⁻²⁸

In 2000, the rate of patients receiving treatment for ESRD in Hawaii was nearly two fold higher than the national average (Figure 5).²⁹

Diabetes is the leading cause of kidney dialysis and transplantation. In Hawaii there are 16 dialysis centers that serve nearly 2,000 patients. There is one transplant center that, in 2003, performed 52 renal transplants and had 356 patients remaining on the waiting list.²⁶ The

percent of Native Hawaiians and Pacific Islanders on dialysis is disproportionately higher; while they make up only 23% of the Hawaii's population, they account for over 50% of the living chronic dialysis patients (Figure 6).^{4, 27}

Another serious, diabetes-associated complication is nerve damage, neuropathy, which affects over 60% of people with diabetes. In combination with blood vessel damage, neuropathy can cause impaired sensation that may lead to severe infections which, if left untreated, may result in amputations. In the United States, an estimated 82,000 diabetes-associated, non-traumatic lower-extremity amputations are performed each year.¹

Figure 5: Patients Receiving Treatment for End-stage Renal Disease Related to Diabetes, Rate per 100,000, U.S. and Hawaii, 1996-2000²⁹

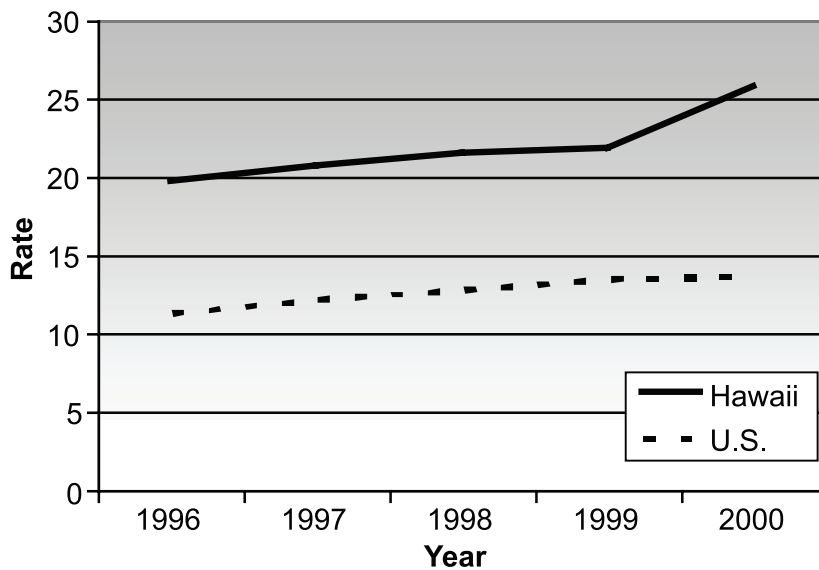
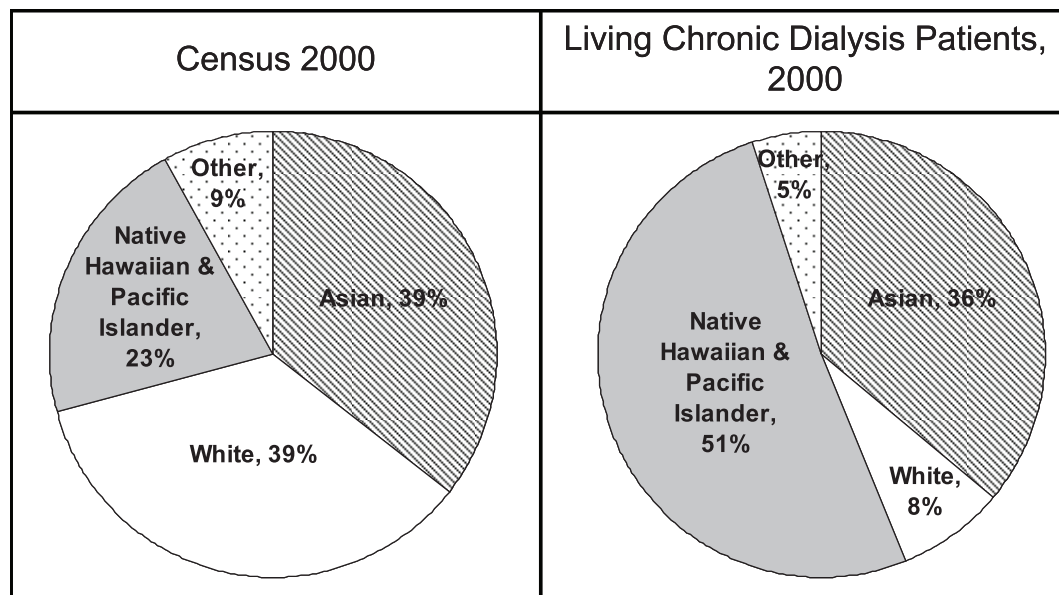


Figure 6: Census 2000 & Living Chronic Dialysis Patients, Hawaii, 2000^{4, 27}



According to the Hawaii State Department of Health, diabetes was the seventh leading cause of death in Hawaii in 2001.³⁰ There is significant disparity between ethnic groups when a comprehensive assessment of cause of death is examined. The Hawaii Department of Health prepared mortality rates for diabetes as an underlying or a contributing cause of death, Native Hawaiians and Filipino's rates were respectively 4.6 and 2.1 times higher than the white population.³

Hawaii's Efforts to Address Diabetes

Studies and programs using the foods from the traditional Hawaiian diet are the most well known culturally-based behavioral interventions in Hawaii. The first of these was the 1987 Molokai Diet Study (MDS). The MDS examined the effects of a pre-contact, traditional Hawaiian diet, in combination with a cultural and health education component, on blood cholesterol and triglyceride values. The participants were Native Hawaiian residents of Molokai, a small, rural island in Hawaii. After three weeks of the program, participants' mean cholesterol levels decreased by 9%, and their mean triglyceride levels decreased by 47%.²² In 1989, the Waianae Diet Study (WDS) examined the effects of a traditional Hawaiian diet on the health of overweight and morbidly obese individuals. Participants of the three week WDS experienced a mean reduction of consumed calories, body weight, average serum cholesterol, serum triglyceride, mean serum glucose, blood pressure, and a decrease in the use of insulin and anti-hypertensive medication.²² Throughout the 1990's a proliferation of health programs were implemented based on the findings of these landmark studies. A recent evaluation reports that programs based on these studies are appealing to participants because they instill pride, build community capacity, and incorporate Native Hawaiian values and traditions, such as the participation of families. This evaluation also concluded that, in the short-term, there was weight loss and improvement in health. However, long-term effects were less conclusive, with incidence of regaining weight similar to other diet interventions.³¹

Although diabetes education programs are widely available throughout the state of Hawaii, only approximately 55% of those diagnosed with diabetes access this resource. Data collected from the 2003 BRFSS determined that Native Hawaiian adults are less likely to participate in diabetes education opportunities, compared to their Caucasian and Japanese counterparts.³²

The Native Hawaiian Diabetes Intervention Program (NHDIP) examined whether a lifestyle intervention implemented with family support was more effective in improving lifestyle behaviors than a standard intervention. The family support intervention included cultural components and social support. The NHDIP results demonstrated that the family support intervention was more effective than a standard diabetes intervention.³³

In addition to the intervention studies noted above, there has been copious screening and health and wellness programs targeting obesity and diabetes in Hawaii. A smaller number of programs have specifically targeted Native Hawaiians and Pacific People. The Native Hawaiian Health Care Systems, a network of health and wellness centers throughout Hawaii, have considerable focus on risk factors for diabetes.³⁴ For example, Na Puuwai, the Native Hawaiian Health Care System for the islands of Molokai and Lanai, provide nutrition and exercise programs that otherwise would not be available in these rural communities.³⁵

The U.S. federally designated community health centers have been important innovators in developing diabetes prevention and treatment programs targeting Pacific People

The U.S. federally designated community health centers have been important innovators in developing diabetes prevention and treatment programs targeting Pacific People. Kokua Kalihi Valley (KKV), a community health center on the island of Oahu, has developed particularly innovative programs. For example, KKV recently launched a project to develop a 100 acre community park that will include a community garden, and bike and hiking trails.³⁶

The Hawaii EXPORT Center at the University of Hawaii's medical school's Department of Native Hawaiian Health, a new participant in disseminating diabetes information and services, has been involved in several collaborative, community-based diabetes awareness, control and management initiatives targeting Native Hawaiians and Pacific People. Since 2004, 12 community-based programs were launched, ranging from gardening-nutrition workshops, to intensive self-management, to culturally-based education and screening.³⁷

Conclusions

In Hawaii, Native Hawaiians and Pacific People have a greater burden of diabetes and related complications than the rest of the population.

There is significantly more data available about the status of diabetes in Native Hawaiians, compared to other Pacific-based ethnic groups. Further studies are needed to better understand the magnitude of this health

problem in the Pacific People of Hawaii. Prevalence of type 2 diabetes in Filipinos and Micronesians could be considerably higher than available reports indicate. Barriers to medical services, including language, culture, and socioeconomic status may increase the risk of undiagnosed diabetes in these ethnic groups.

The global epidemic of type 2 diabetes requires innovative research, prevention, and treatment efforts. The role of culture in both the development and control of diabetes cannot be ignored.

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The global epidemic of type 2 diabetes requires innovative research, prevention, and treatment efforts

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Diabetes is the leading cause of kidney dialysis and transplantation. In Hawaii there are 16 dialysis centers that serve nearly 2,000 patients

I have seen the future of the Pacific Rim and I am scared out of my mind (John Sargeant – 1994)