A General Inquiry Into The Health Status of the Nottawaseppi Huron Band of Potawatomi And the Risk Factors Associated With Their Non-Insulin Dependent Diabetes Mellitus

By

Floyd E. Gallegos

Master in Social Work

Western Michigan University (1998)

Submitted to the Department of Urban Studies and Planning
In Partial Fulfillment of the Requirements for the Degree of
Master in City Planning

at the
Massachusetts Institute of Technology
September, 2000

Signature of Author .....
Department of Urban Studies and Planning

Certified by .....
Professor Phillip Clay and Associate Provost
Department of Urban Studies and Planning

Accepted by .....
Professor Dennis Frenchman
Chairman, MCP Committee

TABLE OF CONTENTS

TABLE OF CONTENTS

List Of Tables

List Of Tables

List Of Tables

List Of Tables

List Of Tables

List Of Figures

Introduction

The purpose of this thesis is to investigate the relationship between cultural lifestyle, perceived health status and non-insulin dependent diabetes mellitus (NIDDM) among the Nottawaseppi Huron Band of Potawatomi. The specific focus of this work is to survey the health risk behaviors and self perceived health status indicators of the Nottawaseppi to determine whether there is a significant correlation with the presence of NIDDM in the survey respondents. In addition, this thesis also focuses on identifying health care policies related to NHBP Native Americans that will promote positive, policy formation and planning within the Nottawaseppi community to reduce NIDDM.

Chapter I will provide the context for the study. It begins by identifying the most prominent health related issues faced by Native American communities within the boundaries of the United States, focusing on the incidence of diabetes mellitus. The chapter concludes with a general list of the challenges and impact of diabetes in Native communities. Chapter II examines a range of literature in several disciplines to identify historical interpretations and approaches to the study of diabetes among Native populations. This chapter concludes with a focus on the Nottawaseppi Huron Band of Potawatomi in Michigan, which was the population studied for this research. Chapter III describes the design and methods for the study. This chapter describes the survey conducted to generate data on the Nottawaseppi Huron Band of Potawatomi Indians in Michigan. The chapter also provides a general medical profile of the tribe and provides a theoretical model to be used in future studies. Chapter IV presents the descriptive findings, while Chapter V presents the significant analytical findings. Chapter VI presents some of the planning and policy implications for the work delineated in this study.

Chapter One

The Problem

Important changes in the health status of Native Americans living within the geographical boundaries of the United States over the past 50 years have shifted Native American medical and public health concerns from the treatment and prevention of accidents, tuberculosis and gastrointestinal diseases, which are generally associated with pre-industrial societies, to the prevention and cure of industrial and post-industrial diseases, including diabetes, heart disease and cancer.

Perhaps the most important overall change in Native American health has been the change in the age-adjusted death rates of Native Americans. In 1965, for example, Native Americans had a death rate of 1,208.3 per 100,000 population compared to all races with a rate of 779.7. The precipitous fall in the Native American death rate to 456.7 in 1996 caused the ratio of Native American deaths to white deaths--the comparison ratio--to fall from 1.54 in 1965 to .98 in 1996.[1]

What should also be acknowledged, however, is that even in 1965, the number one and number two killers of whites, heart disease and cancer, adjusting for age, were the number two and three killers of Native Americans. Without adjusting for age, respiratory disease (tuberculosis) was the number three killer of Native peoples. Accidents and tuberculosis, as late as the 1960s, continued to be major killers of Native Americans. Up to 1965, the impact of the degenerative diseases, heart disease, cancer, and cerebrovascular disease, were masked by the effects of the accidents and tuberculosis on the Native American population; but by 1996, having mitigated the effects of accidents and tuberculosis on their health, Native Americans, like whites, were facing heart disease and cancer as their number one and number two killers.

Although white American medical technology is probably responsible for the fall in prevalence of tuberculosis among Native peoples, the penetration of Native American societies by whites may have also brought higher death rates both in natural and external causes of death. In particular, since 1980, the age-adjusted death rates for Native Americans have increased in four areas: cancer, chronic obstructive pulmonary diseases, HIV, and diabetes mellitus (Table 1.1). Of

---

[1]National Center for Health Statistics, *Health, United States, 1998. With Socioeconomic Status and Health Chartbook*, (U.S. Department of Health and Human Services: Hyattsville, MD, 1998), Table 33, p. 213.

these four areas, cancer has the highest death rate followed by diabetes mellitus. Given that cancer is the number two killer of whites and given that it was killing whites at a rate of 125.2 per 100,000 residents, and given that no specific cancer (breast, prostate, lung, or colorectal) kills more Native Americans than diabetes mellitus, I have decided to investigate diabetes mellitus, the fourth highest killer of Native Americans in 1996.

More specifically, attention will be focused on investigating the community health policies that may lead to a reduction of diabetes mellitus in the Native American community of the Nottawaseppi Huron Band of Potawatomi. At least three reasons make this important. First, despite the health setbacks of the 1990s that are reflected in both the rising death rates and rising comparison ratios for Native Peoples relative to whites, improvements in U. S. population health due to improved medical technology has passed through to the Native American community. Thus, although most Native Americans are on the margin of white American society, investments in health technologies do appear to be positively correlated with general improvements in Native American health. Second, and perhaps, more importantly, in the general population, the age-adjusted death rate due to diabetes mellitus declined from 14.3 per hundred thousand in 1950 to 9.7 in 1985, but by 1996, it had increased to 13.6 per hundred thousand.

Among Native Americans, the number of deaths due to diabetes mellitus rose from 18.7 per hundred thousand in 1985 to 28.8 per hundred thousand in 1996. The reason for such an increase is not known. One might speculate that lack of data collection and reporting in the period prior to 1985 might explain part of the difference in the two periods. Alternatively, Natives might be passing through an NIDDM epidemic period. And third, the Potawatomi, though characterized as having moderate incidence of diabetes mellitus in some localities, have received very little primary research attention. This is not surprising given among all 540 plus tribe, almost all research has focused on only a small fraction. And, in terms of longitudinal studies the number of tribes under study is only a handful.

Thus, given the death rate for diabetes mellitus in 1985 for both the general population and Native Peoples, it would seem that local diabetes mellitus education projects, designed to replace unhealthy life activities with healthy activities, run by and for Native Americans, might induce a permanent decline in the diabetes mellitus death rate for Native Peoples.

Positive changes have occurred in the general health status of American Indians and

Alaska Natives (Indians) over the past 40 years. Mortality, morbidity, and disability due to serious infections and other acute conditions have decreased. The impressive reduction of mortality rates from 1972 to 1993 is shown in Table 1.2. As shown in this table, death rates have decreased in the periods covering 1991 through 1993. The greatest decrease has occurred in the incidence and mortality from tuberculosis, followed by gastrointestinal diseases and maternal mortality. This gratifying improvement is a tribute to Indian communities. Tribes throughout the country have vigorously participated in setting health priorities, generally welcomed interventions of modern medical technology, and implemented relevant community-based disease prevention and health promotion programs. However, Indians still continue to experience a disproportionate burden of disease.

In spite of health improvements, major health problems, including heart disease, injuries (intentional and unintentional), malignant neoplasm, diabetes, and chronic liver disease/ cirrhosis cause high mortality in many Indian communities. Table 1.3 shows the mortality rates due to these causes and compares Indian with U.S. White rates.

As can be seen by the comparative data, the differences between white and Native populations at that national level are measurable. More whites perish from heart disease than Natives, yet far more Natives perish from injuries, chronic liver disease and diabetes. To further explore these difference, this writer sough information on causes of death for Natives in Michigan.

Data on deaths of Michigan Indians from 1985 to 1994, as seen in Table 1.4, were gathered in December 1997, by staff of Johns Hopkins University, for a workshop: "Capacity Building: Public Health Concepts and Planning for Michigan Indians." Table 1.4 also presents data for Natives residing in Michigan and Indiana. These data, preliminary to this study, depict the leading causes of death for Natives residing in Michigan and Indiana.

The above brief discussion suggests three highlight areas in the campaign against diabetes mellitus among Native Peoples: first, prior to the recent upswing in diabetes mellitus as a cause of death, there had been a thirty-five year decline in its attribution as cause of death within the general population; second, although equally reliable data is not available on the attribution of diabetes mellitus as a cause of death among Native Peoples, it does appear that the upswing began at the same time that it began for the general population, around 1985; third, a return to the 1985

diabetes mellitus death rate should be possible, perhaps an even lower rate, without any additional advances in medical technology.

The specific problem under consideration in this study is two fold: first, to assess the prevalence of non-insulin dependant diabetes mellitus (NIDDM) among Nottawaseppi Huron Band of Potawatomi (NHBP); and second, to design a set of policy recommendations that will assist the Nottawaseppi nation in reducing the prevalence of diabetes mellitus.

Although most U.S. American adults know someone who has diabetes, like most diseases, it is not well understood outside of the medical community.

Diabetes, which can lead to death, adult blindness, kidney disease, and foot or leg amputation,[2] prevents the body's cells from absorbing sugar from the blood stream. The normal mechanism by which sugar leaves the blood stream and enters the cell is governed by insulin, which is produced by the pancreas. Insulin is hampered from performing its function for one of two reasons: either the pancreas does not produce sufficient insulin or the insulin that is produced cannot be used. If the pancreas does not produce sufficient insulin, then the diabetes that results is called insulin dependent or Type I diabetes; if sufficient insulin is produced but cannot be used by the body, then the diabetes that results is called non-insulin dependent or Type II diabetes mellitus (NIDDM). Insulin dependent or Type I diabetes occurs in 10 percent of the population of persons with diabetes.

In the present study my focus is on Type II or non-insulin dependent diabetes mellitus (NIDDM), which represents about 90 percent of the diabetic population.[3,4] As mentioned above, diabetes has both a direct and an indirect affect upon morbidity and mortality. Health complications resulting from diabetes, for example, include hypertension, blindness, renal failure, neuropathy, amputations, and birth defects in babies born to mothers or fathers with diabetes.

---

[2]John West, "National Diabetes Education Program," *Closing the Gap: A newsletter of the Office of Minority Health, U..S. Department of Health and Human Services*, (Feb/Mar, 1999), p. 1.

[3]Oxendine , Jean. "Who has Diabetes", Diabetes Facts and Figures, Closing the Gap, February/March 1999, Office of Minority Health, Office of Public Health and Science, U.S. Department of Health and Human Services. p. 5.

[4]National Institutes of Health (NIH), 1994.

Diabetes is also a primary risk factor for cardiovascular disease and stroke.[5]

Recent medical research shows that diabetes often occurs several years prior to its being diagnosed by a health specialist, and much of the suffering and many of the complications associated with diabetes can be prevented, if detected in its earliest stages. The prevention of many of the complications of diabetes can be accomplished through early diagnosis, blood sugar control, routine health screening, and medical treatment.

In the United States, diabetes affects more than sixteen million people and ranks as the fourth leading cause of death. It is more prevalent in the black and Native American populations than in the white population; and, more prevalent among Native American than among blacks.

The prevalence of diabetes among Native Americans has an unexplained history. Fifty years ago, diabetes was virtually unreported, and perhaps had a relatively low prevalence among Native Americans.[6] By 1989, however, it had become the seventh leading cause of death among Native peoples[7] Campbell 1989; and according to data collected by Indian Health Services (IHS), by 1996, diabetes was ranked as the fifth leading cause of death among Native Americans.

---

[5] Ibid.

[6] Recent studies, however, suggests that Native Americans have a genetic propensity to develop diabetes. The reported low prevalence of diabetes among Native Peoples prior to 1985 does not suggest, however, support for a genetic explanation.

[7] Campbell, Gregory, R. "The changing dimension of Native Health: A Critical Understanding of Contemporary Native Health Issues." American Indian Culture and Research Journal Special Edition. Contemporary Issues in Native American Health. 13, nos. 3&4 (1989): 1-20.

Table 1.1. (T31) U.S. Age-adjusted death rates for selected causes by race,

Selected years 1980-1996 for White and Native Americans

Causes	1980 White	1980 Native	1990 White	1990 Native	1995 White	1995 Native	1996 White	1996 Native
All	559.4	564.1	492.8	445.1	476.9	468.5	466.8	456.7
Natural	497.7	436.5	442.4	360.3	428.5	385.4	419.2	374.5
Heart	197.6	131.2	146.9	107.1	133.1	104.5	129.8	100.8
Cerebral	38.0	26.6	25.5	19.3	24.7	21.6	24.5	21.1
Cancer	129.6	70.6	131.5	75.0	127.0	80.8	125.2	84.9
COPD[1]	16.3	7.5	20.1	12.8	21.3	13.8	21.5	12.6
PN/IN[2]	12.2	19.4	13.4	15.2	12.4	14.2	12.2	14.0
Liver	11.0	38.6	8.0	19.8	7.4	24.3	7.3	20.7
Diabetes	9.1	20.0	10.4	20.8	11.7	27.3	12.0	27.8
Exter[3]	61.9	127.6	50.8	84.8	48.4	83.0	47.5	82.1
Accident	41.5	95.1	31.8	59.0	29.9	56.7	29.9	57.6
Suicide	12.1	12.8	12.2	12.4	11.9	12.2	11.6	13.0
Homicide	6.9	16.0	5.9	11.1	5.5	11.9	4.9	10.1

Source: *Health, 1998*, op. cit., Table 31; comparison ratios calculated by author.

1.COPD = chronic obstructive pulmonary disease

2.PN/IN= pneumonia/influenza

3. External injuries=accidental and intentional

Table 1.1 (Continued):(T31) U.S. Comparison Ratio Age-Adjusted Death rates NA/Whites for Selected years 1980-1996

	1980	1985	1990	1995	1996
All	1.01	0.89	0.90	0.98	0.98
Natural	0.88	0.79	0.81	0.90	0.89
Heart	0.66	0.68	0.73	0.79	0.78
Cerebral	0.70	0.75	0.76	0.87	0.86
Cancer	0.54	0.55	0.57	0.64	0.68
COPD[1]	0.46	0.51	0.64	0.65	0.59
PN/IN[2]	1.59	1.16	1.13	1.15	1.15
Liver	3.51	2.65	2.48	3.28	2.84
Diabetes	2.20	2.17	2.00	2.33	2.32
EXTER[3]	2.06	1.76	1.67	1.71	1.73
Accident	2.29	2.52	1.86	1.90	1.93
Suicide	1.06	0.98	1.02	1.03	1.12
Homicide	2.32	2.26	1.88	2.16	2.06

1.COPD = chronic obstructive pulmonary disease

2.PN/IN= pneumonia/influenza

3. External injuries=accidental and intentional

Table 1.2 Reductions of Selected Mortality Rates For Native American Indians And Alaska Natives under the Care of Indian Health Services

Deaths: Health Condition	Death Rates 1972-74	Death rates 1991-93	Percent Decrease
Infant Mortality[1]	22.2	8.8	60
Maternal Mortality[2]	27.7	8.9	75
Pneumonia Influenza[3]	40.8	19.2	53
Tuberculosis[3]	10.5	2.1	80
Gastrointestinal[3]	6.2	1.5	78
Accidents[3]	188.0	83.4	56
Suicide[3]	21.0	16.2	23
Homicide[3]	24.3	14.8	40
Alcoholism[3]	59	38.4	35

1 rate per 1,000 live births; 2 rate per 100,000 live births; 3 age adjusted rate per 100,000 population

Table 1.3 Leading Causes of

Indian/White Mortality Rates[1] Comparisons, 1991-1993

Deaths Due To	Indian	White	Ratio: Indian/White
Heart Disease	165.5	172.8	(0.96)
Injuries (unintentional/ intentional)	83.4/30.8	28.2/17.9	2.96/1.72
Malignant Neoplasm	98.8	129.9	(0.76)
Chronic Liver/Cirrhosis	30.1	7.7	3.9
Diabetes	31.7	10.5	3.0

[1] rate per 100,000 population

Table 1.4. Leading Causes of Death:
Michigan/Indiana, 1985-1994*

Cause of Death	Number of Deaths
Cardiac – Ischemic	850
Cancer (lung =234)	580
Injuries (intentional/non)	320
Respiratory	140
Cerebrovascular	140
Diabetes	110
Pneumonia	90
Chronic Liver/Cirrhosis	80

* Data from IHS statistics.

Chapter Two

Literature Review

The literature on the relationship between diabetes and Native Americans can be partitioned into two broad groups: the pre-1940 work, which generally found an absence of diabetes among Native Americans; and the post-1940 work, which recognizes increasing prevalence and incidence rates of diabetes, particularly non-insulin dependent diabetes mellitus (NIDDM) among Native Americans. The post-1940 NIDDM/Native American (NIDDM/NA) database for the literature is, in large part, based upon a longitudinal health survey begun in 1965 of the Gila River Indian Community. The major findings of most of the NIDDM/NA literature are the following:

1. Diabetes is one of the five leading causes of death among Native Americans;
2. Although genetic factors may influence the incidence and prevalence of diabetes among Native Americans, it is generally believed that diet and exercise can significantly control symptomatic manifestations of the disease;
3. Diabetes contributes to increased mortality rates among Native Americans through the deterioration of bodily activities, including the kidneys and the cardiovascular system;
4. Recent evidence suggests that NIDDM, whose incidence had been generally restricted to adults over 45, is becoming more common among First Nation (Native American) children.
5. Improved diet and exercise plans may be relatively inexpensive methods of

reducing morbidity and mortality rates among Native Americans due to diabetes related illness.

Most public health knowledge about the impact of diabetes on the Native American community is based on an epidemiological longitudinal study of diabetes mellitus among Gila River Indian Community, Pima, and Tohono O'odham (Papago) peoples,[8] which was begun in 1965, with two-year follow-up or new examinations. Peter H. Bennett and two associates undertook one of the earliest documentations of the study in 1971.[9] Although the Pima study remains the most important source of prevalence data on Native Americans, other First Nations have been studied also, including Apache, Comanche/Kiowa, Sioux,[10] Chippewa,[11] Navajo.[12],[13],[14] In all these studies the general finding is that the prevalence of diabetes is higher among Native peoples than among non-Native U.S Americans[15], and higher among Native American women

---

[8]K.M. Venkat Narayan, "Diabetes Mellitus in Native Americans: The Problem and Its Implications," in *Changing Numbers, Changing Needs: American Indian Demography and Public Health (CNCN)*, ed. Gary D. Sandefur, Ronald R. Rindfuss, and Barney Cohen. (Washington, D.C.: National Academy Press, 1996), p. 263.

[9]P. H. Bennett, T.A. Burch, and M. Miller, "Diabetes Mellitus in American (Pima) Indians, *Lancet* 2 (1971), 125-128.

[10]J. S. Lee, et al., "Diabetes and Impaired Glucose Tolerance in Three American Indian Populations Aged 45-74 years: The Strong Heart Study, *Diabetes Care* 18:5 (1995), pp. 599-609.

[11]Rith-Nararian et al.., "Diabetes in a Northern Minnesota Chippewa Tribe," *Diabetes Care*, 16, suppl. 1, (1993), pp. 266-270.

[12]J. R. Sugerman, et al., "Prevalence of Diabetes and Impaired Glucose Tolerance Among Navajo Indians, *Diabetes Care*, 15, No. 1, (1992), pp. 114-120.

[13]T. R. Hall, et al., "Evidence For Recent Increases in Obesity and Non-Insulin-Dependent Diabetes Mellitus in A Navajo Community," *American Journal of Human Biology*, 4, (1992), pp. 547-553.

[14]J. C. Will, K. F. Strauss, J. M. Mendlein, C. Ballew, L. L. White, and D. G. Peter, "Diabetes Mellitus Among Navajo Indians: Findings From the Navajo Health and Nutrition Survey," *Journal of Nutrition*, 127, suppl. 10, (Oct 1997), 2106S-2113S.

[15]See, for example, J. S. Carter et al, "Tribal Differences in Diabetes: Prevalence Among American Indians in

than among Native American men.

In conjunction with the higher prevalence of diabetes among Native peoples, it has also been documented that the prevalence of diabetes among Pimas, which has been estimated to reach 70 percent[16], and other First Nations has increased over the last three decades. Kelly M. West, for example, notes that although rates of diabetes were high for all Oklahoma Native Americans at the time that her research was published, between 1932 and 1939, there was no documented evidence of diabetes among Oklahoma nations; albeit many of the same physicians were finding diabetes among contemporaneous white populations.[17] West points out that while prior to 1940 no systematic studies of Oklahoma nations[18] were executed, collateral evidence suggests that diabetes was rare among Native Americans living not only in the United States but in Alaska as well.[19] The author, drawing upon twenty-five years of her own interviews of Oklahoma Native Americans who were either diabetic or a close relative of a diabetic, remembers only one interviewee who had witnessed a case of diabetes prior to 1936.[20] West, though recognizing that the low rates of diabetes among Native peoples was in part attributable to the infrequency of diabetes testing among Native Americans, argues that the rarity of reported diabetes among

---

New Mexico, *Public Health Reports*, 104, (1989), pp. 665-669; W. L. Freeman, "Diabetes in American Indians of Washington, Oregon, and Idaho," *Diabetes Care*, 12, No. 4, (1989), pp. 282-289;

[16]M. A. Charles, E. Eschwege, and P. H. Bennett, "Diabete non insulinodependant dans les populations a risque: les Indiens Pimas," *Diabetes Metabolic*, 23, suppl 4, 6-9.

[17]Kelly M. West, "Diabetes in American Indians and Other Native Populations of the New World," *Diabetes* 23, No. 10, (1974).

[18]It is not clear whether she is referring to systematic studies of diabetes, diseases, or Native American health.

[19]West cites V. Strefansson, "Food and Food Habits in Alaska and Northern Canada," in *Human Nutrition Historic and Scientific*, I. Goldston, ed. (New York: International Universities Press, Inc., 1960), pp. 23-60.

[20]West, op. cit., p. 842.

Native peoples prior to 1940 suggests its low frequency in Native American populations.

In her work with the Shawnee in 1973-1974, West found that of the Native Americans that were discovered with diabetes, 71 percent had polyuria and polydipsia at the time of the test. These tests are important, as they are indicators of the presence of NIDDM. Such positive tests were rare prior to 1940, although urine glucose tests were common at local clinics and hospitals.[21]

As late as 1955, Native Americans and whites had the same diabetes assignment rates as the cause of death.[22] Twelve years later, however, diabetes as the cause of death was 2.3 times as high for Native Americans as it was for whites.[23] In one study by the Division of Indian Health, the diabetes related death rates for Native Americans between forty-five and fifty-four years of age was five times as high as that of non-Natives.[24]

In the wake of the increasing prevalence of diabetes among Native Americans, researchers also found that although many nations had prevalence rates that exceeded those of whites, several tribes had prevalence rates substantially lower than those of both U.S. and Canadian whites. In general, these early findings failed to control for age, frequency of screening, diagnostic procedures, and diagnostic criteria.

West found that the prevalence of diabetes often differs by a factor of at least two among Native American groups. Attempting to control these factors, she made population estimates by

---

[21]Ibid.

[22]F. W. Felsman, "Health Status Report on Diabetes Mellitus," Division of Indian Health, United States Public Health Service, 1965.

[23]C. A. Hill, Jr. and M. I. Spector, "Natality and Mortality of American Indians Compared With U.S. Whites and Nonwhites," HSMHA Health Reports 86, (1971), 229-246.

[24]West, op. cit., p. 843.

age and gender for the twenty-two Native American nations in Oklahoma. Matching IHS data to census figures and tribal roles, she estimated that IHS had data on about 90 percent of the known diabetics. West found that among full bloods in all nations, prevalence rates exceeded 12 percent in those over thirty-four years of age. In a clinical study, West and her colleagues tested for occurrence of diabetes among Cherokees, Seminoles/Creeks, and Kiowas/Comanches. Although the tests and average ages varied among the groups, West was, nonetheless, able to conclude that occult diabetes was common among the groups and therefore the rates of known diabetes substantially underestimated actual rates. She estimated that actual prevalence rate of diabetes at 33 percent of the Oklahoma full blood Native Americans over thirty years of age. Her more general findings concerning Oklahoma Native Americans were four: diabetes was probably rare prior to 1940; diabetes was common by 1974; all tribes were previously slender; and all are now overweight.[25]

Of particular importance to the present study, West classifies the Potawatomies of Oklahoma as probably having a high diabetes prevalence rate.[26]

Diabetes Mellitus Prevalence and Incidence Literature

William C. Knowler et al in the Gila River Indian Community longitudinal study of diabetes, using an oral glucose tolerance test, found that the prevalence of diabetes was extremely common among Pimas.[27] In addition they note that prevalence rates increase with age until age

---

[25]Ibid., p. 847.

[26]Ibid., p. 844.

[27]William C. Knowler, David J. Pettitt, Mohammed F. Saad, and Peter H. Bennett, "Diabetes Mellitus in the Pima Indiands: Incidence, Risk Factors and Pathogenesis," *Diabetes/Metabolism Reviews*, 6(1), (1990), 1-27

64, when they begin to decline. In one analysis, they divide the 1965-1988 period into three periods--1965-1972, 1973-1980, and 1981-1988--and comparing the prevalence rates by age for the three time periods holding age constant, show that cohorts in the later time periods had higher prevalence rates. That is, the prevalence of diabetes over both age (until age 64) and time tended to increase. The authors offer two possible explanations: an increase in incidence rates; or an increase in survival rates. Changes in the survival rate would not explain the increased prevalence among younger age groups (< 56 years of age), who were not dying from diabetes. Knowler et al. found that the incidence rates increased by age group from the 1975-1985 period compared to the 1965-1975 period.

The only groups that did not experience a higher incidence rate over time were males 55-64 and females 45-54. The researchers offer three interacting explanations to explain the fall in the incidence rate among older Pimas: a cohort effect--better diets and more exercise for older cohorts; age effect--exposure occurs or causative factors operate in early and middle adulthood; residual effect--by the time the cohort group gets to be over 55 years of age, all those who will contract diabetes, have. They also suggest that the increased incidence over time supports the hypothesis that environmental factors are more important than genetic factors, since the gene pool is not likely to change substantially in such a short period of time. In particular, the researchers argue that the existence of similar increases in prevalence and incidence rates has also occurred in other Native peoples over the past forty years who have experienced significant socioeconomic changes accompanied by obesity.

Knowler et al. identify eight risk factors that can be used to predict the occurrence of diabetes in the Pimas: diabetes in parents; genetic markers; obesity; diet; prenatal metabolic

environment; glucose intolerance; serum insulin concentrations; and insulin resistance. Based upon an earlier work,[28] Knowler et al. show that the prevalence of diabetes is highest in offspring whose parents both had diabetes at a young age. Moreover, the prevalence of diabetes among children between the ages of 5-14 is almost entirely restricted to children whose parents both had diabetes at a young age. With respect to Native American heritage, the researchers found that the prevalence of diabetes among community residents with zero heritage was 20 percent, half heritage was 30 percent, and full blood [sic] was 40 percent.

Obesity, according to the researchers is a powerful determinant of diabetes. Using a body mass index (BMI) of kilograms/meter^2, Knowler et al found that Pimas with body masses between 19 and 25 had the lowest incidence of diabetes at all age levels; Pimas with body masses between 25 and 35 had a higher incidence of diabetes than the low mass group, but lower than the high mass (>35) group. These findings held for both males and females. Nonetheless, increases in obesity do not account for all of the difference in the incidence of diabetes. Controlling for both age and gender, the researchers found that the ratio of later period to the earlier period incidence rate was 1.5; but after adjusting for body mass, along with age, and gender, the ratio fell to only slightly to 1.4.

Turning to the prenatal environment, diabetes in pregnancy often results in children who between the ages of 5 and 9 become obese. When the mother becomes diabetic, this also affects the offsprings' weight. In particular, children born to pre-diabetic (mother develops diabetes after giving birth) and non-diabetic mothers have much closer to standard weights than infants born to

---

[28]W. C. Knowler, et al., "Genetic and Environmental Factors in the Development of Diabetes Mellitus in Pima Indians," in *Genetic Susceptibility to Environmental Factors–A Challenge for Public Intervention*, ed. U. Smith et al, (Stockholm: Almqvist & Wiksell International, 1988), pp. 67-74.

contemporaneously diabetic mothers. The authors offer maternal-child effect to explain some of the increased prevalence of diabetes: diabetic mothers produce diabetic daughters who produce diabetic daughters and so on. Finally, the authors argue that due to the intrusion of Europeans into Pima communities at the beginning of the 20th century, the Pima diet changed drastically. The combination of cash economy, town development, and reservation trading posts lead to the Pimas substituting a western diet for their indigenous foods. Carbohydrate consumption is the single strongest predictor of diabetes; carbohydrate consumption is highly positively correlated with both fat consumption and total caloric intake, making it difficult to separate the three effects.

Knowler et al in a 1991 study[29] went on to acknowledge a paucity of research concerning the causes of obesity in the Pimas, and how obesity increases the incidence of diabetes and whether the prevention or treatment of obesity will reduce the incidence of the disease. In addition to the links between obesity and diabetes and between the diabetic status of the mother and the child, in a 1998 article Knowler in a joint effort with R. L. Hanson[30] are able to partially link a single genetic locus to the age of onset of NIDDM. Charles et al[31] argue that it is the genetic link that probably explains why diabetes has taken on epidemic proportions among the Pima.

In 1995 Dorothy Gohdes, in a critical review of the research concerned with NIDDM and Native Americans, indicates that diabetes has reached epidemic proportions in Native American

---

[29]William C. Knowler et al., "Obesity in the Pima Indians: Its Magnitude and Relationship with Diabetes," *American Journal of Clinical Nutrition*, 53, (1991), pp. 1543S-1551S.

[30]R. L. Hanson and W. C. Knowler, "Analytic strategies to detect linkage to a common disorder with genetically determined age of onset: diabetes mellitus in Pima Indians," *Genetic Epidemiology*, 15, no. 3, (1998), 299-315.

[31]Charles et al op. cit.

communities.[32] Gohdes is less tentative than earlier authors in identifying its cause, arguing that genetic factor plays only a small part in the dramatic increase in the disease. According to Gohdes, the major factors contributing to the increase in prevalence and incidence are Native American's assimilation of Euro-American lifestyles, on the one hand, and their increased body weight and reduced physical activity on the other. To buttress her argument, Gohdes notes that the only Native Americans for which diabetes has not become an epidemic are those populations of the arctic, who continue to live outside of most westernizing influences.

K. M. Venkat Narayan, updating the work of William C. Knowler[33] and his colleagues, shows that the prevalence of diabetes among the Pima, using the oral glucose tolerance test, from 1965 to 1994, increased by nearly 30 percent for Native males and 35 for Native females.[34] Narayan offered the same two possible explanations for these findings as were proposed by Knowler et al. for the higher prevalence of diabetes among the Pima: 1) survival rates increased; or 2) increased number of Native peoples acquiring diabetes. Because diabetes contributes only marginally to the mortality rates of those under 55 years of age, Narayan, following Knowler et al., dismissed increased survival rates as an explanation of the increased prevalence among the under 55 year old group. Yet the data presented by Narayan, which extends Knowler's results into the 1989 to 1994 period, show a fall in prevalence over the three decade period among men who where 40 or younger. The prevalence of diabetes among men between 40 and 65 does, however, rise over the same period. Thus, the increase in the prevalence rate among older

---

[32]Dorothy Gohdes, "Diabetes in North American Indians and Alaska Natives," in *Diabetes in America*, ed. National Institutes of Health, 2nd edition, NIH Publication No. 95-1468, 1995, pp. 683-701.

[33]William C. Knowler et al., "Diabetes Mellitus in the Pima Indians: Incidence, Risk Factors and Pathogenesis," *Diabetes/Metabolism Reviews*, 6, No. 1, (1990), pp. 1-27.

Natives is not inconsistent with improved survival rates; whereas the decrease in prevalence among younger Natives is consistent with both a decrease in incidence or a decrease in survival rates.

Taking the changes in old and young men into account, it seems unlikely on the face of it that diabetes would increase the mortality of younger men, while having no such effect on older men.[35] The more likely explanation is that younger men are experiencing a lower incidence over time, while older men with diabetes are living longer relative to older men without diabetes. For Native American females, except for the 30-40 year old group, prevalence increased over the thirty-year period for all age groups. The increased prevalence for older Native American females might be explained by higher survival rates, but for younger women the cause must be sought elsewhere, higher incidence rates for example. Investigating the role of incidence as a contributor to higher prevalence rates over time, Naranyan presents incidence rates for Native males and females. The incidence data over most age groups show that Pimas over time, both males and females, have experienced an increased likelihood of testing positively for diabetes.

In a 1997 comment D. J. Pettitt et al reported that unlike cow's milk, which has been implicated in the occurrence of insulin-dependent diabetes mellitus, human milk significantly reduced the prevalence of NIDDM in Pimas.[36] The researchers, controlling for age, sex, parental diabetes, and birth weight, found that the odds of Pimas who were exclusively breast fed

---

[34]Narayan, op. cit., pp. 265-266.

[35]Although it is possible to speculate that those diabetics who do not die before age forty are more likely to survive diabetes related deaths than person who develop diabetes after age forty.

[36]D. J. Pettitt, M. R. Forman, R. L. Hanson, W. C. Knowler, and P.H. Bennett, "Breastfeeding and Incidence of Non-Insulin-Dependent Diabetes Mellitus in Pima Indians," *Lancet*, 19 July 1997), 166-168.

developing NIDDM was 40 percent of that of those who were bottle fed.

Although diet and environment are often given primacy over genetics in predicting the prevalence and incidence of NIDDM, H. Sakul et al in a 1997 article argues that susceptibility to NIDDM is primarily genetically determined in Pimas.[37] Although the authors are cautious about extending their findings outside of the Pima community, they found that percentage body fat (PFAT) and acute insulin response (AIR) are highly familial traits. If these findings persist in other studies, then much of the pre-1940 conclusions concerning the absence of NIDDM in Native American populations will have to be reinterpreted or completely dismissed.

Diabetes Related Diseases

Jeffrey M. Newman and his colleagues, using 1983 through 1986 Medicare files estimated the incidence of end-stage renal disease (ESRD) among Native Americans and whites in the United States.[38] Using the race category of the HCFA Medical Evidence Report for every patient receiving dialysis or renal transplantation reimbursement, Newman et al. selected those referrals that identified race as either Native American/American Indian or white. The researchers found that, after age-adjusting the Native American population to the white population, the Native Americans had an ESRD incidence rate nearly three times has high as the white rate. Moreover, 55.5 percent of the age-adjusted incidence of ESRD for Native Americans was attributable to

---

[37]H. Sakul, R. Pratley, L. Cardon, E. Ravussin, D. Mott, and C. Bogardus, "Familiality of Physical and Metabolic Characteristics that Predict the Development of Non-Insulin-Dependent Diabetes Mellitus in Pima Indians," *American Journal of Human Genetics*, 60, no. 3, (1997), 651-656.

[38]Jeffrey M. Newman et al., "End State Renal Disease Among Native Americans, 1983-86," *American Journal of Public Health*, 80, No. 3 (March 1990), pp. 318-319.

diabetes, compared to 26.9 percent for whites. Thus, not only do Native Americans have a higher prevalence of diabetes, but they also have a higher probability that given they are in need of dialysis or renal transplantation that diabetes is an underlying factor. Newman et al. offer two intervention strategies: the prevention of non-insulin dependent diabetes; and early identification of renal disease in persons with diabetes for dietary and blood pressure control.

Gregory Campbell (1989)[39] and Dorothy Ghodes (1995)[40] believe the rise in diabetes mellitus is due to the changes in lifestyle and diet that resulted from the Native Americans' movement onto reservations. As their physical activity decreased; their physical weight increased. Studies of the Pima and Zuni tribes validate this reasoning. According to T. Que Young (1996)[41] and Sievers et al (1985)[42], the Pima have the highest prevalence of diabetes in the world: 50 percent of all adults over age 35 are diabetic. This finding is based upon case registries, glucose testing, and surveys of self-reported diabetes (Gohdes 1995)[43].

Knowler et al (1990)[44] detail a study of the Pima tribe of southern Arizona. The writers focused on the Gila River Indian community. Tribal members were examined every two years since 1965. The examination included measurements of height and body weight, a medical history, and glucose tolerance tests. The factors that predict diabetes were also studied: diabetes in parents, genetic markers, obesity, diet, and prenatal metabolic environment (Knowler et al 1990)[45]. The highest rates occurred if one parent was diagnosed before age 45 or if one of the individuals was fully Native American.

---

[39] Cappbell, op.cit.
[40] Ghodes op.cit.
[41] Young, op. cit.
[42] Sievers, op. cit
[43] Ghodes, op.cit.

A study of the Zuni tribe in southwest New Mexico focused on exercise and weight control. The goal of the study was to improve tribal members' health by changing their behavior. Initiated by the IHS, the Zuni Diabetes Project began in 1983 (Heath et al 1991)[46]. IHS began a community-based exercise and weight program, designed "to instruct and motivate tribal members who had diabetes as well as those who did not have diabetes to increase their physical activity, lose body fat, and achieve or maintain normal body weight" (Heath et al 1991)[47]. IHS staff members reviewed participants' medical records for height, weight, glucose values, blood pressure, and history or presence of other diseases. Aerobic exercise sessions were held weekly at a variety of sites throughout the community. Fifteen to 50 people participated in each session with over 200 participating in the project itself (Health et al 1991)[48]. As a result of their participation in the study and their adherence to the protocol, participants modified their behaviors and lost weight. Corresponding blood pressure and glucose levels dropped dramatically. The Zuni Study demonstrated the effectiveness of community-based public health programs (Heath et al 1991)[49].

Gregory W. Heath et al. recognizing the relationship between cardiovascular disease and NIDDM, investigated the effect of community-based exercise and weight loss on glycemic control in Zuni Native Americans.[50] Although Heath et al. argued that NIDDM is a major risk factor for cardiovascular disease, in their paper, they concentrate on obesity reduction, which acts independently upon both NIDDM and cardiovascular disease. In 1983, Indian Health Services

---

[44] Knowler, op. cit.
[45] Ibid.
[46] Gregory W. Heath et al., "Community-Based Exercise and Weight Control: Diabetes Risk Reduction and Glycemic Control in Zuni Indians," *American Journal of Clinical Nutrition*, 53, (1991), pp. 1642S-1646S.
[47] Ibid
[48] Ibid
[49] Ibid
[50] Ibid.

(IHS) initiated a community-based exercise and weight-control program designed to increase the level of physical activity among the Zuni. In 1987 the Zuni Diabetes Project implemented a weight-loss competition. The researchers, using a matched comparison group for the exercise and weight-control program and non-finishers for the weight-loss competition, found the following. The weight-control group participants experienced an average weight loss of 4 kg compared to .9 kg for the match group; and the participants' mean fasting blood glucose values dropped from 13.2 to 10.8 mmol/l. The decline for the comparison group was from 12.6 to 12.4 mmol/l. There was also a significant decline in the use of hypoglycemic-medication by participants.

The information obtained from the studies of the Pima and Zuni tribes suggest a need for the study of the Huron Potawatomi in Michigan to determine if tribal members have similar health profiles and may be at risk for diabetes. Data from the study could be used to educate tribal members, to determine health care policy, and to create community-based health education programs.

Background of Nottawaseppi Huron Band of Potawatomi (NHBP)[51]

The traditional (pre-15th Century) homelands of the Potawatomi people were along the Eastern seaboard of North America. By the end of the 16th Century the Europeans, who were expanding westward, were forcing the Potawatomi off of their traditional homeland. The western advance of Eastern Native Peoples, including the Potawatomi, served as an ineluctable omen of

[51]The material in this section is based upon three historical sources: the history of Nottawaseppi Huron as it appears in the Bureau of Indian Affairs' "Proposed Finding For Federal Acknowledgment of Huron Potawatomi, Inc," undated; a history included in a tribal grant, undated; and a version compiled by Red Elk Banks, at Pine Creek Reservation , Athens, Michigan, July 1993.

the end of traditional life in the New World. And by 1608, the French recorded the Potawatomi as living in Michigan.

Under pressure from the Removal Act of 1830 and growing westward pressure from white settlers, the Potawatomi, Ottawa, and Ojibwe (all members of the Algonquin language family) signed a treaty ceding the Pokagon village reservation and the entire Nottawasippe reservation--created under previous treaties--to the U.S. government. Although Nottawasippe leadership refused to sign the treaty, seven years later, the U.S. government began its forced removal of all Native People. In the late 1830s the Michigan Potawatomi, Ottawa, and Ojibwe were removed to Kansas. Several tribal members and their families managed to evade removal and returned to their homes. Among the resisters was Chief John Moguago, who along with a small group of Nottawasippe, escaped the removal caravan and returned to Athens, Michigan, where, with the cooperation of local whites, the Nottawasippe established "Indiantown."

By 1842, the Nottawaseppi Huron Band had settled in the Dry Prairie in Calhoun County, Michigan, within the former Nottawaseppi Reserve. The Pine Creek Settlement in Calhoun County was also established in 1842, and the Pine Creek Reservation has, throughout recorded history in the region, been recognized as a settlement of the Michigan Potawatomi in federal, state and local documents since that time. The 1842 settlement or reservation was approximately 4,500 acres, which had dwindled to a 120-acre tract by 1951.[52] The population had also declined from about 400 at the beginning of the twentieth century to about 60 in 1951. Many of the Potawatomi had moved from the reservation to cities and towns both inside and outside of Michigan. The reservation, which was designed to contain Native peoples rather than to serve

---

[52]Laurie York Erskine, "Athens Pottawatomies Rapidly Merging into Stream of American Enterprise," *Battle Creek Enquirer & News*, August, 26, 1951, np.

their development needs, provided little more than subsistence for the Native community and the men sought jobs off the reservation.

By 1960, for example, Potawatomi land was serving the recreational interests of the whites who came to fish and hunt for pleasure rather than the survival needs of Potawatomi.[53] By 1981 the reservation population had fallen to twenty-five persons, mostly elderly and their main source of income was social security. It was during this economic and social nadir that interest in federal "tribal" recognition status was rekindled among Potawatomi people. Ironically, the nation's interest in federal tribal status was concurrent with its interest in sovereignty and self-determination. Tribal members at the time estimated the tribal population at about 500.[54] In the spring of 1995, the Potawatomi were notified that the Bureau of Indian Affairs (BAI) was recommending that the tribe's sixty-one year old petition for tribal recognition be granted. The BIA's decision to recommend "tribal" status, if accepted by the federal government, would make the Potawatomi eligible federal economic development aid. In addition, the nation could also apply for a casino license. The Potawatomi at that time had 819 members on its official membership list.[55] After correcting for dual membership--which is prohibited by the federal government--the membership role fell to 600.[56]

In 1996, the tribe, numbering a few hundred adults, received federal recognition as a sovereign Native American nation. The population under observation in this study is defined as the enrolled adult members of the Nottawaseppi Huron Band of Potawatomi tribe in 1996 (age

---

[53]"Athens Pottawatomies at Trail's End, No More do the Yong Men Find a Good Life in the Out-of Doors," *Battle Creek Enquirer & News*, June 12, 1960, np.

[54]Lori Vande Bunt, "Reservation seeks sovereignty, Pine Creek Indians hope for renovation," *Battle Creek Enquirer & News*, July 19, 1981, np.

[55]Bill Miller, "Changes won't come quickly to area Indian reservation," *Battle Creek Enquirer & News*, May 13, 1995, np.

[56]Bill Miller, "Tribe views other needs: Housing, health aid possible while casino may be years away," *Battle Creek Enquirer & News*, June 4, 1996, np.

16-84), which numbers about three hundred.

Chapter Three

Research Design and Methods

Data was collected, using a mail survey, between October 1996 and February 1997, followed by reminders at two-week intervals. The NBPHP study was designed to collect health risk information and health status from the adult population. The survey consisted of a self administered (mail survey) that was designed by Medical Outcomes Trust and modified with additional questions by staff of the Calhoun County Health Improvement Program (CCHIP). This program was funded with the support of the WK. Kellogg Foundation.

The survey included the complete SF 36 Health Survey. Additionally, questions concerning traditional Native American healing and practice of these traditions were asked. For CCHIP the survey was intended as an appraisal of the health status of the Potawatomi Tribe from two important perspectives – the self perceived health status of the tribe and a comparative measure of the health risks they face relative to their neighbors.

Lastly, the data collected are based, again, on self-reports. The value of this study depends on the respondents' truthfulness (and memory!). When possible, personal assistance was used for special cases (lack of elementary education, vision impairment, or people who are elderly). For non-responses, a follow-up was attempted either by telephone or by a home visit with the intent of characterizing the non-respondent population. I attempted to survey the entire population for my study because, in 1966, the entire adult population of the Nottawaseppi Huron Band of Potawatomi tribe, according to the tribal records, numbered three hundred. Three hundred surveys were mailed to the registered adult members of the tribe, 198 completed questionnaires were returned.

In this research design the SF-36 survey was used to measure the prevalence of diabetes mellitus in the Nottawaseppi Huron Band of Potawatomi and to identify the manifestations of the disease in the community. The Medical Outcomes Trust developed the SF-36. The self-reporting instrument is widely used by community and academic investigators. It is used by those interested in obtaining general health status data at the individual level without using a health specialist as an interviewer. The instrument attempts to capture aspects of the individual's health status that are important not only to health professionals, but to patients as well. In addition, community multi-purpose centers, which are not necessarily staffed with a physician, also use this information to assess the general heath status of the communities they serve.

Survey Contents

The survey questions are divided into the following three sections: Section 1: Health Status Survey; Section 2: Health Risk Behavior; Section 3: Personal Information.

Section 1 has eleven questions designed to solicit three types of information from the self-reporter. The first part asks for a self-reporter's assessment of her (his) current health and how that status compares to her assessment of her own health a year earlier. The second part calls for the self-reporters to describe their general level exercise on a typical day. In the third part, the survey asks a series of question pertaining to the self-reporter's health over the past four weeks and how her health interacts with work and social life.

Section 2, Health Risk Behavior, asks twenty-two questions designed either to determine the self-reporter's contact with risk of illness due to being overweight or to cigarette and alcohol consumption; or to document the presence of high blood pressure, high blood cholesterol levels,

or diabetes. Section 2, also provides health insurance status, medical care visits, and out-of-pocket health care cost data.

Section 3, Personal Information, requests the following: height; weight; age; gender; and educational level. The data requested is self reported.

The sampling error of an estimate is the error caused by the selection of a sample instead of conducting a census of the population. A reduction of the sampling error was attempted by selecting a large sample. As stated before, a listing of the official tribal rolls for the tribe was utilized. That list included residence, gender, and age of the members. Actual sample size takes into account non-responses. When questionnaires were returned data entry, editing, and coding, as necessary was performed.

The purpose of this project was to identify diabetes prevalence in the NHBP. No differentiation was made between the three types of diabetes. The assumption, based on a review of the literature, was that the majority of positive responses refer to NIDDM.

This study is a first step in providing community level data describing the impact of diabetes on the NHBP community. NHBP health officials can use the data presented to better understand the local impact of diabetes, to plan and implement interventions for diabetes, and thereby improve the lives of tribal members so affected and at risk.

The data presented in this study will show the NHBP how risk factors promote diabetes, and how replacing unhealthy activities with healthy activities, as well as treatment with medication and traditional methods can reduce these factors. The study will also assist the NHBP in structuring health policies that promote health education and wellness. In conclusion, the information gained from this study will benefit the tribe by improving the quality of life for its

population.

The risk factors identified in this survey--physical inactivity, smoking, drinking, high blood pressure, poor nutrition, and high blood cholesterol--were chosen because they are modifiable, contribute significantly to major causes of death--including heart disease, stroke, cancer--and they exacerbate others--including diabetes. The reduction of the risk of serious illness is achievable through a dual approach--elimination or significant curtailment of cigarette and alcohol consumption, on the one hand, and an improved regime of exercise and nutrition, on the other.

Although risk reduction requires the disciplined commitment of the individual, such commitment is often significantly related to the social environment in which the individual lives, the medical, educational, and financial resources that are available to them.

General Medical Profile of the Huron Potawatomi

Based on the body mass index (BMI)[57], over half (53.1%) of the adult population was classified as overweight, with virtually no difference by gender. Males, nonetheless, tended to self-report higher levels of physical activity than females. Educational attainment was negatively correlated with physical activity for men, but positively correlated with physical activity for women.

The prevalence of drinking among men was considerably higher than it was among women: nearly one-half of Potawatomi men are drinkers compared to one-third of women. Heavy drinking had a higher prevalence among college educated Potawatomi than among their

[57]The BMI is a obesity measurement, where BMI = weight(kg)/height(m)^2.

less educated counterparts.

Access to Health Care

The measures of health care access for the survey respondent are three: medical health insurance; medical prescription coverage; and out-of-pocket medical cost.

Whereas 75 percent of the respondents reported some health care coverage, between 87 and 90 percent of Michigan's population had some form of health insurance. The 65 year and older Native American population, however, has nearly the same coverage rate (87%) as the general population (88%).

Of those respondents with health insurance, the most common provider source of was employers, nearly 50 percent. Over 75 percent of all respondents had a regular medical care provider. Males (69.2%) were less likely than females (82.7) to have a regular provider; and 18-34 year olds were less likely (63.6%) than other age groups (80%) to have a usual provider.

Over 25 percent of Native American females compared to about 16 percent for males reported some time within the last year that they had difficulty obtaining medical care. Moreover, 52.3 percent of the respondents reported that not having health insurance was the main reason for not obtaining medical services. In addition to medical services, medical drugs were often out of reach. For example, 23 percent of all respondents reported having a need for a prescription that they could not afford. Females faced this problem nearly 27 percent of the time compared to 17 percent for males. In addition, 21 percent of the respondents reported having out-of-pocket monthly medical expenses in excess of 100 dollars.

Measures of Diabetes

Of the medical conditions reported, diabetes had the highest prevalence (21.9%), which is more than four times higher than the state and national averages. Diabetes was three times more prevalent among female Native Americans, nearly 30 percent, than among males, about 10 percent. Consistent with national findings, older Potawatomi (55 years and older) had the highest prevalence, nearly 42 percent.

With the exception of homicides out of the top ten causes of death, diabetes mellitus, the disease around which this thesis is organized, was the fourth highest killer of both Native American men and women.[58] Among whites, however, diabetes mellitus was the seventh highest killer.

According to the Indian Health Service (IHS), from 1991 to 1993,[59] the leading causes of death among Indians throughout the United States were: heart disease, (non)intentional injuries, malignant neoplasms, chronic liver disease and cirrhosis and diabetes mellitus. Aggregate health status data (IHS, 1985 to 1994) suggest that Native Americans residing in Michigan and Indiana experience a health status profile and associated health risks similar to those of Native Americans in general.

These leading causes of mortality are the major reasons for premature death and years of productive life lost among Indian communities. Each of these causes has associated dietary,

---

[58] *Health. 1998*, op. cit., p. 214.

[59] Ibid.

lifestyle, and behavioral risk factors that will respond to community-based health promotion and disease prevention interventions. Unlike so many other conditions, antibiotics and vaccines have no effect in preventing these leading causes of mortality and morbidity among Indians.

This Health Status Assessment focuses on the need to strengthen the capacity of the Nottawaseppi Huron Band of Potawatomi (NHBP) Indian community, of southwest Michigan, to develop and implement community health risk interventions based on sound data as well as the wisdom from elders in the community. The study will describe several steps in arriving at meaningful community plans of action for improved health status and well being. These steps include (1) collecting information and data on current health status (2) a method of involving the community in gaining a better understanding of health status and how to systematically address

health status problems, and (3) recommendations for implementing health improvement community action.

The Theoretical Model

Analysis of the data involves both descriptive and analytical sections. The descriptive statistics were used to provide a general profile of the Nottawaseppi Huron Band of Potawatomi. The general profile discussed in the General Medical Profile provides data in four distinct areas of Nottawaseppi life: 1) socio-economic data--education, gender, and age; 2) life-style data--cigarette and alcohol consumption; 3) medical condition data--high blood pressure, high cholesterol, diabetes; 4) medical expenditure data.

The second stage of the study attempts to determine how well the socio-economic and medical characteristics of the self-reporter predict whether the self-reporter has diabetes. More importantly, perhaps, I shall attempt to identify which of the physical activity variables and risky behavior variables have a significant effect on the likelihood of having been diagnosed as diabetic. In particular, the likelihood of being diagnosed as diabetic is a function of the set of medical and demographic variables.

The following variables were extracted from the survey for analysis:

Diabetic	Yes/No
Age	Numerical, in years (16-84)
Gender	Female/Male
BMI	Body Mass Index (Weight/Height^2)
Physical Activity	Low, Middle, High

Fat in Diet	Low, Middle, High

Following Narayan (1996)[60], BMI, Physical Activity, and diet along with age and gender represent the independent variables against which the probability of being diagnosed a diabetic is regressed. Based upon variables derived from the survey, five hypotheses are tested:

Hypothesis 1: As age increases, the risk of self-reported diabetes increases.

Hypothesis 2: As BMI increases so does the risk of self-reported diabetes.

Hypothesis 3: Females have a higher risk of self-reported diabetes than males.

Hypothesis 4: Diabetes prevalence is inversely related to a group's level of physical activity.

Hypothesis 5: Diabetes prevalence is higher among Nottawaseppi with high-fat diets.

The hypotheses will be tested using logit model. The results of the logit model analyses will be used to develop a set of policy recommendations for the Nottawaseppi tribal leaders in reducing the incidence and prevalence of diabetes in among their members.

[60] Op. cit.

Data Analysis

The analysis begins by describing the distribution of each variable. Next, key bivariate relationships are identified and measured. Logit Regression analysis was performed using the Statistical Package for the Social Sciences for Microsoft Windows. The analysis includes variables selected to measure the potential risk factors in relation to self-reported diabetes.

Chapter Four

Descriptive Research Findings

This chapter describes the results of the various analyses. Specifically, we looked at the population's demographic distribution, risk behaviors patterns such as smoking, drinking and levels of exercise as well as the individual's self reported health status. As stated earlier, all of these data were self-reported. The SF-36 is a well-documented health status survey. The form is brief but relatively comprehensive. The survey is designed to gather information in eight health areas about the physical and mental health of the survey respondent.

Gender, Age and Physical Attributes of the Sample

Based upon the SF-36 survey, Table 4.1 provides a general profile of the Huron Potawatomi. The majority of the survey population is female; the average age of the survey population 43 years; and the average educational level is at least the ninth grade. The distribution of age and gender are presented in Table 4.2.

The profile presented in Table 4.2 indicates that, assuming male and female education is uniformly distributed within the categories, females have less education than males; they also tend to be slightly older, having an average age of 45 compared to 42 to for males. With respect to age and educational attainment, males and females are not significantly different.[61]

Turning to physical attributes, although the men are statistically significantly taller and heavier than the women, body mass, which corrects for gender differences between male and

[61]These differences are not statically significant at the .05 alpha level, however.

female size, show no significant difference between males and females. In general, the physical and educational profiles of the Huron Potawatomi do not vary greatly by gender.

Discussion of Section I of Health Status Survey

When asked to measure their own health status, women, relative to men, rated themselves as having poorer health. Women were, on average, most likely to rate their own health as fair; men where evenly split between good and fair. Both men and women saw their health as being about the same as last year, although men were more likely than women to say that their health had improved somewhat from the previous year.

In Table 4.4 are presented the results of question 3: Whatever your daily activities, does your health now limit your ability to perform them? The question applies to general levels of activity, vigorous and moderate; in addition, the question also applies to eight specific types of activities. Vigorous activities are defined as running or lifting heavy objects; moderate activity is defined as moving tables, vacuuming, and bowling. The eight specific activities are: 1) lifting or carrying groceries; 2) climbing several flights of stairs; 3) climbing one flight of stairs; 4) bending, kneeling, or stooping; 5) walking more than one mile; 6) walking several blocks; 7) walking one block; and 8) bathing or dressing.

Although females ranked their own health at a lower rate than males ranked their own health, when asked about their ability to participate in vigorous or moderate activities, and women reported that their health limited their physical activity more than men said that health restricted theirs, there was no statistical significant difference in the effects of health on vigorous or moderate physical activity. Turning to the eight specific measures of health on daily activities, in only two areas were there significant differences between males and females; carrying groceries

and walking many flights of steps. In both cases, males were less likely than females to find that their ability to lift groceries or walk many flights of steps was influenced by their health. In the other six areas, although no result was significant, males were less likely to feel that their ability to perform physical activities was related to their health then females.

Potawatomi men are less likely than women to say that their physical health has resulted in decreased work productivity. In particular, men were less likely than women to say that their physical health resulted in less time working, in less work being accomplished, in fewer kinds of work being done, or in more effort being expanded to maintain previous productivity levels. The difference between the responses of men and women, however, is statistically significant only with respect to normal work requiring more effort. On the other hand, men were significantly less likely than women to associate diminished work or diminished regular activities with emotional health problems. For example, 34.7 percent of the women said that emotional problems reduced their productivity compared to 20.5 percent of the men. As a result of emotional ill-health, women (27.0) were more likely to report themselves as working less carefully than men.

The mean level of bodily pain for men and women was not statistically different; both groups, on average, suffered only a slight deterioration of social activities as a result of physical or emotional ill health.

The mean degree of bodily pain suffered by males and females was not statistically significant and averaged between very mild and mild, 2.28 for males and 2.54 for females.

Mean bodily pain for females was close to moderate, and though slightly higher than that for males, was not statistically different from that of males.

Question 9 is a composite of nine sub-questions, which each sub-question having six levels of response. The six levels range from "all of the time" to "none of the time." Table 4.7 presents

the summary findings for question 9. Females tended to be significantly less energetic, more tired, and more worn out, then male Potawatomi. Women also tended to statistically suffer from down hearted blues more than men. It should also be noted that very few Potawatomi were "so down" that they were inconsolable.

The results in Table 4.8 reinforce the earlier findings on the relationship between physical and emotional health, and participation in social activities. Men tend to report that their physical or emotional illness is unlikely to affect their behavior. Women, though reporting a statistically significantly lower mean interference level, nonetheless reported that the level of interference was only "a little of the time."

Health Perceptions: Differences by Age and Gender

The mean age for the Potawatomi is 43.3 and the median age is 42. Age forty has been used in this section to investigate differences in perceived health among the Potawatomi. Age, unlike gender, appears to play a major role in determining perceived well being by the respondents. For example, over 60 percent of the respondents under forty years of age reported their own health as either excellent (23.9%) or very good (37.0%) compared to 27.2 percent of the respondents that were over forty years of age, with only 5 percent of this group reporting excellent health. At the other end of the distribution, 34 percent of the forty years old and over group reported fair or poor health, compared to 10 percent of the under forty year olds. The mean level of perceived health for the older respondents is both statistically significant and numerical full response level higher than that of the under forty year old group. On the other hand, relative to the previous year both age groups had similar experiences. For example, about 21 percent of both age groups were feeling either better or much better than they were feeling a

year earlier.

Limitations Imposed by Health: Physical Activities and Work Related

Table 4.11 presents the finding of the relationship between age assessment and the degree of limitation that health places on their physical activities. The limitations placed on older respondents were often significantly greater than those placed on younger respondents. For example, 15 percent of the under forty group said that health restricted their vigorous activity by a lot, compared to 33 percent of the forty and older group. The mean difference between the two groups was statistically significant at the .05 -level. Older respondents had considerably less trouble performing activities that required only moderate physical exertion; and as a consequence the mean response levels for the two groups were not statistically significant. The general findings are confirmed when the respondents are asked about specific tasks: carrying groceries, walking distances, climbing stairs, and bathing and dressing themselves. Only 12 percent of the older group had a lot of difficulty carrying or lifting groceries, compared to 9 percent of the younger group. Whereas 76 percent of the younger group had no difficulty with groceries, 61 percent of the older group had not difficulty.

There was no significant difference between older and younger respondents when it came to lifting or carry groceries. On the other hand, walking and bending significantly affect the ability of older persons to perform. For example, not only is the mean level of difficulty associated with walking up many flights of stairs statistically significantly higher for older persons, but the mean level of difficulty of walking up one flight of stairs is also statistically higher for older persons. Slightly over 50 percent of older respondents have at least some trouble bending over, compared to 27 percent of younger persons, which is statistically significant. Similarly, 75 percent of

younger persons have no trouble walking more than a mile, compared to 50 percent of older persons. Even when attempting to walk several blocks, older persons are significantly more likely to have some difficulty in doing so. It is only when asked whether they have troubling walking one block, that older persons have a mean difficulty level that is not statistically significantly different from that of younger respondents. Finally, with respect to bathing and dressing older workers had a mean level of difficulty of 2.75, compared to 2.74 for younger workers.

In Table 4.12 are presented the responses to the question "during the past four weeks, as a result of your physical or emotional health, has work or have regular activities been affected in any of the following ways?" Respondents who were at least forty years old more likely than younger respondents to either work less time or put in a greater effort to do "normal" work than their younger Counterparts. In addition, older respondents were also more likely to work less due to emotional difficulties than younger respondents.

The physical and emotional health problems confronting Huron Potawatomi over the four weeks prior to the taking of the survey did not significantly affect the over-forty group's ability to interact socially. In particular, for both age groups about 60 percent of the population found that their health had no impact on their social activities. It should be noted, however, that during the same four-week period nearly 70 percent of the under-forty group, but only 50 percent of the over-forty group, did not experience sufficient pain to affect their work at all. On the other hand, about 70 percent of the under-forty group experienced no-pain or very mild pain, compared to 50 percent of the over-forty group. Thus, although the two groups have statistically significant differences in their mean levels of pain and work interference as a result of pain, the transformation relationship between pain and productivity for the two groups appears to be the same. Roughly, the correspondence between pain and work interference is one to one: high pain

translates into high work interference; low pain translates into low work interference.

Thus, for the under-forty group, however severe their health problems, those problems had a greater impact on their social life than on their work life. For the over-forty group the findings were reversed: their ill health had a greater impact on their work life than on their social activities. One possible explanation is that social activities are usually conditioned by physical and mental health, whereas work activities are taken as givens. Moreover, social contacts, particularly family contacts, usually evolve over time; work responsibilities, in the absence of a job change or technological innovation are fixed over time.

In Table 4.14 is a comparison of the "feelings" of the under-forty and the forty-and-over group. Respondents are asked to described their feelings over the last four weeks. Their choices include: "full of pep," "so down in the dumps that nothing could cheer" them up, "happy" or "tired." Of the nine questions in the "feelings" battery, two resulted in statistically significant means for the two age groups: "full of pep" and "had lots of energy." Whereas the younger age group had significantly more energy than the older respondents, the older respondent, surprisingly, were not significantly more tired than their younger counterparts.

Data in Table 4.15 shows that older and younger respondents tended to have similar levels of interference with social activities. Over 60 percent of the younger group and nearly 60 percent of the older group had not occasions when physical or emotional health interfered with social activities; and about 8 percent of the younger and 11 percent of the older group had difficulties either all or most of the time.

In general older respondents are not as confident as younger respondents that they are as well as anybody they know. In particular, they are twice as likely as younger respondents to say that it is false that they are not as healthy as anybody they know. When asked whether they

expected to get worse, 62 percent of the under-forty group said either definitely or mostly false, compared to 40 percent of the forty-and-over. Finally, with respect to excellent health, nearly 75 percent of the under-forty group responded with either definitely or mostly true, compared to 55 percent of the over-forty group.

Summary of Gender and Age Findings of Section 1 of the Health Status Survey

The analysis of the Section 1 reveals three major findings with respect to gender: first, males evaluated themselves at a higher level of well being, both mental and physical than did females; second, the difference between the mean health levels of males and females was always less than a full interval; the absolute well being rankings of both males and females was, in general, above "normal" or "good." That is, Potawatomi respondents saw themselves as healthy rather than as sick, although males rated themselves healthier than females rated themselves.

In the absence of a set of scientific measures of wellness, it is unclear whether males are actually healthier than females or just less willing to self-report their illnesses.

The age data are unambiguous: younger respondents perceive themselves as healthier than older respondents perceive themselves.

Discussion of Section II of Health Status Survey: Health Risk Behavior

In this section of the survey, respondents were asked a series of twenty-two personal and community health questions. In Table 4.17 is the distribution of responses by gender to the question "which of the following is the most significant problem facing your community right now?" The three most frequent responses were crime (19.7%), health care cost (18.7%), and

employment (17.1). When the responses of younger and older respondents are compared, there is no statistically difference in their responses.[62] It should be noted, nonetheless, that younger respondents ranked crime and jobs as the two major problems of the community and the cost of health care third. Older respondents pushed jobs down from tied for first place to fourth place, after the cost of health care.

Males and females also gave statistically equivalent responses to the problems facing their community.[63] Males ranked the top three problems as follows: crime (21.3%), jobs (20.0%), and health care cost (17.5%); Females ranked them as crime (19.7%), health care cost (18.7%), and jobs (17.1%).

Respondents who did not attend high school ranked schools, crime, and cost of health care as equally important; however, nearly forty percent of this group responded "don't know" to the question. Among those who ended their education with high school, 23.9 percent listed crime as the community's major problem, followed by jobs (18.2%), and then health care costs (17.0%). Among those who attended college, health care costs (21.0%) was the community's major problem, followed by unemployment (19.9%), and schooling (17.3%). Assuming that as a respondent's education increases, then the respondent will answer more and more like the average college respondent. Thus, the largest disparity in responses should be between the 1-8 grade group and the college group. Performing the Pearson chi-square test, those respondents who attended college show a statistically different response distribution from that shown by the 1-8

---

[62]Although Table 4.17 includes a t-test of means, nonparametric two independent sample tests included Mann-Whitney U test and the Wilcoxon rank sum W statistic which also resulted in the acceptance of the null hypothesis that older and younger respondents came from the same statistical population.

[63]The nonparametric two-independent-samples test using the Mann-Whitney U found no

grade respondents. On the other hand, given that the distribution of major problems cited by 9-12 grade group is not statistically different from either those with less or with more education, education seems to have a measurable effect upon how respondents perceive the problems in their community, or how the problems of their community affect them.

Of the older respondents, 84.5 percent had a primary care provider, compared to 66.7 percent of the under-forty group. The difference in the distribution between younger and older respondents was statistically significant. Although females had primary care providers at a rate of 81.6 percent, compared to 68.4 percent for males, the difference was not statistically significant. Educational attainment had no obvious effect on which respondents had primary care providers and there was statistically significant difference among the three groups.

When asked about "difficulty obtaining health care services," 21.5 percent of the respondents answered "yes." Table 4.21 summarizes the results. Younger respondents (24.4%) tended to have more difficulty obtaining health care services than their older counterparts (18.8). Women (26.3%) also had significantly more trouble obtaining health care services than men (14.3). Educational attainment had no significant impact on the distribution of responses. This finding holds not only for the three fold classification of educational attainment, 1-8, 9-12, and college, but also when college and 1-8 grades were tested. Although not statistically significant, respondents who attended college had more difficulty obtaining health care services (21.5%) than 1-8 graders (13.6%).

In Table 4.22 are presented the responses to the question, "In the past year, have you or a family member needed a prescription (drugs) but were unable to afford it?" Although 22.8 percent

---

statistical difference between males and females at the .05 level.

of the respondents reported that at sometime over the "last" year they were unable to purchase a prescription drug, age, gender, or education had no significant affect on a respondents ability to buy prescription drugs.

Table 4 23 presents smoking data. Respondents were asked "Do you smoke now?" The likelihood of smoking was statistically correlated with both age and education, but not with gender. Given the recent evidence of an increase in the rate of new female smokers and a decline in the rate of new male smokers, the interaction between age and gender was investigated. The results indicate that both proportion of younger respondents who smoke is higher than the proportion of older respondents who smoke. It is not clear whether this result is a consequence of older respondents quitting or younger respondents having higher starting rates. What does seem to be clear, however, is that gender plays no significant role in the decision to smoke or not to smoke. Moreover, when smokers were asked if they would like to stop smoking 66.2 percent said yes, but gender, age, nor education had a significant affect upon the respondents answer.

In Table 4.24 is presented the responses to the question "Have you every been told by a doctor, nurse, or other health professional that you have high blood pressure?" The result of the survey indicate that 34 percent of the respondents had been diagnosed as having high blood pressure; and only age was significantly correlated with the disease.

Of those 66 respondents that were diagnosed with high blood pressure, 54 (81.8%) sought and received treatment. Seeking and receiving treatment was significantly correlated with age, with 90.4 percent of older respondents seeking and receiving treatment compared to only 50 percent of the younger respondents. With respect to education, although the results were not statistically significant, less educated respondents were more likely to seek and obtain treatment than college educated respondents.

Although women were more likely than men and college educated were more likely than noncollege educated to have their cholesterol levels checked, only older respondents were statistically more likely than their younger cohorts to have their cholesterol checked.

There were 190 cases where respondents said that they had their cholesterol checked. In Table 4.26 are the responses of the 119 (117 usable) respondents who had cholesterol tests. Of the younger cohorts who tested for cholesterol, 22.7 percent tested positively, compared to 53.4 percent of the forty-and-over group. This result was statistically significant. Gender and education, however, had no statistically significant effect upon the outcome of the cholesterol tests.

Table 4.27 reports the results from question 11, "Overall, would you say your diet is high, medium, or low in fat?" Only 11.9 percent of the respondents reported high fat diets; 63.9 percent reported medium fat, 16.5 percent low fat diets; and 7.7 percent did not know. No significant difference existed in the fat content of diet by either education or gender. Eliminating the "don't knows" from the sample, older respondents had lower fat diets than younger respondents.[64]

All respondents were asked if they had tried to decease their fat intake, Table 4.28 contains the findings. Overall, 68.8 percent of the respondents said they had tried to reduce their fat intake. By age, older respondents (73.5) were more likely to try than younger respondents (63.3) and women (70.8) were slightly more likely than men (65.8), but neither result was statistically significant. College educated respondents were statistically more likely to try to reduce their consumption of fat than were noncollege educated respondents. What is surprising is that 9-12 rather than the 1-8 grade group is statistically less likely than the college group to try to change

[64]Treating age and fat content as ordinal variables, the Spearman correlation coefficient was significant at the two-tail level of .05.

their diet.

Table 4.29 presents the responses to the question "In an average week, how many times per week do you engage in physical activity?" In Table 4.30 are the distributions of beer consumption per week by age and gender. Though the mean beer consumption was higher for younger responders, the Pearson chi-square and the t-tests for the means were not statistically significant. Men and women did, however, have statistically significantly different drinking patterns: men averaged 5.2 beers per week, compared to 1.7 for women.

In Table 4.31 are the distributions of beer consumption per week by educational attainment. The data in Table 4.31 support the hypothesis that education has no effect upon the level of alcohol consumption. Although neither the distribution of mean level of consumption is statistically significant, the means suggest that as education increases so does beer consumption. This finding is consistent with educational attainment serving as a proxy for income. In which case, assuming that beer is a normal good, then as income (education) rises, consumption is expected to go up as well. Perhaps the most important finding, however, is that nearly 70 percent of the respondents have zero beers per week.

When asked about their consumption of wine or wine coolers, 91 percent of the respondents reported that on average they drink zero glasses or wine or wine coolers. Similarly results hold for mixed drinks or shots of liquor: 90 percent of the respondents reported zero consumption of mixed drinks or shots of liquor per week.

When the respondent was asked if he or she wanted to decrease alcohol consumption, 19 percent of those surveyed answered yes (Table 4.30). Females (21.9%) wanted to decrease their consumption slightly more than males (16.4%); older respondents (27.1%), more than younger (13.3%). By education, the 9-12 graders (17.5) had the least desire to reduce consumption, but,

nonetheless, they were very close to the overall average of 19.4.

The responses to question 17a "Have you ever been told by a doctor or other health professional that you have diabetes or high blood sugar?" Age, gender, and educational attainment were all statistically significant indicators of whether a respondent has been informed that he or she has diabetes or high blood sugar. In particular, 23.0 percent of the survey respondents had been informed that they had diabetes. Older respondents reported diabetes at a rate of 37.4 percent, compared to younger respondents who reported at a rate of 7.6 percent.[65] Females report having diabetes nearly three times as often as males. By education, respondents with 1-8 grade educations were more likely than respondents with a 9-12th grade education to have tested positive for diabetes.

Of those respondents who have diabetes, 57.8 percent were taking medication, 66.7 percent of the males and 55.6 percent of the Females: a difference that was not statistically significant (Table 4.31). Older respondents were more likely than their younger counterparts to be taking medication, but again the difference between the two groups was not statistically significant. Educational differences also failed to produce any significant difference in the likelihood that a respondent was on medication.

The form of medication does vary statistically by gender, but not by age or educational attainment. In Table 4.35 are presented the distribution of types of medication.

Answers to the question "Do you follow a diabetic diet?" are presented in Table 4.36. Age,

---

[65]The survey did not include the question "Have you ever been tested for diabetes?" Without that question, it is impossible to know whether respondents who answered "no" to question 17a--"Have you ever been told..."--answered "no" because they were told by a physician that they did not have diabetes or whether "no" indicated that they had never been tested. It is more likely that "no" among younger respondents is as a result to not having been tested than it is among older respondents.

gender, nor education has a statistically significant effect on whether the respondents take pills or shots. Nonetheless, 60 percent of the female diabetic follow a diet, compared to 40 percent of the males; 61.1 percent of the forty-and-over group tended to follow diabetic diet, compared to 28.6 percent of the younger group. With respect to education the least years of schooling were the most likely to follow a diabetic diet (77.8%), compared to 50 percent for both 9-12 graders and college attendees.

When the respondents were asked "Are you interested in learning more about how to care for yourself related to diabetes?" 76.7 percent of the respondents answered "yes." The results are depicted in Table 4.37. Over forty (71.4%}, males (88.9%), and college attendees (81.0%) were more interested in learning more about diabetic health care, then were under forty (71.4%), females (73.5%), 1-8 grade (75.0%), and 9-12 grade (71.4), respectively. The distributional differences between these cohort groups was not statistically significant, however.

When asked whether they relied upon "traditional" forms of healing, 12.2 percent of the respondents answered "yes" (Table 4.38). Though none of the results were statistically significant, females (14.5%), forty-and-over (15.2%), and 1-8 grade (23.8%), were more likely than males (9.0%), under-forty (9.0%), and 9-12 grade (7.9%) and college (14.1%) to rely upon traditional Native forms of healing.

Comparison of the responses to question 18, which only allowed for a yes or no answer, with the responses to question 19, which allowed for a five answers ranging from always to never, suggests that 66 percent of the respondents use some form of traditional medicine (Tables 4.39a and 4.39b). Men (31.3%) and women (36.2%) never use traditional medicine at about the same rate; younger respondents (39.3%) are more likely to never use traditional medicine than older respondents (29.2%); and respondents that ended schooling before high school (54.5%) are more

likely to high school attendees (32.9%) and college attendees (29.6) to never use traditional medicine.

In nearly 60 percent of all respondent households everyone in the household had medical insurance. Differences in the percentage of household where everyone had insurance did not vary sizeable or significantly by gender or educational attainment (Tables 4.40 and 4.41)--57.8 percent of males lived in households where everyone was covered, compared to 61.3 percent of females (Table 4.40); and the high school group was least likely to live in a household where everyone has insurance (52.7%), compared to the 1-8 group (61.9%), and college (67.1%) (Table 4.41).

Younger respondents lived in households that, with respect to insurance status, were statistically different from the households of older respondents. Younger respondents (10.9%) were less likely than older respondents (14.7) to be living in households where no one has insurance; but younger respondents (18.5%) were more likely not to have insurance than older respondents (4.9%).

The source of health insurance is significantly correlated with the age and educational attainment of the respondent, but not with the respondent's gender. Although, women (18.8%) were slightly more likely to be on Medicaid than men (12.5%), the distributions of both groups were virtually the same. Although the distribution of health insurance does vary significantly by age, if the "don't knows" are excluded, there was no significant difference between younger and older respondents. Stated differently, younger respondents were nearly 10 times as likely not to know the insurance status of the household as were older workers.[66] The majority of College educated respondents (60.8%) who had insurance had insurance through an employer plan,

---

[66]Perhaps, younger respondents were less likely than older respondents to be the head of household.

compared to 23.8 percent for 1-8 graders and 41.0 percent of 9-12 graders. After correcting for "don't knows" the distributions remain statistically significant. Moreover, when college respondents were separated compared to 1-8 graders, the statistically significant difference persisted; there was no statistically significant difference, however, better 9-12 graders and college attendees.

Out-of-pocket medical expenditures are depicted in Tables 4.44a and b. The expenditure intervals were originally eight: don't know cases were dropped and no respondent recorded expenditures for category 7: "$601 or more." On average respondents had monthly out-of-pocket medical expenses of between 1 and 100 dollars; and 80.0 percent of the respondents spent less than 100 per week. Still the expenditures on average are sizeable. The yearly average expenditures for all respondents was $3625; for males, $3490, females, 4803; for the young, $4215, the old, $5087; for 1-8 graders, $6358, 9-12 graders, $4447, and college attendees, $4679. None of these differences was statistically significant, however.

Table 4.1: General Profile of the Potawatomi
by Gender, Age and Schooling

	Count	Percentage
Gender		
Male	83	41.5
Female	115	57.5
Total	198	99.0
Schooling (grade)		
1-5	1	.5
6-8	23	11.5
9-12	91	45.5
12+	82	41.0
Total	197	98.5
Average schooling	9-12 grade	
Age Group		
18-34	66	33
35-54	82	41
54+	49	24.5
Total	197	98.5
Average age	43.7	

Table 4.2: General Profile of the Potawatomi, by Gender

Gender	Male		Female	
Schooling (grade)	Count	Percentage	Count	Percentage
1-5	0	0	1	.9
6-8	8	9.6	15	13.2
9-12	36	43.4	55	48.2
12+	39	47.0	43	37.7
Total	83	100.0	114	100.0
Average schooling	9-12		9-12	
Age Group				
18-34	32	38.6	34	29.6
35-54	35	42.2	47	40.9
Age				
54+	16	19.3	33	28.7
Total	83	100.0	115	100.0
Average age	41.5		44.7	
Average height (in)	70.4		64.5	
Average weight (lbs)	198.4		169.6	
Body mass index	28.1		28.3	
Overall Body Mass Index	28.1		28.3	
Small body frame	24.1		23.3	
Medium body frame	26.2		28.1	
Large body frame	30.9		33.2	

Table 4.3: Personal General Health Assessment by Gender
Question 1: would you say your health is:

	Total		Male		Female	
Response	Count	Percent	Count	percent	Count	-Percent
Excel (1)	27	13.5	13	15.7	14	12.2
Very Good (2)	57	28.5	32	38.6	25	21.7
Good (3)	68	34.0	23	27.7	44	38.3
Fair (4)	35	17.5	12	14.5	22	19.1
Poor (5)	10	5.0	3	3.6	7	6.1
Total	197		83		114	
Mean*			2.52		2.85	
Question 2: compared to a year ago, how are you now?						
Much Better (1)	18	9.0	9	10.8	8	7.0
Better (2)	24	12.0	15	18.1	9	7.8
Same (3)	131	65.5	55	66.3	75	65.2
Worse (4)	24	12.0	4	4.8	20	17.4
Mean*			2.65		2.96	

(* Indicates that the t-test of equality of means were statistically different significant at the .05 two-tail level)

Table 4.4:Personal General Health Assessment by Gender
Question 3: Are your daily activities limited by your health?

	Total		Male		Female	
Response	Count	Percent	Count	Percent	Count	Percent
Vigorous Activities	200		83	100.0	115	100.0
A lot (1)	49	24.5	16	19.3	31	27.0
A little (2)	71	35.5	35	42.2	36	31.3
Not at all (3)	73	36.5	31	37.3	42	36.5
Don't know/na	7	3.5	1	1.2	6	5.2
Mean	2.1		2.18		2.10	
Moderate Activity	200		83		115	100.0
A lot (1)	26	13.0	16	19.3	19	16.5
A little (2)	41	20.5	35	42.2	20	17.4
Not at all (3)	126	63.0	31	37.3	71	61.7
Don't know/na	7	3.5	1	1.2	5	4.3
Mean	2.52		2.60		2.47	
Carry groceries	200	100.0	83	100.0	115	100.0
A lot (1)	22	11.0	4	4.8	17	14.8
A little (2)	39	19.5	15	18.1	24	20.9
Not at all (3)	131	65.5	60	72.3	70	60.9
Don't know/na	8	4.0	4	4.8	4	3.5
Mean	2.57		2.71		2.48	
Many stairs	200	100.0	83	100.0	115	100.0
A lot (1)	33	16.5	9	10.8	23	20.0
A little (2)	54	27.0	17	20.5	36	31.3
No (3)	105	52.5	54	65.1	51	44.3
Don't know/na	8	4.0	3	3.6	5	4.3
Mean	2.38		2.56		2.25	

Table 4.4:Personal General Health Assessment by Gender (cont.)
Question 3: Are your daily activities limited by your health?

	Total		Male		Female	
Response	Count	Percent	Count	Percent	Count	Percent
Climb 1 set stairs	200	100.0	83	100.0	115	100.0
A lot (1)	29	14.5	8	9.6	20	17.4
A little (2)	33	16.5	13	15.7	20	17.4
No (3)	132	66.0	60	72.3	71	61.7
Dont know/na	6	3.0	2	2.4	4	3.5
Mean	2.53		2.64		2.46	
Bending	200	100.0	83	100.0	115	100.0
A lot (1)	33	16.5	9	10.8	24	20.9
A little (2)	44	22.0	21	25.3	22	19.1
No (3)	116	58.0	51	61.4	65	56.5
Dont know/na	7	3.5	2	2.4	4	3.5
Mean	2.43		2.52		2.37	
One mile walk	200	100.0	83	100.0	115	100.0
A lot (1)	30	15.0	9	10.8	21	18.3
A little (2)	44	22.0	18	21.7	25	21.7
No (3)	120	60.0	55	66.3	65	56.5
Dont know/na	6	3.0	1	1.2	4	3.5
Mean	2.43		2.56		2.40	
Walk blocks	200	100.0	83	100	115	100.0
A lot (1)	20	10.0	7	8.4	13	11.3
A little (2)	43	21.5	15	18.1	28	24.3
No (3)	131	65.5	60	72.3	70	60.9
Dont know/na	6	3.0	1	1.2	4	3.5
Mean	2.46		2.65		2.51	

Table 4.4:Personal General Health Assessment by Gender (cont.)
Question 3: Are your daily activities limited by your health?

	Total		Male		Female	
Response	Count	Percent	Count	Percent	Count	Percent
Walk 1 block	200	100	83	100.0	115	100.0
A lot (1)	18	9.0	5	6.0	13	11.3//
A little (2)	25	12.5	9	10.8	16	13.9
No (3)	149	74.5	67	80.7	81	70.4
Mean	2.68		2.77		2.62	
Bath/dress	200	100.0	83	100.0	115	100.0
A lot (1)	20	10.0	5	6.0	15	13.0
A little (2)	10	5.0	5	6.0	5	4.3
No (3)	165	82.5	72	86.7	92	80.0
Don't know/na	5	2.5	1	1.2	3	2.6
Mean	2.73		2.82		2.69	

Table 4.5: Problems Due To Physical/Emotional Health
During Last 4 Weeks By Gender
Question 4: During past 4 weeks, as a result of your physical health has work or regular activities been affected by any of the following?

	Total	Yes		No		No Answer		
Response	Count	Count	Percent	Count	Percent	Count	Percent	Mean
Less work time	200	39	19.5	154	77.0	7	3.5	1.80
Male	83	12	14.5	69	83.1	2	2.4	1.85
Female	115	27	23.5	84	73.0	4	3.5	1.76
Less done	200	62	31.0	129	64.5	9	4.5	1.68
Male	83	20	24.1	60	72.3	3	3.6	1.75
Female	115	31	27.0	79	68.7	5	4.3	1.63
Fewer kinds of work done	200	40	20.0	149	74.5	11	5.5	1.79
Male	83	14	16.9	65	78.3	4	4.8	1.82
Female	115	31	27.0	79	68.7	5	4.3	1.76
Extra effort to do normal work*	200	41	20.5	150	75.0	9	4.5	1.79
Male	83	10	12.0	70	84.3	3	3.6	1.88
Female	115	31	27.0	79	68.7	5	4.3	1.72

Table 4.5: Problems Due To Physical/Emotional Health
During Last 4 Weeks By Gender cont.
Question 5: During past 4 weeks, as a result of your emotional health, has work or regular activities been affected by any of the following?

	Total	Yes		No		No Answer		
Response	Count	Count	Percent	Count	Percent	Count	Percent	Mean
Less work time	200	48	24.0	146	73.0	6	3.0	1.75
Male	83	15	18.1	66	79.5	2	2.4	1.81
Female	115	32	27.8	79	68.7	4	3.5	1.71
Less done*	200	61	30.5	130	65.0	9	4.5	1.68
Male	83	17	20.5	62	74.7	4	4.8	1.78
Female	115	43	37.4	67	58.3	5	4.3	1.61
Not as careful*	200	45	22.5	146	73.0	9	4.5	1.76
Male	83	13	15.7	67	80.7	3	3.6	1.84
Female	115	31	27.0	78	67.8	6	5.2	1.72

Table 4.6:Degree Of Physical/Emotional Health Interference
With Social Activities During Last 4 Weeks By Gender

Question 6: During past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

	Total		Male		Female	
Response	Count	Percent	Count	Percent	Count	Percent
Total	200	100.0	83	100.0	115	100.0
Not at all (1)	117	58.5	51	61.4	65	56.5
Little bit (2)	38	19.0	16	19.3	22	19.1
Moderately (3)	20	10.0	8	9.6	12	10.4
Quite (4)	12	6.0	3	3.6	8	7.0
Extremely (5)	8	4.0	4	4.8	4	3.5
Don't know/na	5	2.5	1	1.2	4	3.5
Mean	193	1.74	82	1.70	111	1.77

Table 4.6 (continued) Question 7: Bodily pain during the past 4 weeks by gender

	Count	Percent	Male Count	Male Percent	Female Count	Female Percent
Total	200	100.0	83	100.0	115	100.0
None (1)	69	34.5	32	38.6	39	31.3
Very mild (2)	47	23.5	19	22.9	28	24.3
Mild (3)	28	14.0	14	16.9	14	12.2
Moderate (4)	34	17.0	12	14.5	21	18.3
Severe (5)	14	7	3	3.6	11	9.6
V. Severe (6)	4	2.0	2	2.4	2	1.7
Don't know/na	4	2.0	1	1.2	3	2.6
Mean	194	2.43	82	2.28	112	2.54

Table 4.6 (continued) Question 8: During the past 4 weeks, how much did pain interfere with our normal work (housework and outside work)

	Count	Percent	Male Count	Male Percent	Female Count	Female Percent
Total	200	100.0	83	100.0	115	100.0
Not at all (1)	110	55.0	49	59.0	61	53.0
Little bit (2)	36	18.0	19	22.9	16	13.9
Moderately (3)	24	12.0	6	7.2	17	14.8
Quite (4)	20	10.0	5	6.0	15	13.0
Extremely (5)	5	2.5	2	2.4	3	2.6
Don't know/na	5	2.5	2	2.4	3	2.6
Mean	193	1.83	81	1.67	112	1.96

Table 4.7: Distribution of Feelings Along A Feeling Continuum During 4 Week Period by Gender
Question 9: How Much of the time during The past 4 weeks did you feel....
Range of Responses Always =1 ... none =6

	Always	Mostly	Good	Some	Lit	None	NA	Mean
Full of Pep[1]	14	64	45	49	18	6	4	3.06
Male	5	33	21	14	8	1	1	2.88
Female	8	31	24	34	10	5	3	3.20
Nervous	6	9	10	34	65	70	6	4.83
Male	1	2	4	13	30	30	3	4.99
Female	5	7	6	19	35	40	3	4.71
So down[2]	5	7	7	26	36	113	6	5.16
Male	1	4	1	7	14	53	3	5.35
Female	4	3	6	19	22	58	3	5.02

1=energy, liveliness, invigoration
2= so down that they were inconsolable

Table 4.7: Distribution Of Feelings Along A Feeling Continuum During A 4 Week Period By Gender (Cont)

Question 9: How Much of the time during the past4 weeks did you feel....

Range of Responses Always =1 ... none =6

	Always	Mostly	Good	Some	Lit	None	NA	Mean
Calm	16	77	36	35	17	12	7	2.99
Male	8	35	16	11	8	2	3	2.78
Female	7	42	20	24	9	10	3	3.14
Energy	10	76	35	42	28	3	6	3.05*
Male	5	39	15	13	8	2	1	2.83
Female	5	37	20	27	20	1	5	3.21
Down	2	15	9	38	61	67	8	4.79*
Male	0	4	2	11	24	38	4	5.14
Female	2	11	7	25	37	29	4	4.54
Wornout	6	15	20	50	66	33	10	4.34*
Male	0	6	3	19	33	17	5	4.67
Female	6	9	17	30	32	16	5	4.10
Happy	22	91	29	30	9	6	7	2.62
Male	10	44	13	9	2	3	2	2.48
Female	11	52	16	21	7	3	5	2.73
Tired	7	16	23	63	67	18	6	4.15*
Male	0	5	7	25	34	10	2	4.46
Female	7	11	15	37	33	8	4	3.92

Table 4.8: Frequency Of Physical/Emotional Health Interference With Social Activities During Last 4 Weeks By Gender

Question 10: During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with family, friends, neighbors, etc)?

	Total		Male		Female	
Response	Count	Percent	Count	Percent	Count	Percent
Total	200	100.0	83	100.0	115	100.0
All times(1)	8	4.0	0	0	7	6.1
Most times(2)	11	5.5	4	4.8	7	6.1
Some times(3)	24	12.0	8	9.6	16	13.9
Few times(4)	36	18.0	18	21.7	18	15.7
No time(5)	115	57.5	51	61.4	63	54.8
Don't know/na	6	3.0	2	2.4	4	3.5
Mean*	193	4.24	81	4.43	111	4.11

Table 4.9: Self Reported Health Status
Question 11: How true is each of the following statements
definitely true =1 definitely false=5

	Def. True (1)	Most True (2)	Don't Know (3)	Mostly False (4)	Def. False (5)	NA	Mean
Well as anybody	44	74	37	17	18	10	2.43
Male	22	34	14	3	8	2	2.27
Female	22	39	17	12	16	8	2.54

Table 4.9: Self Health Status Question 11: How true is each of the following statements (Definitely true =1,definitely false=5)

	Def. True (1)	Most True (2)	Don't know (3)	Mostly false (4)	Def. False (5)	NA	Mean
Health Excellent	44	80	26	23	21	6	2.46
Male	22	35	9	11	4	2	2.26
Female	22	44	17	12	16	4	2.60
Get sick easier	6	23	32	42	88	9	3.96
Male	4	6	13	15	43	2	4.07
Female	2	17	18	26	45	7	3.88
Expect to get worse	9	11	71	22	74	13	3.75
Male	2	6	29	10	31	5	3.79
Female	7	5	42	12	42	7	3.71

Table 4.10: Personal General Health Assessment By Age
Question 1: would you say your health is:

	Total		<40		>=40	
Response	Count	Percent	Count	Percent	Count	Percent
Excellent (1)	27	13.8	22	23.9	5	4.9
Very good (2)	57	29.2	34	37.0	23	22.3
Good (3)	67	34.4	27	29.3	40	38.8
Fair (4)	34	17.4	7	7.6	27	26.2
Poor (5)	10	5.1	2	2.2	8	7.8
Total	195	100.0	92	100.0	103	100.0
Mean*	2.71		2.27		3.10	
Question 2: compared to a year ago, how are you now?						
Much better (1)	17	8.7	7	7.6	10	9.7
Better (2)	24	12.3	12	13.0	12	11.4
Same (3)	130	66.7	64	69.6	66	34.1
Worse (4)	24	12.3	9	9.8	15	14.6
Total	195	100.0	92	100.0	103	100.0
Mean	2.83		2.82		2.83	

(* indicates that the t-test of equality of means were statistically different significant at the .05 two-tail level)

Table 4.11:Physical Health Assessment By Age

Question 3: Are your daily activities limited by your health?

	Total		Age <40		Age>=40	
Response	Count	Percent	Count	Percent	Count	Percent
Vigorous Activity	191	100.0	91	100.0	100	100.0
A lot (1)	47	24.6	14	15.4	33	33.0
A little (2)	71	37.2	36	39.6	35	35.0
No (3)	73	38.2	41	45.1	32	32.0
Mean*	2.14		2.30		1.99	
Moderate Activity	191	100.0	91	100.0	100	100.0
A lot (1)	25	13.1	10	11.0	15	15.0
A little (2)	40	20.9	16	17.6	24	24.0
No (3)	126	66.0	65	71.4	61	61.0
Mean	2.53		2.60		2.48	
Carry groceries	190	100.0	89	100.0	101	100.0
A lot (1)	21	11.1	8	9.0	13	12.9
A little (2)	39	20.5	16	14.6	26	25.7
No (3)	130	68.4	68	76.4	62	61.4
Mean	2.53		2.60		2.48	

Table 4.11:Physical Health Assessment By Age (Cont.)

Question 3: Are your daily activities limited by your health?

	Total		Age <40		Age>=40	
Response	Count	Percent	Count	Percent	Count	Percent
Climb Many stairs	190	100.0	90	100.0	100	100.0
A lot (1)	32	16.8	12	13.3	20	20.0
A little (2)	53	27.9	20	22.2	33	33.0
No (3)	105	55.3	58	64.4	47	47.0
Mean*	2.38		2.51		2.27	
Climb 1 Set of stairs	192	100.0	92	100.0	100	100.0
A lot (1)	28	14.6	10	10.9	18	18.0
A little (2)	33	17.2	11	12.0	22	22.0
No (3)	131	68.2	71	77.2	60	60.0
Mean*	2.54		2.66		2.42	
Bending	192	100.0	92	100.0	100	100.0
A lot (1)	33	17.2	12	13.0	21	21.0
A little (2)	43	22.4	13	14.1	30	30.0
No (3)	116	60.4	67	72.8	49	49.0
Mean*	2.43		2.60		2.28	

Table 4.11:Physical Health Assessment By Age (Cont.)

Question 3: Are your daily activities limited by your health?

	Total		Age <40		Age>=40	
Response	Count	Percent	Count	Percent	Count	Percent
One mile walk	193	100.0	92	100.0	101	100.0
A lot (1)	30	15.5	10	10.9	20	19.8
A little (2)	43	22.3	13	14.1	30	29.7
No (3)	120	62.2	69	75.0	51	50.5
Mean*	2.47		2.64		2.31	
Walk blocks	193	100.0	92	100.0	101	100.0
A lot (1)	20	10.4	6	6.5	14	13.9
A little (2)	43	22.3	15	16.3	28	27.7
No (3)	130	67.4	71	77.2	59	58.4
Mean*	2.57		2.71		2.45	
Walk 1 block	191	100.0	92	100.0	99	100.0
A lot (1)	18	9.4	8	8.7	10	10.1
A little (2)	25	13.1	8	8.7	17	17.2
No (3)	148	77.5	76	82.6	72	72.7
Mean	2.68		2.74		2.63	
Bathe/dress	194	100.0	92	100.0	102	100.0
A lot (1)	20	10.3	10	10.9	10	9.8
A little (2)	10	5.2	4	4.3	6	5.9
No (3)	164	84.5	78	84.8	86	84.3
Mean	2.74		2.74		2.75	

Table 4.12: Problems Due To Physical/Emotional Health By Age
Question 4: During past 4 weeks, as a result of your physical health has work or have regular activities been affected by any of the following?

	Total	Yes		No		
Response	Count	Count	Percent	Count	Percent	Mean
<Wktime*	192	39	20.3	153	79.7	1.80
<40	91	12	13.2	79	86.8	1.87
>=40	101	27	26.7	74	73.3	1.73
<Wkdone	190	61	32.1	129	67.9	1.88
<40	91	26	28.6	65	71.4	1.71
>=40	99	35	35.4	64	64.6	1.65
<Kindswk	188	40	21.3	148	78.7	1.79
<40	91	14	15 4	77	84.6	1.85
>=40	97	26	26.8	71	73.2	1.73
>Effort*	192	47	24.5	145	75.5	1.78
<40	91	15	16.5	76	83.5	1.89
>=40	101	32	31.7	69	68.3	1.69
<Wktime*	192	47	24.5	145	75.5	1.76
<40	91	15	16.5	76	83.5	1.84
>=40	101	32	31.7	69	68.3	1.68
<Done	189	60	31.7	129	68.3	1.68
<40	91	23	25.3	68	74.7	1.75
>=40	98	37	37.8	61	62.2	1.62
<Care	189	44	23.3	145	76.7	1.77
<40	91	18	19.8	73	80.2	1.80
>=40	98	26	26.5	72	73.5	1.73

Table 4.13:Degree Of Physical/Emotional Health Interference With Social Activities During Last 4 Weeks By Age

Question 6: During past 4 weeks, to what extent has your physical health or have your emotional problems interfered with your normal social activities with family, friends, neighbors, or groups?

	Total		< 40		>=40	
Response	Count	Percent	Count	Percent	Count	Percent
Total	193	100.0	91	100 0	102	100.0
Not at all (1)	116	60.1	54	59.3	62	60.8
Little bit (2)	38	19.7	22	24.2	16	15.7
Moderately (3)	20	10.4	9	9.9	11	10.8
Quite (4)	11	5.7	2	2.2	9	8.8
Extremely (5)	8	4.1	4	4.4	4	3.9
Mean	1.74		1.68		1.79	

Table 4.13:Degree Of Physical/Emotional Health Interference With Social Activities During Last 4 Weeks By Age(continued)
Question 7: Bodily pain during the past 4 weeks by gender

	Count	Percent	Count	Percent	Count	Percent
Total	194	100.0	91	100.0	103	100.0
None (1)	68	35.1	36	39.6	32	31.1
Very mild (2)	47	24.2	27	29.7	20	19.4
Mild (3)	28	14.4	13	14.3	15	14.6
Moderate (4)	33	17.0	10	11.0	23	22.3
Severe (5)	14	7.2	4	4.4	10	9.7
V. Severe (6)	4	2.1	1	1.1	3	2.9
Mean*	2.43		2.14		2.69	

Table 4.13:Degree Of Physical/Emotional Health Interference With Social Activities During Last 4 Weeks By Age
Question 8: During the past 4 weeks, how much did pain interfere with our normal work (housework and outside work) (cont.)

	Count	Percent	Count	Percent	Count	Percent
Total	193	100.0	90	100.0	103	100.0
Not at all (1)	110	57.0	61	67.8	49	47.6
Little bit (2)	35	18.1	16	17.8	19	18.4
Moderately (3)	23	11.9	4	4.4	19	18.4
Quite (4)	20	10.4	7	7.8	13	12.6
Extremely (5)	5	2.6	2	2.2	3	2.9
Mean*	1.83		1.59		2.05	

Table 4.14: Feelings During The Past 4 Weeks By Age.
Question 9: (Always =1, None =6)

	Total	Always	Mostly	Good	Some	Little	None	Mean
Full of pep*	194	13	64	45	48	18	6	3.06
<40	91	7	36	22	20	4	2	2.82
>=40	103	6	28	23	28	14	4	3.27
Nervous	192	6	9	10	32	65	70	4.83
<40	91	4	5	5	12	30	35	4.80
>=40	101	2	4	5	20	35	35	4.85
So down	192	5	7	7	26	36	111	5.16
<40	91	2	4	5	9	21	50	5.12
>=40	101	3	3	2	17	15	61	5.19

Table 4.14: Feelings During The Past 4 Weeks By Age
Question 9: (always =1 none =6) (cont.)

	Total	Always	Mostly	Good	Some	Little	None	Mean
Calm	192	15	77	36	35	17	12	2.99
<40	91	6	38	16	18	8	5	2.99
>=40	101	9	39	20	17	9	7	2.99
Energy*	192	10	76	35	40	28	3	3.05
<40	91	5	45	17	14	9	1	2.78
>=40	101	5	31	18	26	19	2	3.29
Down	190	2	15	9	36	61	67	4.79
<40	91	1	8	4	17	28	33	4.78
>=40	99	1	7	5	19	33	34	4.80
Wornout	188	6	15	20	49	65	33	4.34
<40	90	3	8	12	22	27	18	4.29
>=40	98	3	7	8	27	38	15	4.38
Happy	191	21	96	29	30	9	6	2.62
<40	91	10	45	15	14	5	2	2.62
>=40	100	11	51	14	16	4	4	2.63
Tired	192	7	16	22	62	67	18	4.15
<40	91	4	7	12	22	36	10	4.20
>=40	101	3	9	10	40	31	8	4.10

Table 4.15: Frequency Of Physical/Emotional Health Interference With Social Activities During Last 4 Weeks By Age

Question 10: During the past 4 weeks, how much of the time has your physical health or emotional problems interfered with your social activities (like visiting with family, friends, neighbors, etc)?

	Total		<40		>=40	
Response	Count	Percent	Count	Percent	Count	Percent
Total	192	100.0	91	100.0	101	100.0
All times(1)	7	3.6	3	3.3	4	4.0
Most times (2)	11	5.7	4	4.4	7	6.9
Some times (3)	24	12.5	9	9.9	15	14.9
Few times (4)	36	18.8	19	20.9	17	16.8
No time (5)	114	59.4	56	61.5	58	57.4
Mean	4.24		4.33		4.17	

Table 4.16: Health Status Comparison to Others
Question 11: How true is each of the following statements?

	Total	Def. True (1)	Most True (2)	Don't Know (3)	Mostly False (4)	Def. False (5)	Mean
Sick easier	189	6	23	61	41	88	3.96
	100.	3.2	12.2	16.4	21.7	46.6	
<40	91	4	10	9	19	49	4.09
	100.	4.4	11.0	9.9	20.9	53.8	
>=40	98	2	13	22	22	39	3.85
	100.	2.0	13.3	22.4	22.4	39.8	
Well as anybody	188	44	73	36	17	18	2.43*
	100.	23.4	38.8	19.1	9.0	9.6	
<40	90	24	36	19	6	5	2.24
	100.	26.7	40.0	21.1	6.7	5.6	
>=40	98	20	37	17	11	13	2.59
	100.	20.4	37.8	17.3	11.2	13.3	
Expect to get worse	186	9	11	71	22	73	3.75*
	100.	4.8	5.9	38.2	11.8	39.2	
<40	91	5	5	24	14	43	3.93
	100.	5.5	5.5	26.4	15.4	47.3	
>=40	95	4	6	47	8	30	3.57
	100.	4.2	6.3	49.5	8.4	31.6	
Health excellent	192	44	79	26	23	20	2.46*
	100.	22.9	41.1	13.5	12.0	10.4	
<40	91	25	42	16	5	3	2.11
	100	27.5	46.2	17.6	5.5	3.3	
>=40	101	19	37	10	18	17	2.77
	100.	18.8	36.6	9.9	17.8	16.8	

Table 4.17: Significant Community Problems, By Age

Question 1 Section 2, Which of the following do you consider to be the most significant problem facing your community right now?

Problems	<40		>=40		Total	
	Count	Percent	Count	Percent	Count	Percent
Schools	12	13.3	16	15.5	28	14.5
Crime	18	20.0	20	19.4	38	19.7
Drugs	10	11.1	12	11.7	22	11.4
Jobs	18	20.0	15	14.6	33	17.1
Cost of Hcare	17	18.9	19	18.4	36	18.7
Access Hcare	2	2.2	5	4.9	7	3.6
Other	1	1.1	2	1.9	3	1.6
Don't know	12	13.3	14	13.6	26	13.5
Total	90	100.0	103	100.0	193	100.0
Mean		3.89		3.91		

Table 4.18: Significant Community Problems, By Gender
Question 1 Section 2, Which of the following do you consider to be the most significant problem facing your community right now?

Problems	Male		Female		Total	
	Count	Percent	Count	Percent	Count	Percent
Schools	9	11.3	19	16.8	28	14.5
Crime	17	21.3	21	18.6	38	19.7
Drugs	11	13.8	11	9.7	22	11.4
Jobs	16	20.0	17	15.0	33	17.1
Cost of Hcare	14	17.5	22	19.5	36	18.7
Access Hcare	3	3.8	4	3.5	7	3.6
Other	0	0.0	3	2.7	3	1.6
Don't know	10	12.5	16	14.2	26	13.5
Total	80	100.0	113	100.0	193	100.0
Mean	3.85		3.94		3.90	

Table 4.19: Significant Community Problems Part I, By Educational Attainment
Question 1 Section 2, Which of the following do you consider to be the most significant problem facing your community right now?

Problems	1-8 grades		9-12 grades		College	
	Count	Percent	Count	Percent	Count	Percent
Schools	4	16.7	10	11.4	14	14.5
Crime	4	16.7	21	23.9	13	19.7
Drugs	2	8.3	11	12.5	9	11.4
Jobs	1	4.2	16	18.2	16	17.1
Cost of Hcare	4	16.7	15	17.0	17	18.7
Access Hcare	0	0.0	3	3.4	4	3.6
Other	0	0.0	2	2.3	1	1.6
Don't know	9	37.5	10	11.4	7	13.5
Total	24	100.0	88	100.0	81	100.0
Mean	4.75		3.82		3.74	

Table 4.20: Availability of Primary Care Provider By Gender, Age, Education
Question 2, Section 2, Do you have a primary care giver, such as a doctor or a clinic where you go every time you are sick or when you need a check up?

	Yes		No		Some-times		Total
	Count	Percent	Count	Percent	Count	Percent	Count
Age*							
<40	60	66.7	24	26.7	6	6.7	90
>=40	87	84.5	13	12.6	3	2.9	103
Total	147	76.2	37	19.2	9	4.7	193
Gender							
Male	54	68.4	21	26.6	4	5.1	79
Female	93	81.6	16	14.0	5	4.4	114
Education							
1-8gr	18	78.3	4	17.4	1	4.3	23
9-12gr	66	74.2	16	18.0	7	7.9	89
College	63	77.8	17	21.0	1	1.2	81

Table 4.21: Difficulty Obtaining Health Care Services By Gender, Age, And Education. Questions 3, Section II, In the past year, have you or any member of your immediate family had difficulty obtaining or continuing health care services that you needed?

	Yes		No		Don't Know		Total
	Count	Percent	Count	Percent	Count	Percent	Count
Age*							
<40	22	24.4	60	66.7	8	8.9	90
>=40	19	18.8	78	77.2	4	4.0	101
Total	41	21.5	138	72.3	12	6.3	191
Gender*							
Male	11	14.3	58	75.3	8	10.4	77
Female	30	26.3	80	70.2	4	3.5	114
Education							
1-8 grade	3	13.6	19	86.4	0	0.0	22
9-12 grade	16	18.2	64	70.7	8	9.1	88
College	22	27.2	55	67.9	4	4.9	81

Table 4.22: Inability to Afford Prescription Drugs By Gender, Age, Education
Question 5 In the past year, have you or a family member needed a prescription (drugs) but were unable to afford it?

	Yes		No		Don't Know		Total
	Count	Percent	Count	Percent	Count	Percent	Count
Age							
<40	22	24.7	63	70.8	4	4.5	89
>=40	22	21.2	80	76.9	2	1.9	104
Total	44	22.8	143	74.1	6	3.1	193
Gender							
Male	15	18.8	63	78.8	2	2.5	80
Female	29	25.7	80	70.8	4	3.5	113
Education							
1-8gr	4	16.7	19	79.8	1	4.2	24
9-12gr	19	21.3	65	73.0	5	5.6	89
College	21	26.3	59	73.8	0	0.0	80

Table 4.23: Current Smoking Status
By Gender, Age and Education
Question 6 Do you smoke now?

	Yes		No		Total
	Count	Percent	Count	Percent	Count
Age*					
<40	44	48.9	46	51.1	90
>=40	35	33.7	69	66.3	104
Total	79	40.7	115	59.3	194
Gender					
Male	35	43.8	45	56.3	80
Female	44	38.6	70	61.4	114
Education*					
1-8gr	13	54.2	11	45.8	24
9-12gr	39	43.8	50	56.2	89
College	27	33.3	54	66.7	81

Table 4.24: High Blood Pressure Diagnosis
By Gender, Age, Education
Question 8 Have you every been told by a doctor, nurse, or other health professional that you have high blood pressure?

	Yes Count	Percent	No Count	Percent	Total Count
Age*					
<40	14	15.7	75	84.3	89
>=40	52	51.0	50	47.0	102
Total	66	34.6	125	65.4	191
Gender					
Male	27	34.6	51	65.4	78
Female	39	34.5	74	65.5	113
Education					
1-8 grade	7	31.8	15	68.2	22
9-12 grade	33	37.1	56	62.9	89
College	26	32.5	54	67.5	80

Table 4.25 Cholesterol Checks By Gender, Age and Education
Question 9 Blood Cholesterol is a fatty substance and found in the blood. Have you ever had your blood cholesterol checked?

	Yes		No		Total
	Count	Percent	Count	Percent	Count
Age*					
<40	44	50.0	44	50.0	88
>=40	77	75.5	25	24.5	102
Total	121	63.7	69	36.3	190
Gender					
Male	43	55.8	34	44.2	77
Female	78	69.0	35	31.0	113
Education					
1-8 grade	13	56.5	10	43.5	23
9-12 grade	52	59.8	35	40.2	87
College	56	70.0	24	30.0	80

Table 4.26: High Cholesterol, By Gender, Age and Education
Question 10 Ever been told by a health professional
that your blood cholesterol was high?

	Yes		No		Total
	Count	Percent	Count	Percent	Count
Age*					
<40	10	22.7	34	77.3	44
>=40	39	53.4	34	46.6	73
Total	49	41.9	68	58.1	117
Gender					
Male	19	45.2	23	54.8	42
Female	30	40.0	45	60.0	75
Education					
1-8 grade	6	54.5	5	45.5	11
9-12 grade	17	33.3	34	66.7	51
College	26	47.3	29	52.7	55

Table 4.27: High Fat Diet, By Gender, Age and Education
Question 11: Overall, would you say your diet is high, medium, or low in fat?

	High		Medium		Low		Dont know	
	Count	Percent	Count	Percent	Count	Percent	Count	Percent
Age*								
<40	15	16.3	56	60.9	12	13.0	9	9.8
>=40	8	7.8	68	66.7	20	19.6	6	5.9
Total								
Mean		11.9		63.9		16.5		7.7
Gender								
Male	10	12.3	56	69.1	10	12.3	5	6.2
Female	13	11.5	68	60.2	22	19.5	10	8.8
Education								
1-8gr	0	0.0	13	56.5	5	21.7	5	21.7
9-12gr	13	14.3	57	62.6	11	12.1	10	11.0
College	10	12.5	54	67.5	16	20.0	0	0.0

Table 4.23: Attempt To Decrease Fat In Diet By
Gender, Age, and Education
Question 12: Have you tried to decrease the fat content of your diet?

	Yes		No		Total
	Count	Percent	Count	Percent	Count
Age					
<40	57	63.3	33	36.7	90
>=40	75	73.5	27	26.5	60
Total	132	68.8	60	31.3	192
Gender					
Male	52	65.8	27	34.2	79
Female	80	70.8	33	29.2	113
Education*					
1-8gr	15	65.2	8	34.8	23
9-12gr	52	57.8	38	42.2	90
College	65	82.3	14	17.7	79

Table 4.29: Attempt To Engage In Physical Activity, By Gender, Age, and Education

Question 13: In an average week, how many times per week do you engage in physical activity? ("Don't knows" are excluded from count but not from percentages and row totals)

	<1/wk		1 or 2/wk		3/wk		>=4/wk		Total
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	
Age									
<40	16	17.4	12	13.0	17	18.5	41	44.6	92
>=40	21	20.8	20	19.8	18	17.8	31	30.7	101
Total	37	19.2	32	16.6	35	18.1	72	37.3	193
Gender									
Male	11	13.8	14	17.5	13	16.3	36	45.0	80
Female	26	23.0	18	15.9	22	19.5	36	31.9	113
Education									
1-8gr	2	9.1	3	13.6	3	13.6	10	45.5	22
9-12gr	20	22.0	14	15.4	13	14.3	32	35.2	91
College	15	18.8	15	18.8	19	23.8	30	37.5	80

Table 4.30: Beer Consumption Per Week By Gender and Age
Question 14: How many cans or bottles of beer do you have during a typical week?

Beer/ Wk	Age				Gender				
	<40		>=40		Male		Female		
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Total
0	57	62.0	77	75.5	45	55.6	89	78.8	136
1	5	5.4	4	3.9	6	7.4	3	2.7	9
2	2	2.2	2	2.0	3	3.7	1	.9	4
3	3	3.3	1	1.0	1	1.2	3	2.7	4
4	3	3.3	1	1.0	2	2.5	2	1.8	4
5	3	3.3	2	2.0	2	2.5	3	2.7	5
6	5	5.4	3	2.9	3	3.7	4	4.4	8
7	1	1.1	1	1.0	2	2.5	0	0.0	2
8-12	5	5.4	6	5.9	8	9.9	3	2.7	11
13-70	8	8.7	5	4.9	9	11.1	4	3.5	13
Total	92	47.4	102	52.6	81	41.7	113	58.3	196[1]
Mean[2]	3.4		2.9		5.2		1.7		

[1]Row totals may be larger than column totals due to missing observations by age and gender.

[2]Means are based upon the raw, unrecoded data.

Table 4.31 Beer Consumption Per Week By Education
Question 14: How many cans or bottles of beer
do you have during a typical week?

Beer/wk	Education: 1-8 grade		9-12 grade		College		Total
	Count	Percent	Count	Percent	Count	Percent	
0	17	70.8	66	72.5	51	64.6	136
1	0	0.0	5	5.5	4	5.1	9
2	1	4.2	0	0.0	3	3.8	4
3	1	4.2	1	1.1	2	2.5	4
4	0	0.0	1	1.1	3	3.8	4
5	3	12.5	1	1.1	1	1.3	5
6	0	0.0	4	4.4	4	5.1	8
7	0	0.0	0	0.0	2	2.5	2
8-12	1	4.2	8	8.8	2	2.5	11
13-70	1	4.2	5	5.5	7	8.9	13
Total	24	12.4	91	46.9	79	40.7	196[1]
Mean[2]	2.3		3.1		3.5		

[1]Row totals may be larger than column totals due to missing observations by education.
[2]Means are based upon the raw, unrecoded data.

Table 4.32:Desire to Reduce Alcohol Intake, By Gender, Age And Education
Question 16: Do you want to decrease the amount you drink?

	Yes		No		Don't know		Total
	Count	Percent	Count	Percent	Count	Percent	Count
Age							
<40	10	13.3	48	64.0	17	22.7	75
>=40	16	27.1	32	54.2	11	18.6	59
Total	26	19.4	80	59.7	28	20.9	134
Gender							
Male	10	16.4	38	62.3	13	21.3	61
Female	16	21.9	42	57.5	15	20.5	73
Education							
1-8 grade	3	21.4	7	50.0	4	28.6	14
9-12 grade	10	17.5	35	61.4	12	21.1	57
College	13	20.6	38	60.3	12	19.0	63

Table 4.33: Diagnosed With Diabetes Or Blood Sugar
By Gender, Age and Education
Question 17a: Have you ever been told by a doctor or other health professional that you have diabetes or high blood sugar?

	Diabetes				
	Yes		No		Total
	Count	Percent	Count	Percent	Count
Age*					
<40	7	7.6	85	92.4	92
>=40	37	37.4	62	62.6	99
Total	44	23.0	147	77.0	191
Gender*					
Male	9	11.4	70	88.6	79
Female	35	31.3	77	68.8	112
Education*					
1-8grade	8	40.0	12	60.0	20
9-12 grade	15	16.5	76	83.5	91
College	21	26.3	59	73.8	80

Table 4.34: Currently On Medication For Diabetes,
By Age, Gender, And Education
Question 17b: Are you currently on medication for diabetes?

	Yes		No		Total
	Count	Percent	Count	Percent	Count
Age					
<40	2	28.6	5	71.4	7
>=40	24	63.2	14	36.8	38
Total	26	57.8	19	42.2	45
Gender					
Male	6	66.7	3	33.3	9
Female	20	55.6	16	44.4	36
Education					
1-8 grade	7	77.8	2	22.2	9
9-12 grade	10	66.7	5	33.3	15
College	9	42.9	12	57.1	21

Table 4.35: Type Of Current Medication For Diabetes,
By Age, Gender and Education
Question 17c: Are you currently on medication for diabetes?

	Pills		Shots		Total
	Count	Percent	Count	Percent	Count
Age					
<40	1	50.0	1	50.0	2
>=40	15	62.5	9	37.5	24
Total					
Gender*					
Male	3	50.0	3	50.0	6
Female	13	65.0	7	35.0	20
Education					
1-8grade	5	71.4	2	26.6	7
9-12grade	5	50.0	5	50.0	10
College	6	66.7	3	33.3	9

Table 4.36: Follows Diabetic Diet, by Gender, Age, and Education
Question 17d – Do you follow a diabetic diet?

	Yes		No		Total
	Count	Percent	Count	Percent	Count
Age					
<40	2	28.6	5	71.4	7
>=40	22	61.1	14	38.9	36
Total					
Gender*					
Male	4	40.0	6	60.0	10
Female	20	60.6	13	39.4	33
Education					
1-8 grade	7	77.8	2	22.2	9
9-12 grade	7	50.0	7	50.0	14
College	10	50.0	10	50.0	20

Table 4.37: Interested In Learning About Self Care,
By Gender, Age and Education
Question 17e: Are you interested in learning more about how to care for yourself related to diabetes?

	Yes		No		Total
	Count	Percent	Count	Percent	Count
Age					
<40	5	71.4	2	28.6	7
>=40	28	77.8	8	22.2	36
Total	33	76.7	10	23.3	43
Gender*					
Male	8	88.9	1	11.1	9
Female	25	73.5	9	26.5	34
Education					
1-8 grade	6	75.0	2	25.0	8
9-12 grade	10	71.4	4	28.6	14
College	17	81.0	4	19.0	21

Table 4.38: Reliance On Traditional Forms Of Healing,
By Age, Gender, and Education
Question 18: Do you rely on traditional (Native) forms of healing?

	Yes		No		Total
	Count	Percent	Count	Percent	Count
Age					
<40	8	9.0	81	91.0	89
>=40	15	15.2	84	84.8	99
Total	23	12.2	165	87.8	188
Gender					
Male	7	9.0	71	91.0	78
Female	16	14.5	94	85.5	110
Education					
1-8 grade	5	23.8	16	76.2	21
9-12 grade	7	7.9	82	92.1	89
College	11	14.1	67	85.9	78

Table 4.39a: Frequency of Use of Traditional Healing,
By Gender and Age
Question 19: How often do you, or would you, utilize traditional healing methods?

	Gender				Age				Total
	Male		Female		<40		>=40		Count
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	
Always	9	11.3	15	14.3	9	10.1	15	15.6	24
Usually	13	16.3	13	12.4	16	18.0	10	10.4	26
Sometime	33	41.3	39	37.1	29	32.6	43	44.8	72
Never	25	31.3	38	36.2	35	39.3	28	29.2	63

Table 4.39b: Frequency Of Use Of Traditional Healing By Education, Question 19: How often do you, or would you, utilize Traditional healing methods?

	Education						Total
	1-8		9-12		College		
	Count	Percent	Count	Percent	Count	Percent	
Always	4	18.2	9	11.0	11	13.6	24
Usually	2	9.1	12	14.6	12	14.8	26
Sometime	4	18.2	34	41.5	34	42.0	72
Never	12	54.5	27	32.9	24	29.6	63

Table 4.40: Health Insurance in Household by Gender and Age
Question 20: Who has health insurance in your household?

	Gender				Age*				Total
	Male		Female		<40		>=40		Count
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	
No one	12	14.5	13	11.7	10	10.9	15	14.7	25
Everyone	48	57.8	68	61.3	53	57.6	63	61.8	116
Myself and others	9	10.8	11	9.9	5	5.4	15	14.7	20
Others	10	12.0	12	10.8	17	18.5	5	4.9	22
Don't know	4	4.8	7	6.3	7	7.6	4	3.9	11

Table 4.41: Health Insurance in Household by Education
Question 20: Who has health insurance in your household?

	Education						Total
	Grades 1-8		Grades 9-12		College		
	Count	Percent	Count	Percent	Count	Percent	Count
No one	3	14.3	13	14.3	9	11.0	25
Everyone	13	61.9	48	52.7	55	67.1	116
Myself and others	3	14.3	10	11.0	7	8.5	20
Others	2	9.5	12	13.2	8	9.8	22
Dont know	0	0.0	8	8.8	3	3.7	11

Table 4.42: Source Of Health Insurance In Household, By Age And Gender
Question 21: If you or someone in your household has health insurance, who provides your insurance?

	Gender				Age*				Total
	Male		Female		<40		>=40		
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count
Your employer	35	48.6	47	46.5	37	44.6	45	50.0	82
Spouse's employer	13	18.1	17	16.8	17	20.5	13	14.4	30
Selfpayer	5	6.90	5	5.0	3	3.6	7	7.8	10
Medicare	9	12.5	19	18.8	13	15.7	15	16.7	28
Medicaid	5	6.9	7	6.9	3	3.6	9	10.0	12
Military	0	0.0	1	0.6	1	1.2	0	0.0	1
Don't know	5	6.9	5	5.0	9	10.8	1	1.1	10
Total	72		101		83	100.	90	90	173

Table 4.43: Source of Health Insurance in Household, by education – Question 21: If you or someone in your household has health insurance, who provides your insurance?

	Education						Total
	1-8		9-12		College		
	Count	Percent	Count	Percent	Count	Percent	Count
Your employer	5	23.8	32	41.0	45	60.8	82
Spouse's employer	2	9.5	14	17.9	14	18.9	30
Selfpayer	2	9.5	5	6.4	3	4.1	10
Medicare	7	33.3	12	15.4	9	12.2	28
Medicaid	5	23.8	6	7.7	1	1.4	12
Military	0	0.0	1	1.3	0	0	1
Don't know	0	0.0	8	10.3	2	2.7	10
Total	21	100.	78	100.	74	100.	173

Table 4.44a: Out Of Pocket Expenditures In Household By Gender And Age
Question 22: What amount of money per month do you pay for all types of health care, including insurance?

	Gender				Age				Total
	Male		Female		<40		>=40		
	Count	Percent	Count	Percent	Count	Percent	Count	Percent	Count
None	23	28.0	30	26.3	33	36.3	20	19.0	53
$1-100	33	40.2	53	46.5	34	37.4	52	49.5	86
101-200	12	14.6	7	6.1	7	7.7	12	11.4	19
201-300	3	3.7	8	7.0	6	6.6	5	4.8	11
301-400	2	2.4	3	2.6	1	1.1	4	3.8	5
401-500	0	0.0	1	.9	1	1.1	0	0.0	1
501-600	9	11.0	12	10.5	9	9.9	12	11.4	21
Total	82	100.	114	114	91	100.	105	100	196
Mean[1]	67		72		63		76		70

Table 4.44.b Out of Pocket Expenses in Household by Education
Question 22: What amount of money per month do you pay for all types of health care, including insurance?

	Education						Total
	Grades 1-8		Grades 9-12		College		
	Count	Percent	Count	Percent	Count	Percent	Count
None	7	30.4	28	30.8	18	22.0	53
$1-100	7	30.4	36	39.6	43	52.4	86
101-200	2	8.7	7	7.7	10	12.2	19
201-300	1	4.3	7	7.7	3	3.7	11
301-400	1	4.3	2	2.2	2	2.4	5
401-500	1	4.3	0	0.0	0	0.0	1
501-600	4	17.4	11	12.1	6	7.3	21
Total	23	100.	91	100.	82	82	196
Mean[1]	95		66		67		70

[1]means are computed using the midpoints of the intervals.

Chapter Five

Logit Regression Research Findings

A Profile of Self-Acknowledged Diabetics and Alcohol Consumption

As reported in Table 4.33 on page 82, forty-four respondents self-reported as diabetic, which represents 23 percent of the 191 respondents for which data on gender, age, and education were available 18 percent were NIDDM ,5 percent ID. Again, women (31.3%) were more likely than men (11.4%),[67] respondents 40 years old and over (37.4%) were more likely than younger respondents, and 1-8graders (40%) were more likely than responders with at least some high school (about 21%) to have reported themselves as diabetic.

Turning to health behavior, Table 5.1 presents the consumption of cans of beer per week by gender and diabetes status. Although women tend to have a higher prevalence of diabetes then men, with respect to beer consumption, they consume, on average, considerably less than men: 1.97 cans per week compared to 4.67 cans per week for men. Comparing diabetics to those nondiabetics, the behavior is mixed. Men with diabetes tend to consume slightly less beer than nondiabetic men; whereas nondiabetic women consume more beer than their diabetic counterparts. Given that women are more likely to visit a physician than men, women who report nondiabetic are more likely not to have diabetes than similarly reporting men. Hence, the unhealthy behavior of diabetic women drinkers suggests that their knowing that they had diabetes did not alter their drinking to bring it into line with that of nondiabetic women.

Of the nine men that self-reported as diabetic seven (77%) of them drank zero bottles of beer per week, all nine drank zero glasses of wine or wine cooler per week, and eight (89%) of

---

[67]This finding is consistent with national studies. For a detailed presentation of earlier finding see Dorothy Gohdes, "Diabetes in North American Indians and Alaska Natives," in *Diabetes in America*, 2nd ed. NIH publication No. 95-1469, 1995, 683-701, particularly pages 683-688.

the nine drank zero shots of liquor per week. Of the seventy men self-reporting as nondiabetic, 36 (51%) drank zero cans of beer per week, 68 (97%) drank zero glasses of wine, and 61 (87%) drank zero shots of liquor per week. Moreover, no significant difference could be found in a respondent's desire to decrease alcohol consumption as a function of his diabetes status. That is, men with diabetes were no more likely to desire to reduce their drinking than nondiabetic men.

Of the thirty-five women that self-reported as diabetic thirty (86%) of them drank zero bottles of beer per week, all thirty-five drank zero glasses of wine or wine cooler per week, and all thirty-five drank zero shots of liquor per week. Of the seventy-six women self-reporting as nondiabetic, 58 (76%) drank zero cans of beer per week, 68 (97%) drank zero glasses of wine, and 61 (87%) drank zero shots of liquor per week.

Moreover, no significant difference could be found in a respondent's desire to decrease alcohol consumption as a function of her diabetes status. That is, women with diabetes were no more likely to desire to reduce their drinking than nondiabetic women.

To estimate the effect of health behavior on the likelihood of a desire to decrease, logit models where estimated with and without diabetes status as an independent variable. The independent variables were education, age, gender, beer consumption per week, and diabetes status. Overall, none of the variables significantly affected the model's predictability. When the respondent's smoking status is included in the regression, smoking status, diabetes status, and age are significant in the equation estimating the probability of not desiring to decrease alcohol consumption. In particular, respondents who said they did not have a desire to decrease alcohol consumption were between the ages of 31 and 50 years of age and smoked. The logit results presented in Table 5.2 indicate that among the nonrespondents to "do you desire to reduce your alcohol consumption" younger respondents and smokers were significantly less likely than respondents over 60 and smokers to be in the no response group.[68] Perhaps, what is most

[68]This group, as indicated in the text, is comprised of respondents who were nondrinkers. The group is probably made of respondents who did not drink and therefore could not answer yes to "do you desire to reduce your consumption..." Although the question is somewhat ambiguous,

significant and disturbing about these results is that level of alcohol consumption does not have an influence on the respondents' decisions to reduce consumption.

Predicting Diabetes

As noted earlier, diabetes among Native Americans is attributed to four causes: genetics--full blooded Native Americans are more likely to contract diabetes than other Native Americans; obesity; life style; and pathogenesis. The data collected in this study will provide measurements on two of the four causes of diabetes: obesity and life style. The obesity measure is the body/mass index (bmi), weight(kg)/height(m)^2. The life style measures are listed below also with the variable identification code:

In the first estimation of equation 1, the SF-36 variables were included, each variable is standardized on a scale from 0 to 100: Below is a list of the SF-36 variables with definitions of their extreme values.

---

the fact that nearly all members of the group drank zero classes of beer or wine or liquor per week, suggests that the group as a whole is similar to those respondents who answered "yes" to the "desire to reduce alcohol consumption" question.

Figure 5.1 SF-36 Variable Definitions

	Low	High
Phys.Function (PF)	Limit physical activity	No limitations
Role-Physical (RP)	Problems with work or other daily activity	No problems
Bodily Pain (BP)	Very severe and extremely limiting pain	No pain or limitations due to pain
General Health (GH)	Self-evaluates health as poor	Evaluates personal health as excellent
Vitality (VT)	Feels tired and worn out all the time	Feels full of pep and energy always
Social Function (SF)	Extreme and frequent interference with normal social activities due to physical or emotional	Performs normal social activities without interference due to physical or emotional problems
Role-Emotional (RE)	Problems with work or other daily activities as a result of emotional problems	No problems with work or other daily activities as a result of emotional problems
Mental Health (MH)	Feelings or nervousness and depression all of the time	Feels peaceful, happy, and calm all the time

Three measures pertain primarily only to physical health: physical function (PF), role-physical (RP), bodily pain (BP). Two measures pertain primarily only to the mental health: role-emotional (RE), and mental health (MH). The other three measures pertain to both physical and mental health: general health (GH), vitality (VT), and social functioning (SF). Figure 4.2 depicts the eight measurement instruments and aspects of health status they are intended to measure.

Figure 5.2: SF-36 Health Measures

Function	Well-being	Disability	Personal evaluation
PHYSICAL			
Physical function	P		
Role-physical		P	
Bodily pain	P	P	
General health			P-M
MENTAL			
Vitality	P-M		
Social-function	P-M		
Role-emotional		M	
Mental health	M		

P=Physical; M=Mental

Although there is some overlap between physical and mental health indicators, physical functioning, role-physical, bodily pain, and general health compose, nonetheless, the physical component summary (PCS) score; and the four mental concept scores, vitality, social functioning, role-emotional, and mental health compose mental component summary (MCS) score.

Responses to individual questions are standardized and transformed to a 0-100 scale for each concept. The meaning of each concept scale is summarized in Figure 5.3

Figure 5.3: Value Range of Eight Health Measures

Measures	Low	High
Physical		
Physical functioning	Having limited ability to perform physical activities including bathing and dressing	Performs all types of physical activities without health limitations
Role-physical	Work or daily activity problems due to physical health	no work or daily activity problems due to physical health
Bodily pain	Very severe and extremely limiting pain	No pain or limitations due to pain
General health	Evaluates health as poor and worsening	Evaluates health as excellent
Mental		
Vitality	Feels tired and exhausted all the time	Always feels full of pep and energy
Social functioning	Extreme and frequent interference with normal social activities due to physical or emotional problems	Performs normal social functions without interference due to physical or emotional problems
Role-emotional	Problems wit work or other daily activities as a result of emotional problems	No problems with work or other daily activities as a result of emotional problems
Mental health	Feelings of nervousness and depression all the time	Feels peaceful, happy, and calm all of the time

Column 2 of table 5.3 presents the result of the logit regressions using the SF-36 variables, age, gender, and BMI, the body mass index. In equation 1a the probability that a respondent is estimated as a function of three composite variables: body mass index (BMI), physical component summary (Phys.Comp), and the mental component summary (Mental Comp). The logit results indicate that two of the three variables have B coefficients that are significantly different from zero. Specifically, body/mass, a ratio of respondent's weight over the height squared and physical component summary, a weighted average of physical functioning (Pf), role-physical (RP), bodily pain (BP), and general health (GH). The BMI coefficient is positively correlated with the probability of having testing positively for

diabetes, indicating that as body weight (or obesity) increases so does the likelihood of having diabetes.

The four variables composing the physical component summary (phys.comp) or PCS has a high value (near 100) if the respondent is not suffering from any physical limitations and near zero if she is. The significant and negative B coefficient for PCS indicates that persons with high physical performance measures are less likely to have diabetes than persons with low physical performance levels. The lack of significance of the mental component summary suggests that mental measures of emotional well being do not significantly affect the likelihood of testing positive for diabetes.

The -2 log likelihood, an estimate of the goodness of fit, is 158.79. In order to compare maximum likelihood estimates across alternative model specification that allow for changes in sample size, the Schwartz criterion is also presented. In the case of equation 1a the Schwartz criterion value is 170.0. Finally, the last three rows provide the probability of successfully predicting the diabetic status of respondents. Equation 1a correctly predicts that a respondent is diabetic (P_prob dia) 19 percent (.19) of the cases; equation 1a correctly predicts that a respondent is nondiabetic (P_prob ndia) 97 percent (.97) of the cases; equation 1a, therefore, correctly predicts the overall probability of diabetes (P_prob over) in 81 percent (.81) of the cases.

In summary, based upon equation1a, as a respondent's obesity increases or as physical well-being declines that respondent is much more likely to test positive for diabetes. That is, those members of the nation most likely to test positively for diabetes display visible signs of susceptibility: obesity, physical pain, or physical health problems such as limited functionality and limited performance. The major set back with this physical health model is that it only correctly predicts those respondents with diabetes in 19 percent of the cases.

Equation1b is the result of estimating the probability of diabetes using only demographic variables, age, gender, and educational status. Age is a continuous variable, which is positively

associated with diabetes. That is, older respondents are more likely than younger respondents to self-report themselves as diabetic. Females are significantly more likely than males to self-report themselves as diabetic; and respondents who have attended college are more likely to self-report as diabetic than respondents with less than a college education.

Applying the -2log likelihood and Schwartz criteria, the goodness of fit estimates indicate that equation1b provides a better overall fit for the data than equation1a. In addition equation1b is a better predictor than equation1a of the respondents who tested positive for diabetes, correctly predicting diabetic respondents in 41 percent of the cases compared to on 19 percent of the case for equation1a. On the other hand, equation1b does not do as well as equation1a in predicting nondiabetic respondents. Given that both equations have equally reliable prediction levels, .81 and .80, respectively, equation1b may be preferred to equation1a for its higher level of correct predictions of diabetics.

Equation1c combines the composite variables of equation1a with the demographic variables of equation1b. The results indicate that both types of variables continue to have statistically significant effects on the likelihood of self-reporting diabetes. Although both sets of variables seem relatively robust, both the likelihood estimate and the Schwartz criteria worsened (increased) as a result of the re-specification of the equation. Partially offsetting the deterioration of two goodness of fit tests, however, is the slight improvement in the equation1c's predictability. Equation1c improved its correct predictions of respondents self-reporting diabetes by 1 percentage point and its correct predictions of respondents self-reporting as nondiabetic by 3 percentage points. Thereby it increased its overall predictability to 84 percent the best of all five models.

The volatility of the goodness of fit tests is further substantiated when the education variable is removed from equation1c, producing equation1d. Both the -2logliklihood (-2LL) and the Schwartz criteria fall (improve) by about 13 percent. On the other hand, exclusion of the education variable

results in a 68 percent decrease in the model's reliability as correct identifier of respondents that are diabetic. The results of equation1c suggest that a model which includes both demographic variables and measures of physical well being is a better predictor of diabetes than either of the two sets of variables separately.

The goodness of fit tests is highly sensitive to the education variable. When education is removed from equation1c, producing equation1d, both the -2logliklihood (-2LL) and the Schwartz criteria fall by about 13 percent, indicating an improvement in how well the equation fits the data. On the other hand, exclusion of the education variable results in a 68 percent decrease in the model's reliability as a correct identifier of respondents that are diabetic. Given that the most important function of the models is to identify which member of the tribe are likely to present as diabetic, the loss of predictability due to the exclusion of education is not an acceptable outcome.

In equation1e the composite variables Physical Component and Mental Component are replaced by their constituent parts. Physical component is replaced by physical function, role physical, body pain and general health. Of these four variables, general health is statistically significant. None of the mental component variables is statistically significant. Although the -2LL measure of 135.3 is the lowest of the five equations, once the number of variables is corrected for, the Schwartz criteria of equation1e is higher than that of equation1d. Still, relative to equation1d, equation1e is a slightly better predictor of respondents with diabetes. In conclusion, based upon the five equations presented in Table 5.2, using the probability of correctly identifying those respondents with diabetes (P-prob dia), equation1c, which includes demographic, the physical component variable and bmi, had the best predictability. Using equation1c community leaders without further medical data could properly identify respondents with diabetes in 42 percent of the cases. The major problem,

however, even with the equation1c specification of the model is that the same leaders would probably do better by flipping a coin. That is, unless the model is able to correctly identify diabetes in more than 50 percent of the cases, the model is of no practical value.

In Table 5.4 the results of introducing the fat consumption and gender-age interactions are presented. The diet variable is not significant in any of the equations into which they are introduced. Equation1f is the demographic variables only equation. In comparison to equation1b, where the diet fat variables have been excluded, equation1f does not do as well with its goodness of fit or in predicting respondents that have tested positive for diabetes. Equation1c is re-estimated as equation1g with the diet dummy variables included. The results indicate that the diet variables improve the -2LL estimates but decrease the predictability of diabetes in respondents.

The interaction between age and gender is introduced in equatin1h. The interaction destabilizes, what had been a relatively robust set of coefficient estimates. As a result of the introduction of the interaction term, age takes on a negative sign which is counter-intuitive: suggesting that older respondents are less likely to test positive for diabetes than younger respondents. One possible explanation for the sign change on the age variable is that women are interacting differently with age from men. In particular, women as they get older experience a much higher rate of positive diabetes testing than similarly aged men. In addition, women represent nearly sixty percent of the respondents, by 82 percent of the respondents by diabetes. Thus, in those equations where the interacting is not considered the "female diabetics" effect masks the relationship between males and diabetes. To test whether the change in sign of the age coefficient was due to women having a higher rate of positive testing, separate logit equations were run for men and women. The results are displayed under the columns labeled male1 and female1. Consistent with the hypothesized findings, both the male and female equations report positive age coefficients. The age coefficient is significant,

however, in the female equation only.

More generally, by running separate gender equations, it appears that variables that affect males and females likelihoods for reporting diabetes are different. The only variable that is significant in the male equation is physical components: the better the overall physical condition of a male the less likely he is to report being diabetic. For females the likelihood of reporting positively for diabetes increases with the age of the respondent. Perhaps, more importantly, the male model only correctly predicts diabetes in 37.5 percent of the males who have diabetes compared to female model, which correctly predicts 57.14 percent of the females that have diabetes. Notably, it is only after separating the respondents by gender that any model is able to do better than a coin flip in predicting the diabetes.

In Tables 5.5 and.5.6 separate equations are presented for each gender. Equation male1 in Table 5.5 shows that neither of the two demographic variables, age and college education had a significant effect upon the likelihood that a male reported a positive test for diabetes. Equation male1 also failed to correctly identify males with the diabetes more than 22 percent of the time. In equation male2 fat content in diet dummy variables are included along with age and education in the regression equation. The results indicate that self-reported fat content in diet has no significant effect on the likelihood that a male will report having tested positive for diabetes. The physical component summary coefficient (-.15) is significant. The negative sign indicates that men who suffer from less pain, less loss of work, and self-report as healthier as less likely to report as diabetic than other men. As a result of including the fat variables, the body mass index (bmi), and the physical component summary, male2 has an increased predictability of diabetes of 63 percent of equation male1.

Equation male3 tests whether the mental component summary has a statistically significant impact on likelihood of diabetes or increases the predictability of the model. In both cases the answer is no.

Equation male4 replaces the two component summary variables PCS and MCS with constituent parts. Body pain (BP) is the only variable that is significant in the equation. The negative coefficient indicated that as the respondent's absence of pain increases, the likelihood of reporting diabetes declines.

The most serious problem associated the statistical analysis of the male population is the small number of respondents reporting diabetes, eight. The number of males with diabetes is so small that the number of independent variables should be no larger than two or three. As the number of independent variables increases beyond three, the number of empty cells or cells is likely to increase as well.

The same sampling size problems that restrict the usefulness of the male sample are absent from the female sample. Whereas only 10 percent of the male respondents reported themselves as diabetic, 24 percent of the females were diabetic. In addition, the female sample has 104 valid cases compared to only 74 valid male cases. Thus the female sample is both absolutely larger and relatively more balanced than the male sample.

The age and education in equation female1, unlike the same variables in equation male1, are both significant. The positive values of both coefficients indicate that older respondents are more likely than their younger counterparts to have diabetes. Moreover, college educated respondents are more likely than those without a college education to have self-reported as being diabetic. This finding suggests that education might serve as a proxy for contact with health providers.[69] If college educated

[69]The correlation between college/ non-college versus health insurance/no insurance .12 was not significant at the .05 level. A logit on likelihood of diabetes was estimated with education, age, and dummy health insurance variable. The coefficient for health insurance was negative, as would be expected if access to health insurance reduced the likelihood of testing positive. In fact, health insurance should increase respondent contact with health professionals and therefore increase the probability of reporting a positive test. Given that the coefficient was not significant, however, this anomaly is left unresolved.

respondents are more likely non-college educated respondents to visit a health care provider, then their higher probability of reporting diabetes is not an unexpected result.

In female2 the fat-in-diet dummy variables along with the bmi and physical component summary variables are included in the logit model. The results show that the age and education coefficients are reduced by about 20 percent and 13 percent respectively, but both coefficients remain statistically significant. The bmi and other variables are neither statistically significant nor contributors to the predictability of the model.

Substituting the elemental variables in female5 for the component summary variable of female3 has no noticeable effect upon the number of significant coefficients, the predictability is, however, raised from .54 to .61, and increase of about 13 percent. Perhaps the most significant finding is revealed in a comparison of female4 and female5. The only difference between the two models is that female4 equation excludes the demographic variables. Without demographic variables, general health, a measure of the respondent's overall assessment of her own well being, is the only significant variable;

and the predictability of diabetes falls from 61 percent (female5) to 39 percent (female4), a decline of 36 percent.

In summary, four general conclusions can drawn from the investigation of the relationship between likelihood of reporting positive for diabetes and the demographic and health related characteristics of the Potawatomi. First, either males and females actually have different prevalence rates for diabetes, or males and females behave differently as respondents to the questionnaire or in their interaction with the health care community or in the actual rate of diabetes. Although there is some evidence that females are more likely to be diabetic, the difference in prevalence rates between males and females is considerably smaller than those in this sample. A more likely explanation of relatively low incidence among males is that males are underreporting because they do not know that they are diabetic. In the absence of doctor or hospital visit data, it is not possible to estimate the magnitude of the difference between the rates of health care contact for males and females.

Second, the female data shows a strong correlation between age and the likelihood of being diabetic. If this correlation is also present in the male Potawatomi population, then the results of the female regressions should be applied to the male cohorts as well, which would suggest that older tribe members should have more frequent tests for diabetes.

Third, although medical research as found a link between obesity and diabetes, the relationship between fat content in diet and diabetes is more tenuous. It is therefore difficult to determine whether self-reporting questions on diet are virtually useless as measures or whether the link between diet and diabetes is to weak to support a significant finding, given the other weaknesses in the current data set.

Fourth, with respect to predicting the likelihood of reporting positive for diabetes, the elemental health variables are better predictors than the composite variables PCS and MCS. The best that the models do in predicting positive for diabetes is around 63 percent.

Fifth, the level of exercise activity as captured by question 13 of the survey, contrary to the findings for the Zuni nation, had no statistically significant impact on the likelihood of diabetes. Separate logit models were run for males and females, where level exercise activity was the only variable in the logit and was treated as four dummy variables: exercise less than once a week (excluded variable); exercise once a week or twice a week; three times a week; four or more times a week. Although exercise is surely related to obesity, the response to the current survey did not produce any usable results.

Table 5.1 Diabetes and Alcohol Consumption by Type of Alcohol, Gender, and Age

	Diabetic				Not Diabetic			
	Male		Female		Male		Female	
Frequency	Bottles/Cans of Beer per week		Bottles/Cans of Beer per week		Bottles/Cans of Beer per week		Bottles/Cans of Beer per week	
	Count	%	Count	%	Count	%	Count	%
0	7	77.8	30	85.7	36	51.4	58	76.3
1	0	0	0	0	6	8.6	3	3.9
2	0	0	0	0	3	4.3	0	0
3	0	0	0	0	1	1.4	3	3.9
4	0	0	1	2.9	2	2.9	1	1.3
5	0	0	1	2.9	2	2.9	2	2.6
6	0	0	0	0	6	4.3	5	6.6
7	0	0	0	0	2	2.9	0	0
9	0	0	0	0	1	1.4	0	0
10	0	0	0	0	2	2.9	0	0
12	0	0	1	2.9	5	7.1	2	2.6
15	0	0	0	0	0	0	1	1.3
18	1	11.1	0	0	2	2.9	0	0
20	0	0	0	0	1	1.4	0	0
24	0	11.4	2	5.7	2	2.9	1	1.3
50	0	0	0	0	1	1.4	0	0
70	0	0	0	0	1	1.4	0	0
Total	9	100.0	35	100.0	70	100.0	76	100.0
Mean	4.67		1.97		5.40		1.57	

Table 5.2: Logit Of Probability Of Desiring To Decrease Alcohol Consumption.
("*" significant at .05 -level)

Variables	Logit1 (no response)		Logit3 (no desire)	
		Signif.		Signif.
Age 18-30	-2.57	.037*		
Age 31-40			5.26	.006
Age 41-50			3.64	.036
Age 61-87 (ex.)				
Smoker (yes)	-2.09	.002*	-1.219	.044

Table 5.3: Logit Estimates Of Having Diabetes Using SF-36 Variables1

	EQUATION 1A		EQUATION 1B		EQUATION 1C		EQUATION 1D		EQUATION 1E	
Variables	B	sig	B	sig	B	sig	B	sig	B	sig
Constant	-1.38	.37	-9.16	.00*	-10.15	.000*	-6.47	.002*	-6.52	.001*
Age			.08	.00*	.063	.000*	.05	.002*	.045	.005*
Female			1.45	.00*	1.34	.008*	1.06	.025*	1.10	.026*
College			.64	.01*	.849	.002*				
Body/MASS	.076	.02*			.076	.039*	.08	.028*	.068	.062
Phys. Composite	-.065	.001 *			-.067	.003*	-.05	.025*	-	
Mental Composite	.016	.43			.039	.116	.02	.284	-	
Physfunction									.002	.883
Rolephysical									-.011	.286
Body pain									-.005	.652
Genhealth									-.035	.033*
Vitality									.005	.794
Social Functioning									.013	.423
Role emotional									.013	.196
Mental Health									.003	.876
N	178		191		178		178		178	
-2loglikeli	158.8		157.7		159.4		140.9		135.3	
Schwartz Criterion	170.0		164.5		172.9		152.2		160.1	
P_prob diabetic	.19		.41		.42		.25		.31	
P_prob not diabetic	.97		.91		.94		.94		.94	
O_predict	.81		.80		.84		.80		.81	

Table5.4: Logit With Fat Consumption, And Gender With Age Interactions1

	EQUATION1F		EQUATION1G		EQUATION1H		MALEI		FEMALEJ	
Variables	B	sig	B	sig	B	sig	B	sig	B	sig
Constant	-9.31	.00*	-7.99	.00*	-4.02	.23	-15.24	.77	-6.39	.01*
Age (S3q4)	.08	.00*	.06	.00*	-03	.67	.02	.55	.08	.00*
Female (S3q5)	1.45	.00*	1.91	.02*	-1.18	.47	x	x	x	x
Age*Female					.05	.14	x	x	x	x
College (S3q6r2)	.63	.01*	.70	.01*	.71	.01*	1.07	.10	.70	.09
Low Fat (Excl)	x	x	x	x	x	x	x	x	x	x
High Fat Diet	.26	.78	-.30	.77	-.21	.84	8.59	.87	-7.35	.78
Med Fat Diet	.30	.57	.55	.39	.51	.43	7.53	.88	.36	.62
Unknown .Fat Diet	.36	.71	-.14	.90	-.19	.86	8.29	.87	-.76	.54
Body/Massbmi			.08	.05*	.07	.07	.25	.08	.05	.25
Phys.Comp			-.06	.01*	-.06	.01*	-.15	.02*	-.04	.18
N	191		178		178		74		104	
-2loglikeli	156.89		130.62		128.42		29.93		83.14	
Schwartz Criterion	175.13		153.12		153.17		43.13		100.42	
P_prob diabetic	.39		.33		.44		.38		.57	
P_prob ndiabetic	.93		.96		.94		.97		.88	
O_predict	.80		.83		.84		.91		.80	

Table 5.5: Separate Logits For Males

	Male1		Male2		Male3		Male4	
Variables	B	sig	B	sig	B	sig	B	sig
Constant	-13.7	.00*	-15.24	.77	-17.1	.74	-8.38	.86
Age	.06	.07	.02	.55	.03	.58		
College	.79	.09	1.07	.10	1.10	.09		
Low Fat (Excl)			x	x				
High Fat Diet			8.59	.87	8.54	.87	5.94	.90
Med Fat Diet			7.53	.88	7.56	.88	4.49	.92
Unknown .Fat Diet			8.29	.87	8.54	.87	8.12	.86
Body/Massbmi			.25	.08	.27	.07	.30	.25
Phys. Composite			-.15	.02*	-.16	.02		
Mental Composite					.03	.61		
Phys function							-07	.24
Rolephysical							.06	.27
Body pain							-.13	.05*
Genhealth							-.11	.11
Vitality							.07	.32
Socfunction							-.11	.20
Rolemotional							.08	.15
Mental health							.05	.46
N	79		74		74		74	
-2loglikeli	45.6		29.93		29.67		23.52	
P_Prob diabetic	22.2		.38		.38		.63	
P_Prob nondiabetic	100.0		.97		.97		.97	
O_Predict	91.1		.91				.93	

Table 5.6: Separate Logits For Females1

	Female1		Female2		Female3		Female4		Female5	
Variables	B	Sig	B	Sig	B	sig	B	sig	B	sig
Constant	-7.96	.00*	-6.39	.01*	-8.35	.00*	-1.98	.31	-6.80	.01*
Age (S3q4)	.10	.00*	.08	.00*	.08	.00*	x	x	.09	.00*
College (S3q6r2)	.81	.01*	.70	.03*	.85	.02*	x	x	1.32	.01*
Low Fat (Excl)										
High Fat Diet			-7.34	.78	-7.48	.76	-9.55	.69	-8.82	.69
Med Fat Diet			.36	.62	.23	.75	.18	.80	.34	.67
Unknown .Fat Diet			-.76	.54	-.62	.61	-1.16	.29	.25	.85
Body/Massbmi			.05	.25	.05	.23	.07	.10	-.01	.90
Phys.Composite			-.04	.18	.05	.08				
Mental Composite					.04	.15				
PF Physfunction							-.01	-.48	-.03	.14
RP Rolephysical							-.01	.44	-.01	.69
BP Body pain							.01	.70	.002	.90
GH Genhealth							-.06	.00*	-.05	.06
VT Vitality							.01	.65	.04	.24
SF Socfunction							.03	.18	.02	.43
RE Rolemotional							.01	.48	.03	.07
MH Mental health							.01	.67	-.04	.18
N	112		104		104		104		104	

Chapter Six

Conclusion

Policy Implications

It is well recognized in the health care community, which serves Native peoples that relative to whites, since the early 1960s diabetes has disproportionately affected the Native American community. Thus although Native peoples have lower mortality and morbidity rates than whites in the three major causes of death--cancer, heart attacks, and strokes, further educational work needs to be done in the area of diabetes. In a recent national study where Native Americans were three times more likely than whites to be diabetic, the researchers concluded that effective intervention strategies were required for both diabetes and its complications--which include blindness, kidney failure, lower-extremity amputation, cardiovascular disease, and premature death.[70]

Effective intervention strategies require a long-term relationship between health care providers and Native American communities,[71] a relationship, in the case of the present study, which, because of the geographical dispersion of the respondents, was only partially established. On the other hand, in-roads into the Native communities need not be as extensive as may have been viewed previously by researchers which included: nurse investigators and practitioners, a cultural anthropologist, a sociolinguist, a social psychologist, a diabetes physician, a diabetes educator, and many Indian consultants and field workers.[72] Yet it is important, as the current investigation documents, to spend considerable time with the respondents to ensure that the questions that the researchers are asking are also the questions that the respondents are answering, e.g. wanting to stop

---

[70]"Prevalence of Diagnosed Diabetes Among American Indians/Alaskan Natives--United States, 1996. *Morbidity and Mortality Weekly Report* 901(1): Oct, 30, 1998. Source: internet: https://www.dialogweb.com/cgi/dwclinet.

[71]Sharol F. Jacobson, Debeborah Booton-Hiser, John H. Moore, Karethy A. Edwards, Sue Pryor, and Janis M. Campbell, "Diabetes research in an American Indian Community," *Journal of Nursing Scholarship*, 30:2 (Summer 1998), 161-166.

[72]Ibid.

drinking or smoking when the response prior is "don't know" or "don't drink" may suggest the respondent wants to help someone else stop.

One of the major findings from the current investigations is the importance of access to medical records. These records are important for two reasons, first such records would add a level of objectivity to the data base that is important in accurately sorting the respondents into those who test positively for and those who do not test positively for diabetes. In the current survey, which is based upon the SF-36 questionnaire, respondents who do not test positively for diabetes and respondents who have not been tested cannot be distinguished. The need for medical records arises not only to confirm survey response data, but also to help estimate the respondents who have diabetes but self-report as not having diabetes. Secondly, from this information, researchers can begin to develop a demographic and health behavior profile of patients that are likely to self-report as nondiabetic who are diabetic. With this information local Native American community organizers can begin to develop strategies for targeting and educating this population.

The importance of reaching those members of the community least likely to seek medical care is crucial in reducing not only the incidence of diabetes, but also the incidence of heart attack, stroke, and cancer as well. The integral relationship between diet and health is gaining prominence within the traditional medical community. Recently, Thomas R. Reardon, president of the American Medical Association (AMA), was asked what it would take for the AMA to endorse alternative holistic treatments. Holding tightly to the scientific basis for all medical treatment, Reardon said that "Once there are trials and studies for the safety and efficacy of different herbal and alternative treatments, then physicians can see which ones will be effective for their patients or what could be dangerous."[73] Although Reardon is certainly pushing alternative medicines beyond the reach of traditional medical practitioners; at this time the public's interest in complementary and alternative medicine (CAM) is on the increase. For example, in the May 2000 *Consumer Report*, 16,000 respondents, one-third of the sample, said they have used alternative therapies; but only 8,000 said that they informed their regular physician.

---

[73]Thomas R. Readon, "Interview," *Physician's Practice Digest*, 10:4 (July/Aug, 2000), 14.

The general movement towards alternative medicines, may increase the willingness of Native American health specialists to rely less and less of formal medical centers, particularly off-reservation medical centers, in which case, medical records and standardized medical testing may become less common particularly among those Native Americans who are not seriously ill. It therefore is more important to be able to develop an indigenous medical expertise that can educate the community to the point where the community is willing to make a significant change in its eating and exercising regiment. BMI, body mass index, a composite measure of the height and weight of the respondent, or general health were significantly correlated with likelihood of having diabetes, when included in the logit as independent variables.

It should also be noted that in addition to obesity and lifestyle the other two recognized contributors to incidence of diabetes are genetics and pathogenesis. Ironically, if Native American communities attempt to remain Native American, then the prevalence of diabetes, all other things equal, is likely to increase. For the diabetes rate is highest among full-blooded Native Americans. Thus, as Native American autonomy and self-determination become more important to Native American communities, the priority of controlling diabetes will also be bid up.

Within the context of self-determination and autonomy, health care cost, which the U.S. consistently attempts to treat as a private good, looks more and more like a social good within the Native community. Although the exclusion principle--preventing some persons from consuming a good while others consume it--certainly applies to health care, the externalities are so large from health care that indirect benefits to family members and the community at large are often nearly as large as those of the individual health care consumer. Productivity at the workplace increases as well as ways of engaging with ones family. This observation would seem to be particularly important within a community concerned about autonomy from other forms of government.

First the economic cost of illness within subsistence and near subsistence communities are often too large to be absorbed independently by the autarky. On the one hand, in the absence of adequate medical care, the sick must: a) be moved outside of the reservation (or community); or b) external medical services must be imported into the

community. In either case Native American autonomy suffers. While political sovereignty can be claimed; economic sovereignty certainly cannot.

Second, to the extent that diabetes strikes workers, the joint effect is at least two fold: income to the workers household declines; and the community productivity declines as well. In the current data analysis, for example, it was found that 31 percent of the respondents accomplished less than would have liked and nearly 20 percent down on the amount of time spent working. Moreover, females (23.5%) tended to have experienced greater productivity losses than men (14%). If the community is operating below full employment, which is usually the case on reservations, then the reservation's collective productivity is unaffected; and the only effect of the illness is to shift income from one family to another. Still the social welfare of the community has declined. This is readily seen. The community decreases its number of well persons by one and increases its number of sick-persons by the same amount; and although high unemployment allows the economy to absorb the work by hiring a currently unemployed worker, the community is worse off after the sickness.

On a different note, if the ill worker had the choice between being ill and losing her job or just losing her job, she would probably choose the job loss without illness.[74] Moreover, given the interdependency that autonomy assumes in this model, her illness will bring sadness not only to her direct family by to her extended family, that is, the entire tribal community.

Finally, even if the community were able to provide the medical care required to treat her diabetes, the community suffers by having to allocate resources to treatment healthcare rather than some other goods and services. The only way that treatment healthcare is preferable to preventive healthcare is when the cost total cost of treatment is less than the total cost of prevention. It is assumed here that the cost of treatment includes the pain, suffering, and loss income associated with the illness.

Given that the type of preventative health care associated with preventing or prolonging the symptomatic appearance of diabetes is better diet and exercise., then the

---

[74]We assume here, of course, that the stigma of job loss is zero. Otherwise, a job loss because of illness may be preferred to an "unexplainable" job loss.

cost of implementing such a program to the individual is the loss of pleasure derived from being overweight and not exercising. To the community there is almost no cost, except perhaps the opportunity cost of enjoying eating and not of exercising together with others. Both pleasures are substantial. It is the role of education, nonetheless, to attempt to reduce risky behavior, in the case of diabetes the high fat consumption, big-Mac, diet is often a contributor. In the Pimas, however, a high-calorie diet has been associated with the development of diabetes.[75] French fries, which are considered a complementary good to hamburgers, are also high in carbohydrates. High carbohydrates, in turn, are a very high predictor of diabetes. Together, these two foods are a deadly combination to the diabetic.

If Native American health professionals can educate their community to the point where exercise activities are undertaken daily, then even in the presence of obesity, then the risk of presenting with diabetes may decrease significantly among the Potawatomi as it has among the Zuni.[76]

Although, it has been assumed that Native Americans are interested in pursuing a development of autonomy, the alternative should be mentioned as well. In a recent article discussing the health care problems facing Native Americans, researchers noted that the level of Native American health care is being jeopardized by three forces: 1) Native American authorities assuming the responsibility for more and more clinical operations, 2) inadequate federal funding, and 3) intensified involvement with managed care organizations.[77] Thus, as the federal government decreases its direct support through the Indian Health Services and indirectly through human services programs, Native Americans may be moving toward financial independence at a faster rate than their current health services infrastructure can support.

As noted in the *Diabetes in America* study, "the historical experience of Native American communities and the growing understanding of the path physiologic interactions

---

[75]See National Diabetes Data Group, *Diabetes in America*, 2nd ed., (Washington DC: National Institutes of Health, NIH 95-1468, 1995), 688.

[76]National Diabetes Data Group, *op. cit.*, 688.

[77]Jay Noren, David Kindig, Audrey Sprenger, *Public Health Reports,* 113:1 (Jan-Feb 1998), 22-34.

between genetics and lifestyle suggest that NIDDM can be prevented in Native Americans."[78] The tasks for Native American health care professionals and community leaders is to use education and inspiration to alter the lifestyle patterns of Native peoples in such a way that diabetes return to what many researchers and community members believe was its pre-1960 status in the community: virtually non-existent.

As community leaders begin to design specific strategies, some consideration must be given relative lack of contact between males and medical professionals. In the current study, for example, 81 percent of the females had a regular primary health care provider, compared to only 65 percent of the males. Moreover, by age group, younger respondents those between 18-34 years of age had primary care providers in only 60 percent of the cases, compared to over 80 percent in respondents 35 years old and older. Local health care strategies have to successfully overcome gender and age resistance to health care contact. It should also be noted that the problems that the lack of contact between males and primary care providers is not due to difficulty in obtaining services. Females, in fact, are twice as likely as males to report some difficulty in obtaining health services.

The need to devise health initiatives that overcome the gender and age barriers is not simply a consequence of males' low participation rate in health programs, but is also a consequence of their relatively higher propensity for risky behavior: males are more likely than females to smoke; and younger Potawatomi are more likely to smoke than older members of the nation. Similar results pertain to drinking: 44.6 percent of males compared to 33 percent of females drink alcohol during a week; and nearly 50 percent of those under 35 years of age compared to about 20 percent of the over 54 year olds consume alcohol during a typical week.

Although males and females reported similar rates of high blood pressure, given that males are less likely to visit a medical professional, the reported rate for males relative is probably significantly higher than the actual rate. Even among the males who were diagnosed with high blood pressure 22 percent did not receive treatment, compared to 15 percent of the females. By age group the results are yet more ominous: nearly 57 percent

---

[78]National Diabetes Data Group, *op. cit.*, 694.

of the respondents under 35 who were diagnosed as having high blood pressure did not receive treatment compared to about 4 percent of the respondents over 54 years of age. Similar behavior by gender and age is associated with cholesterol testing.

The potential for the reduction of risky behavior through education is unclear. The best teacher seems to be life itself: older respondents are much more conscious of health risks than younger respondents. Unlike the Potawatomi respondents in this sample who are nonreservation residents, however, reservation Native Americans are more likely to be influenced by targeted educational programs. Still the educational task of reducing risky behavior is going to be easier in some domains than in others. Resistance to reduced drinking is going to be high among the Potawatomi respondents in the current survey: of the drinkers, only 14 percent of the males and 18 percent of the females indicated an interest in reducing their consumption; and only 3 percent of those under 35 years of age and about 25 percent of those 35 and older indicated an interest in alcohol consumption reduction. On the other hand, 63 percent of the male and 70 percent of the females indicated an interest in reducing their fat consumption. With respect to diabetes, fat consumption reduction may have a larger effect on the probability of presenting with diabetes than alcohol consumption reduction. Still, the positive correlation between diabetes and end-stage renal disease among Native Americans is documented as is the positive correlation between alcohol consumption and renal diseases as well.

Not only are the Potawatomi interested in reducing their fat consumption, but they are similar interests with respect to cigarette smoking: 71 percent of the males and 59 percent of the females have a desire to stop smoking; and 69 percent of the younger smokers and 64 percent of the older smokers desire to quit.

Suggestions for Further Research

At the same time that external supports weaken, a new challenge is becoming more formidable: Native American child obesity.[79] The data drawn from the Pediatric Nutrition

[79]Mary Story, Karen F. Strauss, Elenora Zephier, Brenda A. Broussard, *Journal of the American Dietetic Association*, 98:2 (Feb 1998), 170-177.

Surveillance System (PedNess) of the Centers for Disease Control identify obesity as a health risk and point to its occurrence as being early in childhood. In the current investigation children under eighteen were excluded. Clearly, any follow-up investigation among the Potawatomi must include a section of the survey that gathers data on the children.

The current study of the Potawatomi tends to confirm national and local findings about diabetes, obesity and lifestyle. If local community intends to continue to investigate health and education issues surrounding diabetes, then it would of considerable value to redesign the survey instrument in at least nine specific areas. The first major change would be to include the medical records of the two hundred respondents, where possible. Second, with respect to the physical activities, the respondents should be given a set of physician administered physical stress tests. Third, the blood pressure, and cholesterol tests, if not current, should be administered by a health physician; 4) the diet questions should be collected from a journal; 5) the education question should be reported by grade completed, not by intervals; 6) genealogical questions should be included; 7) a family and individual income question should be included. Finally the diabetes question (17a-17e) should be reorganized as follows:

17a. Have you been tested for diabetes?

17b. If yes, what was the date of the test?

17c. If yes, what was the result of the test?

17d. If you have not been tested, may we test you now?

17e. If you tested negative, but you were tested over a year ago, may we test you now?

17f. If you have diabetes, who is your attending physician? May we have permission to review your records?

17g. If you have diabetes, are you insulin or non-insulin dependent?

17h. List your parents that have diabetes?

17g. List your children that have diabetes?

The questionnaire should also include a question on the possible health complication: diabetic nephropathy, diabetic retinopathy, lower extremity amputation, periodontal disease, persistent infections; gallbladder disease; cardiovascular disease--ischemic heart disease, hypertension, stroke, diabetes antedating pregnancy, gestational diabetes. Finally, the questionnaire should include a more detailed set of questions on availability of diabetes prevention programs, nutritional programs, and diabetes education programs.

Given that the respondents from this survey were nonreservation dwellers, the importance of national campaigns to reduce fat and cigarette consumption are probably responsible, in part, for the respondents desire to reduce their risky behavior. Consistent with this hypothesis is the general impression that popular culture does not stress the reduction in alcohol consumption, if anything; beer consumption advertisements are the best known on television. To the extent that the respondents to this survey are influenced by pop culture and its trends, then it is not surprising that on the one hand they express a desire to be trendy, that is, reduce fat and cigarette consumption, but when asked to disregard Madison Avenue's alcohol excess campaign, they are unable to recognize the relationship between alcohol and health. What is ominous about such speculations is that it suggests that trends, not education, are the primary movers of U.S. society in general. An additional foreboding is that unless national television joins in the campaign against alcohol, most of those influenced by U.S. television, including Native Americans will continue in the alcohol related risky behavior.

Epilogue

Still Native American community leaders and organizers should take advantage of the opportunity that pop culture is all over them to reduce the fat and cigarette consumption among their people and within their nations. One never can tell; Joe Camel may soon be riding over the TV commercial horizon with the Marboloro Man at the reins coming to join the Budweiser frog at MacDonald's for an egg-Mac-muffin lite.

APPENDIX A: Analytical Models
Three Models for Multivariate Analysis

Model I

VARIABLES	Value Label
Dependent:	
Diabetes	(1 = Diabetic, 0 = Otherwise)
Independent:	
Age	Actual years
Gender	(1 = Female, 0 =Male)
BMI	Actual Body Mass Index

Model II

VARIABLES	Value Label
Dependent:	
Diabetes	(1 = Diabetic, 0 = Otherwise)
Independent:	
Age	Actual years
Gender	(1 = Female, 0 = Male)
BMI	Actual Body Mass Index
Physical Activity	(1 = High, 0 = Otherwise)
	(2 = Medium, 0 = Otherwise)
Diet	(Fat1: 1 = High, 0 = Otherwise)
	(Fat2: 1 = Medium, 0 = Otherwise)

Model III

VARIABLES	Value Label
Dependent:	
Diabetes	(1 = Diabetic, 0 = Otherwise)
Independent:	
Age	Actual years
Gender	(1 = Female, 0 = Male)
BMI	Actual Body Mass Index
Physical Activity	(1 = High, 0 = Otherwise)
	(2 = Medium, 0 = Otherwise)
Diet	(Fat1: 1 = High, 0 = Otherwise)
	(Fat2: 1 = Medium, 0 = Otherwise)
Interaction Terms:	Age*Sex (Age Groups x Gender Interaction)

S1q1 Personal General Health Assessment

Value	Label
1	Excellent
2	Very Good
3	Good
4	Fair
5	Poor

S1q2 Comparative Health Assessment To One Year Ago

Value	Label
1	Much Better Now Than One Year Ago
2	Somewhat Better Now Than One Year Ago
3	About The Same As One Year Ago
4	Somewhat Worse Now Than One Year Ago
5	Much Worse Now Than One Year Ago

S1q3a Vigorous Activities (Running, Lifting Heavy Objects)

Value	Label
1	Yes - Limited A Lot
2	Yes - Limited A Little
3	No - Not Limited At All

S1q3b Moderate Activities (Moving Table, Vacuuming, Bowling)

Value	Label
1	Yes - Limited A Lot
2	Yes - Limited A Little
3	No - Not Limited At All

S1q3c Lifting Or Carrying Groceries

Value	Label
1	Yes - Limited A Lot
2	Yes - Limited A Little
3	No - Not Limited At All

S1q3d Climbing Several Flights Of Stairs

Value	Label
1	Yes - Limited A Lot
2	Yes - Limited A Little
3	No - Not Limited At All

S1q3e Climbing One Flight Of Stairs

Value	Label
1	Yes - Limited A Lot
2	Yes - Limited A Little
3	No - Not Limited At All

S1q3f Bending, Kneeling, Or Stooping

Value	Label
1	Yes - Limited A Lot
2	Yes - Limited A Little
3	No - Not Limited At All

S1q3g Walking More Than One Mile

Value	Label
1	Yes - Limited A Lot
2	Yes - Limited A Little
3	No - Not Limited At All

S1q3h Walking Several Blocks

Value	Label
1	Yes - Limited A Lot
2	Yes - Limited A Little
3	No - Not Limited At All

S1q3j Bathing Or Dressing

Value	Label
1	Yes - Limited A Lot
2	Yes - Limited A Little
3	No - Not Limited At All

S1q3i Walking One Block

Value	Label
1	Yes - Limited A Lot
2	Yes - Limited A Little
3	No - Not Limited At All

S1q4a Cut Down On Amount Of Time Spent Working/Activities

Value	Label
1	Yes
2	No

S1q4b Accomplished Less Than Would Have Liked

Value	Label
1	Yes
2	No

S1q4c Limited In The Kind Of Work/Activities

Value	Label
1	Yes
2	No

S1q4d Difficulty Performing Work/Activities

Value	Label
1	Yes
2	No

S1q5a Cut Down On Amount Of Time Spent Working/Activities

Value	Label
1	Yes
2	No

S1q5b Accomplished Less Than Would Have Liked

Value	Label
1	Yes
2	No

S1q5c Did Not Do Work/Activities As Carefully As Usual

Value	Label
1	Yes
2	No

S1q8 Bodily Pain Interference With Normal Work

Value	Label
1	Not At All
2	A Little Bit
3	Moderately
4	Quite A Bit
5	Extremely

S1q9c Felt So Down That Nothing Would Cheer You Up

Value	Label
1	All Of The Time
2	Most Of The Time
3	A Good Bit Of The Time
4	Some Of The Time
5	A Little Of The Time
6	None Of The Time

S1q9f Felt Down Hearted And Blue

Value	Label
1	All Of The Time
2	Most Of The Time
3	A Good Bit Of The Time
4	Some Of The Time
5	A Little Of The Time
6	None Of The Time

S1q9g Felt Worn Out

Value	Label
1	All Of The Time
2	Most Of The Time
3	A Good Bit Of The Time
4	Some Of The Time
5	A Little Of The Time
6	None Of The Time

S1q9i Felt Tired

Value	Label
1	All Of The Time
2	Most Of The Time
3	A Good Bit Of The Time
4	Some Of The Time
5	A Little Of The Time
6	None Of The Time

S1q10 Physical/Emotional Interference Time - Social Activities

Value	Label
1	All Of The Time
2	Most Of The Time
3	Some Of The Time
4	A Little Of The Time
5	None Of The Time

S1q11a Seem To Get Sick Easier Than Others

Value	Label
1	Definitely True
2	Mostly True
3	Don't Know
4	Mostly False
5	Definitely False

S1q11b Healthy As Anybody I Know

Value	Label
1	Definitely True
2	Mostly True
3	Don't Know
4	Mostly False
5	Definitely False

S1q11c Expect My Health To Get Worse

Value	Label
1	Definitely True
2	Mostly True
3	Don't Know
4	Mostly False
5	Definitely False

S1q11d Health Is Excellent

Value	Label
1	Definitely True
2	Mostly True
3	Don't Know
4	Mostly False
5	Definitely False

S2q1 Most Significant Community Problems - Part1

Value	Label
1	Quality Of The School System
2	Crime
3	Drug Use
4	Job Opportunities And Unemployment
5	Cost Of Health Care
6	Access To Quality Healthcare
7	Other - Nonspecific
8	Don't Know
9	Bad Government
10	Teen Pregnancy
11	Bills/Food
12	Seizures/Pregnancy
13	Settling Of Our Land
14	Poor Parenting

S2q2 Have A Primary Care Provider

Value	Label
1	Yes
2	No
3	Sometimes
4	Don't Know

S2q3 Difficulty Obtaining Health Care Services

Value	Label
1	Yes
2	No
3	Don't Know

S2q5 Unable To Afford Prescriptions

Value	Label
1	Yes
2	No
3	Don't Know

S2q6 Smoke Cigarettes

Value	Label
1	Yes
2	No

S2q8 High Blood Pressure

Value	Label
1	Yes
2	No

S2q8a High Blood Pressure Treatment

Value	Label
1	Yes
2	No

S2q8b Reason For Not Seeking High Blood Pressure Treatment

Value	Label
1	Did Not Know Where To Go For Help
2	Cannot Afford Treatment
3	Other - Nonspecific
4	Don't Know
5	Temporary Condition
6	Did Not Take Time
7	Don't Care

S2q9 Ever Had Blood Cholesterol Checked

Value	Label
1	Yes
2	No

S2q10 High Blood Cholesterol Level

Value	Label
1	Yes
2	No

S2q11 Opinion Of Fat Content In Diet

Value	Label
1	High
2	Medium
3	Low
4	Don't Know

S2q12 Tried To Decrease Fat Content In Diet

Value	Label
1	Yes
2	No

S2q13 Physical Activity/Exercise

Value	Label
1	Less Than One Time Per Week
2	One Or Two Times Per Week
3	3 Times Per Week
4	4 Or More Times Per Week
5	Don't Know

S2q14a Bottles/Cans Of Beer Per Week
S2q16 Desire To Decrease Amount Of Drinking
Value Label
1 Yes
2 No

S2q17a Diabetes/High Blood Sugar
Value Label
1 Yes
2 No

S2q17b On Medication For Diabetes
Value Label
1 Yes
2 No

S2q17d Follow A Diabetic Diet
Value Label
1 Yes
2 No

S2q17e Interested In Learning More About Diabetes Care
Value Label
1 Yes
2 No

S2q18 Rely On Traditional (Native) Forms Of Healing
Value Label
1 Yes
2 No

S2q19a Utilize Traditional Healing Methods
Value Label
1 Always
2 Usually
3 Sometimes
4 Never

S2q20 Health Insurance Incidence In Household

Value	Label
1	No One Living In My Household Has Health Insurance
2	I Have Health Insurance And So Does Everyone Living Here
3	I Have Health Insurance But Others Living Here Do Not
4	I Do Not Have Health Insurance But Others Living Here Do
5	Don't Know

S2q21 Health Insurance Provider - Part1

Value	Label
1	My Employer
2	My Spouse's Employer
3	Me/My Family Pay For Insurance
4	Medicaid
5	Medicare
6	Military
7	Combination
8	Don't Know
9	Contract Health (IHS)
10	Disability
11	Social Security
12	Blue Cross/Blue Shield

S2q22 Monthly Out-Of-Pocket Health Care Expenses

Value	Label
1	None
2	$1 - $100
3	$101 - $200
4	$201 - $300
5	$301 - $400
6	$401 - $500
7	$500 - $600
8	$601 Or More
9	Don't Know

S3q1a Height (Feet)

Measurement Level: Ordinal

S3q1b Height (Inches)

S3q3 Body Frame Size Opinion
Value Label
1 Small
2 Medium
3 Large
4 Don't Know

S3q2 Weight (Pounds)

S3q4 Age

S3q5 Gender
Value Label

1 Male
2 Female

S3q6 Highest Education Level Achieved
Value Label

1 Grade School (Grades 1-5)
2 Middle School (Grades 6-8)
3 High School (Grades 9-12)
4 Some College/College Graduate

Pf Physical Functioning Score
Rp Role-Physical Score
Bp Bodily Pain Score
Gh General Health Score
Vt Vitality Score
Sf Social Functioning Score
Re Role-Emotional Score
Mh Mental Health Score
Pcs Physical Component Summary
Mcs Mental Component Summary

AGEBRK Age Group
Value Label

1.00 16 - 26
2.00 27 - 37
3.00 38 - 45
4.00 46 - 58
5.00 59 - 87
7.00 Na

Rci Response Consistency Index

Rcipct Rci Percentage Consistent Of 15 Checks

1pct Percentage Of Sf-36 Section Completed
Measurement Level: Ordinal

Sfage Age Group
Value Label

1.00 18 - 34
2.00 35 - 54
3.00 > 54
4.00 Other/Na

Bmi Body Mass Index
Measurement Level: Scale

S2q1_R Most Significant Community Problem Part 1 Recoded
Measurement Level: Nominal
Value Label
1 Quality Of School(1)
2 Crime(2)
3 Drug Use(3)
4 Unemployment(4)
5 Health Cost(5)
6 Health Care Access(6)
7 Other(7)
8 Don't Know(8)

S3q6_R Highest Grade Completed Recoded
Measurement Level: Ordinal

Value	Label
1	Recoded To 2
2	1-8grades
3	9-12grades
4	College

S3q6_R2 1-12 And College
Measurement Level: Ordinal

Value	Label
2	1-12 Grades
4	College

S2q10_R1 Had Cholesterol Checked And Was High
Measurement Level: Scale

S2q14a_R Recoded Beers/Wk
Measurement Level: Scale

S2q20_R Recode Household Insurance No Don't Knows
Measurement Level: Nominal

Value	Label
1	No One Living In My Household Has Health Insurance
2	I Have Health Insurance And So Does Everyone Living Here
3	I Have Health Insurance But Other People Living Here Do Not
4	I Do Not Have Health Insurance But Others Do

S2q21_R Recoded Health Insurance Provider No 'Dont Know'
Measurement Level: Scale

S2q22_R Recode Monthly Out-Of-Pocket Health Care Expenses No "Dont Know"
Measurement Level: Scale

Bibliography

Beauvals, Fred. "An annotated bibliography of papers on drug abuse among Indian youth by staff of the Tri-Ethnic Center for Prevention Research." American Indian and Alaskan Native Mental Health Research 5, no.1 (1992): 68-48.

Beauvals, Fred. "Attitudes about drugs and the drug use of Indian youth' 1992. American Indian and Alaskan Native Mental Health Research 5, no. 1 (1992): 38-41.

Beauvals, Fred. "Characteristics of Indian youth and drug use." American Indian and Alaskan Native Mental Health- Research 5, no. 1 (1992): 51-67.

Beauvals, Fred. "Comparison of drug use rates for reservation Indian. non-reservation Indian and Anglo youth." American Indian and Alaskan Native Mental Health Research 5, no. 1(1992): 13-31.

Beauvals, Fred. "The consequences of drug and alcohol use for Indian youth. American Indian and Alaskan Native Mental Health Research 5, no. 1(1992): 32-37.

Beauvals, Fred. "Drug use of friends: A comparison of reservation and non-reservation Indian youth." American Indian and Alaskan Native Mental Health Research. 5, no- 1 (1992): 43-49.

Beauvals, Fred. "Trends in adolescent drug and alcohol use." American Indian and Alaskan Native Mental Health Research. 5, no. 1 (1992): 1-12.

Bennion. Lynn J. and Ting-Kal, Li. "Alcohol metabolism in American Indians and Whites: Lack of racial differences In metabolic rate and liver alcohol dehydrogenase." New Eng J Med 294, no. 1(1 January 1976): 9-13.

Berwick, Donald M. et al "Performance of a five-Item mental health screening test." Medical Care 29, no. 2 (February 1991): 169-176

Bousquet, Jean et al. "Quality of life in asthma: Internal consistency and validity of the SF-36 Questionnaire." American Journal of Respiratory and Critical Care Medicine 149, no 2 (February 1994): 371-375.

Bullinger, Monicka. "German translation and psychometric testing of the SF-36 Health Survey: Preliminary results from the IQOLA Project." Social Science Med 41, no. 10 (1995): 1359-1366.

Bureau of Indian Affairs' "Proposed Finding For Federal Acknowledgment of Huron Potawatomi, Inc" undated; an history included in a tribal grant undated; and a version compiled by Red Elk Banks, at Pine Creek Reservation , Athens, Michigan, July 1993.

Campbell, Gregory R. "The changing dimension of Native American health: A critical understanding of contemporary Native American health issues." American Indian Culture and Research Journal Special Edition Contemporary Issues in Native American Health 13, nos. 3 & 4 (1989): 1-20.

Chen, Yung-Ping. "Improving the economic security of minority persons as they enter old age." In Minority Elders: Longevity, Economics, and Health Building a Public Policy Base. Washington, DC: The Gerontological Society of America. n.d.: 14-23.

"Cigarette smoking among American Indians, Alaskan Natives--behavioral risk factor surveillance System, 1987-1991." JAMA 268, no.21 (2 December 1992): 3052-3055.

"Classification of American Indian race on birth and death certificates--California and Montana." Prepared by the Centers for Disease Control. MMWR 42, no. 12, 22 1-223.

Cunningham, Peter J. and Barbara M Altman. "The Use of Ambulatory Health Care Service by American Indians with disabilities." Medical Care 31, no. 7 (July 1993): 600-616.

Cunningham, Peter J. and Llewellyn J. Cornelius. "Access to ambulatory care for American Indians and Alaskan Natives: The relative importance of personal and community resources." Soc Sci Med 40, no. 3 (1995): 393-407.

Davis, Karen and Diane Rowland. "Uninsured and underserved: Inequities in health care in the United States." Milbank Memorial Fund Quarterly/ Health and Society 61, no. 2 (Spring 1983): 149-176.

Ellis, Jennifer Lowe and Doug Campos-Outcalt. "Cardiovascular Disease Risk Factors Native Americans: A Literature Review." Am J Prev Med 5, no. 10 (September/October 1994): 295-307.

Fryback, Dennis G. "The Beaver Dam Health Outcomes Study: Initial Catalog Of Health-State Quality Factors." Medical Decision Making 31, no. 2 (April-June 1993): 09-102.

Gillum, Richard F. "The Epidemiology Of Stroke In Native Americans." Stroke: A Journal of Cerebral Circulation 26, no. 3 (March 1995): 514-521.

Gohdes, Dorothy. "Diabetes in North American Indians and Alaska Natives." In Diabetes in America. 2nd ed. NIH Publication. No. 95-1468. 1995.

Haley, Stephen M. Collen A. McHorney, and John E. Ware, Jr. "Evaluation of the MOS-36 Physical Function Scale (PF-10): I. Unidimensionality and reproducibiiity of the Rasch Item Scale." Journal of Clinical Epidemiology 47, no. 5 (June 1994): 671-684.

Harris, M.I. Prevalence of Non-Insulin Dependent Diabetes and Impaired Glucose Tolerance. In M.I. Harris and R.F. Hamman (eds.) Diabetes in America, NIH pub No 85-1468, Washington, DHHS, August, 1985.

Health. eds. Gary Don- Sandefur, Ronald R. Rindfuss, and Barry Cohen. Committee on Population. Commission on Behavioral and Social Science and Education, National Research Council. Washington, D.C.: National Academy Press, 1996.

Heath, Gregory W. et al. "Community-Based Exercise and Weight Control: Diabetes Risk Reduction And Glycemic Control In Zuni Indians." Am J Clin Nutr 53 (1991): 1642s-1646s.

Helmrich, Susan B. et al. "Physical activity and reduced occurrence of non-insulin-dependent diabetes mellitus." New Eng J Med 335. no.3 (18July1991): 147-152.

Herman, W.H., S.M. Teutsch, M. Steven and L.S. Geiss. Diabetes Mellitus. In R.W. Amler and H.B. Dull (eds.) Closing the Gap: The Burden of Unnecessary Illness. New York Oxford University Press, 1987.

Jacobson, Alan M., Mary De Groot, and Jacqueline A. Samson. "The evaluation of two measures of quality of life in patients with type land type II diabetes." Diabetes Care 17, no.4 (April 1994); 267-274.

Jette, Diane U. and Jill Downing. "Health status of individuals entering a cardiac rehabilitation program as measured by thc the Medical Outcomes Study 36-Item Short-Form Survey (SF-36)." Phys Ther 74, no. 6 (June 1994): 521-527.

Julius SA. George S., Campbell MJ. Sample sizes for studies using the short form 36 (SF-36). Epidemiological Community Health. 1995; 49:642-4.

Kannel,William B., Ralph B. D'Agastino and Janet L. Cobb. "Effect of weight on cardiovascular disease." Am J Clin Nutr 66 (suppl) (1996): 419s-225s.

Kantz, M. Elizabeth et al. "Methods for assessing condition-specific and generic functional status outcomes after total knee replacement." Medical Care 30 (suppl), no. 5 (May 1992): MS240-MS2S2.

Kappelle, L. Jaap et al. "Prognosis of young adults with Isehemic stroke: A long-term follow-up study assessing recurrent vascular events and functional outcomes in the Iowa Registry of Stroke in Young Adults." Stroke 25, no. 7 (July 1994): 1360-1365.

Katz, Jeffrey N. et al. "Comparative measurement sensitivity of short and longer health status instruments." Medical Care 30, no. 10 (October 1992): 917-925.

Katz, Jeffrey N. et al. "Predictors of functional outcomes after arthroscope partial memiscectomy." Journal of Rheumatology 19, no. 12 (December 1992): 938-1942.

Knowler, William C. et al. "Diabetes mellitus in the Pima Indians: incidence, risk factors, and pathogenesis." Diabetes/Metabolism Reviews 6, no. 1 (1990): 1-27.

Kramer, B. Josea. "Urban American Indian aging." Journal of Cross-Cultural Gerontology 6, no. 2 (April 1991): 205-217.

Krousel-Wood, M. A. and Richard N. Re. "Health status assessment in a hypertension section of an internal medicine clinic" Am J Med Sci 308. no. 4 (October 1994): 211-217.

Krousel-Wood, Marie A. et al. "Predicting work status for patients in an occupational medicine setting who report back pain." Archives of Family Medicine 3 (April 1994): 349-355.

Kunitz, Stephen J. "Fertility, mortality, arid social organization." Human Biology 48. No. 2 (May 1976): 381-377.

Kurtin, Paul S. et al. "Patient-based health status measures in outpatient dialysis; Early experiences in developing outcomes assessment program." Medical Care 30 (suppl), no. 5 (May 1994): MS136-MSI49.

Kutner, Nancy G. et al. "Older adults' perceptions of their health and functioning in relation to sleep disturbance, falling, and urinary incontinence." Journal of the American Geriatrics Society 42, no. 7 (July 1994): 757-762.

Lamarine, Roland J. "Alcohol abuse among Native Americans." Journal of Community Health 13, no. 3 (Fall 1988): 143-155

Lancaster, Tim. et al. "The impact of long-term Warfin Therapy on quality of life: Evidence from a randomized trial." Arch Intern Med 151, no. 10 (October 1991)' 1944-1949.

Lansky, David, J. B. V. Butler, and Frederick T. Waller. "Using health care status measures in a hospital setting: From acute care to 'outpatient management.'" Medical Care 30 (suppl), no. 5 (May 1992): MSS7-MS73.

Lee, Elisa T. et al. "The Strong Heart Study: A study of cardiovascular disease In American Indians: Design and methods." Am J Epidemol 132, no. 6 (1990): 1141-1155

Lerner, Debra J. et al. "Job strain and health-related quality of life in a national sample." Am J Public Health 84, no. 10 (October 1994): 1580-1585.

Levy, Jerrold E. and Stephen J. Kunitz. "A suicide prevention program for Hopi youth." Soc Sci Med 25, no.8 (1987): 931-940.

Lyons, Ronan A., Huw M. Perry, and Beverly N. C. Littlepage. "Evidence for the validity of the short-form 36 questionnaire (SF-36) in an elderly population." Age and Aging 23 (1994): 182-184.

McCarron, David M. and Molly E. Rouser. 'Body weight and blood pressure regulation." Am J C/in Nutr 63 (suppl) (1996): 4235-425S.

McLeod, Jane D. and Michael J. Shanahan. "Poverty, parenting, and children's mental health." ASR 58. no. 3 (June 1993): 351-366

McHorney, Cullen A., Mark Kosinski. and John E. Ware Jr. "Comparisons of the costs and quality of norms for the SF-36 health survey collected by mail versus telephone interview: Results from a national survey." Medical Care 32, no.6 (June 1994): 551-557.

McHorney, Collen A. and John A. Ware. "Construction and validation of an alternate form general mental health scale for the medical outcomes study short-form 36-Item health survey." Medical Care 33, no. 1 (January 1995): 15-28.

McHorney, Collen A. et al. "The MOS 36-Item Short-Form Health Survey (SF-36): Ill. Tests of data quality, scaling, assumptions, and reliability across diverse patient groups." Medical Care 32, no. 1 (January 1994): 40-66.

McHorney, Collen A. et al. "The validity and relative precisions of MOS Short- and Long-Form Health Status Scales and Dartmouth COOP Charts: Results from the Medical Outcome Study." Medical Care 30, no. 5 (May 1992) suppl: MS253-MS265.

Mahoney, Martin C. and Arthur M. Michalek. "A meta-analysis of cancer incidence in United States arid Canadian Native American populations." International Journal of Epidemiology 20, no. 2 (1991): 323-327.

Mangione, Carol M. et al. "Influences of age on measurement of health status in patients undergoing elective surgery." Journal of the American Geriatrics Society 41, no. 4 (April 1993): 377—383

Martin, C., P. Marquis, and S. Bonfils. "A 'quality of life' questionnaire adapted to duodenal ulcer therapeutic trails." Scandinavian Journal of Gastroenterology 29, suppl. 206 (1994): 40-43.

Mason, Jay W. "A comparison of electrophysiologic testing with Holter Monitoring to predict antiarrhythmic-drug efficacy for ventricular tachyarrhythmias" New Eng J Med 329, no. 7 (12 August 1993): 505-507.

Meyer, Klemens B. et al. "Monitoring dialysis patients' health status." American Journal of Kidney Disease s 24, no.2 (August 1994): 267-279.

Nerenz, David M. "Ongoing assessment of health status in patients with diabetes mellitus." Medical Care 30 (suppl), no.5 (May 1992): MS112-MS124.

Newman, Jeffrey M. et al. "End state renal disease among Native Americans, 1983-1986." Am J Public Health 80, no. 3 (March 1990): 318-319.

Nutting, Paul A. et al. "Cancer incidence among American Indians and Alaska Natives, 1980-1987" Am J Public Health 83. no. 1 I (November 1983): 1589-1598.

Osterhaus, Jane I. et al. "Measuring the functional status and well-being of patients with migraine headaches." Headache 34, no. 6 (June 1994) 337-343

Pi-Sunyer, F. Xavier. "Weight and non-insulin-dependent diabetes mellitus." Am JR Clin Nutr 63(suppl) (1996): 426s-429s.

Rampal, P. et al. "A quality of life study in live hundred and eighty-one duodenal patients: Maintenance versus Intermittent treatment with nitzatidine." Scandinavian Journal of Gastroenterology 20 (suppl. 206) (1994): 44-51 on-

Rector, Thomas S., Sofia M. Ormaza. and Spencer H. Kubo. "Health status of heart transplant recipients versus patients awaiting heart transplantation: A preliminary evaluation of the SF-36 Questionnaire," Journal of Heart and Lung Transplantation 12, no. 6 Part I (November/December 1993): 983-986.

Rhoades, Everett Ron- et al. "The burden of illness and future health interventions." Public Health Rep 102. no.3 (July-August 1987): 361-368.

Rowland, Diane and Barbara Lyons. 'Triple Jeopardy: Rural, poor, and uninsured." HSR 23, no. 6 (February 1989): 975-1004.

Rut, Danny A. et al. "Developing a valid and reliable measure of health outcome for patients with low back pain." Spine I9, no. 17(1 September 1994):1887-1896.

Sandefur, Gary D., Ronald H. Rindfuss, and Barney Cohen, eds. Changing Numbers, Changing Needs: American Indian Demography and Public Health. Committee on Population. Commission on Behavioral and Social Sciences and Education. National Research Council. Washington, D.C.:National Academy Press, 1996.

Sandefur, Gary D. and Arthur Sakamoto. "American Indian household structure and income." Demography 25. no. 1 (February 1988): 71-80.

Selvin, Steve. Statistical Analysis of Epidemiological Data- New York: Oxford University Press, 1991.

Siu, Albert L. et al. "Measuring functioning and health in the very old," Journal of Gerontology 48, no. 1 (January 1993): M1O-M14

Spillman, Brenda C. "The impact of being uninsured on utilization of basic health care services." Inquiry 29, no, 4 (Winter 1992): 457-467.

Stewart, AL, Ware JE. Measuring Functioning and Well-Being: The Medical Outcomes Study Approach. Durham, NC: Duke University Press, 1992.

Street, Richard L. William R. Gold, and Tony McDowell. "Using health status surveys in medical consultations." Medical Care 34. no. 7 (July 1994):732-744.

Sugarman, Jonathan R. et al. "Using the behavioral risk factor surveillance system to monitor year 2000 objectives among American Indians." Public Health Rep 107, no 4 (July-August 1992): 449-456.

Sullivan, Marianne, Jan Karlsson, and John E. Ware Jr. "The Swedish SFG-36 Health Survey-- l. Evaluation of data quality, scaling assumptions, reliability, and construct validity across general populations in Sweden." Soc Sci Med 41, no, 5 (1995) 1349-1358.

Vickery, Barbara G. et al. "A health-related quality of life instrument for patients evaluated for epilepsy surgery." Mod/cal Care 30, no. 4 (April 1992): 299-3 19.

Viramontes, Jose Luis and Bernie O'Brien. "Relationship between symptoms and health-related quality of life in chronic lung disease." Journal of General Internal Medicine 9, no. 17 (January 1994): 46-48.

Ware, John E. "Comments on the use of health status assessment in clinical settings." Medical Care. 30 (suppl). no. 5 (May 1992): MS2O5-MS209.

Ware John E., Kosinksi M, Keller SD. SF-36 Physical and Mental Summary Scales: A User's Manual. Boston, MA: The Health Institute, 1994.

Ware, John E. 'The MOS 36-Item Short-Form Health Survey (SF-36)." In Outcomes Assessment in Clinical Practice. eds. Lloyd l. Sederar and Barbara Dickey. Baltimore:Williams and Wilkins: Pub Date Missing. 61-64.

Ware, John E., Snow KK, Kosinski M, Gandek B. SF-36 Health Survey Manual and Interpretation Guide. Boston, MA: New England Medical Center, The Health Institute, 1993.

Ware, John E. Jr. et al. "Evaluating translations of health status questionnaires: Methods from the IQOLA Project." International Journal of Technology Assessment in Health Care 11, no. 3 (Summer, 1995): 525-551.

Ware, John E. Jr. et al. "Comparison of methods for the scoring and statistical analysis of SF-36 health profile and summary measures: Summary of results from the Medical Outcomes Study." Medical Care 33 (suppl), no. 4 (April 1995): AS264-AS279.

Ware, John E. et al. "The SP-36 Health Survey: Development and use in mental health research and the IQOLA Project." Int J Ment Health 23. no.2 (Summer 1994): 49-73.

Weinberger, Morris, 'The relationship between glycemic control and health-related quality of life in patients with non insulin-dependent diabetes mellitus." Medical Care 32, no. 12 (December 1994): 1173-1181.

Weinberger, Morris et al. "An evaluation of a brief health status measure in elderly veterans." Journal of the American Geriatrics Society 39, no. 7 (July 1991): 691-694.

Wells, Kenneth B. "The course of depression in adult outpatients: Results from the medical outcomes study." Arch Gen Psychiatry 49, no. 10 (October 1992): 788-794.

West, Kelly M. "Diabetes in American Indians and other Native American populations of the world." Diabetes 23, no. 10 (October 1974): 841-855.

Wiebel –Orlando, Joan. "Indians. ethnicity as a resource and aging: You can go home again." Journal of Cross-Cultural Gerontology 3, no. 4 (1988): 323-348.

Welty, Thomas K. et al. "Cardiovascular disease risk factors among American Indians: The Strong Heart Study." Am J Epidemol 142. no. 3 (August 1995): 269-287.

Wolf, Anne M. and Graham A. Colitis "Social and economic effects of body weight in the United States." Am Jour C/in Nutr 63 (suppl) (1996): 466s-469s.

Young, T. Kue. "Recent health trends in the Native American population" In Changing Numbers Changing Minds: American Demography and Public.

THESIS PROCESSING SLIP

FIXED FIELD: ill. _____ name _____

index _____ biblio _____

► **COPIES:** (Archives) Aero Dewey Barker Hum

Lindgren Music (Rotch) Science Sche-Plough

TITLE VARIES: ► ☐ _____

_____

_____

NAME VARIES: ► ☐ _____

_____

IMPRINT: **(COPYRIGHT)** _____

_____

► **COLLATION:** _____

_____

► **ADD: DEGREE:** _____ ► **DEPT.:** _____

► **ADD: DEGREE:** _____ ► **DEPT.:** _____

SUPERVISORS: _____

_____

NOTES:

cat'r: date: 9/24

page:

► **DEPT:** _____

► **YEAR:** _____ ► **DEGREE:** _____

► **NAME:** _____

_____