NATIVE AMERICAN ADMIXTURE AND ITS RELATIONSHIP TO NON-INSULIN-DEPENDENT DIABETES MELLITUS

BY

SHARON GAIL BRUCE

A Thesis
Submitted to the Faculty of Graduate Studies
in Partial Fulfillment of the Requirements
for the Degree of

MASTER OF ARTS

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ABSTRACT

The prevalence of non-insulin-dependent diabetes mellitus (NIDDM) among many Native American populations exceeds that of Caucasian populations even though the disease among Native Americans was reportedly rare prior to 1940. Both environmental and genetic factors have been implicated in the etiology of NIDDM. This research was based upon the hypothesis that the prevalence of NIDDM is positively associated with increasing degrees of Native ancestry. Two sources of information were used: (1) demographic archival data from the United States Bureau of the Census for the years 1910 and 1930, and (2) published estimates of NIDDM prevalence. Rank-ordered profiles of standardized admixture rates and diabetes prevalence were constructed for linguistic stock and tribal populations. Spearman's rank correlation coefficient was used to measure joint variation of admixture between the two census years. Pearson's product moment correlation coefficient was used to compare the rank-ordered profiles of the demographic and prevalence data. Wide variation in admixture was observed among linguistic stock and tribal populations. With the exception of a few tribes, rates of admixture increased from 1910 to 1930. Consistency in the census data was evident in the strong and significant correlation in the rates and patterns of admixture between the two enumerations. Analysis of a limited subset of the prevalence data yielded nominal support for the hypothesis. A more thorough testing of the hypothesis was not possible due to the inadequacies of the published prevalence data. Census data proved to be a valuable source of non-genetic data appropriate to admixture analysis. The use of prevalence data in comparative research is severely limited due to the varied methodologies in both the data collection and analysis.

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CHAPTER ONE

INTRODUCTION

The medical history of Native Americans has been described as an " 'unnatural history of disease'...because the epidemiology of Native American people changed under the hegemony of European contact" (Campbell, 1989). Sustained contact with Europeans brought economic disruption, increased violence, epidemics of new diseases, and social disorganization. The combined effects of these factors operating over several hundred years served to reduce population size through increased mortality and changes in marriage and fertility patterns. Recovery from "contact shock" in the form of lower mortality and higher fertility levels began by 1930 (Johansson, 1982). However, the decline in health status which occurred as a result of massive cultural disruption persisted.

Native populations in both Canada and the United States consistently demonstrate higher all-cause mortality rates and lesser life expectancies at birth when compared to their respective general populations. However, the gap in life expectancy is narrowing and as the Native American population ages, in a demographic sense, their disease pattern is becoming similar to that of the general population. Chronic diseases such as cardiovascular disease and diabetes have become major contributors to morbidity and mortality (Rhoades, Hammond, Welty, Handler, & Amler, 1987; Young, 1988).

The prevalence of non-insulin-dependent diabetes mellitus (NIDDM) among many Native American groups exceeds that of Caucasians even though the disease was reportedly rare prior to 1940 (Joslin, 1940; West, 1974; Lee et al., 1985; Wiedman, 1989). By 1982 the rate of diabetes-related mortality among Native Americans and Alaskan

Natives was twice the United States "all race" rate (Ghodes, 1986); for the period 1984-1986 this rate had increased to 2.5 times that of the U.S. "all race" rate (Gohdes, Kaufman & Valway, 1993). This statistic is quite alarming considering the reported rarity of the disease only forty years earlier.

The question then arises: What factors have contributed to the increased incidence of overt NIDDM in Native Americans in such a short period? Many, like Campbell (1989), believe that diabetes is a disease of colonialism and social change; a sedentary lifestyle combined with dietary changes are believed to have led to high levels of obesity (a strong risk factor) and diabetes. However, most researchers agree that lifestyle changes and obesity alone do not account for the increased incidence. Rather, the combined effects of a changed lifestyle superimposed upon a genetic risk are believed necessary contributors to the prevalence witnessed today (Weiss, Ferrell & Hanis, 1984; Megill, Hoy & Woodruff, 1988; Sugarman, Hickey, Hall & Ghodes, 1990; Knowler, Pettitt, Saad & Bennett, 1990).

Epidemiology of Diabetes in Native North American Populations

In 1980 the World Health Organization Expert Committee on Diabetes Mellitus defined the diabetic state as one of chronic hyperglycemia (Ekoe, 1988). Two major types of diabetes exist: insulin-dependent and non-insulin-dependent. Insulin-dependent diabetes mellitus (IDDM), Type I, is characterized by dependence on exogenous insulin to prevent ketoacidosis and death, the presence of antibodies to pancreatic islet cells, and an abrupt onset of symptoms. Non-insulin-dependent diabetes mellitus (NIDDM), Type II, is characterized by ketosis resistance, a lack of islet cell antibodies, initial high

concentrations of insulin, and often an asymptomatic onset (Knowler, Pettitt, Bennett & Williams, 1983). Diabetes in Native North American populations is almost exclusively non-insulin-dependent.

Reports from the National Diabetes Data Group (1979) and the World Health Organization (1980) outlined diagnostic criteria for NIDDM and impaired glucose tolerance (Ekoe, 1988). Because a number of surveys were completed prior to these standardizations of criteria, population comparisons are difficult. Interpretation of survey results is further hampered by the differing sampling techniques and screening procedures utilized. However, even when differing methodologies and diagnostic criteria are considered, significant differences in the prevalence of NIDDM exist between countries, and between different groups within the same country (Zimmett, 1982).

Diabetes among Native American populations was reportedly rare prior to 1940; the prevalence in the majority of Native American populations now exceeds that of Caucasians. The prevalence of NIDDM varies among Native populations (Appendix A), but the pattern of disease is similar (i.e., prevalence is greater in females than males and increases with age, a strong association with obesity is evident, and complications are similar and often severe).

The Pima of Arizona have the highest recorded prevalence and incidence of NIDDM among all populations for which diabetes has been reported. The Pima are also the only group who have participated in a longitudinal study concerning the epidemiology of diabetes. From the start of the study in 1965, to 1988, both the prevalence and incidence of NIDDM have increased (Knowler et al., 1990). The lowest prevalence of

diabetes is found among Natives residing in Alaska, British Columbia, the Yukon and the Northwest Territories. In fact, the prevalence of NIDDM among these Natives is lower than that of non-Natives. However, according to recent surveys, the incidence of diabetes among these groups is increasing as well (Mouratoff, Carroll & Scott, 1967; Mouratoff & Scott, 1973; Schraer, Lanier, Boyko, Ghodes & Murphy, 1988; Young, Szathmary, Evers & Wheatley, 1990; Schraer, Ulkow, Murphy & Lanier, 1993). Although reports of NIDDM among most Native groups are limited and less complete than for the Pima, increasing incidence appears to be the norm rather than the exception (Ghodes, 1986; Gohdes, Kaufman & Valway, 1993).

The disturbing aspect of the high prevalence is the toll the disease takes in the form of vascular complications. In the late 1960s two reports regarding the lack of diabetic complications among Native Americans were presented. Saiki and Rimoin (1968) concluded that "abnormal glucose tolerance appears to be a relatively isolated, benign chemical abnormality in the Navajo". Prosnitz and Mandell (1967) were impressed by the lack of vascular disease in Navajo and Hopi patients with diabetes. They advanced the hypothesis that these groups either had genetic protection from vascular disease or a different type of diabetes than the larger Western population. But diabetes is not a benign disease in any population. West (1974) cautioned that in many Native Americans duration of disease had been short, therefore more "duration-matched data" were needed to assess long-term complications. Duration of disease does appear to be an important factor. Between 1983 and 1986, diabetic nephropathy resulting in end-stage renal disease occurred in Native Americans almost six times more frequently than

among U.S. whites (Newman, Merlin, Eggers & Helgerson, 1990). Megill et al. (1988) report that "the increase and current preponderance of diabetic renal disease in Navajos, all due to type II diabetes, is striking" and new cases are arising at rates ten times that of U.S. whites. Sugarman et al. (1990) state that among the New Mexico Navajo the typical vascular complications of diabetes are important causes of morbidity and mortality. Similar results were obtained in a cross-sectional study of the Hopi and Navajo in Arizona. The frequency of vascular complications such as retinopathy, nephropathy, peripheral neuropathy, and peripheral vascular diseases were all related to duration of diabetes (Rate et al., 1983). Diabetes complications are found in other Native Americans populations as well (Nelson et al., 1988; Everhart, Pettitt, Knowler, Rose, & Bennett, 1988; Macaulay, Montour & Adelson, 1988).

West (1978) claims that the Native American diabetes epidemic began in the 1940s, spread through the 1950s, and became "massive" in the 1960s. Similar increases in diabetes incidence were witnessed in several other populations which underwent similar rapid cultural changes (e.g., Pacific Island populations, Asian populations, and migrant Indian populations)(Zimmett, 1982; Knowler et al., 1983). Over such a short time period, changes in gene frequencies in these populations could not be large enough to account for the observed changes in diabetes incidence. Environmental factors were therefore suspected (Knowler et al.. 1990).

Massive socioeconomic and cultural changes accompanying "westernization" of Native Americans that are believed important to NIDDM include a decrease in physical activity, dietary changes and an attendant increase in obesity. NIDDM is usually

associated with prior obesity in all populations and the degree of obesity and prevalence of diabetes is highly correlated (Weiss et al., 1984). Reports from the early 1900s indicate that Native Americans were generally lean and obesity was uncommon (West, 1974; Wiedman, 1989; Knowler et al., 1990). Obesity is now common in many Native American populations.

West (1978) believed that the main factor responsible for high diabetes prevalence in Native Americans was their "susceptibility to obesity in their present environments". He concluded that the duration of obesity was an important risk factor because rates of diabetes rose with each decade of obesity. While it is generally agreed that obesity is an important determinant of diabetes, there is evidence to suggest that obesity is not solely responsible for the excess prevalence of diabetes in Native American populations.

The incidence of diabetes in the Pima is strongly related to obesity. However, even in leaner Pimas the incidence of diabetes was eight times that of a predominantly Caucasian U.S. comparison population (Knowler, Pettitt, Savage, & Bennett, 1981). Similar results were observed in a study of diabetes prevalence in Mexican Americans. The prevalence of diabetes rose with increasing degrees of obesity, however, within each category of obesity Mexican Americans had significantly higher rates than the Anglo-American comparison population. Further, lean Mexican Americans were found to be at greater risk of diabetes than equally lean Anglo-Americans (Stern, Gaskill, Hazuda, Gardner & Haffner, 1983). The high diabetes prevalence rates in the Nauruans of the South Pacific could neither be solely attributed to the marked obesity witnessed in the population (Zimmet, 1979).

Among the Pima another important risk factor for diabetes is the diabetic status of parents. After adjusting for age and obesity, the diabetes incidence rate was two times as high in Pimas with one diabetic parent and four times as high in Pimas with two diabetic parents than in Pima with non-diabetic parents. In fact, a synergistic relationship between parental diabetes status and obesity was observed. The effect of obesity was greater in those with at least one diabetic parent than in those with both parents non-diabetic (Knowler et al., 1981). Similar results were observed in Oklahoma Natives. After adjusting for age and sex, the risk of diabetes for the obese was two times that for the non-obese. The proportion of diabetic individuals was greatest for obese Natives with one or more diabetic parents (Lee et al, 1985).

The role of physical inactivity and the development of NIDDM is currently being investigated in a number of populations. Some researchers believe that physical activity may offer some protection against the development of NIDDM and that the role of physical inactivity as an independent risk factor may not have been investigated adequately because of the focus on obesity (Zimmett, 1992). Among the Pima, physical activity was found to be independently associated with NIDDM after controlling for current BMI (Body Mass Index), sex, age, and parental diabetes (Kriska et al., 1991).

Another factor which may partially contribute to increased prevalence is increased lifespan. In the United States, life expectancy of Native peoples at birth is approaching that of the United States population as a whole (Rhoades et al., 1987). Thus, the numbers of individuals at risk for chronic diseases will increase as the proportion of individuals in older age categories increases.

The increased prevalence of NIDDM and obesity in Native American populations does not appear to be a case of " 'Westernization' gone out of control" (Weiss et al., 1984, p.169). Rather, the increased prevalence of NIDDM regardless of geographic location and tribal affiliation, the excess prevalence of NIDDM not accounted for by obesity, and the strong association between NIDDM incidence and parental diabetes status suggests a genetic susceptibility which is strongly acted upon by environmental factors (Zimmett, 1982; Weiss et al., 1984; Knowler et al., 1990).

Genetic Susceptibility

Evidence for a genetic susceptibility to NIDDM has been drawn from the longitudinal study of the Pima Indians of Arizona. Among the Pima, frequency distributions of 2-hour plasma glucose concentrations are bimodal (i.e., two overlapping Normal distributions). The first component is comprised of individuals with normal glucose tolerance, while the second component is comprised of individuals with marked glucose intolerance (diabetes). The centre of the distribution is comprised of those who have impaired glucose tolerance (i.e., their plasma glucose concentrations fall between the glucose tolerance values of normal and diabetic individuals).

Bimodality does not mean that individuals are born into and remain in either the first or second component. Rather, the proportion of individuals located in the second component increases with age. Below the age of 25, the majority of individuals are located in the first (normal) component. Thus, a worsening of glucose tolerance occurs with advancing age. However, the points which separate the components vary little with age. Similar bimodal plasma-glucose distributions were reported in the Nauruans of the

South Pacific, another population with a similarly high NIDDM prevalence, and the Seminoles of Oklahoma and Florida. This bimodality is suggestive of a single-gene mode of inheritance (Rushforth, Bennett, Steinberg, Burch & Miller, 1971; Elston, Namboodiri, Nino & Pollitzer, 1974; Zimmett, 1979; Knowler et al., 1990).

The development of NIDDM (i.e., progression to marked glucose intolerance) is due to changes in insulin action and pancreatic function (insulin secretion). Individuals with impaired glucose tolerance demonstrate a reduction in insulin action (i.e., insulin resistance) as measured by the rate of insulin-mediated glucose disposal, but retain normal pancreatic beta-cell secretory function. Thus, hyperinsulinemia and moderate hyperglycemia are evident in these individuals. In diabetics, insulin resistance is still evident but plasma insulin concentrations diminish indicating pancreatic beta-cell secretory deficiency (Lillioja et al., 1988; Knowler et al., 1990).

The events leading to the development of NIDDM in the Pima do not appear to be different from other populations (i.e., hyperinsulinemia, insulin resistance, pancreatic deficiency). However, nondiabetic Pima demonstrate higher fasting insulin concentrations and greater insulin resistance than Caucasian comparison populations, even after adjusting for obesity (Nagulesparen et al., 1982). This increased insulin resistance has been attributed to weight gain, aging, and decreased physical activity. However, Lillioja et al. (1987) found family membership to be a more important determinant of *in vivo* insulin action than any of the above environmental factors, suggesting genetic involvement.

Bogardus et al. (1989) determined the distribution of *in vivo* insulin action among nondiabetic Pima to be a mixture of three overlapping Normal distributions. This

distribution suggested that insulin action (resistance) has a single-gene codominant mode of inheritance.

Further evidence for a genetic risk derives from population studies within which the prevalence of diabetes among subsets with different degrees of native ancestry (also referred to as 'quantum of Indian blood') was compared. If the high prevalence of diabetes in Native Americans is the result of a gene or genes which increase susceptibility to diabetes, then those groups with less Native ancestry would be expected to have lower prevalence of diabetes while groups with the most Native ancestry would be expected to have the highest prevalence (Knowler et al., 1990).

Brosseau, Eelkema, Crawford, and Abe (1979) conducted a retrospective analysis of Indian Health Service clinic records to determine the extent of diabetes among the Affiliated Tribes of North Dakota (Arikara, Mandan, and Hidatsa). A strong hereditary tendency was observed. Among full inheritance Natives (8/8) 22% were diabetic; 15% of those between 4/8 and 8/8 Native ancestry were diabetic; and 4% of those less than 4/8 Native ancestry were diabetic. No noticeable differences in the lifestyles or environments of these groups were evident. The medical records of the Three Affiliated Tribes were reviewed again in 1988. Ninety-two percent (n=195) of 212 diabetics were of greater than one-half Native ancestry. Fifty seven percent (120) claimed full Native ancestry, thirty five percent (75) claimed to have more than half but less than full Native ancestry, and eight percent (17) claimed one-half or less Native ancestry (Brosseau, 1993).

Among the Cherokee of North Carolina, quantum of Indian blood was positively associated with prevalence of NIDDM. The prevalence of NIDDM was higher in those

whose quantum of Indian blood was 50% or greater (Stein, West, Robey, Tirador, & McDonald, 1965). In 1988 the prevalence of NIDDM among the Cherokee was estimated based on previous diagnosis. Prevalence of NIDDM increased with increasing degree of Native ancestry. Of 603 diabetics, 463 (77%) were of greater than one-half Native ancestry. Interestingly, over 60% (373) of the diabetics claimed greater than three-quarter Native ancestry and of the total population only 28% are registered as having that degree of Native ancestry (Farrell et al., 1993). Lee et al. (1985), found that the degree of Native inheritance was significantly higher in diabetic than non-diabetic Oklahoma Natives. Similarly, among diabetic Alaskan Eskimos, Indians and Aleuts, the majority were "full-blooded" (Schraer et al., 1988). Prevalence of NIDDM among the Muskogee Creek Indians of Oklahoma was also highly correlated with known fraction of Amerindian ancestry (Weiss, Moore, Buchanan, Kris-Etherton, & Rusell, 1989). Among the Pima and Papago, Native ancestry was found to have a large effect on NIDDM prevalence - as the fraction of Native American genes increased, the prevalence of NIDDM increased (Knowler, Williams, Pettitt, & Steinberg, 1988).

A portion of the gene pool of Mexican Americans is derived from Native American sources. It is hypothesized that if the excess prevalence of NIDDM in "full-blooded" Native Americans has a genetic component, then diabetes prevalence in Mexican Americans should correspond to the degree of Native American ancestry. Gardner et al. (1984) studied the relationship between diabetes prevalence, obesity and degree of Native American ancestry among Mexican Americans and Anglos in San Antonio, Texas. The prevalence of NIDDM increased as the degree of Native American ancestry increased.

Thus, there appears to be a relationship between the degree of Native ancestry and prevalence of diabetes. However, the results from the above studies must be interpreted as suggestive rather than conclusive for a number of reasons. First, the degree of Native ancestry was not reported for non-diabetics by Brosseau et al. (1979), Schraer et al. (1988), or Brosseau (1993). Second, the reported ancestry for Brosseau et al. (1979), Lee et al. (1985), Gardner et al. (1984), Schraer et al. (1988), Brosseau (1993), and Farrell et al. (1993) was self-reported and may be subject to error. Finally, there may be confounding factors involved. Gardner et al. (1984) found an association between socioeconomic status and degree of native ancestry (the greater the Native ancestry, the lower the socioeconomic status). There may be factors associated with lower socioeconomic status that could also contribute to excess NIDDM.

The most effective way to prove the existence of a diabetes-susceptible genotype would be to have a genetic marker for NIDDM. Because such a marker is not presently available, a less powerful method, genetic admixture analysis, has been utilized (Gardner et al., 1984).

Admixture

Admixture analysis investigates population variability at the genetic level and offers a quantitative estimate of the "proportional contributions of ancestral populations in the formation of hybrid populations" (Chakraborty, 1986). The goals of admixture studies include: (1) clarification of historical affinities between populations; (2) ascertainment of the time of origin of a hybrid group; (3) the relation of the degree of

ancestry to intra-populational variation; and (4) determination of complex disease etiology (Relethford & Lees, 1982; Chakraborty, 1986).

Admixture estimation is conducted utilizing either gene or, more rarely, phenotype frequency data. Gene frequencies are most often derived from serological data (i.e., blood groups, serum proteins, and other genetic markers). Bernstein (cited in Chakraborty, 1986), was the first to use allele frequency data to estimate the accumulated proportional contributions of ancestral stocks in a hybrid population. The basic principles of his model are still applied to all methods of admixture estimation today. These principles are most easily explained for a hybrid population derived from two ancestral stocks, although it also applies to hybrid populations derived from more than two ancestral stocks. Basically, a hybrid population, H, is formed through the contributions of two ancestral populations, A and B. If P(H), P(A), and P(B) denote the frequencies of a particular allele, and m_i denotes the fraction of alleles contributed by population A and $(1-m_i)$ the contribution by population B with

$(0 \leq m_i \leq 1; \Sigma m_i=1)$ then:

$$P(H)=m_iP(A)+(1-m_i)P(B)$$

When the allele frequencies for P(A), P(B), and P(H) are known, m_i can be derived by:

$$m_i=\frac{P(H)-P(B)}{P(A)-P(B)}$$

(Chakraborty, 1986; Williams, Steinberg, Knowler, & Pettitt, 1986).

When a population is formed in this manner, the allele frequencies of the hybrid population will be a linear combination of the two parental frequencies, unless the frequencies are subsequently altered by other evolutionary processes (Long & Smouse, 1983).

The validity of these principles are dependent upon at least two assumptions: (1) the ethnic compositions and allele frequencies of the ancestral populations are known without error; and (2) gene flow is the only process affecting changes in gene frequencies between ancestral and contemporary generations in all populations involved (Chakraborty, 1986).

The confidence placed in admixture analysis depends to a great extent on the degree to which these assumptions have been met, and the validity of the assumptions can only be verified with the use of supporting demographic, cultural, and ethnohistorical data (Chakraborty, 1986). In regard to the first assumption, ethnic composition and allele frequencies of ancestral populations cannot be known without error because ancestral stocks are not available in their original form for survey. Supporting data are necessary for the identification of the geographic origins of ancestral populations, the time of contact between populations, patterns of marriage/mating, etc. Application of gene frequencies from descendants of the ancestral populations are then used in the determination of admixture estimates in the hybrid. Native American admixture studies often use as the estimate for ancestral European frequencies aggregated data based on large samples of Caucasian individuals of Western European origin resident in North America (Szathmary & Reed, 1972; Williams et al., 1985). Only through the use of

supporting data may contemporary populations be chosen which resemble ancestral populations to the degree that they may be used effectively in admixture analysis.

The second assumption asserts that gene flow is the only mechanism affecting changes in gene frequencies between ancestral and contemporary generations. The validity of this assumption has been tested by comparing the closeness of m_i estimates from different alleles and loci for the same population (Chakraborty, 1986). Comparison of m_i estimates from different alleles is based on the expectation that admixture affects all loci equally, therefore the same admixture proportions are expected to apply to all alleles at all loci. However, deviations from this expectation do occur and are attributed to: (1) sampling error, (2) genetic drift, and/or (3) natural selection (Long, 1991).

Genetic drift refers to random fluctuations in allele frequencies from one generation to the next. Drift includes random events such as population reduction through mortality and migration. These events can reduce effective population sizes such that significant departures from the original allele frequencies have occurred (Roberts, 1988; Long & Smouse, 1983). A systematic bias can occur if natural selection acts for or against particular alleles (Long, 1991). Supporting data regarding the history of ancestral and hybrid populations are necessary in determining those processes responsible for observed variation in admixture estimates. Mathematical models have been formulated which account for variation in m_i estimates due to mechanisms such as sampling error and evolutionary processes (Chakraborty, 1986; Long & Smouse, 1983; Long, 1991).

Other methods to increase the validity of the analysis have been suggested. In response to the difficulty of correctly identifying ancestral populations, admixture analysis

has been conducted using only those alleles which are believed to have been present in one ancestral population, A, but not the other, B. The presence of such alleles in the hybrid population, H, can therefore be taken as evidence for admixture and the proportional contribution of population A can then be estimated. The difficulty is not completely resolved as allele frequencies in population A must still be estimated. However, the margin of error may be reduced as only one set of ancestral frequencies is required. Such a procedure requires data from a large number of loci as efficiency of the admixture estimate generally improves the greater the number of loci used (Chakraborty, 1986; Long & Smouse, 1983).

While the presence of alleles in the hybrid population probably indicates admixture, the absence of these alleles does not necessarily indicate the absence of admixture. For example, if the observed frequencies in the ancestral population are themselves low, they may not be observed in the hybrid population even in the event of admixture, especially if the hybrid population sample size is small (Szathmary & Reed, 1972).

Once ancestral populations have been chosen different methods have been suggested to independently assess the validity of the admixture estimate derived by genetic analysis. One method involves the partitioning of the hybrid population into groups that differ in the degree of known ancestry (parents and grandparents). Partitioning by ethnic origin of immediate ancestors provides an approximation to the amount of admixture in the population. Partitioning may be accomplished by directly asking individuals about their ancestry (stated admixture) or by reviewing genealogical

records. A problem arises when individuals are unsure of their ancestry or genealogical records are either incorrect or not of sufficient time depth (Chakraborty, 1986).

Another method involves the use of surnames. Where naming follows an exact mode of transmission surnames act like genetic markers. Although surname analysis is easy, it is also affected by name changes, non-reporting of adoption and non-paternity (Chakraborty, 1986).

Admixture in Native North American Populations

Based on genetic, historical, and cultural data it is believed that admixture in Native American populations is derived primarily from European (Caucasian), Mexican American, and African American sources (Williams et al., 1986). The proportional contribution of these sources varies depending on the Native American population in question.

Beginning in the 1950s researchers began to investigate the distribution of different genetic systems among Native American populations, primarily in an attempt to describe the variation and make inferences about the processes involved in the determination of the distributions (e.g., gene flow, drift, migration, selection). However, very few reports are available in which data could be used to make accurate estimates of admixture primarily due to methodology.

Survey participants are often unrepresentative of the populations from which they are drawn and results are therefore applicable only to the participants themselves. This situation occurs when the numbers involved in a survey are low and a volunteer sample

is used, or if there exists a selection bias (i.e., participants are chosen because they possess a particular characteristic or attribute).

Gershowitz (1959) completed a blood group analysis on 73 Apache outpatients at a community hospital. It would be impossible to state that this group was representative of the population from which they were selected. Pollitzer et al. (1970) and Pollitzer, Namboodiri, Elston, Brown, and Leyshon (1971) conducted blood group analyses on the Seminole Indians of Florida and Oklahoma respectively. Participants for both studies were volunteers who responded to health surveys [n=413 (1970) and n=263 (1971)]. Pollitzer et al. (1970) claim that the 413 volunteers were "believed to be representative of the reservation populations" from which they were drawn. No explanation for this statement was provided.

In a study on admixture in two Canadian Ojibwa populations, Szathmary and Reed (1972) note that portions of both populations were non-resident at the time of sampling. Admixture results therefore applied only to the resident population. Differential migration could have affected the derived estimates in either direction.

Selection bias is also evident as reports are often based on those participants who claim full (8/8) Native ancestry (Workman, Niswander, Brown, & Leyshon, 1974). A blood group analysis of the Cherokee, Choctaw, and Creek of Oklahoma included only those individuals who claimed more than "three-quarters Indian blood". Of the more than 4000 volunteers, results were only reported on the approximately 900 (22.5%) who identified themselves as more then three-quarters Native ancestry (Kasprisin, Crow, McClintock, & Lawson, 1987). Even if it is assumed that the volunteer sample of 4000

individuals represented the distribution of admixture among these three Oklahoma populations, the reported frequencies could not be used to calculate admixture estimates as a great deal of information is missing due to the selection bias. Rokala, Polesky, and Matson (1977) state that the intentional selection of individuals with full, 8/8, Native ancestry biases against the effects of gene flow and "imposes severe restrictions on analysis and interpretation in comparative research".

Another limitation of many of the reports to date concerns the genetic systems that have been selected for analysis. Genetic loci differ in their utility for admixture estimation (Szathmary & Reed,1972; Long & Smouse,1983), thus admixture estimates vary depending upon which systems are used (Suarez, Crouse, & O'Rourke, 1985). The loci which appear to be the most informative are those in which the calculated variances are the smallest and the distance between the allele frequencies of the parental populations is the largest (A-B)(Szathmary & Reed, 1972; Long & Smouse, 1983).

Based on data from a number of Native populations it is generally agreed that the alleles/haplotypes from the following systems were either absent or present in very low frequencies in pre-contact Native populations, and that their presence is indicative of admixture: (1) A_2, B (ABO); (2) Lu^a (Lutheran); (3) r (cde) (Rh); (4) K (Kell); (5) P^c (red cell acid phosphatase); (6) AK^2 (adenylate kinase); (7) Gm allotypes; and (8) ADA^2 (adenosine deaminase) (Suarez, Crouse, & O'Rourke, 1985; Szathmary & Reed, 1972). Of these the Rh and Gm systems appear to be most informative (Szathmary & Reed, 1972). The genetic systems that most studies to date have reported on include: ABO, Rh, MNS, Kell, Duffy and Lewis. Thus, based on the difficulties in methodology (both

sampling and genetic systems chosen for analysis), it is evident that much of the genetic data available is of limited usefulness for admixture analysis in Native North American populations.

Several reports exist which are not hampered by methodological problems and therefore demonstrate the utility of the admixture procedure. Williams et al. (1986) estimated the amount of admixture among a large sample (n=4978) of Pima and Papago using the Gm haplotype Gm $^{3;5,13,14}$. Comparisons of the estimates were made with an independent admixture estimate (stated-admixture). The frequency of the Gm $^{3;5,13,14}$ haplotype was found to increase as the amount of non-Native admixture increased. A strong association between the admixture estimate based on haplotype frequency and that based on reported admixture was found. The authors concluded that this Gm haplotype is a marker for Caucasian admixture in this population.

Williams et al. (1992) used both genetic and demographic analyses to estimate the amount and trace the origins of European-American admixture in the Gila River Indian Community (GRIC) of Arizona. Genetic analysis was completed using the multiallelic weighted least-square (MWLS) procedure on 23 alleles or haplotypes from eight genetic loci. Demographic analysis included questioning individuals about their heritage in regard to admixture from other Native American tribes and admixture from other non-Native populations. The total proportion of European-American alleles in the Gila River Indian Community as estimated through genetic analysis is .054; the proportion as estimated by demographic analysis is .059. The largest proportion of European-American alleles in this community were derived from Mexican-American sources.

Long et al. (1991) completed an analysis on eight genetic loci to determine which populations had contributed to the Mexican American gene pool and their proportional contributions. The major contributors to this Mexican American population were the Spanish and Amerindians. A small amount of African ancestry was also demonstrated by the presence of the Fy allele. Some historical and demographic data was provided to support the conclusions derived from genetic analysis.

Admixture studies have also been completed which attempt to analyze the relationship between the amount of Native American ancestry and chronic disease prevalence. Gardner et al. (1984) examined the prevalence of diabetes in Mexican Americans in relation to the degree of Native ancestry. Genetic admixture calculations were based on Bernstein's equation using skin colour data. Skin colour is predominantly under genetic control and an association between skin colour and gene frequency measures of population differentiation has been established. The medial aspect of the upper arm was chosen to minimize environmental effects. The lower the skin reflectance value the greater the Native American admixture. A positive association between NIDDM prevalence and Native American genetic admixture was found. It was concluded that the proportion of Native American genes may contribute to NIDDM prevalence.

All of the above studies which reported a positive association between prevalence of diabetes and proportion of Native American genes are classified as ecological (i.e., the group rather than the individual is the unit of comparison). Ecological studies are vulnerable to confounding factors because data on individual behaviours that may

influence risk have not been collected (Mausner & Kramer, 1985). For this reason the risk of diabetes in individual Native Americans cannot currently be determined.

An attempt was made to estimate individual admixture in a Mexican American population through genetic analysis and determine individual risk of diabetes and gall bladder disease. No association between individual admixture estimates and either disease was found. The authors concluded that in order for the method to be useful in determining individual risk for disease, those alleles contributing directly to the distribution of the disease must be determined and included in the genetic analysis (Hanis, Chakraborty, Ferrell, & Schull, 1986).

A relationship between the degree of Native ancestry and prevalence of diabetes appears to exist. Because the duration of disease is an important factor regarding the onset of complications, it is useful to determine those at greatest risk so that measures which may either prevent or delay the onset of disease can be identified and implemented. At the present time the practical utility of admixture analysis is questioned because of the untestable assumptions upon which it is based (particularly the correct identification of ancestral populations). Chakraborty (1986) asserts that the difficulties encountered in admixture studies are not insurmountable provided that historical and social data are used along with genetic data. Thus, admixture analysis "should be theorized and implemented in practice as a truly multi-disciplinary approach which combines genetic, epidemiologic,...historical demography...as well as the social sciences".

Statement of the Problem

An association between the degree of Native ancestry and prevalence of diabetes is believed to exist but there is limited genetic data to confirm the hypothesis. Within available demographic data, bearing on ethnicity and marital-household composition, additional data appropriate to admixture analysis may be recovered.

Research Questions

1. What evidence appropriate to admixture analysis can be recovered from demographic and ethnographic archives?
2. Based upon available archival data, what rank-order profiles of admixture among Native North American populations emerge?
3. How does this rank-order reconstruction of admixture compare with or correlate to the rank-ordered prevalence data for NIDDM?

Significance of the Research

The utility of admixture analysis extends beyond the description of the variability between populations in terms of amounts and rates of admixture. Admixed populations provide an opportunity to unravel the roles of environment and heredity in the etiology of complex diseases. Future uses of admixture analyses may include application to the fields of medical anthropology and genetic epidemiology (Chakraborty, 1986). This research explores non-genetic data in an attempt to provide supporting evidence for the hypothesis that an association between admixture and prevalence of NIDDM exists.

Ethical Statement

The materials used in this research included archival documents in the public domain, specifically Reports of the United States Bureau of the Census and published research from the biomedical literature. Confidentiality and anonymity of the individuals within the populations to whom the reports refer are ensured by the methods of reporting utilized by the above data sources. Consultation with thesis committee members ensured that the results and conclusions of this research are consistent with the data used.

CHAPTER TWO

MATERIALS AND METHODS

MATERIALS

The data utilized in this research were derived from two mutually exclusive sources of information. The first consisted of demographic data, related to admixture among Native American populations, derived from publications of the United States Bureau of the Census. The second consisted of a limited subset of published estimates of the prevalence of non-insulin-dependent diabetes mellitus (NIDDM) among Native populations of the United States. Prevalence data, as currently available, have been extracted from the related literature and are presented in Appendix A.

Demographic Data

Population data for American Indians resident within the United States and its regions are collected and maintained by three different bureaus and services within three separate U.S. government agencies: (a) the Bureau of Indian Affairs (U.S. Department of the Interior), (b) the Indian Health Service (U.S. Department of Health and Human Services), and (c) the Bureau of the Census (U.S. Department of Commerce). As the mandates of these bureaus/services differ, so too do the numbers of Indians and types of data reported.

Prior to 1954 administration of Indian affairs was the responsibility of the Indian Office of the Department of War, later to become the Bureau of Indian Affairs (BIA). The Bureau of Indian Affairs remains the major administrative organization dealing with American Indians. The responsibilities of the BIA extend to federally recognized Indians,

living on or near federal reservations. Members of federally recognized tribes living off-reservation or Indians who are not members of a federally recognized tribe are not eligible for the services provided by the BIA. Consequently the number of American Indians reported by the BIA includes only federally recognized Indians living on or near federal reservations (Department of the Interior, 1974; Taylor, 1984).

The Indian Health Service (IHS), which assumed responsibility for health care delivery in 1954, is one of the most important federal divisions other than the BIA that deals specifically with American Indians. The IHS provides health care directly through hospitals and clinics to Indians living on or near federal reservations. The number of Indians reported by the IHS reflects the service/user population only (Department of Health, Education, and Welfare, 1978; Taylor, 1984).

Enumeration of all residents of the United States is the responsibility of the Bureau of the Census. The U.S. Census represents the closest approximation to the total number of Indians in the United States as it includes Indians living on federal reservations, members of federally recognized tribes living off-reservation, Indians who are not members of federally recognized tribes, and any other individuals who identify themselves as 'Indian' (Taylor, 1984). Census data offers the most complete estimate of the total number of Indians living in the United States and therefore is the source of demographic data utilized in this research.

Nature of the Data

The demographic data, specific to admixture analysis, used in this research were derived from 1910 and 1930 U.S. Census reports. The following information regarding

the 1910 Census has been extracted from the report of the United States Department of Commerce (1915).

Data regarding the Indian population in 1910 were obtained through the use of two separate schedules -- the general population schedule and a special schedule. The special schedule included specific questions related to tribal affiliation and degree of Native ancestry or heritage (i.e., "purity of blood") as well as questions from the general schedule. The use of this special schedule marked the first time that a deliberate effort was made to collect census data regarding the degree of Native ancestry in the Indian population (i.e., the proportion of "full bloods" and "mixed bloods"). Because of this effort the data regarding Indian heritage were considered to be the first of their kind of some analytical utility. Enumeration using the special schedule was conducted by special agents who had experience in the Office of Indian Affairs.

Areas in which the special schedules were employed included all districts in which Indians lived on reservations as well as those counties which had reported twenty or more Indians at the census of 1900. Indians who did not reside in areas covered by the special schedule were enumerated on the general population schedule only, and therefore did not provide any information in regard to tribal affiliation and ancestry. However, individuals who identified themselves as 'Indian' on the general population schedule were included in the total number of Indians living in the United States. The total number of Indians reported was 265,683. Data were secured via the special schedule for 247,137 Indians (93%); data regarding the remaining 18,546 Indians were obtained via the general population schedule only.

Individuals counted and reported as 'Indian' included those who claimed full Native heritage ("full bloods") as well as those who claimed mixed heritage ("mixed bloods"), regardless of the degree of mixture (i.e., even if the proportion of 'other' exceeded that of 'Indian'). The "mixed-blood" classification included the following categories: 'White and Indian', 'Negro and Indian', 'White, Negro and Indian', 'other mixtures' and 'mixture unknown'. Mexican Americans, a hybrid population of White, Indian, and African ancestry, were included in the 'White' category, thus the 'White and Indian' category included individuals of either 'White and Indian' or 'Mexican and Indian' heritage.

A further feature of the special schedule was the enumeration of Indians by tribe; 52 linguistic stocks with 208 different tribes were reported in the United States in 1910. Determination of tribal affiliation was easily achieved for individuals reporting full-tribal heritage, however, this was not so for those reporting mixed-tribal status. Enumerators were instructed to count mixed-tribal individuals as members of the father's tribe except if this rule led to "obviously incorrect results" due to the complexity of heritage in both parents (p.71). In such cases assignment of tribal affiliation followed the dominant lineage. If the dominant lineage was undeterminable tribal affiliation was assigned to the "father's father" (p.71).

The 1910 data were organized and reported by geographic division, state, linguistic stock, and tribe. Three age categories were used in data presentation: (a) less than twenty, (b) twenty to fifty years, and (c) 51 years and over. The age distribution of American Indians in 1910 by linguistic stock, tribe, and sex is presented in Appendix B.

The following information regarding the 1930 Census has been extracted from the report of the United States Department of Commerce (1937). Data concerning the Indian population were derived from the general population schedule with one modification -- in place of the question regarding state or country of parents' birth, Indians were asked to provide information regarding degree of Native ancestry and tribal affiliation. Individuals counted and reported as Indian included those with full Native ancestry ("full bloods") and those of mixed ancestry (White and Indian) except if the degree of Indian ancestry was "very small" or if the individual was considered 'White' in his/her community of residence (p.1). Individuals of 'Indian and Negro' ancestry were counted as Negro unless the degree of Indian ancestry was greater, or if the individual was recognized as Indian by his/her community. In contrast to 1910 when special agents collected data from Indians, regular enumerators obtained all information in 1930.

As outlined above, the Indian population of 1910 was assigned to 52 linguistic stocks with 280 tribes. Many of the smaller tribes of 1910 were combined in 1930 resulting in 40 linguistic stocks with 100 different tribes. Direct comparison of the 1910 and 1930 census data is possible as the 1930 census report contains a detailed listing of the 1930 and corresponding 1910 linguistic stock and tribal classifications.

As in 1910, the 1930 data were organized and reported by geographic division, state, linguistic stock, and tribe. Age was reported by standard demographic age cohorts. Age distributions by linguistic stock, tribe, and sex are presented in Appendix C.

Prevalence Data

Prevalence is a measure of the number of individuals in a population who have a disease at a particular point in time. Published reports concerning NIDDM in Native American populations contain two measures of prevalence, point prevalence and period prevalence. Point prevalence refers to the number of existing cases of a disease at a point in time, while period prevalence refers to the number of existing cases of a disease over a specified period of time. Because period prevalence measures disease over a time frame (e.g., one year), it includes both prevalence at a point in time, as well as new and persistent cases. Prevalence is an especially important measure for chronic disease because it can serve as an indicator of the burden of a particular condition in a population (Mausner & Kramer, 1985).

Nature of the Data

The first estimates of NIDDM prevalence in the Native North American population were published in the 1940s and the most recent in the 1990s. The estimates utilized in this research (Appendix A) are primarily point prevalence estimates and were derived from: (a) retrospective analyses of health records, which provided the numbers of living individuals diagnosed as diabetic at the time of the review; or (b) surveys, which allowed for the determination of known and newly diagnosed cases through measurement of participants' blood glucose levels. Estimates derived from both of these methods represent static pictures of the numbers and relative proportions of individuals in the population who had NIDDM at the time the studies were conducted.

Three different measures of elevated blood glucose have been used in the diagnosis of NIDDM - random blood glucose (RBG), fasting blood glucose (FBG), and the oral glucose tolerance test (OGTT). The criteria used for the diagnosis of diabetes mellitus have changed over the years, but recent recommendations for diagnosis by the National Diabetes Data Group (1979) and the World Health Organization (WHO) Study Group on Diabetes Mellitus (1985) are considered standard.

The advantage of determining prevalence through the use of either retrospective analysis or survey is that they are easier and less expensive to complete than longitudinal studies of one population over time. Further, a series of cross-sectional surveys can be completed in order to track changes in disease frequency in a population over time.

METHODS

Data analysis was completed in three stages. The first stage consisted of organization of the census data into a format which permitted for fair intra- and inter-tribal comparisons. Determination of the variables which have the greatest influence on admixture rates was also completed at this stage. In the second stage rank-order profiles of the admixture and the prevalence data were generated. Finally, a comparison of the rank-order profiles of the demographic and prevalence data was attempted.

Organization of the Census Data

A review of the 1910 and 1930 census reports resulted in two decisions regarding data allocation, one of which caused derived admixture rates to be minimum estimates. The first decision concerned population size. Along with the total number of individuals per tribe, the distribution among the selected age categories and an additional category,

'age not reported', was provided. A decision was made to assign those individuals for whom age was not reported to the oldest age categories (i.e., 51+ in 1910 and 75+ in 1930). The assumption behind this decision was that older individuals were more likely to have difficulty assessing their age than were the young. The second decision regarding data allocation concerns admixture status. Along with the total number of admixed individuals per tribe, the number not declaring admixture status was reported. Individuals in the 'admixed not reported' category were assigned to the 'non-admixed' (i.e., "full blood") category. As some of these individuals may have been of mixed ancestry, admixture estimates in this report are necessarily minima.

Direct Standardization and Decomposition

Direct Standardization

One of the primary objectives of this research was to determine and compare rates of admixture by tribe in order to construct a rank-order profile of admixture for the Native American population. The simplest type of rate, appropriate to the data, is the crude rate which measures the number of events (E) in a given population (N):

$$\text{Crude rate} = E/N$$

The crude admixture rate would then be the number of mixed-heritage (admixed) individuals (A) in a given census population (N):

$$\text{Crude admixture rate} = A/N$$

(Technically, the measure of admixture used in this research is not a true rate but a proportion. However, because the methodology was derived in analogy to the analysis of mortality, the term rate will be used throughout this report).

Crude admixture rates do not allow for fair comparisons between populations as each rate is affected by the number of mixed-heritage (admixed) individuals in the population and by the age structure of admixture in the population. As growing numbers of Europeans and Africans and their descendants became established in America increased contact between some Native Americans and Europeans and Africans occurred. As a consequence of this process over time, the likelihood of admixture is greater in the younger than in the older age categories. Thus, the higher the proportion of younger individuals in a given population, the greater is the likelihood for a higher crude admixture rate in that population. In order to make fair comparisons between two or more populations the effects of the differences in age structure must be controlled as far as possible. This control is achieved through a procedure known as direct standardization (Last, 1988). In this procedure, age-specific rates from the population of interest are applied to a population of known age structure, the standard population (Mausner and Kramer, 1985). The directly standardized rate represents the expected admixture rate in the population of interest if this population had the same age structure as the standard population (Last, 1988). Although standardized rates are fictitious rates, fair population comparisons are now possible because the confounding effects of different age distributions in the populations of interest have been removed.

Selection of a suitable standard population was guided by the requirement for characterization of the standard and populations of interest by admixture status. This requirement necessitated the selection of a Native American standard population. Differences in age-categorization by admixture status distinguish the 1910 and 1930

census data, thereby precluding the use of either as a universal standard population. Consequently the total Indian population in each of the census years was used in standardization of linguistic and tribal data for 1910 and 1930, respectively.

Following the argument and procedures for direct standardization by Armitage (1971), the directly standardized admixture rate (a_D) is obtained by applying the age-specific admixture rates in the population of interest (a_i), to the standard population sizes (N_i):

$$a_D = \frac{\Sigma(N_i)(a_i)}{\Sigma(N_i)}.$$

The variance of a_D will then be:

$$var(a_D) = \frac{\Sigma(N_i^2 a_i(1-a_i)/n_i)}{(\Sigma N_i)^2}.$$

where n_i = number within age group (i) in the population of interest.

The standard error of the standardized admixture estimate is the square root of the variance:

$$S.E.(a_D) = \sqrt{var(a_D)},$$

with 95% confidence limits:

$$C.I.(95\%) = a_D \pm 1.96\ S.E.(a_D).$$

Once the standardized rates were obtained, a rank-ordered admixture profile was constructed through the use of an index defined, according to Keyfitz and Flieger (1971),

as the ratio of the standardized admixture rate in the population of interest to the crude admixture rate of the standard population:

$$INDEX_a = \frac{\Sigma((N_i)(a_i)/N)}{\Sigma((N_i)(A_i)/N)}$$

These procedures permitted fair comparisons to be made between linguistic stocks and between tribes within linguistic stocks. Simple sorting on the index allowed for the construction of a tribal rank-order profile by census year.

Another comparison of interest to this research concerned gender-specific differences in admixture within tribes and linguistic stocks. Following again the procedures of Armitage (1971), these analyses began with the determination of age-specific standardized admixture rates by gender. The differences in age-specific rates by gender are given by:

$$d_i = a_{M_i} - a_{F_i},$$

where the subscripts M and F relate to the age-specific rates for males and females of age *i* in the population. Pooling of the weighted age-specific differences yields a weighted mean estimate of *d*:

$$d = \frac{\Sigma N_i(a_{M_i} - a_{F_i})}{\Sigma N_i}.$$

The variance of d is

$$var(d) = \frac{\Sigma N_i^2 var(d_i)}{(\Sigma N_1)^2}$$

where

$$var(d_i) = \frac{(a_{T_i}(1-a_{T_i}))(n_{M_i}+n_{F_i})}{n_{M_i} n_{F_i}}$$

and a_{Ti} = admixed males + females in age-category i/(M_i + F_i). If, in addition to standardization of the male and female subdivisions the total population was standardized, then a_{Ti} = the age-specific admixture rate for the total population.

On the null hypothesis, d/SE(d) can be taken as approximately a standardized normal deviate or its square d^2/var(d) as a X^2 variate (Armitage, 1971).

Decomposition

The difference in crude admixture rates between given and standard populations is due in part to differences in admixture rates and also to differences in age structure. However, interaction between age structure and rates of admixture can occur which limits the ability to allocate the differences between crude admixture rates exclusively to the two variables of interest (i.e., part of the difference in crude admixture rates may be due to interaction between the variables of interest and not only to their individual contributions). In order to gain an understanding of the magnitude of the effects of each of these variables it is essential that the extent of interaction between the variables (if any exists) be determined. The utility of the $Index_a$ in differentiating populations is inversely related

to the extent of interaction between the determining variables (i.e., the greater the interaction the less reliable is the $Index_a$). Decomposition, as outlined by Keyfitz and Flieger (1971), allowed for the determination of interaction and the relative contributions of age- and rate-structures to the difference in crude rates.

The first step in the decomposition process is the calculation of the difference between the crude rates of admixture in a given and standard population:

$$DIFF.C.R. = \frac{\Sigma(N_i)(A_i)}{N} - \frac{\Sigma(n_i)(a_i)}{n}$$

ACOMP.1 is defined as a weighted average of the differences in age composition of the populations. ARATE.1 is defined as a weighted average of the differences in age-specific admixture rates. The sum of ACOMP.1 and ARATE.1 is equal to the difference in crude admixture rates between the given and standard populations (i.e. **ACOMP.1 + ARATE.1 = DIFF. C.R**). Additivity results from the selection of weights from the given and from the standard population, respectively. Thus ACOMP.1 utilizes weights a_i from the given population, whereas ARATE.1 uses weights N_i/N from the standard. Therefore,:

$$ACOMP.1 = \sum (a_i(\frac{N_i}{N} - \frac{n_i}{n}))$$

$$ARATE.1 = \sum (\frac{N_i}{N})(A_i - a_i)$$

If both weights are selected from the standard population, ACOMP.2 and ARATE.2 are derived according to the following:

$$ACOMP.2 = \sum (A_i(\frac{N_i}{N} - \frac{n_i}{n}))$$

$$ARATE.2 = ARATE.1$$

ACOMP.2 and ARATE.2 do not sum to the difference between the crude rates of admixture, the discrepancy being the interaction between the two variables:

$$INTERACTION = (ACOMP.2 + ARATE.2) - DIFF.C.R.$$

Rank Order Profile of Prevalence Data

The first step in the construction of the rank-order profile was a review of all reports included in Appendix A. The major difficulty encountered in the construction of the profile was the relative incomparability of the prevalence data due to variations in: (a) the research designs and methodologies used for data collection, (b) the methods used for data analysis, and (c) the ways in which data have been presented in publication. The great concern regarding preparation of the data for this stage related to its analytical utility in the next stage, the test for association between admixture status and diabetes prevalence. Superficial inspection of the data revealed that they are inappropriate to an

incremental analysis of the relationship between admixture, as an independent variable, and diabetes prevalence due to the variations described above. However, with modification and/or adjustment some of the prevalence data presented the possibility for a statistical test of association.

Modifications/adjustments required of the data are illustrated through the treatment afforded to the prevalences reported by Carter *et al.* (1989) for the Rio Grande Pueblo, Zuni, Navajo, and Apache populations of New Mexico. Estimates of the total population at risk for diabetes in 1987 were projected, methodology not stated, from the 1980 United States Census of American Indians. Based on the 1980 census, the authors assumed an age structure for each of the populations in which 24.9% were aged 35 years and greater. Accordingly, the estimated population at risk for diabetes, 35+ years, was determined by applying the standard proportion to each of the projected total populations. Estimates of the prevalence of diabetes were derived according to the formula: previously diagnosed cases 35+/estimated population at risk 35+.

Inspection of the 1980 census reports for each of these populations indicated appreciable deviations from the assumed standard age distribution (i.e., 24.9% aged 35+), the effect then necessarily concentrated in the denominator of the prevalence equation (i.e., the population at risk). Positive deviations increase the population at risk and, for a constant number of diagnosed diabetics, decrease estimates of prevalence. Negative deviations decrease the population at risk and, for the same number of diabetics, result in higher estimates of diabetes prevalence. Therefore, in this research, the age distribution for the 35+ 1980 census cohort have been used to re-estimate the 35+ population at risk.

Observed number of diabetics, aged 35+ years, by residential unit have been provided by Dr. J. Carter (personal communication, September, 1992). Diabetes prevalence for the 35+ cohort has been recalculated on the basis of the re-estimated population at risk.

Further manipulation of the prevalence data is illustrated through the treatment of Freeman, Hosey, Diehr, and Gohdes (1989). The total populations at risk for diabetes were determined by the American Indian and Alaska Native user populations at each of the IHS health facilities during the three years previous to the study in 1987, and restricted to those resident within 40 miles of the facility. Cases of NIDDM are presented by standard demographic age cohorts and sex. However, the population at risk by standard age cohorts is not presented. Therefore, in this research, the populations at risk, 35+ years, have been estimated from the 1980 census age distributions applied to the reported user population totals.

In other relevant studies, population surveys excepted, determination of the population at risk was based upon either user populations, the population registered at a health facility, or projected from the 1980 census populations. The denominator in the prevalence equation for each of these (i.e., the population at risk 35+ years) was recalculated in accordance with the procedures described above.

The test for correlation (r, the product-moment correlation coefficient) between admixture and diabetes prevalence is based upon: (a) tribal admixture and residential prevalence, and (b) tribal admixture and reconstructed tribal prevalence wherever multiple residential units of the same tribe/linguistic stock have been described. Reconstructed tribal prevalence has been calculated as a weighted mean prevalence, $(N_i/N)p_i$, where:

N_i = the size of population 35+ years within the (i)th residential unit, N = the sum of the individuals at risk over all residential units belonging to a tribal or linguistic community, and p_i = the crude prevalence rate for (i)th residential population at risk.

Survey data used in this research (Pima, Papago, Paiute, Washoe, Cocopah, and Northern Yumans) are based upon the 160 mg/dl threshold. Insufficient numbers of studies following either the NDDG or WHO standard threshold of 200 mg/dl and admitting calculation of the prevalence for the 35+ year population at risk are currently available. The few studies available which permit comparison between the 160 mg and 200 mg thresholds suggest that inflation of prevalence estimates will be of insignificant impact given other liabilities of the data.

Correlation

A non-parametric test, Spearman's rank correlation coefficient was used to measure the joint variation between rates of admixture between the two census years. Following Hassard (1991), the ranks of the variables rather than the original measurements are used. Each population n, contributes measurements for two variables x and y. The variables (x=admixture rank in 1910; y=admixture rank in 1930) are ranked separately (as described previously) and the population-specific rankings are then correlated with one another (i.e., x_1y_1=tribe 1; x_2y_2=tribe 2). The difference between each pair of ranks (i.e., $x_1 - y_1$; $x_2 - y_2$) is calculated, squared and summed:

$$r_s = 1 - \frac{6\sum d^2}{n(n^2-1)}$$

where n = number of populations involved in the analysis.

An attempt was also made to measure the joint variation between rates of admixture and prevalence of diabetes. Pearson's product-moment correlation coefficient was utilized (Hassard, 1991). The correlation coefficient (r) will produce values between +1 and -1, where +1 corresponds to a perfect direct relationship (i.e., the prevalence of diabetes increases/decreases as the rate of admixture increases/decreases), and -1 corresponds to a perfect inverse relationship (i.e., the prevalence of diabetes increases/decreases as the rate of admixture decreases/increases). The sign of the correlation coefficient specifies the direction of the relationship, while the absolute value is a measure of the strength of the relationship. This is also true for Spearman's rank correlation coefficient.

CHAPTER THREE

RESULTS

1910

Standardization

Rankings of the 1910 standardized admixture rates, including 95% confidence limits, are presented by linguistic stock and tribe in Tables 3.1 (p.44) and 3.2 (p.45), respectively. The standardized admixture rates, expressed as percentages, represent the extent of admixture in each population.

Standardized admixture rates by linguistic stock in 1910 ranged from less than one percent, (0.86%), for the Keresan to 66.98% for the Iroquoian. Ten of the twenty-eight stocks (36%) had admixture rates of 50% or greater. The geographic distribution of linguistic stocks in relation to their rankings is worth noting. The first six linguistic stocks listed in Table 3.1 (Keresan, Piman, Zunian, Athapaskan, Tanoan, and Yuman) had admixture rates of 5% or less and are located in the Southwest. The linguistic stocks that had admixture rates of greater than 50% (Maidu, Miwok, Kutenaian, Karok, Wintun, Algonquian, Wiyot, and Iroquoian) were located in areas in which the possibility of contact with non-Natives was greatest (i.e., the East and West Coasts; in the case of the Algonquian and Iroquios early and sustained contact occurred in relation to the fur trade and other historic developments).

The 1910 standardized tribal admixture rates exhibited a wide range from less than one percent for the Hopi (0.15%) to 90.94% for the Virginia/Carolina Indians. Admixture rates for twenty-one of seventy-three tribes (29%) were greater than fifty percent (Table

3.2, p.45). The tribes of the Southwest (Hopi, Navajo, Pima, Maricopa, Cocopa, Mohave, Zuni, Papago, Apache, Northern Yumans, and Yuma) exhibited admixture rates of less than three percent. Of the twenty-one tribes with admixture rates of 50% or greater, sixteen are East or West coast tribes or are members of the Algonquian or Iroquioan linguistic stocks.

TABLE 3.1 STANDARDIZED ADMIXTURE RATE BY STOCK 1910

LINGUISTIC STOCK	DIRECT INDIAN RATE %	UPPER LIMIT	LOWER LIMIT	INDEX
KERESAN	0.86%	1.15%	0.56%	0.02
PIMAN	0.92%	1.13%	0.71%	0.03
ZUNIAN	0.99%	1.49%	0.49%	0.03
ATHAPASKAN	3.33%	3.53%	3.13%	0.09
TANOAN	3.40%	4.05%	2.74%	0.10
YUMAN	5.73%	6.46%	5.00%	0.16
CHIMAKUAN	7.29%	10.34%	4.24%	0.21
SHOSHONEAN	12.30%	12.81%	11.79%	0.35
CADDOAN	14.76%	16.36%	13.17%	0.42
YOKUTS	20.17%	23.61%	16.72%	0.57
POMO	20.33%	22.72%	17.94%	0.58
YUROK	22.94%	26.15%	19.73%	0.65
WASHOAN	23.53%	26.57%	20.50%	0.67
KIOWAN	25.13%	27.56%	22.70%	0.71
SHAPWAILUTAN	26.94%	28.12%	25.75%	0.77
SHASTAN	27.35%	29.53%	25.16%	0.78
SIOUAN	31.69%	32.20%	31.19%	0.90
SALISHAN	36.75%	37.80%	35.70%	1.05
CHINOOKAN	50.13%	53.35%	46.92%	1.43
MUSKHOGEAN	50.49%	51.06%	49.92%	1.44
MAIDU	51.16%	53.93%	48.38%	1.45
MIWOK	53.42%	56.90%	49.94%	1.52
KUTENAIAN	53.87%	57.93%	49.80%	1.53
KAROK	53.99%	57.24%	50.73%	1.54
WINTUN	56.02%	59.50%	52.54%	1.59
ALGONQUIAN	58.81%	59.25%	58.36%	1.67
WIYOT	58.91%	66.33%	51.49%	1.68
IROQUOIAN	66.98%	67.44%	66.52%	1.90

TABLE 3.2 STANDARDIZED ADMIXTURE RATE BY TRIBE 1910

TRIBE	DIRECT INDIAN RATE %	UPPER LIMIT	LOWER LIMIT	INDEX
HOPI	0.15%	0.31%	-0.02%	0.00
NAVAJO	0.41%	0.50%	0.33%	0.01
PIMA	0.46%	0.67%	0.25%	0.01
MARICOPA	0.54%	1.28%	-0.21%	0.02
COCOPA	0.84%	2.02%	-0.34%	0.02
MOHAVE	0.99%	1.63%	0.34%	0.03
ZUNI	0.99%	1.49%	0.49%	0.03
PAPAGO	1.43%	1.80%	1.05%	0.04
APACHE	2.40%	2.78%	2.01%	0.07
NORTHERN YUMANS	2.34%	3.33%	1.36%	0.07
YUMA	2.54%	3.76%	1.32%	0.07
WICHITA/KICHAI	3.55%	5.51%	1.59%	0.10
UTE	5.24%	6.20%	4.29%	0.15
ARAPAHO	8.26%	9.75%	6.77%	0.23
PAIUTE/MONO/PAVIOTSO	11.37%	12.25%	10.49%	0.32
CHEYENNE	11.54%	12.74%	10.35%	0.33
PAWNEE	12.64%	15.26%	10.02%	0.36
OMAHA	12.94%	14.89%	10.99%	0.37
SHOSHONI	14.47%	15.63%	13.31%	0.41
WINNEBAGO	15.78%	17.49%	14.08%	0.45
KIOWA APACHE	15.96%	21.95%	9.97%	0.45
ARIKARA	16.20%	19.61%	12.78%	0.46
CALIF. SHOSHONEANS	17.29%	19.24%	15.34%	0.49
CAYUSE/MOLALA	19.47%	23.86%	15.07%	0.55
SEMINOLE	22.26%	24.22%	20.30%	0.63
YUROK	22.94%	26.15%	19.73%	0.65
HIDATSA	23.02%	26.50%	19.54%	0.65
DIEGUENO	23.24%	26.20%	20.28%	0.66
WASHO	23.53%	26.57%	20.50%	0.67
SAUK/FOX	23.67%	26.74%	20.61%	0.67
MANDAN	23.73%	29.59%	17.86%	0.67
CADDO	24.00%	27.81%	20.20%	0.68
GROS VENTRES	24.53%	28.24%	20.82%	0.70
BANNOCK	24.89%	29.36%	20.41%	0.71
KIOWA	25.13%	27.56%	22.70%	0.71
CROW	25.18%	27.24%	23.12%	0.72
SHAHAPTIANS	25.45%	26.79%	24.11%	0.72
DAKOTA	30.84%	31.44%	30.23%	0.88
IROQUOIS	31.82%	32.86%	30.78%	0.90
KICKAPOO	32.18%	37.01%	27.36%	0.92
COAST SALISH	32.57%	34.01%	31.13%	0.93
COMANCHE	35.64%	38.33%	32.94%	1.01
KLAMATH/MODOC	35.87%	38.86%	32.88%	1.02
CTO/MISSOURI	35.94%	40.94%	30.95%	1.02
OTTAWA	37.68%	39.50%	35.86%	1.07
ASSINIBOIN	39.45%	42.12%	36.79%	1.12
INTERIOR SALISH	40.84%	42.39%	39.29%	1.16
CREEK	42.26%	43.38%	41.15%	1.20
OREGON ATHAPASKAN	45.17%	48.88%	41.47%	1.28
PIEGAN	45.73%	47.70%	43.76%	1.30
PONCA	46.06%	49.20%	42.91%	1.31
QUAPAW	48.18%	54.40%	41.96%	1.37
MENOMINEE	50.89%	53.42%	48.37%	1.45
MAIDU	51.16%	53.93%	48.38%	1.45
CALIF.ATHAPASKAN	51.95%	54.83%	49.08%	1.48
CHOCTAW	52.42%	53.20%	51.65%	1.49
KUTENAI	53.87%	57.93%	49.80%	1.53
ORLEANS	53.99%	57.24%	50.73%	1.54
OSAGE	54.48%	57.07%	51.90%	1.55
SHAWNEE	58.34%	60.91%	55.76%	1.66
HUMBOLDT BAY	58.91%	66.33%	51.49%	1.68
POTAWATOMI	59.93%	61.84%	58.03%	1.70
CHIPPEWA	65.03%	65.67%	64.38%	1.85
KANSA	65.80%	71.80%	59.79%	1.87
DELAWARE/MUNSEE	68.38%	71.22%	65.53%	1.94
CHICKASAW	69.03%	70.53%	67.53%	1.96
ATL. COAST TRIBES	69.36%	71.36%	67.37%	1.97
IOWA	73.86%	79.28%	68.43%	2.10
CHEROKEE	75.52%	76.01%	75.03%	2.15
MIAMI/ILLINOIS	79.59%	83.68%	75.50%	2.26
CATAWBA	89.30%	94.90%	83.71%	2.54
WYANDOT	89.78%	93.01%	86.56%	2.55
VIR./CAROLINA	90.94%	91.66%	90.22%	2.59

Decomposition

Determination of the variable(s) which had the greatest influence on admixture rates was an essential component of the analysis. Beyond errors in the census data two variables may have affected standardized admixture rates: (a) rates of admixture, and (b) age structures in the populations of interest. The relative contributions of these two variables were determined through the decomposition analysis. Decomposition of crude admixture rates by linguistic stock and tribe are reported in Tables 3.3 (p.47) and 3.4 (p.48), respectively.

The second column in Tables 3.3 and 3.4, D.C.R., is the difference in the crude admixture rates between the standard (i.e., 1910 total American Indian population) and given populations. Negative values resulted when the crude admixture rate in the given population was greater than that in the standard population (e.g., Chinookan, Table 2A). The third column, R.C.1, is the weighted average of the difference in age-specific admixture rates and represents that portion of the difference between crude rates that is due to admixture. The difference between the D.C.R. and the R.C.1 (i.e., D.C.R. - R.C.1) represents that portion of the difference due to age structure (i.e., A.C.1, not shown). Inspection of Tables 3.3 and 3.4 reveals that the majority of the difference in crude rates can be accounted for by differences in admixture rates and not differences in age structure.

The fourth column, INT., represents the amount of interaction that occurred between the two variables of interest. The extent of interaction was minimal, ranging from 0.02% (-0.0002) for the Algonquian to 3.70% (-0.0370) for the Wiyot among

linguistic populations (Table 3.3), and 0.0% (0.0000)for the Caddo to 3.70% for the Wiyot among tribal units (Table 3.4). The differences in crude rates between the standard and given populations can therefore be confidently attributed to the relative contributions of each of the variables of interest. The minimal interaction between the variables of interest also assures the reliability of the Index in differentiating populations on the basis of admixture.

TABLE 3.3 -- DECOMPOSITION OF CRUDE RATES BY STOCK 1910

LINGUISTIC STOCK	D.C.R.	R.C.1	INT.
KERESAN	0.3434	0.3430	0.0032
PIMAN	0.3424	0.3424	0.0006
ZUNIAN	0.3426	0.3417	0.0099
ATHAPASKAN	0.3174	0.3183	-0.0071
TANOAN	0.3194	0.3176	0.0073
YUMAN	0.3000	0.2943	0.0113
CHIMAKUAN	0.2862	0.2787	0.0119
SHOSHONEAN	0.2378	0.2286	0.0058
CADDOAN	0.2040	0.2040	-0.0005
YOKUTS	0.1565	0.1499	0.0042
POMO	0.1672	0.1483	0.0051
YUROK	0.1420	0.1222	-0.0044
WASHOAN	0.1440	0.1163	-0.0071
KIOWAN	0.0905	0.1003	0.0028
SHAPWAILUTAN	0.0021	-0.0159	-0.0068
SHASTAN	0.0911	0.0781	-0.0028
SIOUAN	0.0514	0.0347	-0.0037
SALISHAN	0.1106	0.0822	-0.0052
CHINOOKAN	-0.1322	-0.1497	-0.0050
MUSKHOGEAN	-0.1727	-0.1533	0.0042
MAIDU	-0.1402	-0.1600	-0.0109
MIWOK	-0.1520	-0.1826	-0.0168
KUTENAIAN	-0.1744	-0.1871	-0.0051
KAROK	-0.1787	-0.1883	-0.0049
WINTUN	-0.1738	-0.2086	-0.0184
ALGONQUIAN	-0.2348	-0.2365	-0.0002
WIYOT	-0.1813	-0.2375	-0.0370
IROQUOIAN	-0.3319	-0.3182	0.0009

TABLE 3.4 -- DECOMPOSITION OF CRUDE RATES BY TRIBE 1910

TRIBE	D.C.R.	R.C.1	INT.
HOPI	0.3501	0.3501	-0.0025
NAVAJO	0.3472	0.3475	-0.0133
PIMA	0.3471	0.3470	0.0047
MARICOPA	0.3464	0.3462	0.0072
COCOPA	0.3434	0.3432	0.0140
MOHAVE	0.3431	0.3417	0.0236
ZUNI	0.3426	0.3417	0.0099
PAPAGO	0.3371	0.3373	-0.0038
APACHE	0.3284	0.3276	0.0054
NORTHERN YUMANS	0.3303	0.3282	0.0127
YUMA	0.3324	0.3262	0.0185
WICHITA/KICHAI	0.3157	0.3161	-0.0008
UTE	0.3030	0.2992	0.0087
ARAPAHO	0.2755	0.2690	0.0069
PAIUTE/MONO/PAVIOTSO	0.2514	0.2379	0.0067
CHEYENNE	0.2472	0.2362	0.0111
PAWNEE	0.2300	0.2252	0.0007
OMAHA	0.2213	0.2222	-0.0004
SHOSHONI	0.2201	0.2069	0.0052
WINNEBAGO	0.1994	0.1938	0.0064
KIOWA APACHE	0.1933	0.1920	0.0009
ARIKARA	0.1894	0.1896	0.0040
CALIF. SHOSHONEANS	0.1906	0.1787	0.0016
CAYUSE/MOLALA	0.1723	0.1569	0.0024
SEMINOLE	0.1266	0.1290	-0.0026
YUROK	0.1420	0.1222	-0.0044
HIDATSA	0.1194	0.1214	-0.0020
DIEGUENO	0.1254	0.1192	-0.0002
WASHO	0.1440	0.1163	-0.0071
SAUK/FOX	0.1154	0.1149	-0.0014
MANDAN	0.1411	0.1143	-0.0054
CADDO	0.0994	0.1116	-0.0000
GROS VENTRES	0.1183	0.1063	-0.0020
BANNOCK	0.1337	0.1027	-0.0005
KIOWA	0.0905	0.1003	0.0028
CROW	0.1315	0.0998	-0.0086
SHAHAPTIANS	0.1250	0.0971	-0.0030
DAKOTA	0.0633	0.0432	-0.0036
IROQUOIS	0.0356	0.0334	0.0031
KICKAPOO	0.0441	0.0298	-0.0050
COAST SALISH	0.0374	0.0259	-0.0049
COMANCHE	0.0066	-0.0048	-0.0026
KLAMATH/MODOC	0.0254	-0.0071	-0.0152
OTO/MISSOURI	-0.0078	-0.0078	0.0011
OTTAWA	-0.0146	-0.0252	0.0003
ASSINIBOIN	-0.0051	-0.0429	-0.0184
INTERIOR SALISH	-0.0320	-0.0568	-0.0092
CREEK	-0.0755	-0.0710	-0.0030
OREGON ATHAPASKAN	-0.0676	-0.1001	-0.0182
PIEGAN	-0.1127	-0.1057	0.0035
PONCA	-0.1147	-0.1090	0.0025
QUAPAW	-0.1592	-0.1302	0.0129
MENOMINEE	-0.1519	-0.1573	-0.0022
MAIDU	-0.1402	-0.1600	-0.0109
CALIF.ATHAPASKAN	-0.1344	-0.1679	-0.0200
CHOCTAW	-0.1956	-0.1726	0.0059
KUTENAI	-0.1744	-0.1871	-0.0051
ORLEANS	-0.1787	-0.1883	-0.0049
OSAGE	-0.2121	-0.1932	0.0055
SHAWNEE	-0.2456	-0.2318	0.0044
HUMBOLDT BAY	-0.1813	-0.2375	-0.0370
POTAWATOMI	-0.2537	-0.2477	0.0005
CHIPPEWA	-0.2979	-0.2987	-0.0004
KANSA	-0.3501	-0.3064	0.0206
DELAWARE/MUNSEE	-0.3489	-0.3322	0.0059
CHICKASAW	-0.3794	-0.3387	0.0143
ATL. COAST TRIBES	-0.3297	-0.3420	0.0036
IOWA	-0.4025	-0.3870	0.0050
CHEROKEE	-0.4204	-0.4036	-0.0004
MIAMI/ILLINOIS	-0.4484	-0.4443	-0.0005
CATAWBA	-0.5597	-0.5414	0.0056
WYANDOT	-0.5492	-0.5462	-0.0084
VIR./CAROLINA	-0.5578	-0.5578	-0.0090

Through the decomposition procedure the magnitude of the effects of the variables of interest were ascertained (i.e., admixture was isolated as the significant variable). A separate analysis, using the procedures for indirect standardization, was undertaken to determine the extent of the differences in age structures between stocks and tribes (data not shown). An Index of age structure was constructed by applying standard age-specific admixture rates (1910 total American Indian population) to the corresponding age categories of the populations of interest. No significant differences in the age structures among linguistic stocks and tribes were found, confirming admixture as the significant variable determining derived admixture rates.

The age-structure Index just described also proved useful in the comparison of admixture rates by sex within linguistic stocks and tribes. Standard admixture rates were applied to sex-specific age distributions. The purpose of this procedure was to determine if age structure contributed to differences in sex-specific admixture rates. No significant differences in the sex-specific age structures within linguistic stocks and tribes were found, therefore any differences in admixture rates between sexes within linguistic stocks and tribes may not be attributed to differences in age structure.

Differences in Admixture Rates by Sex

Comparisons of standardized admixture rates by sex are reported in Tables 3.5 (p.50) and 3.6 (p.51). Significant differences in admixture rates between the sexes were found in the following linguistic stocks: Athapaskan, Yurok, Washoan, Kiowan, Siouan, Salishan, and Algonquian (Table 3.5). In all cases, except for the Washoans, rates of admixture were greater in males than females. Significant differences in sex-specific

tribal admixture rates were found among the Navajo, Seminoles, Yurok, Washo, Kiowa, Coast Salish, Creek, Choctaw, Chippewa, Chickasaw, and Atlantic Coast Tribes (Table 3.6). With the exception of the Washo and Choctaw, rates of admixture were greater in males than in females.

TABLE 3.5 -- M/F STANDARDIZED ADMIXTURE RATES BY STOCK 1910

LINGUISTIC STOCK	MALE DIRECT RATE %	FEMALE DIRECT RATE %	X^2
KERESAN	0.75%	0.97%	0.5194
PIMAN	0.99%	0.85%	0.6079
ZUNIAN	1.45%	0.52%	3.3394
ATHAPASKAN	3.58%	3.08%	6.0017*
TANOAN	3.52%	3.31%	0.0925
YUMAN	5.97%	5.45%	0.4895
CHIMAKUAN	8.15%	5.91%	0.5067
SHOSHONEAN	12.21%	12.40%	0.1243
CADDOAN	16.14%	13.90%	1.6092
YOKUTS	23.33%	16.63%	3.6232
POMO	20.26%	20.31%	0.0004
YUROK	27.09%	19.16%	5.8488*
WASHOAN	19.98%	27.14%	5.3510*
KIOWAN	28.74%	21.91%	7.5901**
SHAPWAILUTAN	28.15%	25.88%	3.5235
SHASTAN	27.81%	26.85%	0.1813
SIOUAN	32.26%	31.13%	4.8934*
SALISHAN	38.43%	34.95%	10.4555**
CHINOOKAN	52.37%	48.00%	1.7641
MUSKHOGEAN	50.76%	50.17%	1.0245
MAIDU	53.14%	48.86%	2.2661
MIWOK	53.24%	53.72%	0.0183
KUTENAIAN	55.37%	52.11%	0.6150
KAROK	57.04%	50.88%	3.4387
WINTUN	56.63%	55.31%	0.1383
ALGONQUIAN	59.45%	58.13%	8.5926**
WIYOT	61.94%	54.56%	0.8816
IROQUOIAN	67.08%	66.87%	0.1947

* P<.05 **P<.01

TABLE 3.6 -- M/F STANDARDIZED ADMIXTURE RATES BY TRIBE 1910

TRIBE	MALE DIRECT RATE %	FEMALE DIRECT RATE %	X^2
HOPI	0.20%	0.10%	0.3755
NAVAJO	0.54%	0.29%	8.6870**
PIMA	0.66%	0.26%	3.5787
MARICOPA	1.08%	0.00%	2.0317
COCOPA	0.00%	1.73%	2.0794
MOHAVE	0.60%	1.47%	1.7549
ZUNI	1.45%	0.52%	3.3394
PAPAGO	1.36%	1.50%	0.1213
APACHE	2.69%	2.10%	2.2302
NORTHERN YUMANS	2.67%	1.89%	0.6793
YUMA	2.82%	2.24%	0.2218
WICHITA/KICHAI	3.28%	3.77%	0.0591
UTE	4.76%	5.77%	1.0599
ARAPAHO	8.47%	8.03%	0.0831
PAIUTE/MONO/PAVIOTSO	11.67%	11.09%	0.4189
CHEYENNE	11.77%	11.30%	0.1487
PAWNEE	13.86%	11.54%	0.7496
OMAHA	14.02%	11.81%	1.2391
SHOSHONI	14.36%	14.61%	0.0432
WINNEBAGO	16.84%	17.47%	0.1093
KIOWA APACHE	13.92%	17.44%	0.3206
ARIKARA	18.40%	14.29%	1.3800
CALIF. SHOSHONEANS	16.18%	18.55%	1.4131
CAYUSE/MOLALA	21.43%	17.54%	0.7525
SEMINOLE	24.60%	19.79%	5.7743*
YUROK	27.09%	19.16%	5.8488*
HIDATSA	20.39%	26.30%	2.7451
DIEGUENO	24.50%	21.53%	0.9607
WASHO	19.98%	27.14%	5.3510*
SAUK/FOX	22.94%	24.33%	0.1983
MANDAN	26.95%	20.01%	1.3349
CADDO	23.77%	24.29%	0.0182
GROS VENTRES	23.80%	24.86%	0.0777
BANNOCK	23.35%	26.60%	0.5041
KIOWA	28.74%	21.91%	7.5901**
CROW	25.00%	25.36%	0.0290
SHAHAPTIANS	26.27%	24.78%	1.1749
DAKOTA	31.36%	30.31%	2.8724
IROQUOIS	32.76%	30.87%	3.1899
KICKAPOO	35.78%	27.54%	2.7573
COAST SALISH	34.64%	30.23%	8.9439**
COMANCHE	36.40%	35.13%	0.2120
KLAMATH/MODOC	38.17%	33.64%	2.2047
OTO/MISSOURI	37.48%	34.51%	0.5090
OTTAWA	37.65%	37.67%	0.0001
ASSINIBOIN	40.17%	38.48%	0.3839
INTERIOR SALISH	42.02%	39.66%	2.2276
CREEK	43.71%	40.77%	6.6335**
OREGON ATHAPASKAN	46.48%	43.74%	0.5229
PIEGAN	47.68%	43.79%	3.7424
PONCA	47.36%	44.64%	0.7196
QUAPAW	52.91%	43.81%	2.0524
MENOMINEE	52.01%	49.61%	0.8612
MAIDU	53.14%	48.86%	2.2661
CALIF.ATHAPASKAN	54.07%	49.92%	2.0002
CHOCTAW	51.61%	53.23%	4.2343*
KUTENAI	55.37%	52.11%	0.6150
ORLEANS	57.04%	50.88%	3.4387
OSAGE	54.49%	54.44%	0.0003
SHAWNEE	59.32%	57.46%	0.4982
HUMBOLDT BAY	61.94%	54.56%	0.8816
POTAWATOMI	60.36%	59.38%	0.2456
CHIPPEWA	65.70%	64.29%	4.6049*
KANSA	63.97%	65.99%	0.0943
DELAWARE/MUNSEE	70.10%	66.91%	1.2044
CHICKASAW	71.55%	66.86%	9.3071**
ATL. COAST TRIBES	72.08%	66.54%	7.3684**
IOWA	74.29%	73.40%	0.0262
CHEROKEE	75.48%	75.56%	0.0290
MIAMI/ILLINOIS	80.22%	78.95%	0.0890
CATAWBA	88.43%	90.54%	0.1348
WYANDOT	90.39%	89.59%	0.0556
VIR./CAROLINA	91.15%	90.73%	0.3270

* P<.05 **P<.01

1930

Standardization

Rankings of the 1930 standardized admixture rates, including 95% confidence limits, are presented by linguistic stock and tribe in Tables 3.7 (p.53) and 3.8 (p.54), respectively. The range of values observed in 1930 is greater than in 1910. Standardized admixture rates by linguistic stock in 1930 ranged from less than one percent (0.48%) for the Zuni to 82.09% for the Karok (1910; 0.86% to 66.98%). Standardized admixture rates for fourteen of the twenty-eight (50%) linguistic stocks were 50% or greater in 1930 (four more than in 1910). The geographic distribution of the linguistic stocks in 1930 is similar to 1910; the tribes of the Southwest continue among the least admixed (six of the first seven linguistic stocks listed in Table 3.7 are from the Southwest). The difference between the rankings of 1910 and 1930 is that the Yuman and Chimakuan stocks have changed positions; the rate of admixture in the Chimakuans in 1930 is less than in the Yumans. A greater number of linguistic stocks have admixture rates of 50% or greater than in 1910, however, the stocks that were within this range in 1910 are represented again in 1930. Thirteen of the fourteen stocks with admixture rates of 50% or greater are either East or West Coast Tribes, Algonquian, or Iroquoian.

Some major shifts occurred between 1910 and 1930. The Yokuts were ranked 10 in 1910 (20.17% admixed) and 18 in 1930 (58.08%). The Pomo ranked 11 in 1910 (20.33%) and 16 in 1930 (49.76%), the Yurok ranked 12 in 1910 (22.94%) and 20 in 1930 (60.49%), and the Maidu ranked 21 in 1910 (51.16%) and 27 in 1930 (78.38%). Two stocks shifted positions in rank between the years, however, the change in admixture rate was minimal. The Washoans ranked 13 in 1910 (23.53%) and 8 in 1930 (23.67%)

while the Kutenaians ranked 23 in 1910 (53.87%) and 15 in 1930 (49.68%). Standardized tribal admixture rates in 1930 ranged from 0.48% for the Zuni to 95.26% for the Wyandot Table 3.8). Admixture rates of 50% or greater were observed in 34 of 73 tribes (47%) in 1930 [1910: 21 of 73 (29%)]. The admixture rates for the tribes of the southwest were less than 7% with the exception of the Yuma who had a rate of 22.82% which increased from 2.54% in 1910. Twenty-five of the 34 tribes with admixture rates of 50% or greater in 1930 were either East or West Coast tribes, Algonquian, or Iroquoian. Major shifts in ranking occurred in the Yurok which ranked 26 in 1910 (22.94%) and 46 in 1930 (60.49%) and the Virginia/Carolina Indians which ranked 73 in 1910 (90.94%) and 43 in 1930 (55.51%).

TABLE 3.7 -- STANDARDIZED ADMIXTURE RATES BY STOCK 1930

LINGUISTIC STOCK	DIRECT INDIAN RATE %	UPPER LIMIT	LOWER LIMIT	INDEX
ZUNIAN	0.48%	0.74%	0.21%	0.01
KERESAN	1.88%	2.23%	1.54%	0.04
PIMAN	1.99%	2.23%	1.75%	0.05
ATHAPASKAN	3.61%	3.71%	3.50%	0.08
TANOAN	5.24%	5.86%	4.62%	0.12
CHIMAKUAN	10.63%	12.90%	8.35%	0.25
YUMAN	16.81%	17.67%	15.96%	0.40
WASHOAN	23.67%	26.34%	21.00%	0.56
SHOSHONEAN	24.61%	25.10%	24.13%	0.58
CADDOAN	27.75%	29.03%	26.47%	0.65
KIOWAN	28.51%	30.29%	26.72%	0.67
SHASTAN	32.47%	34.82%	30.13%	0.76
SHAPWAILUTAN	42.50%	43.33%	41.68%	1.00
SIOUAN	48.21%	48.53%	47.89%	1.14
KUTENAIAN	49.68%	53.77%	45.60%	1.17
POMO	49.76%	51.71%	47.82%	1.17
MUSKHOGEAN	57.54%	57.85%	57.23%	1.36
YOKUTS	58.08%	59.93%	56.22%	1.37
SALISHAN	58.39%	59.00%	57.77%	1.38
YUROK	60.49%	63.04%	57.94%	1.42
CHINOOKAN	63.14%	65.63%	60.66%	1.49
ALGONQUIAN	65.54%	65.77%	65.30%	1.54
WIYOT	72.49%	75.77%	69.21%	1.71
MIWOK	74.13%	76.22%	72.05%	1.75
WINTUN	75.62%	77.58%	73.66%	1.78
IROQUOIAN	77.16%	77.35%	76.96%	1.82
MAIDU	78.38%	83.32%	73.44%	1.85
KAROK	82.09%	83.64%	80.54%	1.93

TABLE 3.8 -- STANDARDIZED ADMIXTURE RATES BY TRIBE 1930

TRIBE	DIRECT INDIAN RATE %	UPPER LIMIT	LOWER LIMIT	INDEX
ZUNI	0.48%	0.74%	0.21%	0.01
HOPI	0.67%	0.87%	0.47%	0.02
NAVAJO	0.88%	0.94%	0.82%	0.02
PIMA	1.87%	2.22%	1.52%	0.04
PAPAGO	2.07%	2.40%	1.73%	0.05
APACHE	3.50%	3.84%	3.17%	0.08
COCOPA	3.63%	5.77%	1.49%	0.09
MARICOPA	4.16%	5.99%	2.32%	0.10
MOHAVE	4.95%	6.20%	3.70%	0.12
NORTHERN YUMANS	6.20%	7.47%	4.93%	0.15
WICHITA/KICHAI	9.57%	12.19%	6.96%	0.23
UTE	14.34%	15.53%	13.14%	0.34
CAYUSE/MOLALA	17.16%	21.74%	12.57%	0.40
OMAHA	17.18%	18.71%	15.65%	0.40
CHEYENNE	19.85%	20.99%	18.72%	0.47
ARAPAHO	20.16%	21.78%	18.54%	0.47
WINNEBAGO	21.09%	22.42%	19.76%	0.50
SEMINOLE	22.11%	23.37%	20.84%	0.52
YUMA	22.82%	24.17%	21.46%	0.54
SAUK/FOX	22.84%	24.68%	20.99%	0.54
WASHO	23.67%	26.34%	21.00%	0.56
PAIUTE/MONO/PAVIOTSO	26.99%	27.90%	26.07%	0.64
CADDO	28.14%	30.55%	25.73%	0.66
KIOWA	28.51%	30.29%	26.72%	0.67
KIOWA APACHE	29.28%	33.84%	24.72%	0.69
PAWNEE	29.39%	31.54%	27.24%	0.69
SHOSHONI	30.45%	31.48%	29.41%	0.72
SHAHAPTIANS	33.16%	34.17%	32.16%	0.78
CALIF. SHOSHONEANS	33.98%	37.57%	30.39%	0.80
MANDAN	35.73%	39.23%	32.22%	0.84
ARIKARA	37.56%	40.49%	34.63%	0.88
CROW	39.24%	40.76%	37.73%	0.92
BANNOCK	39.69%	43.01%	36.37%	0.93
HIDATSA	40.14%	42.69%	37.59%	0.95
OTO/MISSOURI	41.60%	43.94%	39.27%	0.98
CREEK	43.29%	43.94%	42.64%	1.02
DIEGUENO	43.73%	47.47%	39.98%	1.03
COAST SALISH	45.68%	46.67%	44.69%	1.08
DAKOTA	47.31%	47.70%	46.92%	1.11
KUTENAI	49.68%	53.77%	45.60%	1.17
KICKAPOO	49.94%	52.68%	47.21%	1.18
IROQUOIS	53.76%	54.51%	53.01%	1.27
VIR./CAROLINA	55.51%	55.99%	55.03%	1.31
COMANCHE	55.54%	57.11%	53.96%	1.31
GROS VENTRES	57.18%	59.36%	54.99%	1.35
YUROK	60.49%	63.04%	57.94%	1.42
POTAWATOMI	61.64%	63.03%	60.25%	1.45
ASSINIBOIN	61.67%	63.01%	60.34%	1.45
KLAMATH/MODOC	63.15%	64.36%	61.94%	1.49
SHAWNEE	63.22%	64.86%	61.57%	1.49
PIEGAN	64.67%	65.61%	63.74%	1.52
OTTAWA	64.72%	66.11%	63.34%	1.52
CHOCTAW	64.97%	65.35%	64.58%	1.53
CALIF.ATHAPASKAN	66.37%	67.97%	64.77%	1.56
INTERIOR SALISH	68.38%	69.09%	67.66%	1.61
IOWA	68.71%	72.67%	64.75%	1.62
QUAPAW	69.15%	71.99%	66.31%	1.63
KANSA	69.27%	71.55%	66.98%	1.63
HUMBOLDT BAY	72.49%	75.77%	69.21%	1.71
CHICKASAW	72.61%	73.25%	71.98%	1.71
OSAGE	72.88%	73.87%	71.89%	1.72
OREGON ATHAPASKAN	74.10%	76.21%	71.98%	1.75
PONCA	74.31%	75.78%	72.84%	1.75
MENOMINEE	74.65%	75.69%	73.60%	1.76
DELAWARE/MUNSEE	76.53%	77.78%	75.27%	1.80
MAIDU	78.38%	83.32%	73.44%	1.85
CHIPPEWA	79.49%	79.78%	79.21%	1.87
CHEROKEE	80.65%	80.84%	80.46%	1.90
ORLEANS	82.09%	83.64%	80.54%	1.93
ATL. COAST TRIBES	90.59%	91.29%	89.90%	2.13
MIAMI/ILLINOIS	91.03%	92.10%	89.95%	2.14
CATAWBA	91.28%	92.25%	90.32%	2.15
WYANDOT	95.26%	95.78%	94.74%	2.24

Decomposition

Decomposition of crude rates by linguistic stock and tribe are presented in Tables 3.9 and 3.10 (p.56), respectively. The results of the decomposition procedure on the 1930 data are similar to those of the 1910 data. Admixture accounted for the majority of the difference in crude rates between the standard (1930 total American Indian population) and given populations. Interaction between the variables was minimal ranging from 0.02% for the Caddo to 2.58% for the Yurok (Table 3.9), and 0.00% for the Ponca to 2.58% for the Yurok (Table 3.10). With such low levels of interaction, the reliability of the 1930 Index is assured.

TABLE 3.9 -- DECOMPOSITION OF CRUDE RATES BY STOCK 1930

LINGUISTIC STOCK	D.C.R.	R.C.1	INT
ZUNIAN	0.4199	0.4197	-0.0084
KERESAN	0.4066	0.4057	-0.0082
PIMAN	0.4059	0.4046	-0.0087
ATHAPASKAN	0.3881	0.3884	0.0072
TANOAN	0.3753	0.3721	-0.0016
CHIMAKUAN	0.3312	0.3182	-0.0070
YUMAN	0.2706	0.2564	-0.0039
WASHOAN	0.2194	0.1878	0.0040
SHOSHONEAN	0.1922	0.1784	-0.0010
CADDOAN	0.1451	0.1470	-0.0002
KIOWAN	0.1283	0.1394	-0.0059
SHASTAN	0.1342	0.0998	0.0107
SHAPWAILUTAN	0.0171	-0.0005	0.0040
SIOUAN	-0.0513	-0.0576	0.0029
KUTENAIAN	-0.0285	-0.0723	0.0186
POMO	-0.0427	-0.0731	0.0137
MUSKHOGEAN	-0.1631	-0.1509	-0.0027
YOKUTS	-0.1345	-0.1563	0.0079
SALISHAN	-0.1456	-0.1594	0.0046
YUROK	-0.1403	-0.1804	0.0258
CHINOOKAN	-0.2030	-0.2070	-0.0053
ALGONQUIAN	-0.2344	-0.2309	0.0008
WIYOT	-0.2619	-0.3004	0.0199
MIWOK	-0.3006	-0.3168	0.0083
WINTUN	-0.3118	-0.3317	0.0064
IROQUOIAN	-0.3542	-0.3471	0.0009
MAIDU	-0.3605	-0.3593	-0.0079
KAROK	-0.3755	-0.3964	0.0058

TABLE 3.10 -- DECOMPOSITION OF CRUDE RATES BY TRIBE 1930

TRIBE	D.C.R.	R.C.1	INT
ZUNI	0.4199	0.4197	-0.0084
HOPI	0.4180	0.4178	-0.0067
NAVAJO	0.4154	0.4157	0.0107
PIMA	0.4074	0.4058	-0.0118
PAPAGO	0.4047	0.4038	-0.0062
APACHE	0.3905	0.3895	-0.0077
COCOPA	0.3841	0.3882	0.0152
MARICOPA	0.3858	0.3829	-0.0092
MOHAVE	0.3835	0.3750	-0.0126
NORTHERN YUMANS	0.3672	0.3625	-0.0190
WICHITA/KICHAI	0.3345	0.3288	0.0022
UTE	0.2886	0.2811	-0.0038
CAYUSE/MOLALA	0.2788	0.2529	0.0051
OMAHA	0.2531	0.2527	0.0055
CHEYENNE	0.2375	0.2260	-0.0035
ARAPAHO	0.2279	0.2229	0.0004
WINNEBAGO	0.2150	0.2136	0.0019
SEMINOLE	0.2018	0.2034	0.0016
YUMA	0.2185	0.1963	0.0042
SAUK/FOX	0.1990	0.1961	0.0031
WASHO	0.2194	0.1878	0.0040
PAIUTE/MONO/PAVIOTSO	0.1757	0.1546	0.0005
CADDO	0.1365	0.1431	-0.0053
KIOWA	0.1283	0.1394	-0.0059
KIOWA APACHE	0.1201	0.1317	-0.0048
PAWNEE	0.1271	0.1306	0.0019
SHOSHONI	0.1441	0.1200	0.0044
SHAHAPTIANS	0.1084	0.0929	-0.0007
CALIF. SHOSHONEANS	0.1142	0.0847	0.0149
MANDAN	0.0739	0.0672	0.0082
ARIKARA	0.0554	0.0489	0.0063
CROW	0.0440	0.0321	0.0075
BANNOCK	0.0606	0.0276	0.0128
HIDATSA	0.0154	0.0231	-0.0046
OTO/MISSOURI	-0.0045	0.0085	0.0057
CREEK	-0.0123	-0.0084	0.0005
DIEGUENO	0.0052	-0.0128	-0.0006
COAST SALISH	-0.0236	-0.0323	-0.0003
DAKOTA	-0.0379	-0.0486	0.0044
KUTENAI	-0.0285	-0.0723	0.0186
KICKAPOO	-0.0688	-0.0749	0.0048
IROQUOIS	-0.1100	-0.1131	-0.0008
VIR./CAROLINA	-0.1368	-0.1306	0.0114
COMANCHE	-0.1272	-0.1309	0.0043
GROS VENTRES	-0.1413	-0.1473	0.0080
YUROK	-0.1403	-0.1804	0.0258
POTAWATOMI	-0.1888	-0.1919	-0.0006
ASSINIBOIN	-0.1796	-0.1922	0.0085
KLAMATH/MODOC	-0.1935	-0.2070	0.0060
SHAWNEE	-0.2069	-0.2077	0.0011
PIEGAN	-0.2267	-0.2222	-0.0006
OTTAWA	-0.2145	-0.2227	-0.0003
CHOCTAW	-0.2407	-0.2252	-0.0033
CALIF.ATHAPASKAN	-0.2194	-0.2392	0.0071
INTERIOR SALISH	-0.2418	-0.2593	0.0084
IOWA	-0.2687	-0.2626	-0.0076
QUAPAW	-0.2827	-0.2670	-0.0093
KANSA	-0.2988	-0.2682	-0.0198
HUMBOLDT BAY	-0.3118	-0.3317	0.0064
CHICKASAW	-0.3188	-0.3016	-0.0056
OSAGE	-0.3161	-0.3043	-0.0031
OREGON ATHAPASKAN	-0.2997	-0.3165	0.0080
PONCA	-0.3242	-0.3186	-0.0000
MENOMINEE	-0.3226	-0.3220	0.0001
DELAWARE/MUNSEE	-0.3417	-0.3408	0.0005
MAIDU	-0.3605	-0.3593	-0.0079
CHIPPEWA	-0.3723	-0.3704	0.0016
CHEROKEE	-0.3900	-0.3820	0.0021
ORLEANS	-0.3755	-0.3964	0.0058
ATL. COAST TRIBES	-0.4787	-0.4814	-0.0076
MIAMI/ILLINOIS	-0.4910	-0.4858	-0.0001
CATAWBA	-0.5153	-0.4883	-0.0140
WYANDOT	-0.5273	-0.5281	0.0010

Differences in Admixture Rates by Sex

Sex-specific standardized admixture rates for 1930 by linguistic stock and tribe are found in Tables 3.11 (p.58) and 3.12 (p.59), respectively. Analysis of sex-specific age structure revealed no significant differences within linguistic stocks and tribes. Significant differences in admixture rates between the sexes were detected in the following linguistic stocks: Washoan, Shastan, Shapwailutan, Yokuts, and Salishan (Table 3.11). Among this group rates of admixture were greater in males than in females for all stocks with the exception of the Washoans. Tribes in which significant sex-specific differences in admixture rates were found include the Navajo, Pima, Cocopa, Washo, Diegueno, Virginia/Carolina Indians, California Athapaskans, and Catawba (Table 3.12). With the exception of the Washo, Virginia Carolina Indians, California Athapaskans, and the Catawba, rates of admixture were greater in males than females. There were two linguistic stocks in which significant differences in admixture rates between the sexes were found in both 1910 and 1930 -- Washoan and Salishan. Similarly, significant differences in admixture rates between males and females were found in the Navajo and Washo tribes in both 1910 and 1930.

TABLE 3.11 -- M/F STANDARDIZED ADMIXTURE RATES BY STOCK 1930

LINGUISTIC STOCK	MALE DIRECT RATE %	FEMALE DIRECT RATE %	X^2
ZUNIAN	0.52%	0.42%	0.0905
KERESAN	2.17%	1.72%	1.0269
PIMAN	2.08%	1.90%	0.3558
ATHAPASKAN	3.72%	3.48%	2.0992
TANOAN	4.80%	5.76%	1.4757
CHIMAKUAN	10.27%	10.80%	0.0232
YUMAN	17.35%	16.25%	0.9029
WASHOAN	19.08%	27.71%	5.9094*
SHOSHONEAN	24.71%	24.49%	0.0935
CADDOAN	28.79%	26.62%	1.3165
KIOWAN	29.58%	27.61%	0.5150
SHASTAN	37.42%	26.54%	10.0954**
SHAPWAILUTAN	43.89%	41.23%	4.5708*
SIOUAN	48.47%	47.95%	1.0794
KUTENAIAN	50.08%	48.81%	0.0423
POMO	50.27%	48.73%	0.2695
MUSKHOGEAN	57.23%	57.86%	1.3708
YOKUTS	60.92%	54.96%	4.1930*
SALISHAN	59.44%	57.34%	4.2691*
YUROK	62.50%	57.36%	1.3776
CHINOOKAN	64.39%	61.24%	0.5818
ALGONQUIAN	65.60%	65.44%	0.1602
WIYOT	71.83%	70.07%	0.0835
MIWOK	77.06%	70.95%	2.5952
WINTUN	77.04%	73.48%	0.9078
IROQUOIAN	76.87%	77.47%	2.6441
MAIDU	76.35%	74.64%	0.0390
KAROK	83.84%	80.87%	1.2502

*P<.05 **P<.01

TABLE 3.12 -- M/F STANDARDIZED ADMIXTURE RATES BY TRIBE 1930

TRIBE	MALE DIRECT RATE %	FEMALE DIRECT RATE %	X^2
ZUNI	0.52%	0.42%	0.0905
HOPI	0.60%	0.74%	0.1905
NAVAJO	0.97%	0.77%	4.5028*
PIMA	2.37%	1.42%	4.8689*
PAPAGO	1.85%	2.28%	1.1469
APACHE	3.68%	3.36%	0.4719
COCOPA	5.01%	0.00%	5.2174*
MARICOPA	2.94%	5.73%	1.3483
MOHAVE	5.37%	4.42%	0.3268
NORTHERN YUMANS	5.07%	7.39%	1.2578
WICHITA/KICHAI	10.95%	7.89%	0.7571
UTE	15.12%	13.57%	0.9145
CAYUSE/MOLALA	18.00%	16.82%	0.0427
OMAHA	16.36%	17.68%	0.3294
CHEYENNE	19.92%	19.81%	0.0049
ARAPAHO	21.10%	18.82%	0.9938
WINNEBAGO	20.99%	21.01%	0.0001
SEMINOLE	22.45%	21.58%	0.2310
YUMA	22.65%	23.02%	0.0433
SAUK/FOX	22.17%	24.25%	0.5134
WASHO	19.08%	27.71%	5.9094*
PAIUTE/MONO/PAVIOTSO	27.31%	26.60%	0.3010
CADDO	27.00%	29.11%	0.3605
KIOWA	29.58%	27.61%	0.5150
KIOWA APACHE	29.41%	27.26%	0.1214
PAWNEE	29.90%	28.76%	0.1281
SHOSHONI	30.95%	49.32%	2.3597
SHAHAPTIANS	34.11%	32.37%	1.3400
CALIF. SHOSHONEANS	34.05%	33.80%	0.0025
MANDAN	36.64%	36.61%	0.0000
ARIKARA	42.25%	32.60%	4.4387*
CROW	40.72%	37.91%	1.4138
BANNOCK	42.83%	36.64%	1.5313
HIDATSA	37.94%	41.21%	0.5740
OTO/MISSOURI	43.49%	40.25%	0.6555
CREEK	43.18%	43.41%	0.0512
DIEGUENO	49.46%	36.68%	4.6132*
COAST SALISH	47.03%	44.38%	2.8826
DAKOTA	47.43%	47.23%	0.1102
KUTENAI	50.08%	48.81%	0.0423
KICKAPOO	49.33%	51.34%	0.2155
IROQUOIS	54.13%	53.47%	0.3035
VIR./CAROLINA	53.83%	56.69%	9.9214**
COMANCHE	54.01%	56.82%	1.1475
GROS VENTRES	55.57%	58.73%	0.6851
YUROK	62.50%	57.36%	1.3776
POTAWATOMI	61.10%	62.14%	0.2126
ASSINIBOIN	61.99%	61.70%	0.0152
KLAMATH/MODOC	65.02%	61.28%	3.2655
SHAWNEE	64.06%	62.67%	0.2486
PIEGAN	64.80%	64.62%	0.0114
OTTAWA	64.37%	65.07%	0.0944
CHOCTAW	64.62%	65.37%	1.0661
CALIF.ATHAPASKAN	63.18%	68.87%	4.1948*
INTERIOR SALISH	69.07%	67.75%	1.1066
IOWA	70.19%	65.62%	0.4620
QUAPAW	71.95%	65.98%	1.0797
KANSA	71.25%	67.96%	0.5245
HUMBOLDT BAY	71.83%	70.07%	0.0835
CHICKASAW	72.38%	72.85%	0.1276
OSAGE	74.04%	71.47%	1.8650
OREGON ATHAPASKAN	75.78%	73.45%	0.3671
PONCA	72.15%	76.48%	2.3759
MENOMINEE	74.83%	74.74%	0.0022
DELAWARE/MUNSEE	76.81%	76.29%	0.0415
MAIDU	76.35%	74.64%	0.0390
CHIPPEWA	79.95%	78.98%	3.2046
CHEROKEE	80.34%	81.00%	3.0535
ORLEANS	83.84%	80.87%	1.2502
ATL. COAST TRIBES	90.82%	89.54%	0.9584
MIAMI/ILLINOIS	93.54%	88.15%	2.1193
CATAWBA	81.81%	94.82%	10.3404**
WYANDOT	97.11%	93.00%	3.7285

*P<.05 **P<.01

Comparisons of 1910 and 1930

Standardized Admixture Rates - 1910 and 1930

Comparisons of standardized admixture rates for 1910 and 1930 by linguistic stock and tribe are presented in Tables 3.13 (p.61) and 3.14 (p.62), respectively. Both the linguistic stocks and tribes were sorted first on their respective 1930 Indices, with the secondary sort field defined as the 1910 Index. The Indices in Tables 3.13 and 3.14 are reported to two decimal places, however, the distinction between stocks and tribes was sometimes made on the basis of the fourth or fifth decimal place. Changes in admixture rates and ranking which occurred over the twenty year period from 1910 to 1930 are evident in these tables (e.g., Zuni were the least admixed linguistic stock and were ranked first in 1930, whereas in 1910 the Zuni were ranked third behind the Keresan and Pima). In all linguistic stocks the standardized admixture rates increased from 1910 to 1930 with the exception of the Zuni and Kutenaians. Likewise, admixture rates increased in all tribes from 1910 to 1930 with the exception of the Zuni, Cayuse/Molala, Kutenai, Virginia/Carolina Indians and the Iowa.

TABLE 3.13 -- RANK ORDERED STANDARDIZED RATES BY STOCK 1910/1930

LINGUISTIC STOCK	1930 DIRECT INDIAN RATE %	1910 DIRECT INDIAN RATE %	1930 INDEX	1910 INDEX
ZUNIAN	0.48%	0.99%	0.01	0.03
KERESAN	1.88%	0.86%	0.04	0.02
PIMAN	1.99%	0.92%	0.05	0.03
ATHAPASKAN	3.61%	3.33%	0.08	0.09
TANOAN	5.24%	3.40%	0.12	0.10
CHIMAKUAN	10.63%	7.29%	0.25	0.21
YUMAN	16.81%	5.73%	0.40	0.16
WASHOAN	23.67%	23.53%	0.56	0.67
SHOSHONEAN	24.61%	12.30%	0.58	0.35
CADDOAN	27.75%	14.76%	0.65	0.42
KIOWAN	28.51%	25.13%	0.67	0.71
SHASTAN	32.47%	27.35%	0.76	0.78
SHAPWAILUTAN	42.50%	26.94%	1.00	0.77
SIOUAN	48.21%	31.69%	1.14	0.90
KUTENAIAN	49.68%	53.87%	1.17	1.53
POMO	49.76%	20.33%	1.17	0.58
MUSKHOGEAN	57.54%	50.49%	1.36	1.44
YOKUTS	58.08%	20.17%	1.37	0.57
SALISHAN	58.39%	36.75%	1.38	1.05
YUROK	60.49%	22.94%	1.42	0.65
CHINOOKAN	63.14%	50.13%	1.49	1.43
ALGONQUIAN	65.54%	58.81%	1.54	1.67
WIYOT	72.49%	58.91%	1.71	1.68
MIWOK	74.13%	53.42%	1.75	1.52
WINTUN	75.62%	56.02%	1.78	1.59
IROQUOIAN	77.16%	66.98%	1.82	1.90
MAIDU	78.38%	51.16%	1.85	1.45
KAROK	82.09%	53.99%	1.93	1.54

TABLE 3.14 -- RANK ORDERED STANDARDIZED RATES BY TRIBE
1910/1930

TRIBE	1930 DIRECT INDIAN RATE %	1910 DIRECT INDIAN RATE %	1930 INDEX	1910 INDEX
ZUNI	0.48%	0.99%	0.01	0.03
HOPI	0.67%	0.15%	0.02	0.00
NAVAJO	0.88%	0.41%	0.02	0.01
PIMA	1.87%	0.46%	0.04	0.01
PAPAGO	2.07%	1.43%	0.05	0.04
APACHE	3.50%	2.40%	0.08	0.07
COCOPA	3.63%	0.84%	0.09	0.02
MARICOPA	4.16%	0.54%	0.10	0.02
MOHAVE	4.95%	0.99%	0.12	0.03
NORTHERN YUMANS	6.20%	2.34%	0.15	0.07
WICHITA/KICHAI	9.57%	3.55%	0.23	0.10
UTE	14.34%	5.24%	0.34	0.15
CAYUSE/MOLALA	17.16%	19.47%	0.40	0.55
OMAHA	17.18%	12.94%	0.40	0.37
CHEYENNE	19.85%	11.54%	0.47	0.33
ARAPAHO	20.16%	8.26%	0.47	0.23
WINNEBAGO	21.09%	15.78%	0.50	0.45
SEMINOLE	22.11%	22.26%	0.52	0.63
YUMA	22.82%	2.54%	0.54	0.07
SAUK/FOX	22.84%	23.67%	0.54	0.67
WASHO	23.67%	23.53%	0.56	0.67
PAIUTE/MONO/PAVIOTSO	26.99%	11.37%	0.64	0.32
CADDO	28.14%	24.00%	0.66	0.68
KIOWA	28.51%	25.13%	0.67	0.71
KIOWA APACHE	29.28%	15.96%	0.69	0.45
PAWNEE	29.39%	12.64%	0.69	0.36
SHOSHONI	30.45%	14.47%	0.72	0.41
SHAHAPTIANS	33.16%	25.45%	0.78	0.72
CALIF. SHOSHONEANS	33.98%	17.29%	0.80	0.49
MANDAN	35.73%	23.73%	0.84	0.67
ARIKARA	37.56%	16.20%	0.88	0.46
CROW	39.24%	25.18%	0.92	0.72
BANNOCK	39.69%	24.89%	0.93	0.71
HIDATSA	40.14%	23.02%	0.95	0.65
OTO/MISSOURI	41.60%	35.94%	0.98	1.02
CREEK	43.29%	42.26%	1.02	1.20
DIEGUENO	43.73%	23.24%	1.03	0.66
COAST SALISH	45.68%	32.57%	1.08	0.93
DAKOTA	47.31%	30.84%	1.11	0.88
KUTENAI	49.68%	53.87%	1.17	1.53
KICKAPOO	49.94%	32.18%	1.18	0.92
IROQUOIS	53.76%	31.82%	1.27	0.90
VIR./CAROLINA	55.51%	90.94%	1.31	2.59
COMANCHE	55.54%	35.64%	1.31	1.01
GROS VENTRES	57.18%	24.53%	1.35	0.70
YUROK	60.49%	22.94%	1.42	0.65
POTAWATOMI	61.64%	59.93%	1.45	1.70
ASSINIBOIN	61.67%	39.45%	1.45	1.12
KLAMATH/MODOC	63.15%	35.87%	1.49	1.02
SHAWNEE	63.22%	58.34%	1.49	1.66
PIEGAN	64.67%	45.73%	1.52	1.30
OTTAWA	64.72%	37.68%	1.52	1.07
CHOCTAW	64.97%	52.42%	1.53	1.49
CALIF.ATHAPASKAN	66.37%	51.95%	1.56	1.48
INTERIOR SALISH	68.38%	40.84%	1.61	1.16
IOWA	68.71%	73.86%	1.62	2.10
QUAPAW	69.15%	48.18%	1.63	1.37
KANSA	69.27%	65.80%	1.63	1.87
HUMBOLDT BAY	72.49%	58.91%	1.71	1.68
CHICKASAW	72.61%	69.03%	1.71	1.96
OSAGE	72.88%	54.48%	1.72	1.55
OREGON ATHAPASKAN	74.10%	45.17%	1.75	1.28
PONCA	74.31%	46.06%	1.75	1.31
MENOMINEE	74.65%	50.89%	1.76	1.45
DELAWARE/MUNSEE	76.53%	68.38%	1.80	1.94
MAIDU	78.38%	51.16%	1.85	1.45
CHIPPEWA	79.49%	65.03%	1.87	1.85
CHEROKEE	80.65%	75.52%	1.90	2.15
ORLEANS	82.09%	53.99%	1.93	1.54
ATL. COAST TRIBES	90.59%	69.36%	2.13	1.97
MIAMI/ILLINOIS	91.03%	79.59%	2.14	2.26
CATAWBA	91.28%	89.30%	2.15	2.54
WYANDOT	95.26%	89.78%	2.24	2.55

Tests of association

Spearman's rank correlation was calculated on the linguistic stock and tribal admixture data. A significant correlation was found for both lingistic stocks (r_s = .8916, p<.001) and tribes (r_s = .9272, p<.001) indicating consistency in the ranking on census data between the two years.

Previous analyses have indicated that differences in admixture rates, rather than differences in age structure, distinguish linguistic and tribal populations. Consequently age-specific crude rates were used for within-stock and within-tribe comparisons of admixture between the 1910 and 1930 censuses. The interval between the censuses is 20 years, consequently the cohort aged 0-19 years in 1910 should represent the group aged 20-39 years in 1930. Figure 3.1 (p. 66) is a scatter plot of these within-tribe relationships, 0-19 years in 1910 and 20-39 years in 1930. In the absence of any systematic pressures by admixture status (e.g., mortality or outmigration differentials), it is expected that the tribal cohorts will be arrayed in straight line along the principal diagonal with dispersion accruing mainly through random effects. Superficial inspection of the plot, the essentially straight line pattern of the data, supports the expected absence of systematic effects, indicated by previous analyses, and provides graphic support to the strong correlation between the rankings of admixture in 1910 and 1930.

In the absence of any demonstration for selective inclusion/exclusion by admixture status between 1910 and 1930, and assuming an approximate 20-year generation time, the population aged 0-19 in 1910 is expected to represent the major parental contributors to the cohort 0-19 in 1930. This follows from the observation that each admixed individual

in 1910 necessarily produces admixed offspring among the 1930 cohort of children while the contribution of non-admixed individuals in 1910 to admixed children in 1930 is proportional to the rate of ethnic exogamy and matings with admixed, assuming that matings are equally fertile in the standard genetic sense. Given the evidence of previous analyses it is expected that these distributions would be arrayed on or above the principal diagonal of a scatter plot of these data, given the increases in admixture between the census years. Figure 3.2 (p. 67) provides graphic support, in the linear trend represented, of the consistency of conclusions based upon the demographic analyses. Admixture among the cohorts less than twenty years of age in both 1910 and 1930 for linguistic stocks is plotted in Figure 3.3 (p. 68). This plot reinforces the linear trend previously noted for tribal units, although with evidence for greater dispersion in the distribution of plots.

Admixture rates of the cohort aged 0-19 years in 1930 were used in testing for an association between admixture and diabetes prevalence. This cohort should, again assuming the absence of systematic pressures, represent the grandparents and parents of the majority of the population 35+ years of age and at risk of diabetes. Additionally, surviving members of the cohort will be members of the population at risk as defined for the purpose of these analyses. Prevalence data, by population, admixture, and source are presented in Table 3.15 (p.65). A scatter plot of the relationship between previously diagnosed diabetes on admixture status is presented in Figure 3.4 (p. 69). As previously described, some residential data on diabetes prevalence have been aggregated to conform to the linguistic and tribal organization of the demographic data. The slope of the

nominally linear plot indicates an inverse relationship between the two variables (i.e diabetes prevalence increases as admixure proportion decreases). The association between the depicted variables is statistically significant ($r = -0.604$, $p<.05$). In Figure 3.5 (p.70), the inverse association between diabetes prevalence, based upon previous diagnoses and survey data, on admixture status is represented with approximately the same graphic impact as in Figure 3.4. Statistical test of the association between the variables is again significant ($r= - 0.606$, $p<.01$).

TABLE 3.15 AGE-SPECIFIC ADMIXTURE AND DIABETES PREVALENCE

TRIBE	1930 ADMIXTURE <20 YEARS	DIABETES PREV.35+	AUTHOR
ZUNI	0.0075	0.303	BENNETT & MILLER(1972)
NAVAJO	0.0100	0.177	BENNETT(1972),CARTER(1989)
PIMA	0.0268	0.496	BENNETT & MILLER(1970)
KERESAN	0.0269	0.228	CARTER ET AL (1989)
PAPAGO	0.0306	0.424	BENNETT ET AL (1976)
COCOPA	0.0328	0.342	HENRY ET AL (1969)
APACHE	0.0471	0.164	BENNETT(1976),CARTER(1989)
NORTHERN YUMANS	0.0700	0.299	BENNETT ET AL (1976)
TANOAN	0.0743	0.152	CARTER ET AL (1989)
ARAPAHO	0.2785	0.195	WEST (1974)
WASHO	0.2996	0.167	BARTHA ET AL (1973)
PAUITE/MONO/PAVIOTSO	0.3355	0.259	BARTHA ET AL (1973)
SHAHAPTIANS	0.3796	0.141	FREEMAN ET AL (1989)
CREEK/SEMINOLE	0.3911	0.19	WEST (1974)
BANNOCK/SHOSHONE	0.4287	0.148	FREEMAN ET AL (1989)
ARIKARA/MANDAN/ HIDATSA	0.4790	0.177	BROSSEAU (1979)
COAST SALISH	0.5018	0.082	FREEMAN ET AL (1989)
CHOCTAW	0.7309	0.172	WEST (1974)
INTERIOR SALISH	0.7735	0.109	FREEMAN ET AL (1989)
CHICKASAW	0.8241	0.135	WEST (1974)
CHEROKEE	0.8611	0.149	WEST (1974)

FIG. 3.1 TRIBAL ADMIXTURE: 1910 & 1930

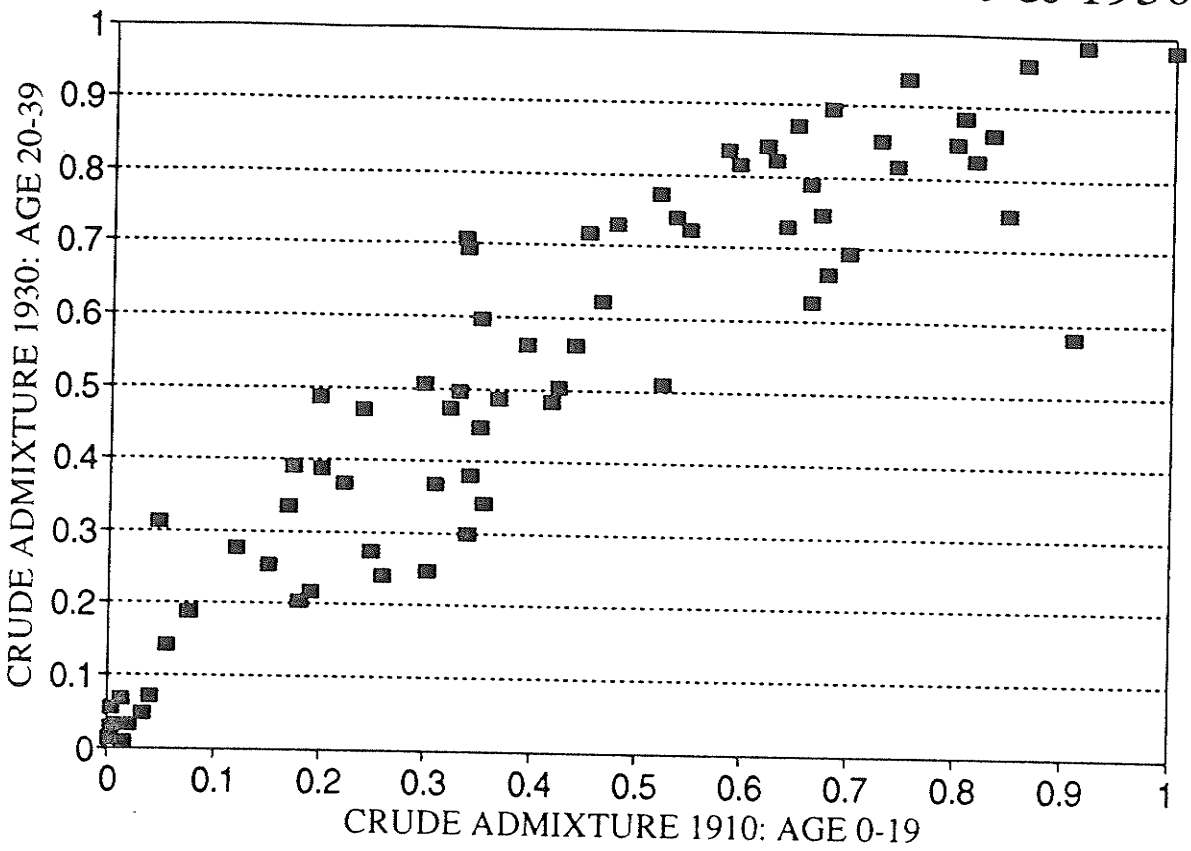


FIG. 3.2 TRIBAL ADMIXTURE:1910 & 1930
COHORTS <20 YEARS OF AGE

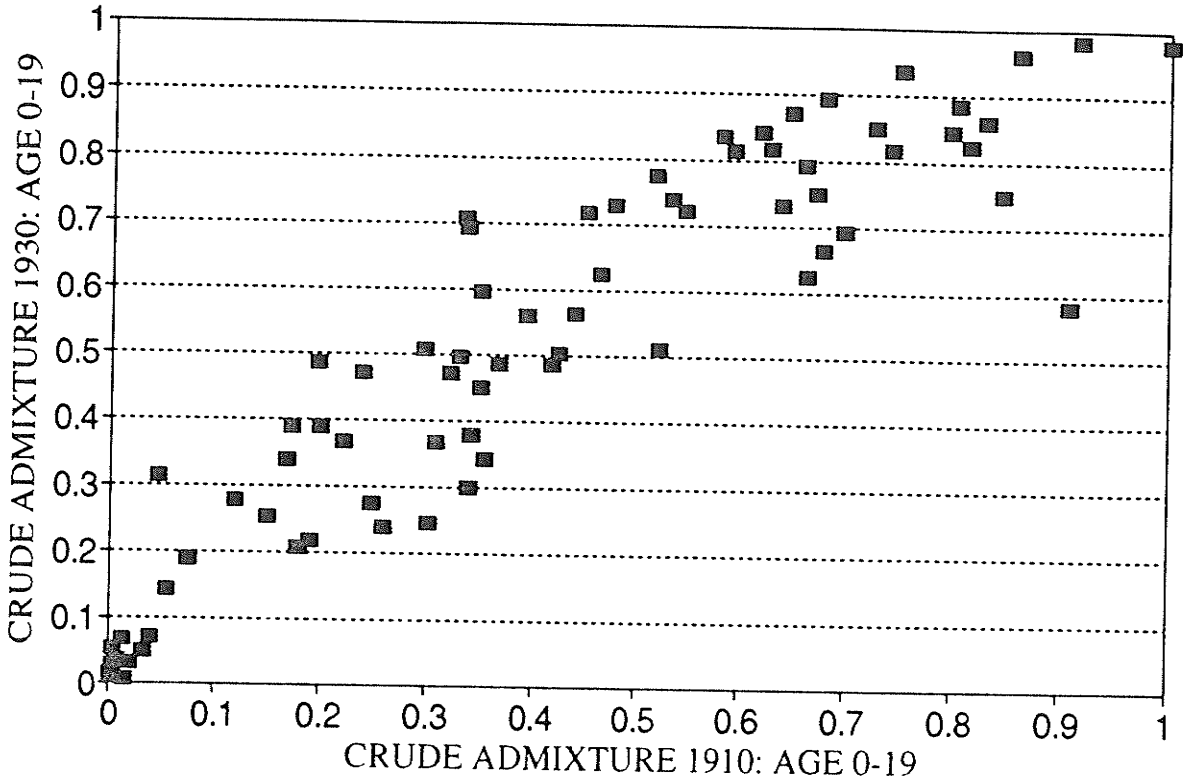


FIG. 3.3 STOCK ADMIXTURE: 1910 & 1930
COHORTS <20 YEARS OF AGE

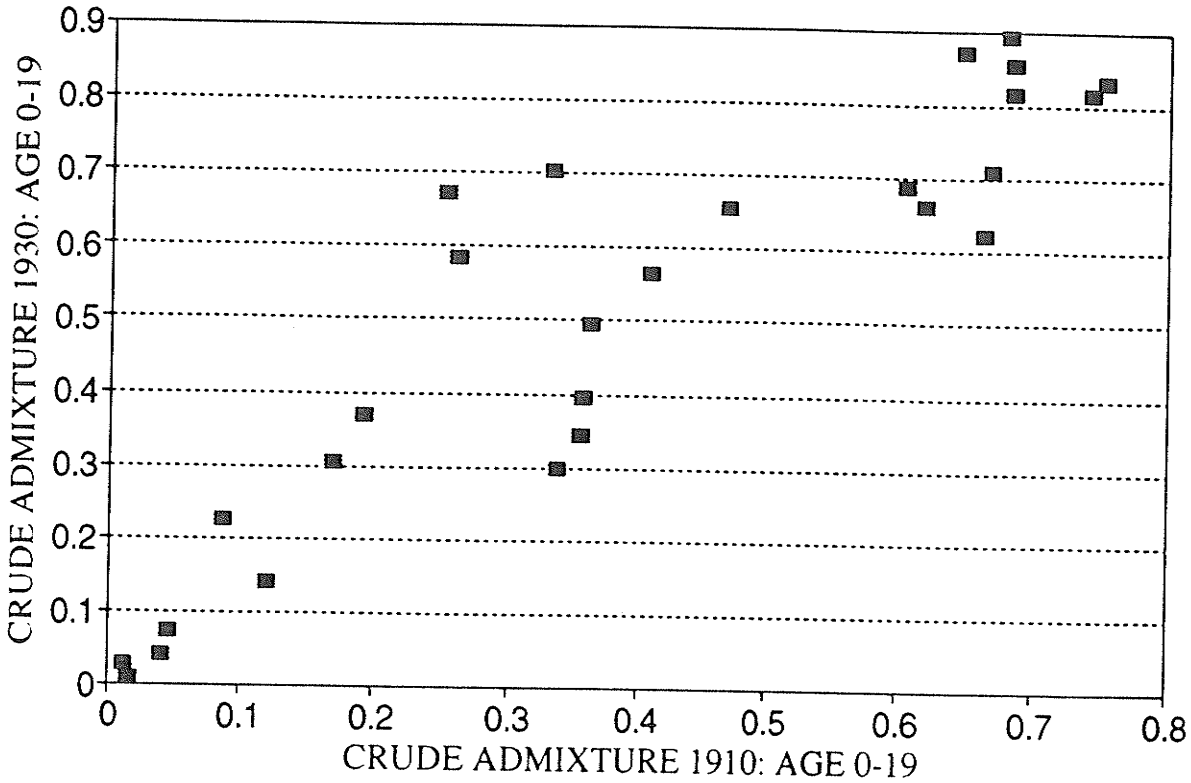


FIG. 3.4 DIABETES BY ADMIXTURE
PREVIOUS DIAGNOSIS

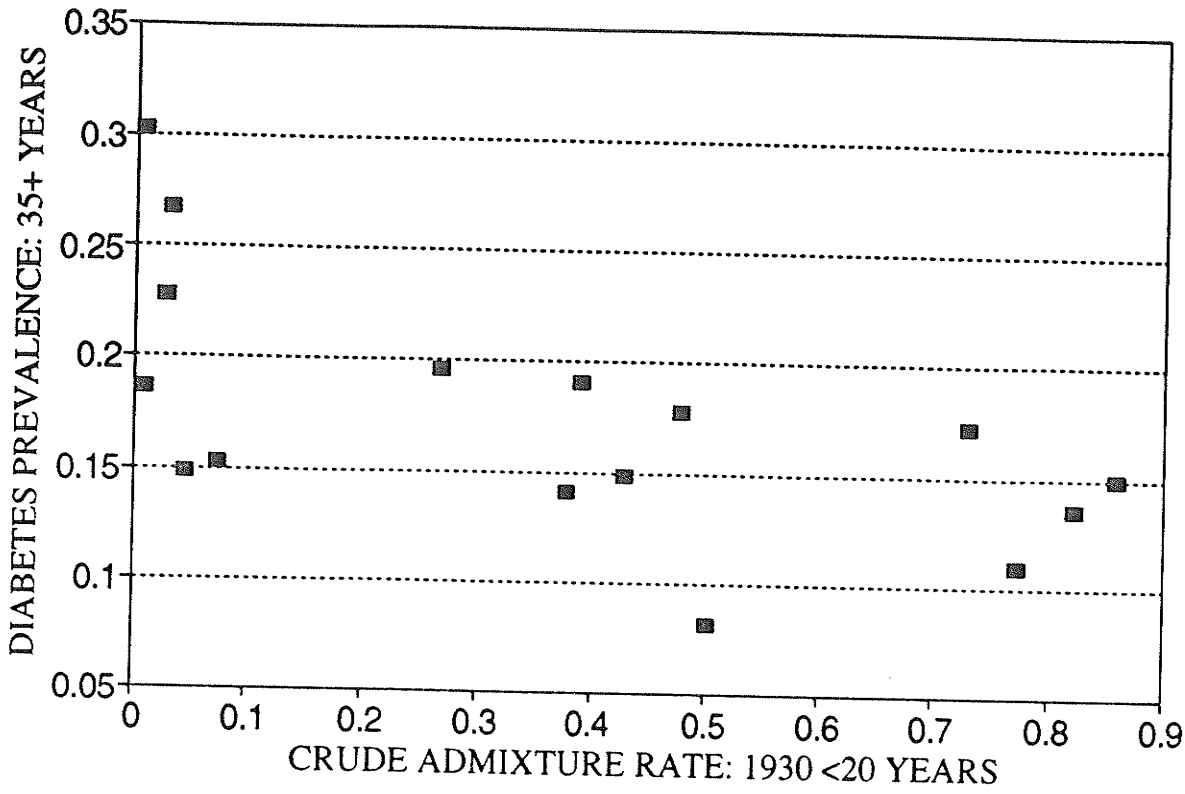
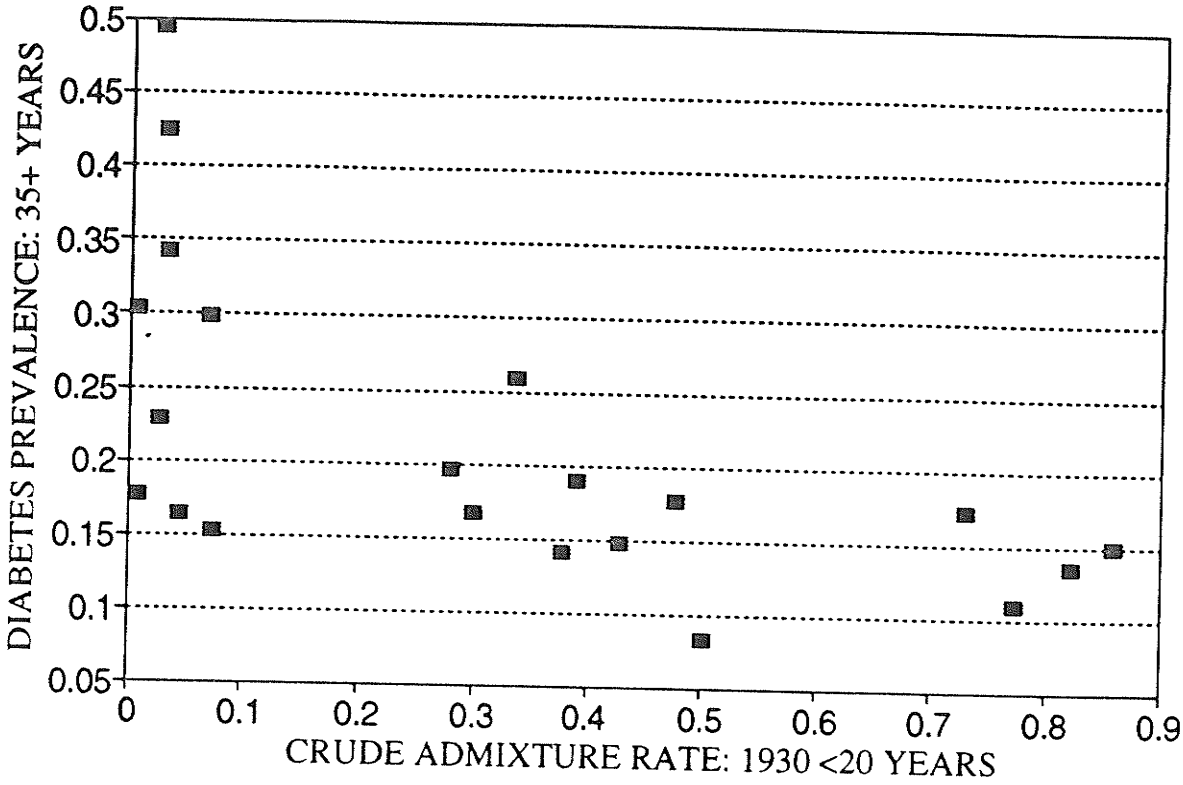


FIG. 3.5 DIABETES BY ADMIXTURE
PREVIOUS DIAGNOSIS AND SURVEY



CHAPTER FOUR

DISCUSSION AND CONCLUSIONS

Discussion

Analysis of census data, as in the case of bioassay, is an imperfect substitute for analysis of pedigreed admixture from continuously maintained registers. Registers allow for the determination of individual as well as population estimates, whereas demographic and genetic analyses are only appropriate to populations. Nevertheless, notwithstanding its restrictions, considerable evidence appropriate to admixture analysis was recovered from the census data used for this research. The extent of admixture among different linguistic stocks and tribes throughout the United States was established. The relationships between admixture and geographic location, age, and sex were also explored. Consistency in the census data was evident in the strong and significant correlation in the rates and patterns of admixture between the two enumerations. The probability of such a strong correlation occurring by chance is less than five percent, which speaks to the consistency of the returns.

A significant result of this research was the determination that in both census years admixture itself, rather than age distribution, was the significant variable affecting comparisons of crude admixture rates. The standardization process was an integral part of the analysis, however, the determination that age structure did not have a significant effect on comparative crude rates allowed for the use of crude rates in the correlation analyses. This was important for two reasons: (1) because standardized rates are fictitious rates whereas crude rates represent the actual extent of admixture in the

populations of interest, and (2) because of the lack of a single standard population with age distributions and admixture rates appropriate to both 1910 and 1930 given populations without significant loss of information.

Wide variation in admixture was observed among linguistic stock and tribal populations. This variation was not unexpected. Sustained contact with Europeans occurred at different times for tribes occupying different parts of the United States. As expected, admixture was generally greatest in those areas that experienced early and sustained contact. Admixture was generally concentrated in the younger age groups in 1910 and exhibited the cumulative effect of sustained exogamy in 1930.

With the exception of a few tribes, rates of admixture increased from 1910 to 1930. Among the tribes where admixture was less in 1930 than in 1910, two experienced sharp declines in numbers (the Cayuse/Molala reported 329 individuals in 1910 and 199 in 1930; the Kutenai reported 538 in 1910 and only 287 in 1930). The lower admixture rates could have resulted if the decreases in population were accounted for by a decrease in the numbers of admixed enumerated. The large decrease in admixture among the Virginia/Carolina Indians (90.94% in 1910; 55.51% in 1930) may be accounted for by an administrative re-allocation of returns which occurred in 1930. The tribal classification, Virginia/Carolina Indians, was formed in 1930 by removing the Virginia tribes from the Algonquian stock and combining them with the North Carolina Indians. According to the 1930 census report the Indians residing in the lowland counties of Virginia and North Carolina were generally of mixed Indian origins. Although the majority of the North Carolina Indians classified themselves as Cherokee in 1930, a decision was made to re-

assign those from the lowland counties to the Virginia/Carolina group. The total number reported for this group in 1930 was 12,975 compared with 6,195 in 1910. The depressant effect of the size increase on admixture derived from the fact that 43% of the reconstituted group identified themselves as having full Native ancestry (i.e., non-admixed). Such a high percentage of "full-bloods" among this group was considered questionable and was attributed either to ignorance of admixture status or a desire to be identified as non-admixed (Department of Commerce, 1937). The rate of admixture also decreased for the Zuni but not by a significant degree (0.99% in 1910; 0.48% in 1930). In 1910 all members of the Zuni tribe reported admixture status, however, 98% of the Zuni in 1930 failed to report admixture status. It is, however, consistent with conventional wisdom to classify the non-respondents among the Zuni as non-admixed, therefore, the 1930 rate (based on the 2% of the Zuni reporting admixture status) was not considered unusual.

Significant differences in admixture rates between males and females were found in both 1910 and 1930. For those groups exhibiting significant differences in 1910, admixture rates were generally greater in males. In 1930, while similar numbers of populations displayed significant differences in admixture between the sexes, the higher rates of admixture were not observed among males as frequently as in 1910. Analysis of the populations in which significant differences between the sexes were observed was completed in an attempt to determine if a common pattern of differential sex distribution by age existed which was attributable to differential outmigration and/or under-reporting/under-enumeration. While differential admixture by sex and age was observed

within and between tribal and linguistic populations, no systematic pattern emerged from the analyses distinguishing populations which exhibited significant differences from those which did not.

A pattern of female dominance among outmigrants from reservation populations has been described by Rokala for the Greater Leech Lake Reservation in northern Minnesota (1971) and Hackenberg and Wilson for the Papago Indians of Arizona (1972). Rokala and Polesky reported that outmigration from the Greater Leech Lake Reservation was associated with lesser Indian ancestry and/or marriage to non-Indians (1973). Patterns of admixture displayed conformity with earlier reports for the Turtle Mountain Plains Ojibwa (Ablon, 1964), the Nez Perce Reservation (Walker, 1967), and later for the Papago residents of Ajo, Arizona (Lamb, 1975). Failure to reproduce the observations of previous researchers may have resulted from distinctions inherent to their analyses of residential populations as compared with the aggregated linguistic and tribal populations analyzed in this research. Admixture data for the census years investigated might have presented similar distributions, or led to similar conclusions, had they been arrayed by residential units rather than the more aggregative tribal and linguistic categories.

Some major shifts in the admixture ranking occurred among stocks and tribes between 1910 and 1930. Some shifts may be accounted for in part by changes in population size. The Yokuts ranked 10 in 1910 (20.17% admixed) and 18 in 1930 (58.08% admixed). An increase in population size also occurred between the years. In 1910 543 were enumerated while in 1930 the population had increased to 1,145. A similar large increase was noted for the Yuma. In 1910, 834 were enumerated, however,

by 1930 the tribal population was reported as 2,306. The admixture rate changed from 2.54% in 1910 to 22.82% in 1930. These California populations were not believed to have been enumerated accurately in either 1910 or 1930 which may partially account for the observed changes. The Maidu ranked 21 in 1910 (51.56% admixed) and 27 in 1930 (78.38% admixed). A large decrease in population size was observed between the two years (1,100 in 1910; 93 in 1930). The Office of Indian Affairs reported 195 Maidu in 1932 most of whom were from the Round Valley Reservation in Mendocino County, California. The difference between the census and Indian Affairs figures may be due to the fact that there were no returns from the Round Valley reservation in the 1930 census. Further, the Maidu were mostly of mixed ancestry and it was thought that many individuals identified as 'Indian' in 1910 may have been returned as 'White' in 1930 (Department of Commerce, 1937). The change in rank position for the Pomo was not accompanied by a significant change in population size (1,193 in 1910; 1,143 in 1930). Decreases were also noted for the Yurok (668 in 1910; 471 in 1930), and the Iowa (224 in 1910; 176 in 1930). The proportion of these populations not reporting admixture status was not significant.

Although consistency was demonstrated between the enumerations the census data were subject to some limitations. These limitations tended to occur within two general categories of error: (a) errors of coverage and (b) errors of content. Errors of coverage occur when a portion of the population is under-enumerated, counted more than once, or missed completely. Errors of content occur when respondents are either unable or unwilling to provide correct information. Enumerator errors are also included in this

category (Pollard, Yusuf & Pollard, 1981). The census returns of 1910 and 1930 are subject to both of these broad categories of error.

Errors of coverage. The definition of 'Indian' used by enumerators determined who was included in the count (i.e., the coverage) and ultimately the numbers reported. The total number of Indians reported in the 1910 census was 265,683, while the report of the Commissioner of Indian Affairs listed 304,950 for that same year. Part of this discrepancy is explained by the inclusion by Indian Affairs of approximately 26,000 freedmen and Whites married to Indians living among the Five Civilized Tribes in Oklahoma. These individuals would have been counted among the Negro and White populations in the census. The remainder of the discrepancy may be due to the use by Indian Affairs of past estimates of the numbers of Indians living in Oklahoma and Arizona (Department of Commerce, 1915). A discrepancy between the Bureau of Indian Affairs and Census reports for 1930 also exists -- the total number of Indians reported in the 1930 census was 332,397, while the Bureau of Indian Affairs report of 1932 listed 228,381 (Department of Commerce, 1937).

According to Schmeckebier (1927) a significant portion of the difference between the numbers reported by the Census and Indian Affairs can be explained by the fact that Indian Affairs is bound by legal definitions of 'Indian', whereas the census relies on the decisions of its enumerators. He claimed that any attempts to account for the differences between the Census and Indian Affairs reports are essentially pointless because of the lack of uniform definition of 'Indian'. Considerable effort was made in regard to the enumeration of Indians in both 1910 and 1930 (more so in 1910) and it is perhaps not

coincidental that the number of Indians reported for these two years is greater than for those census years in which no special attention was given to the issues of tribal affiliation and Native ancestry (e.g., 1890, 1900, and 1920) (Department of Commerce, 1937).

In 1910, approximately 19,000 Indians were enumerated on the general schedule only, thus information regarding ancestry and tribal affiliation was not collected. Such an omission could have affected data appropriate to this analysis. Incomplete coverage of Indians may have occurred in both 1910 and 1930 due to at least two additional factors. First, accurate enumeration of nomadic tribes, such as the Navajo, would have been difficult because of the vast area of country they inhabited. Second, reluctance on the part of respondents to provide information could also have affected the accuracy of the data collected. Johansson and Preston (1978) report an unwillingness on the part of the Hopi to be counted for fear of arousing the wrath of spirits. In fact, a large Hopi village refused to participate in the 1890 census. Under-enumeration of Hopi children aged 0 to 15 years may have occurred in the 1890 and 1900 censuses as the Hopi were resistant to the efforts of Indian agents to enroll their children in school. In both the 1910 and 1930 censuses significant numbers in selected tribes did not provide information on Native ancestry. For example, admixture status was not reported for 17.1% of the Apache in 1910, 28.4% of the Apache in 1930, 16.2% of the Kiowa, and 98% of the Zuni in 1930. Omissions of this size may have affected admixture rates.

Errors of content. Errors of content concern the accuracy of the responses provided to enumerators. Errors occur when individuals provide incorrect information

either intentionally or unintentionally. Areas of particular concern to this research include age and degree of Native ancestry.

The age-structure of the 1910 Indian population was examined through an analysis of single years of age. Heaping around even ages (i.e., greater numbers reporting even ages than expected) and common years was discovered (e.g., individuals may have reported their age as 'about 25' etc.). Difficulties in accurately assessing the ages of Indians in 1910 may have been due in part to the lack of written records and were probably common to all enumerators (i.e., not a tribe-specific difficulty). The age heaping was administratively compensated by the three categories that were chosen for data presentation in the 1910 census report.

The extent of admixture is difficult to determine with complete accuracy after generations of association with other races. Errors may have occurred if individuals deliberately concealed knowledge of admixture or if they were unaware of its occurrence (Department of Commerce, 1937). One factor which may have affected the validity of the data concerns the qualifications of the enumerators. In 1910 special enumerators were assigned to collect data specific to Native ancestry. Regular enumerators were used to collect data in 1930 and it is not certain whether they had knowledge, equivalent to the agent enumerators of 1910, of the different Indian tribes, or the concept of Native ancestry.

The census of 1910 marked the first time that information on ancestry had been collected in such a systematic and thorough manner. In 1930, although special enumerators were not assigned and the extent of information gathered was not as great

as in 1910, information specific to admixture was gathered. Information regarding ancestry was collected, in 1930, by asking if the individual was "of full or mixed blood". Information required in 1910 was much more specific. Proportion of mixture was required of mixed-ancestry individuals (e.g., "half white, half Indian", "less than one-half white", "unknown proportions"). Officials of the Bureau of the Census believed that the detail required in 1910 carried too great a margin of error to be useful and therefore elected to collect data for the 1930 census in the manner described above (Department of Commerce, 1937, p.70). For the purposes of this research only the broad categories of full Native ancestry (non-admixed) and mixed ancestry (admixed) were used.

Enumerators in 1930 were not provided with instructions regarding assignment of tribal affiliation for Indians of mixed-tribal heritage, as were the enumerators in 1910. Therefore, Indians who claimed mixed-tribal heritage were assigned either to their stated tribe of preference or to the tribe in which they were considered members.

The number of Indians reporting mixed 'Indian and Negro' heritage in 1910 was considered to be an underestimate due to the "disinclination to admit Negro blood" (Department of Commerce, 1915, p.38). This belief is also expressed in the 1930 census report. For example, the large increase in the Virginia-Carolina Indians between the two census years was accounted for in part by natural increase but was also attributed to the wishes of the younger generation, with even a small degree of Native ancestry, to be classified as Indian rather than "Negro" (Department of Commerce, 1937, p.39). The possibility of similar 'disinclinations' with respect to mixed 'Indian and White' heritage

cannot be discounted. Even when these errors are taken into account it appears that the censuses were consistent and the results comparable.

The data on the prevalence of NIDDM were also subject to severe limitations. The concern over the use of prevalence data in this research relates to two separate issues: (1) the general utility of the prevalence measure, and (2) the accuracy of the prevalence estimates. The usefulness of prevalence data does not extend beyond the identification of current levels of disease in a population. Because of the static nature of the prevalence measurement, inferences about risk of developing disease over time cannot be made. In order to make such inferences, incidence rates (the number of new cases of disease which develop in a population over a period of time) must be measured (Mausner & Kramer, 1985). This limitation is important in regard to those diseases not under genetic control (e.g., infectious diseases). However, for genetic diseases inherited according to Mendelian principles, prevalence (a measure of the abnormal phenotype frequency) is a function of genotype and therefore may be used to estimate the probability of disease (i.e., risk).

Chronic diseases such as NIDDM present a special challenge because although they aggregate in families, and may be inherited according to Mendelian principles, the majority, including NIDDM, have complex multifactorial etiologies, which include both genetic and environmental components. Thus, in addition to genotype, other factors influence the manifestation of the disease endpoint, NIDDM (Sing, Boerwinkle, & Moll, 1985). Although estimates of the risk of developing disease are not as easily determined for chronic diseases, prevalence data remain an important source of information supporting a genetic etiology.

Another limitation of prevalence data obtained through cross-sectional surveys is that inferences about causation cannot be made if risk factors and disease status are measured at the same time (e.g., obesity and hyperglycemia; which is the cause and which the effect?). Causal inferences can only be drawn from studies which measure incidence rates because the temporal sequence of events can then be established (Mausner & Kramer, 1985).

In contrast to general concerns regarding the utility of the prevalence measure, specific problems relating to differences in research design, sampling or data collection methods, and diagnostic criteria exist which further limited the usefulness of the data. Potential difficulties in comparisons with, and inferences to, other populations may derive from these differences. The validity of prevalence estimates depends in part on the representativeness of the survey population or sample to the target population. Many of the reports included in Appendix A were based on volunteer samples and it is possible that those who volunteered were systematically different from those who did not participate, resulting in a selection bias (Abramson, 1984). A selection bias can affect the representativeness of the sample, the validity of the derived results, and call into question any inferences to other populations. It is unlikely that the prevalence statistics reported in Appendix A represent over-estimates. Through a review of screening surveys conducted among several populations, Zimmett discovered that for every known diabetic individual there was at least one undiagnosed case (1982).

The data collection methodology used for many of the reports listed in Appendix A involved review of medical records. Prevalence estimates were, therefore, based on

previously diagnosed cases of diabetes. This methodology often results in under-estimates as only clinically diagnosed cases of diabetes are reported and undiagnosed cases, which may be discovered with a survey, remain undetected. In addition, many reports based on previous diagnosis did not provide the diagnostic criteria used.

The accuracy of the prevalence estimates reported in Appendix A are also affected by the diagnostic criteria used. The National Diabetes Data Group (1979) and the World Health Organization (1985) have developed standard criteria for the diagnosis of diabetes, but some of the studies were either completed prior to the development of these criteria or simply did not adhere to the recommendations. As the criteria recommended by both the NDDG and the WHO are more stringent than criteria used in the past, some individuals previously diagnosed as diabetic would probably now be diagnosed with impaired glucose tolerance. Because different diagnostic criteria have been used, prevalence estimates are difficult to compare and therefore may be of limited utility (NDDG, 1979).

In spite of the objections some prevalence data remained useful as long as the above limitations were considered. The methodology and criteria used in each report were reviewed prior to acceptance or rejection of the data as appropriate to comparative research. Not all of the reports outlined in Appendix A were subject to the same degree of criticism as others. For example, some reports adhered to the standard diagnostic criteria. Further, the estimates for the Pima of Arizona were derived through a longitudinal study (which allows for the determination of incidence as well as prevalence) of all members of the population over the age of five years (ensuring representativeness

and validity). Nevertheless, most of the data was determined to be inadequate to the intended purpose of this research.

The purpose of this research was not to establish a causal link between degree of Native ancestry and prevalence of NIDDM, but to compare the available demographic and prevalence data in order to determine whether a correlation in support of the hypothesis existed. The prevalence data available, while providing nominal support for the hypothesis, also provided demonstration of the problems in application of epidemiologic data in comparative contexts.

The data from Carter *et al.* (1989) were explored in detail to demonstrate some of the difficulties encountered when using published diabetes data (Table 4.1, p.85). This study was based on previously diagnosed cases of diabetes in selected populations in 1985. While it is generally true that the use of previous diagnoses results in underestimates, the prevalence estimates reported by Carter *et al.* may actually represent overestimates because of the data sources and methodology used for estimation. Three sources of data, based on three distinct population groups, were utilized in the determination of the prevalence estimates: (1) census data, based on residential populations; (2) IHS population data, based on the IHS service population; and (3) IHS user data, based on the actual numbers using IHS facilities. The user population is potentially larger than either the residential or IHS service populations and as a source of data can inflate prevalence rates by increasing the size of the numerator (number of diabetes cases) relative to the denominator (population at risk, based on census and IHS service population data).

Two reports regarding the enumeration of American Indians in 1980 are available from the Bureau of the Census. The first report is based on a complete count of American Indians (short form questionnaire). The second report, a longer questionnaire which was administered by an enumerator, is based on a 75% sample of American Indians. The estimated base population in 1985, used by Carter *et al.*, was projected from the 1980 complete count census and is located in the first column in Table 4.1. The methodology utilized in the projection is not supplied. The second column lists the estimated numbers of individuals aged 35 and over based upon the IHS standard estimate of 24.9%. This estimate is based on the IHS service population. The number and percentage of the population aged 35 years and over, predicted from the 1980 sample census distribution, are found in columns three and four, respectively. The adjusted number of individuals aged 35 years and over in 1985 was determined by applying the proportion 35+ in 1980 to the projected 1985 baseline population. The adjusted population at risk (35+) is based on census data. The proportion of individuals aged 35 and over varies by tribe, ranging from 20.40% for the Mescalero Apache to 41.37% for Taos Pueblo. The prevalence reported by Carter *et al.* and the adjusted prevalence based on the adjusted numbers of individuals aged 35 and over are presented in columns seven and eight respectively. In some cases the prevalence estimates changed quite dramatically (31.24% to 21.10% for the Tesuque Pueblo and 27.64% to 16.64% for Taos). Because the study and adjusted prevalences were based on complete count and survey census data, a separate analysis was undertaken to determine if there existed marked differences in age structure between the complete count and survey census data. The median age of tribal

TABLE 4.1 DIABETES PREVALENCE AMONG SELECTED TRIBAL POPULATIONS FROM NEW MEXICO

POPULATION	1985 IHS BASE	IHS 35+ BASE .249	35+ 1980 SAMPLE	% 35+ 1980 SAMPLE	ADJUSTED IHS 35+ POPULATION	35+ DIABETIC POPULATION	REPORTED PREVALENCE	ADJUSTED PREVALENCE	SAMPLE MEDIAN AGE	CC MEDIAN AGE
COCHITI	690	172	212	34.36%	237	43	25.03%	18.14%	20.8	20.5
SAN FELIPE	2059	513	399	22.27%	458	117	22.82%	25.52%	18.5	18.6
SANTA ANA	460	115	139	34.15%	157	36	31.43%	22.92%	25.1	25.1
SANTO DOMINGO	2555	636	528	24.67%	630	144	22.63%	22.84%	19.8	19.9
ZIA	600	149	138	26.74%	160	35	23.43%	21.81%	21.0	20.7
TOTAL KERESAN	6364	1585	1416	25.88%	1647	375				
ISLETA	3173	790	724	31.63%	1004	141	17.85%	14.05%	23.1	23.2
JEMEZ	1720	428	409	27.23%	468	59	13.78%	12.60%	20.5	20.8
NAMBE	218	54	52	27.66%	60	8	14.74%	13.27%	22.2	22.9
PICURIS	142	35	45	33.09%	47	6	16.97%	12.77%	28.4	31.0
POJOAQUE	110	27	24	24.49%	27	4	14.60%	14.85%	20.2	22.0
SAN ILDEFONSO	552	137	170	35.05%	193	19	13.82%	9.82%	25.3	25.1
SAN JUAN	988	246	203	24.25%	240	42	17.07%	17.53%	22.0	22.1
SANDIA	293	73	69	30.40%	89	23	31.53%	25.82%	24.1	24.6
SANTA CLARA	653	163	557	30.16%	197	50	30.75%	25.39%	21.9	22.5
TAOS	1264	315	434	41.37%	523	87	27.64%	16.64%	27.3	29.4
TESUQUE	270	67	87	36.86%	100	21	31.24%	21.10%	23.7	23.3
TOTAL TANOAN	9383	2336	2774	31.19%	2927	460				
NAVAJO ALAMO	1408	351	239	22.42%	316	58	16.54%	18.37%	17.9	17.5
JICARILLA APACHE	2176	542	410	23.91%	520	53	9.78%	10.19%	19.1	19.1
MESCALERO APACHE	2256	562	393	20.40%	460	92	16.38%	19.99%	17.6	17.9
ZUNI	7057	1757	1385	23.19%	1636	496	28.23%	30.31%	19.3	19.3

group according to the sample and complete count data is presented in the final two columns. The median ages are very similar with the exception of Picuris and Taos of the Tanoans. In both of these cases the age distribution of the sample was younger than the complete count. Had the age distributions of the sample been more similar to the complete count the adjusted prevalences would have been even lower because the base population at risk would have increased. Thus, the assumption that all tribal populations conformed to the same proportion of individuals aged 35 years and over was not appropriate, and the use of data from different population sources generally resulted in overestimates of diabetes prevalence for the Keresan and Tanoan tribes and underestimates for the Navajo, Apache, and Zuni.

The Carter data were highlighted because, although there existed some methodological difficulties, many factors which could have affected the prevalence estimates were accounted for. Care was taken to ensure that study participants belonged only to the tribes included in the study and that those included actually did have diabetes. However, the above example did demonstrate how methodology alone can affect derived prevalence estimates. When variations in diagnostic criteria and other aspects of study methodology (i.e., previous diagnosis vs. survey) are also taken into account the accuracy/reliability of the prevalence estimates may be suspect, which therefore limits the ability to compare populations on the basis of the estimates. The effect on the current research has been to severely limit the number of populations admitted for comparison.

Non-insulin-dependent diabetes mellitus is a large public health problem among Native Americans living in both Canada and the United States as evidenced by its

contribution to morbidity and mortality. Reports in the relevant literature often include commentary regarding underestimation of prevalence rates and increasing incidence. Analysis of available published prevalence data revealed significant problems all of which had an effect on the accuracy of the estimates. Many studies have been completed in an attempt to determine diabetes prevalence. However, because of problems associated with research design etc., the extent of NIDDM among Native American populations cannot really be stated with confidence.

Conclusion

This research was based upon the hypothesis that the prevalence of NIDDM is positively associated with increasing degrees of Native ancestry. Demographic archival data were analyzed and rank-order profiles of admixture among Native American populations were constructed. Wide variation in admixture rates emerged and consistency between the two census reports was demonstrated. Prevalence data were also analyzed in order to determine the correlation between admixture and diabetes prevalence. Nominal support for the hypothesis was found based on a limited subset of prevalence data. The prevalence data presented many difficulties which precluded a more thorough testing of the hypothesis.

Genetic data are not always sufficient to the analysis of admixture but require supporting historical and social data. Census data proved to be a valuable source of non-genetic data appropriate to admixture analysis. The difficulties encountered in completing this research relate to the inadequacies of the published prevalence data. In terms of public health significance the importance of having accurate prevalence estimates cannot be over-stated. Because duration of disease is an important factor regarding onset of complications, it is necessary to determine those at greatest risk so that resources, which may aid in prevention or delay of onset, can be appropriately allocated.

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APPENDIX A

APPENDIX A

1. NATIVE NORTH AMERICAN PREVALENCE OF DIABETES MELLITUS BY POPULATION AND AGE

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion	Reference
Alabama-Coushatta (Texas)						
Total	1959-1963	600	61	10.2	NS	Johnson & McNutt (1964)
20+		270	61	22.6		(from Sievers & Fisher, 1985)
Aleut (Pribiloff Islands)						
10+	1973	335	24	7.2	GTT 200	Dippe et al.(1975)
Aleut (St. Paul, Sand Point, King Cove, Unalaska)						
39+	-1976	-	-	13.7	GTT 150	Mouratoff & Scott (1976)
Aleut (Aleutian, Pribiloff, Kodiak Islands, Alaska)						
0-14	1979-1985	2887	3	0.1	PD; WHO	Schraer et al. (1988)
15-24		2262	0	0.0		
25-34		1478	7	0.5		
35-44		980	19	1.9		
45-54		806	26	3.2		
55-64		513	36	7.0		
65+		387	48	12.4		
35+		2686	129	4.8		

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion	Reference
Aleut (St. Paul Island, Alaska)						
Total	1979-1985	557	25	4.5	PD; WHO	Schraer et al. (1988)
Aleut (Aleutian and Pribiloff Islands)						
Total	1979-1985	2228	43	1.9	PD; WHO	Schraer et al. (1988)
Aleut						
Total	1987	-	157	2.86	PD; WHO	Schraer et al. (1993)
Alaskan Athabaskan						
20+	-1969	306	6	2.0	GTT 140	Mouratoff, Carroll & Scott (1969)
39+	1976	-	-	6.3	GTT 150	Mouratoff & Scott (1976)
Alaskan Eskimo						
20+	1962	705	25	3.5	GTT 150	Mouratoff & Scott (1973)
40+		299	9	3.0		
20+	1972	320	24	7.5	GTT 150	Mouratoff & Scott (1973)
40+		193	15	7.8		
39+	1976	-	-	3.0	GTT 150	Mouratoff & Scott (1976)

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion	Reference
Alaskan Eskimo (Con't)						
0-14	1979-1985	13843	1	-	PD; WHO	Schraer et al. (1988)
15-24		9512	2	-		
25-34		5872	10	0.2		
35-44		3601	18	0.5		
45-54		2853	31	1.1		
55-64		1863	53	2.8		
65+		1765	64	3.6		
35+		10082	166	1.6		
Total	1987	-	216	1.02	PD; WHO	Schraer et al. (1993)
Alaskan Indians						
0-14	1979-1985	8231	1	-	PD; WHO	Schraer et al. (1988)
15-24		5777	4	0.1		
25-34		4175	7	0.2		
35-44		2719	23	0.8		
45-54		1905	66	3.5		
55-64		1203	81	6.7		
65+		1165	110	9.4		
35+		6992	280	4.0		
Total	1987	-	335	2.4	PD; WHO	Schraer et al. (1993)

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion	Reference
Alaskan Native						
Total	1981	64047	550	0.9	PD	Justice JW (1983) (in Sievers & Fisher, 1985)
35+		16716	488	2.9		
Total	1987	-	708	1.74	PD; WHO	Schraer et al. (1993)
Alaskan Sugpiaq Eskimo (Kodiak Island, Coastal Alaskan Peninsula)						
Total	1979-1985	7086	96	1.4	PD; WHO	Schraer et al. (1988)
Algonkian Indians (Quebec)						
18+	-1987	7158	-	5.4	NS	Young & Shah (1987)
Apache (Arizona)						
Total	1940	4906	12	0.2	NS	Joslin (1940)
Apache (Jicarilla/New Mexico)						
Total	1985	2176	65	3.0	PD	Carter et al. (1989)
35+		542	53	9.8		
Apache (Mescalero/New Mexico)						
Total	1985	2256	99	4.4	PD	Carter et al. (1989)
35+		562	92	16.4		

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion	Reference
Apache (San Carlos/Arizona)						
Total	1950-1952	2103	9	0.4	PD	Cohen (1954)
35+	-1976	317	79	24.9	GTT 160	Bennet et al. (1976)
Apache (White River/Arizona)						
Total	1950-1952	2266	3	0.1	PD	Cohen (1954)
35+	-1970	268	29	10.8	GTT 160	Bennett (1972)
Apache-Choctaw (Louisiana)						
Total	1980	895	51	5.7	PD	Roche (1982)
40+		298	44	14.8		
Apache/Kiowa Apache (Oklahoma)						
"Adult"	-1974	130	10	7.7	PD	West (1974)
Assiniboine, Gros Ventres (Montana)						
Total	1979-1986	1949	150	11.8	PD	Acton et al. (1993)
Assiniboine, Sioux (Montana)						
Total	1979-1986	3584	385	17.3	PD	Acton et al. (1993)
Blackfeet (Montana)						
Total	1979-1986	4125	355	16.8	PD	Acton et al. (1993)

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion	Reference
Cahuilla/Luiseno (California)						
Total	-1970	96	12	12.5	NS	Wood (1970)
Cherokee (North Carolina)						
35+	1965	448	130	29.0	GTT 150	Stein et al. (1965)
Cherokee (Oklahoma)						
30+	-1974	124	25	20.2	GTT 149	West (1974)
35+	-1974	4000	530	13.3	NS	West (1974)
Cheyenne/Arapaho (Oklahoma)						
35+	-1974	1000	195	19.5	NS	West (1974)
Cheyenne (Montana)						
Total	1979-1986	3502	105	5.9	PD	Acton et al. (1993)
Chickasaw (Oklahoma)						
35+	-1974	2300	310	13.5	NS	West (1974)
Chippewa/Sioux/Winnebago (Minneapolis, Minnesota)						
15-84	-1984	242	19	8.0	FBG 140	Gillum et al. (1984)

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion	Reference
Chippewa (Red Lake-Minnesota)						
Total	1987	4075	346	14.8	PD	Rith-Najarian et al. (1993)
0-24		2342	2	0.1		
25-34		643	10	1.6		
35-44		423	68	16.1		
45-54		289	94	32.5		
55-64		196	98	50.0		
Choctaw (Oklahoma)						
Total	1956-1961	3575	135	3.8	PD: GTT 150	Drevets (1965)
30+		1525	134	8.8	FBS 130	
35+	-1974	2900	500	17.2	NS	West (1974)
Cochiti (New Mexico)						
Total	1985	690	46	6.7	PD	Carter et al. (1989)
35+		172	43	25.0		
Cocopah (Arizona)						
Total (5+)	1969	182	31	17.0	GTT 160	Henry et al. (1969)
15+		123	30	24.4		
35+		79	27	34.2		
Comanche (Oklahoma)						
30+	-1974	1200	146	12.2	NS	West (1974)

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion	Reference
Confederated Warm Springs Tribes (Oregon)						
Total	1964-1965	-	42	2.6	PD	Justice (1989)
Total	1985	2041	81	4.0	PD	Justice (1989)
Cree/Ojibwa (Northwest Ontario)						
Total	1983	-	385	2.8	PD; NDDG	Young et al.(1985)
1-14		-	3	-		
15-24		-	12	0.4		
25-44		-	149	5.3		
45-64		-	165	12.6		
65+		-	56	9.6		
Cree/Ojibwa (Northern Ontario and Manitoba)						
20-34	1986-1987	335	-	3.0	PD or	Young et al. (1990)
35-49		195	-	15.0	FBG 7.8 mmol/L	
50-64		141	-	22.0		
Crow (Montana)						
Total	1978-1986	5150	292	8.5	PD	Acton et al. (1993)
Dakota/Cree/Ojibwa/Assiniboine (Southern Saskatchewan)						
20-44	1985	-	-	5.0	NS	Young & Shah (1987)
45-64		-	-	15.5		
65+		-	-	14.8		

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion	Reference
Dogrib (Northwest Territories)						
20+	1979	157	15	9.5	NDDG	Szathmary & Holt (1983)
Hualapai/Havasupai (Arizona)						
20+	1957-1964	-	-	28.0	NS	Sievers (1966)
Hualapai/Havasupai/Yavapai (Arizona)						
Total	1970	301	40	13.3	GTT 160	Smith (1970)
35+		101	38	37.6		
Hopi (Arizona)						
20+	1957-1964	-	-	9.0	NS	Sievers (1966)
Total	1963-1965	3000	23	0.8	PD+ FBG 120 GTT 140	Prosnitz & Mandell (1967)
Iroquois (Seneca/New York)						
25+	1967	207	64	30.9	PD+ GTT 200	Doeblin et al. (1969)
Isleta (New Mexico)						
Total	1985	3173	152	4.8	PD	Carter et al. (1989)
35+		790	141	17.8		
Iroquois (Mohawk/Kahnawake, Quebec)						
45-64	1981	544	65	12.0	PD: FBG 120	Montour & Macaulay (1985)

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion GTT 180	Reference
Jemez (New Mexico)						
Total	1985	1720	64	3.7	PD	Carter et al. (1989)
35+		428	59	13.8		
Kickapoo (Oklahoma)						
30+	-1974	173	28	16.2	NS	West (1974)
Kiowa/Comanche (Oklahoma)						
30+	-1974		11	14.0	NS	West (1974)
Mandan/Arikara/Hidatsa (Fort Berthold, North Dakota)						
Total	1978	3719	175	4.7	PD	Brosseau (1979)
35+		877	155	17.7		
Maricopa (Arizona)						
15+	1966	186	49	26.3	GTT 160	Justice (1967)
Mohawk (St. Regis-New York)						
Total	1989	6796	228	4.88	PD	Martinez & Strauss (1993)
<15		1989	1	0.05		
15-44		3480	46	1.32		
45-64		857	93	10.85		
65+		470	88	18.72		
						(from Sievers & Fisher, 1985)
Mojave (Arizona/California)						
Total	1950-1952	1427	32	2.2	PD	Cohen (1954)

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion	Reference
Nambe (New Mexico)						
Total	1985	218	9	4.1	PD	Carter et al. (1989)
35+		54	8	14.7		
Navajo (Arizona)						
Total	1940	36176	4	-	NS	Joslin (1940) - (from Sievers & Fisher,1985)
20+	1957-1964	-	-	1.0	NS	Sievers (1966)
Total	1958-1963	17557	105	0.6	GTT 160	Saiki & Rimoin (1968)
20+		11412	105	0.9		
40+		3687	88	2.4		
Total	1963-1965	15000	78	0.5	PD+ FBG 120 GTT 140	Prosnitz & Mandell (1967)
35+	-1970	55	7	12.7	GTT 160	Bennett (1972) (from Sievers & Fisher,1985)
20-74	1986-1987	444	44	9.9	FBG 140 or RBG 200	Sugarman & Percy (1989)
20-44		254	7	2.8		
45-54		82	13	15.8		
55-64		65	15	23.1		
65-74		43	9	20.9		

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion	Reference
Navajo (Alamo/New Mexico)						
Total	1985	1408	65	4.6	PD	Carter et al.(1989)
35+		351	58	16.5		
Oneida/Chippewa/Delaware (Southwest Ontario)						
5+	1985	1179	116	9.8	PD	Evers et al. (1987)
5-14		-	-	0.4		
15-24		-	-	1.0		
25-34		-	-	4.1		
35-44		-	-	15.5		
45-54		-	-	44.7		
55-64		-	-	32.0		
65-74		-	-	34.9		
75+		-	-	43.8		
Ontario Indians (Ontario)						
20+	-1987	31072	-	6.2	NS	Young & Shaw (1987)
Paiute (Fort McDermitt, Nevada)						
15+	1970	131	15	11.4	GTT 160	Bartha et al. (1973)
35+		54	14	25.9		
Paiute/Shoshone (Nevada)						
Total	1950-1952	2436	21	0.9	PD	Cohen (1954)

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion	Reference
Papago (Arizona)						
Total	1940	4055	10	0.2	NS	Joslin (1940) (from Sievers & Fisher, 1985)
Total	1950-1952	1904	8	0.4	PD	Cohen (1954)
20+	1957-1964	-	-	32.0	NS	Sievers (1966)
10-19	1972	-	-	0.5	PD	Reinhard & Grenwalt (1975)
20-29		-	-	2.0		
30-39		-	-	8.0		
40-49		-	-	15.5		
50-59		-	-	19.2		
60-69		-	-	20.1		
70+		-	-	18.9		
Total		9046	635	7.0		
35+	-1976	365	154	42.2	GTT 160	Bennett et al. (1976)
Papago/Yaqui (Arizona)						
Total	1981	16230	1490	9.2	PD	Justice JW (1983) (from Sievers & Fisher, 1985)
35+		9236	1132	26.7		
Passamaquoddy (Maine)						
20+	1965	56	5	9.0	PD	Ede (1966)

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion	Reference
Pawnee (Oklahoma)						
Total	1965	2241	262	11.7	PD	White (1966) (from Sievers & Fisher, 1985)
20+		1031	254	24.6		
Picuris (New Mexico)						
Total	1985	142	6	4.2	PD	Carter et al. (1989)
35+		35	6	17.0		
Pima (Arizona)						
Total	1940	4633	21	0.4	NS	Joslin (1940) (from Sievers & Fisher, 1985)
Total	1950-1952	2898	94	3.2	PD	Cohen (1954)
15+	1955	6975	282	4.0	PD	Parks & Waskow (1961) - (from Sievers & Fisher, 1985)
20+	1957-1964	-	-	45.0	NS	Sievers (1966)
5+	1965-1967	1881	442	23.5	GTT 160	Miller et al. (1968)
15+		1359	435	32.0		
35+		748	374	50.0		
5+	1965-1969	2917	558	19.1	GTT 160	Bennett & Miller (1970)
15+		1766	541	30.6		
35+		898	447	49.8		

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion	Reference
Pima (Arizona) (Con't)						
5+	1965-1979	4080	704	17.2	GTT 200	Knowler et al. (1981)
15+		2589	703	27.1		
35+		1176	579	49.2		
Plains Indians (Oklahoma)						
Total	1951-1955	9978	430	4.3	PD	Shochet (1958)
Pojoaque (New Mexico)						
Total	1985	110	4	3.6	PD	Carter et al. (1989)
35+		27	4	14.6		
Pottawatomi (Michigan)						
20+	1968	39	8	20.5	PD+	Willet et al. (1970)
San Felipe (New Mexico)						
Total	1985	2059	128	6.2	PD	Carter et al. (1989)
35+		513	117	22.8		
San Ildefonso (New Mexico)						
Total	1985	552	19	3.4	PD	Carter et al. (1989)
35+		137	19	13.8		

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion	Reference
San Juan (New Mexico)						
Total	1985	988	44	4.4	PD	Carter et al. (1989)
35+		246	42	17.1		
Sandia (New Mexico)						
Total	1985	293	24	8.2	PD	Carter et al. (1989)
35+		73	23	31.5		
Santa Ana (New Mexico)						
Total	1985	460	38	8.3	PD	Carter et al. (1989)
35+		115	36	31.4		
Santa Clara (New Mexico)						
Total	1985	653	54	8.3	PD	Carter et al. (1989)
35+		163	50	30.7		
Santa Domingo (New Mexico)						
Total	1985	2555	151	5.9	PD	Carter et al. (1989)
35+		636	144	22.6		
Sauk and Fox (Oklahoma)						
30+	-1974	-	-	16.0	NS	West (1974)

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion	Reference
Seminole (Brighton and Big Cypress, Florida)						
6+	1964	254	89	35.0	GTT 160	Elston et al. (1974)
Total	1969	118	27	22.9	GTT 140	Westfall & Rosenbloom (1971)
20+		52	23	50.0		
35+		37	14	37.8		
Seminole (Oklahoma)						
14+	1963	302	28	9.3	FBG 210	Mayberry & Lindeman (1963)
30+		205	24	11.7	GTT 160	
6+	1964	217	84	38.7	GTT 160	Elston et al. (1974)
Seminole/Creek (Oklahoma)						
35+	-1974	-	-	19.0	GTT 200	West (1974)
Shawnee (Oklahoma)						
30+	-1974	-	-	19.0	NS	West (1974)
Shoshone, Arapaho (Wyoming)						
Total	1979-1986	3730	312	12.5	PD	Acton et al. (1993)
Sioux (South Dakota)						
50+	-1976	50	25	50.0	PD	Dean (1976)

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion	Reference
Sioux/Assiniboine (Montana)						
Total	-1969	3500	100	2.9	PD	Petersen (1969) (from Sievers & Fisher, 1985)
Slavey (Northwest Territories)						
Total	-1987	70	-	4.0	GTT 160	Young & Shah (1987)
Taos (New Mexico)						
Total	1985	1264	92	7.3	PD	Carter et al.(1989)
35+		315	87	27.6		
Tesuque (New Mexico)						
Total	1985	270	22	8.1	PD	Carter et al. (1989)
35+		67	21	31.2		
Ute (Utah)						
Total	1950-1952	877	11	1.2	PD	Cohen (1954)
20+	1957-1964	-	-	7.0	NS	Sievers (1966)
Washoe (California/Nevada)						
15+	1970	112	12	10.7	GTT 160	Bartha et al. (1973)
35+		66	11	16.7		
Yuma (Arizona)						
Total	1950-1952	477	15	3.1	PD	Cohen (1954)

Population By Age	Reference Dates	Base Population	Diabetes #	Diabetes %	Criterion	Reference
Zia (New Mexico)						
Total	1985	600	38	6.3	PD	Carter et al. (1989)
35+		149	35	23.4		
Zuni (New Mexico)						
35+	-1970	292	92	31.5	GTT 160	Bennett & Miller (1972)
Total	1975-1976	6303	268	4.3	PD	Long (1978)
25+		2028	263	13.0		
45+		756	187	24.7		
Total	1985	7057	565	8.0	PD	Carter et al. (1989)
35+		1757	496	28.2		

Legend

Criterion

PD	Previous Diagnosis
PD+	Previous Diagnosis plus newly recovered cases
NS	Not Stated
NDDG	National Diabetes Data Group diagnostic criterion (1979)
WHO	World Health Organization diagnostic criterion (1985)
FBG	Fasting Blood Glucose (mg/dl unless otherwise stated)
GTT	Glucose Tolerance Test (mg/dl unless otherwise stated)
RBG	Random Blood Glucose (mg/dl unless otherwise stated)

APPENDIX A

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APPENDIX B

APPENDIX B

AMERICAN INDIANS BY LINGUISTIC STOCK AND TRIBE: 1910

PART A

LINGUISTIC STOCK/TRIBE		POPULATION SIZE	NOT REPORTED	<20 YEARS	20-50 YEARS	51+ YEARS
ALGONQUIAN	TOTAL	46022	74	23417	16648	5957
	ADMIXED	26985	293	15664	9058	2263
	MALES	23515	39	11858	8644	3013
	ADMIXED	13937	161	7875	4800	1262
	FEMALES	22507	35	11559	8004	2944
	ADMIXED	13048	132	7789	4258	1001
ATHAPASKAN	TOTAL	30402	92	16926	10376	3100
	ADMIXED	1040	1097	694	321	25
	MALES	15321	47	8671	5146	1504
	ADMIXED	564	545	371	177	16
	FEMALES	15081	45	8255	5230	1596
	ADMIXED	476	552	323	144	9
CADDOAN	TOTAL	1863	7	955	688	220
	ADMIXED	275	12	185	73	17
	MALES	906	6	451	311	114
	ADMIXED	141	5	94	40	7
	FEMALES	957	1	504	347	106
	ADMIXED	134	7	91	33	10
CHIMAKUAN	TOTAL	306	2	132	114	60
	ADMIXED	20	0	16	2	2
	MALES	154	1	76	52	26
	ADMIXED	12	0	11	1	0
	FEMALES	152	1	56	62	34
	ADMIXED	8	0	5	1	2
CHINOOKAN	TOTAL	897	6	412	334	151
	ADMIXED	434	2	249	147	38
	MALES	459	2	217	170	72
	ADMIXED	236	0	127	86	23
	FEMALES	438	4	195	164	79
	ADMIXED	198	2	122	61	15
IROQUOIAN	TOTAL	39679	53	23041	13155	3483
	ADMIXED	27119	600	17348	8065	1706
	MALES	20339	34	11717	6759	1863
	ADMIXED	13900	279	8844	4139	917
	FEMALES	19340	19	11324	6396	1620
	ADMIXED	13219	321	8504	3926	789
KAROK	TOTAL	775	1	379	291	105
	ADMIXED	411	0	258	144	9
	MALES	388	1	194	149	45
	ADMIXED	222	0	133	84	5
	FEMALES	387	0	185	142	60
	ADMIXED	189	0	125	60	4

APPENDIX B (Con't)

LINGUISTIC STOCK/TRIBE		POPULATION SIZE	NOT REPORTED	<20 YEARS	20-50 YEARS	51+ YEARS
KERESAN	TOTAL	4027	1	1936	1616	475
	ADMIXED	33	18	26	5	2
	MALES	2126	0	991	869	266
	ADMIXED	15	6	12	2	1
	FEMALES	1901	1	945	747	209
	ADMIXED	18	12	14	3	1
KIOWAN	TOTAL	1126	4	634	361	131
	ADMIXED	294	12	225	60	9
	MALES	536	2	305	168	63
	ADMIXED	159	4	116	38	5
	FEMALES	590	2	329	193	68
	ADMIXED	135	8	109	22	4
KUTENAIAN	TOTAL	538	0	246	224	68
	ADMIXED	283	0	163	101	19
	MALES	286	0	132	119	35
	ADMIXED	156	0	88	60	8
	FEMALES	252	0	114	105	33
	ADMIXED	127	0	75	41	11
MAIDU	TOTAL	1100	4	522	408	170
	ADMIXED	541	15	338	193	10
	MALES	568	0	258	224	86
	ADMIXED	290	9	169	115	6
	FEMALES	532	4	264	184	84
	ADMIXED	251	6	169	78	4
MIWOK	TOTAL	699	4	313	269	117
	ADMIXED	352	1	214	127	11
	MALES	340	3	151	142	47
	ADMIXED	175	1	100	68	7
	FEMALES	359	1	162	127	70
	ADMIXED	177	0	114	59	4
MUSKHOGEAN	TOTAL	29191	93	17001	10156	2034
	ADMIXED	15306	245	10524	4147	635
	MALES	14727	41	8584	5041	1102
	ADMIXED	7738	131	5300	2070	368
	FEMALES	14464	52	8417	5115	932
	ADMIXED	7568	114	5224	2077	267
PIMAN	TOTAL	8034	24	4120	2894	1020
	ADMIXED	74	82	53	19	2
	MALES	4145	8	2126	1488	531
	ADMIXED	41	41	32	8	1
	FEMALES	3889	16	1994	1406	489
	ADMIXED	33	41	21	11	1
POMO	TOTAL	1193	2	490	450	253
	ADMIXED	220	66	128	76	16
	MALES	603	1	240	231	132
	ADMIXED	112	33	58	44	10
	FEMALES	590	1	250	219	121
	ADMIXED	108	33	70	32	6

APPENDIX B (Con't)

LINGUISTIC STOCK/TRIBE		POPULATION SIZE	NOT REPORTED	<20 YEARS	20-50 YEARS	51+ YEARS
SALISHAN	TOTAL	7833	40	3728	2738	1367
	ADMIXED	2738	81	1748	880	110
	MALES	4017	16	1917	1423	677
	ADMIXED	1481	41	901	511	69
	FEMALES	3816	24	1811	1315	690
	ADMIXED	1257	40	847	369	41
SHAPWAILUTAN	TOTAL	5698	55	2364	2141	1193
	ADMIXED	1373	23	857	449	67
	MALES	2713	22	1162	1033	518
	ADMIXED	709	15	413	251	45
	FEMALES	2985	33	1202	1108	675
	ADMIXED	664	8	444	198	22
SHASTAN	TOTAL	1578	26	745	576	257
	ADMIXED	411	3	266	136	9
	MALES	757	12	340	287	130
	ADMIXED	198	2	120	72	6
	FEMALES	821	14	405	289	127
	ADMIXED	213	1	146	64	3
SHOSHONEAN	TOTAL	16842	147	7262	6882	2698
	ADMIXED	1916	242	1241	610	65
	MALES	8620	74	3733	3518	1369
	ADMIXED	985	128	609	336	40
	FEMALES	8222	73	3529	3364	1318
	ADMIXED	931	114	632	274	25
SIOUAN	TOTAL	32941	82	15215	11957	5769
	ADMIXED	9889	501	6221	3165	503
	MALES	16541	40	7729	6153	2659
	ADMIXED	5126	251	3149	1709	268
	FEMALES	16400	42	7486	5804	3110
	ADMIXED	4763	250	3072	1456	235
TANOAN	TOTAL	3140	3	1389	1363	388
	ADMIXED	101	34	65	30	6
	MALES	1636	2	667	745	224
	ADMIXED	52	19	34	15	3
	FEMALES	1504	1	722	618	164
	ADMIXED	49	15	31	15	3
WASHOAN	TOTAL	819	9	311	382	126
	ADMIXED	170	6	105	64	1
	MALES	414	5	156	189	69
	ADMIXED	74	5	42	32	0
	FEMALES	405	4	155	193	57
	ADMIXED	96	1	63	32	1
WINTUN	TOTAL	710	1	311	272	127
	ADMIXED	373	55	213	146	14
	MALES	382	0	165	140	77
	ADMIXED	199	27	114	76	9
	FEMALES	328	1	146	132	50
	ADMIXED	174	28	99	70	5

APPENDIX B (Con't)

LINGUISTIC STOCK/TRIBE		POPULATION SIZE	NOT REPORTED	<20 YEARS	20-50 YEARS	51+ YEARS
WIYOT	TOTAL	152	0	70	48	34
	ADMIXED	81	0	52	26	3
	MALES	92	0	46	29	17
	ADMIXED	54	0	34	18	2
	FEMALES	60	0	24	19	17
	ADMIXED	27	0	18	8	1
YOKUTS	TOTAL	533	1	233	230	70
	ADMIXED	104	28	59	42	3
	MALES	280	1	118	122	40
	ADMIXED	64	10	31	31	2
	FEMALES	253	0	115	108	30
	ADMIXED	40	18	28	11	1
YUMAN	TOTAL	4279	60	1885	1601	793
	ADMIXED	221	58	165	50	6
	MALES	2301	48	990	857	454
	ADMIXED	123	29	87	31	5
	FEMALES	1978	12	895	744	339
	ADMIXED	98	29	78	19	1
YUROK	TOTAL	668	2	297	253	118
	ADMIXED	140	0	99	39	2
	MALES	327	1	150	113	64
	ADMIXED	81	0	56	24	1
	FEMALES	341	1	147	140	54
	ADMIXED	59	0	43	15	1
ZUNIAN	TOTAL	1667	9	745	685	237
	ADMIXED	15	0	12	3	0
	MALES	870	5	368	370	132
	ADMIXED	11	0	9	2	0
	FEMALES	797	4	377	315	105
	ADMIXED	4	0	3	1	0

PART B

APPENDIX B (Con't)

LINGUISTIC STOCK/TRIBE		POPULATION SIZE	NOT REPORTED	<20 YEARS	20-50 YEARS	51+ YEARS
ALGONQUIAN						
ARAPAHO	TOTAL	1419	12	610	602	207
	ADMIXED	108	0	73	35	0
	MALES	727	10	307	312	108
	ADMIXED	57	0	36	21	0
	FEMALES	692	2	303	290	99
	ADMIXED	51	0	37	14	0
ATLANTIC COAST TRIBES	TOTAL	2027	5	868	826	333
	ADMIXED	1381	9	653	543	185
	MALES	1053	3	430	453	170
	ADMIXED	743	9	338	305	100
	FEMALES	974	2	438	373	163
	ADMIXED	638	0	315	238	85
PIEGAN	TOTAL	2268	1	1185	848	235
	ADMIXED	1053	1	649	372	32
	MALES	1122	0	590	430	102
	ADMIXED	548	1	333	200	15
	FEMALES	1146	1	595	418	133
	ADMIXED	505	0	316	172	17
CHEYENNE	TOTAL	3055	6	1232	1246	577
	ADMIXED	319	74	187	119	13
	MALES	1510	2	637	619	254
	ADMIXED	164	36	101	56	7
	FEMALES	1545	4	595	627	323
	ADMIXED	155	38	86	63	6
CHIPPEWA	TOTAL	20214	23	10466	7119	2629
	ADMIXED	13128	106	7615	4375	1138
	MALES	10325	13	5296	3700	1327
	ADMIXED	6775	62	3785	2350	640
	FEMALES	9889	10	5168	3419	1302
	ADMIXED	6353	44	3830	2025	498
DELAWARE/MUNSEE	TOTAL	985	1	568	319	98
	ADMIXED	690	2	457	190	43
	MALES	489	1	287	160	42
	ADMIXED	352	2	235	95	22
	FEMALES	496	0	281	159	56
	ADMIXED	338	0	222	95	21
GROS VENTRES	TOTAL	510	1	232	205	73
	ADMIXED	119	1	78	40	1
	MALES	257	0	108	119	30
	ADMIXED	59	0	34	25	0
	FEMALES	253	1	124	86	43
	ADMIXED	60	1	44	15	1
KICKAPOO	TOTAL	348	4	159	140	49
	ADMIXED	107	1	70	31	6
	MALES	194	1	91	78	25
	ADMIXED	67	0	45	18	4
	FEMALES	154	3	68	62	24
	ADMIXED	40	1	25	13	2

APPENDIX B (Con't)

LINGUISTIC STOCK/TRIBE		POPULATION SIZE	NOT REPORTED	<20 YEARS	20-50 YEARS	51+ YEARS
MENOMINEE	TOTAL	1422	0	740	461	221
	ADMIXED	716	2	464	201	51
	MALES	766	0	376	267	123
	ADMIXED	391	2	239	115	37
	FEMALES	656	0	364	194	98
	ADMIXED	325	0	225	86	14
MIAMI/ILLINOIS	TOTAL	360	0	197	120	43
	ADMIXED	288	3	171	92	25
	MALES	187	0	96	68	23
	ADMIXED	150	1	84	52	14
	FEMALES	173	0	101	52	20
	ADMIXED	138	2	87	40	11
OTTAWA	TOTAL	2717	6	1265	1013	439
	ADMIXED	995	0	571	332	92
	MALES	1429	3	665	524	240
	ADMIXED	524	0	296	171	57
	FEMALES	1288	3	600	489	199
	ADMIXED	471	0	275	161	35
POTAWATOMI	TOTAL	2440	6	1334	832	274
	ADMIXED	1477	2	906	474	97
	MALES	1368	2	725	491	152
	ADMIXED	832	2	497	283	52
	FEMALES	1072	4	609	341	122
	ADMIXED	645	0	409	191	45
SAUK/FOX	TOTAL	724	2	366	280	78
	ADMIXED	171	6	110	50	11
	MALES	377	0	186	149	42
	ADMIXED	86	3	50	29	7
	FEMALES	347	2	180	131	36
	ADMIXED	85	3	60	21	4
SHAWNEE	TOTAL	1338	1	741	480	117
	ADMIXED	799	3	518	242	39
	MALES	626	0	337	230	59
	ADMIXED	378	2	235	125	18
	FEMALES	712	1	404	250	58
	ADMIXED	421	1	283	117	21
VIRGINIA/CAROLINA	TOTAL	6195	6	3454	2157	584
	ADMIXED	5634	83	3142	1962	530
	MALES	3085	4	1725	1044	316
	ADMIXED	2811	41	1567	955	289
	FEMALES	3110	2	1729	1113	268
	ADMIXED	2823	42	1575	1007	241
ATHAPASKAN						
APACHE	TOTAL	6119	11	2973	2264	882
	ADMIXED	142	1045	102	35	5
	MALES	3070	6	1553	1120	397
	ADMIXED	82	520	57	21	4
	FEMALES	3049	5	1420	1144	485
	ADMIXED	60	525	45	14	1

APPENDIX B (Con't)

LINGUISTIC STOCK/TRIBE		POPULATION SIZE	NOT REPORTED	<20 YEARS	20-50 YEARS	51+ YEARS
KIOWA APACHE	TOTAL	139	0	68	55	16
	ADMIXED	22	0	15	7	0
	MALES	56	0	28	22	6
	ADMIXED	8	0	4	4	0
	FEMALES	83	0	40	33	10
	ADMIXED	14	0	11	3	0
CALIFORNIA ATHAPASKAN	TOTAL	1033	0	478	369	186
	ADMIXED	502	0	321	170	11
	MALES	505	0	237	179	89
	ADMIXED	257	0	163	89	5
	FEMALES	528	0	241	190	97
	ADMIXED	245	0	158	81	6
NAVAJO	TOTAL	22455	78	13096	7473	1886
	ADMIXED	99	52	73	25	1
	MALES	11346	41	6683	3712	951
	ADMIXED	64	25	44	19	1
	FEMALES	11109	37	6413	3761	935
	ADMIXED	35	27	29	6	0
OREGON ATHAPASKAN	TOTAL	656	3	311	215	130
	ADMIXED	275	0	183	84	8
	MALES	344	0	170	113	61
	ADMIXED	153	0	103	44	6
	FEMALES	312	3	141	102	69
	ADMIXED	122	0	80	40	2
CADDOAN						
ARIKARA	TOTAL	444	1	228	148	68
	ADMIXED	72	0	45	18	9
	MALES	209	1	104	72	33
	ADMIXED	38	0	24	10	4
	FEMALES	235	0	124	76	35
	ADMIXED	34	0	21	8	5
CADDO	TOTAL	452	2	256	161	35
	ADMIXED	114	0	79	33	2
	MALES	231	2	128	82	21
	ADMIXED	57	0	39	17	1
	FEMALES	221	0	128	79	14
	ADMIXED	57	0	40	16	1
PAWNEE	TOTAL	633	4	295	263	75
	ADMIXED	77	12	51	20	6
	MALES	307	3	142	127	38
	ADMIXED	41	5	27	12	2
	FEMALES	326	1	153	136	37
	ADMIXED	36	7	24	8	4
WICHITA/KICHAI	TOTAL	334	0	176	116	42
	ADMIXED	12	0	10	2	0
	MALES	159	0	77	60	22
	ADMIXED	5	0	4	1	0
	FEMALES	175	0	99	56	20
	ADMIXED	7	0	6	1	0

APPENDIX B (Con't)

LINGUISTIC STOCK/TRIBE		POPULATION SIZE	NOT REPORTED	<20 YEARS	20-50 YEARS	51+ YEARS
IROQUOIAN						
IROQUOIS	TOTAL	7776	27	3761	2967	1048
	ADMIXED	2457	339	1318	879	260
	MALES	4013	16	1862	1566	585
	ADMIXED	1297	154	680	470	147
	FEMALES	3763	11	1899	1401	463
	ADMIXED	1160	185	638	409	113
CHEROKEE	TOTAL	31489	26	19028	10068	2393
	ADMIXED	24309	260	15810	7086	1413
	MALES	16105	18	9727	5131	1247
	ADMIXED	12411	124	8048	3617	746
	FEMALES	15384	8	9301	4937	1146
	ADMIXED	11898	136	7762	3469	667
WYANDOT	TOTAL	353	0	208	107	38
	ADMIXED	318	1	191	95	32
	MALES	198	0	118	52	28
	ADMIXED	179	1	109	47	23
	FEMALES	155	0	90	55	10
	ADMIXED	139	0	82	48	9
KAROK						
ORLEANS	TOTAL	775	1	379	291	105
	ADMIXED	411	0	258	144	9
	MALES	388	1	194	149	45
	ADMIXED	222	0	133	84	5
	FEMALES	387	0	185	142	60
	ADMIXED	189	0	125	60	4
KIOWAN						
KIOWA	TOTAL	1126	4	634	361	131
	ADMIXED	294	12	225	60	9
	MALES	536	2	305	168	63
	ADMIXED	159	4	116	38	5
	FEMALES	590	2	329	193	68
	ADMIXED	135	8	109	22	4
KUTENAIAN						
KUTENAI (KOOTENAI)	TOTAL	538	0	246	224	68
	ADMIXED	283	0	163	101	19
	MALES	286	0	132	119	35
	ADMIXED	156	0	88	60	8
	FEMALES	252	0	114	105	33
	ADMIXED	127	0	75	41	11
MAIDU						
MAIDU	TOTAL	1100	4	522	408	170
	ADMIXED	541	15	338	193	10
	MALES	568	0	258	224	86
	ADMIXED	290	9	169	115	6
	FEMALES	532	4	264	184	84
	ADMIXED	251	6	169	78	4

APPENDIX B (Con't)

LINGUISTIC STOCK/TRIBE		POPULATION SIZE	NOT REPORTED	<20 YEARS	20-50 YEARS	51+ YEARS
MUSKHOGEAN						
CHICKASAW	TOTAL	4204	9	2723	1286	195
	ADMIXED	3073	1	2219	767	87
	MALES	2061	3	1353	623	85
	ADMIXED	1546	1	1115	384	47
	FEMALES	2143	6	1370	663	110
	ADMIXED	1527	0	1104	383	40
CHOCTAW	TOTAL	15917	50	9468	5368	1081
	ADMIXED	8709	108	6045	2321	343
	MALES	8118	21	4840	2675	603
	ADMIXED	4362	57	3029	1136	197
	FEMALES	7799	29	4628	2693	478
	ADMIXED	4347	51	3016	1185	146
CREEK	TOTAL	7341	27	3910	2827	604
	ADMIXED	3135	88	2038	915	182
	MALES	3657	13	1938	1389	330
	ADMIXED	1610	45	1030	471	109
	FEMALES	3684	14	1972	1438	274
	ADMIXED	1525	43	1008	444	73
SEMINOLE	TOTAL	1729	7	900	675	154
	ADMIXED	389	48	222	144	23
	MALES	891	4	453	354	84
	ADMIXED	220	28	126	79	15
	FEMALES	838	3	447	321	70
	ADMIXED	169	20	96	65	8
PIMAN						
PAPAGO	TOTAL	3798	10	1995	1416	387
	ADMIXED	55	40	40	13	2
	MALES	1947	3	1034	704	209
	ADMIXED	27	20	20	6	1
	FEMALES	1851	7	961	712	178
	ADMIXED	28	20	20	7	1
PIMA	TOTAL	4236	14	2125	1478	633
	ADMIXED	19	42	13	6	0
	MALES	2198	5	1092	784	322
	ADMIXED	14	21	12	2	0
	FEMALES	2038	9	1033	694	311
	ADMIXED	5	21	1	4	0
SALISHAN						
COAST SALISH	TOTAL	3918	17	1970	1303	645
	ADMIXED	1231	11	836	368	27
	MALES	2045	7	1018	696	331
	ADMIXED	684	6	434	230	20
	FEMALES	1873	10	952	607	303
	ADMIXED	547	5	402	138	7
INTERIOR SALISH	TOTAL	3780	23	1700	1386	694
	ADMIXED	1450	68	879	490	81
	MALES	1904	9	865	700	339
	ADMIXED	760	35	445	267	48
	FEMALES	1876	14	835	686	355
	ADMIXED	690	33	434	223	33

APPENDIX B (Con't)

LINGUISTIC STOCK/TRIBE		POPULATION SIZE	NOT REPORTED	<20 YEARS	20-50 YEARS	51+ YEARS
SHAPWAILUTAN						
KLAMATH/MODOC	TOTAL	978	3	443	339	196
	ADMIXED	319	1	212	103	4
	MALES	468	2	218	172	78
	ADMIXED	169	1	108	58	3
	FEMALES	510	1	225	167	118
	ADMIXED	150	0	104	45	1
SHAHAPTIANS	TOTAL	4391	51	1771	1691	929
	ADMIXED	995	21	606	329	60
	MALES	2085	19	866	807	412
	ADMIXED	507	13	283	184	40
	FEMALES	2306	32	905	884	517
	ADMIXED	488	8	323	145	20
CAYUSE/MOLALA	TOTAL	329	1	150	111	68
	ADMIXED	59	1	39	17	3
	MALES	160	1	78	54	28
	ADMIXED	33	1	22	9	2
	FEMALES	169	0	72	57	40
	ADMIXED	26	0	17	8	1
SHOSHONEAN						
CALIF. SHOSHONEANS	TOTAL	1497	5	673	575	249
	ADMIXED	241	3	161	76	4
	MALES	796	1	348	320	128
	ADMIXED	120	2	77	39	4
	FEMALES	701	4	325	255	121
	ADMIXED	121	1	84	37	0
BANNOCK	TOTAL	413	0	149	176	88
	ADMIXED	90	0	48	37	5
	MALES	214	0	79	93	42
	ADMIXED	45	0	23	20	2
	FEMALES	199	0	70	83	46
	ADMIXED	45	0	25	17	3
COMANCHE	TOTAL	1171	15	551	445	175
	ADMIXED	404	28	256	119	29
	MALES	590	7	295	217	78
	ADMIXED	213	14	134	61	18
	FEMALES	581	8	256	228	97
	ADMIXED	191	14	122	58	11
HOPI	TOTAL	2009	2	1005	826	178
	ADMIXED	3	0	2	1	0
	MALES	1061	1	516	449	96
	ADMIXED	2	0	2	0	0
	FEMALES	948	1	489	377	82
	ADMIXED	1	0	0	1	0
PAIUTE/MONO/PAVIOTSO	TOTAL	5621	91	2278	2354	989
	ADMIXED	563	185	381	170	12
	MALES	2761	48	1133	1130	498
	ADMIXED	287	97	189	91	7
	FEMALES	2860	43	1145	1224	491
	ADMIXED	276	88	192	79	5

APPENDIX B (Con't)

LINGUISTIC STOCK/TRIBE		POPULATION SIZE	NOT REPORTED	<20 YEARS	20-50 YEARS	51+ YEARS
SHOSHONI	TOTAL	3840	8	1586	1604	650
	ADMIXED	505	6	316	177	12
	MALES	1967	2	822	827	318
	ADMIXED	264	4	151	106	7
	FEMALES	1873	6	764	777	332
	ADMIXED	241	2	165	71	5
UTE	TOTAL	2244	26	1006	885	353
	ADMIXED	109	20	77	31	1
	MALES	1211	15	534	475	202
	ADMIXED	54	11	33	20	1
	FEMALES	1033	11	472	410	151
	ADMIXED	55	9	44	11	0
SIOUAN						
ASSINIBOIN	TOTAL	1253	0	545	459	249
	ADMIXED	447	13	291	145	11
	MALES	643	0	300	239	104
	ADMIXED	244	6	167	73	4
	FEMALES	610	0	245	220	145
	ADMIXED	203	7	124	72	7
CATAWBA	TOTAL	124	1	76	33	15
	ADMIXED	113	0	76	27	10
	MALES	68	0	43	18	7
	ADMIXED	62	0	43	14	5
	FEMALES	56	1	33	15	8
	ADMIXED	51	0	33	13	5
CROW	TOTAL	1799	2	747	676	376
	ADMIXED	396	161	274	111	11
	MALES	903	1	388	349	166
	ADMIXED	202	85	144	54	4
	FEMALES	896	1	359	327	210
	ADMIXED	194	76	130	57	7
DAKOTA	TOTAL	22778	35	10173	8337	4268
	ADMIXED	6566	192	3999	2199	368
	MALES	11339	13	5115	4276	1948
	ADMIXED	3378	94	1997	1186	195
	FEMALES	11439	22	5058	4061	2320
	ADMIXED	3188	98	2002	1013	173
HIDATSA	TOTAL	547	6	307	164	76
	ADMIXED	127	0	91	33	3
	MALES	288	1	170	83	35
	ADMIXED	60	0	42	16	2
	FEMALES	259	5	137	81	41
	ADMIXED	67	0	49	17	1
IOWA	TOTAL	244	1	137	86	21
	ADMIXED	184	0	116	58	10
	MALES	127	0	72	44	11
	ADMIXED	96	0	60	30	6
	FEMALES	117	1	65	42	10
	ADMIXED	88	0	56	28	4

APPENDIX B (Con't)

LINGUISTIC STOCK/TRIBE		POPULATION SIZE	NOT REPORTED	<20 YEARS	20-50 YEARS	51+ YEARS
KANSA	TOTAL	238	2	154	67	17
	ADMIXED	167	0	123	39	5
	MALES	133	2	73	49	11
	ADMIXED	87	0	54	29	4
	FEMALES	105	0	81	18	6
	ADMIXED	80	0	69	10	1
MANDAN	TOTAL	209	1	94	67	48
	ADMIXED	44	0	33	10	1
	MALES	107	1	51	35	21
	ADMIXED	27	0	21	5	1
	FEMALES	102	0	43	32	27
	ADMIXED	17	0	12	5	0
OMAHA	TOTAL	1105	3	581	387	137
	ADMIXED	144	76	104	36	4
	MALES	566	1	300	195	71
	ADMIXED	80	37	57	21	2
	FEMALES	539	2	281	192	66
	ADMIXED	64	39	47	15	2
OSAGE	TOTAL	1373	5	795	467	111
	ADMIXED	774	3	526	212	36
	MALES	713	4	410	247	56
	ADMIXED	402	0	270	115	17
	FEMALES	660	1	385	220	55
	ADMIXED	372	3	256	97	19
OTO/MISSOURI	TOTAL	345	3	172	133	40
	ADMIXED	124	0	72	45	7
	MALES	189	2	98	69	22
	ADMIXED	71	0	38	27	6
	FEMALES	156	1	74	64	18
	ADMIXED	53	0	34	18	1
PONCA	TOTAL	875	0	462	316	97
	ADMIXED	408	6	269	125	14
	MALES	432	0	220	162	50
	ADMIXED	205	3	127	68	10
	FEMALES	443	0	242	154	47
	ADMIXED	203	3	142	57	4
QUAPAW	TOTAL	231	0	142	67	22
	ADMIXED	118	50	88	26	4
	MALES	115	0	72	32	11
	ADMIXED	63	26	44	16	3
	FEMALES	116	0	70	35	11
	ADMIXED	55	24	44	10	1
WINNEBAGO	TOTAL	1820	23	830	696	294
	ADMIXED	277	0	159	97	21
	MALES	918	15	417	353	148
	ADMIXED	149	0	85	53	11
	FEMALES	774	8	339	299	136
	ADMIXED	128	0	74	44	10

APPENDIX B (Con't)

LINGUISTIC STOCK/TRIBE		POPULATION SIZE	NOT REPORTED	<20 YEARS	20-50 YEARS	51+ YEARS
WASHOAN						
WASHO	TOTAL	819	9	311	382	126
	ADMIXED	170	6	105	64	1
	MALES	414	5	156	189	69
	ADMIXED	74	5	42	32	0
	FEMALES	405	4	155	193	57
	ADMIXED	96	1	63	32	1
WIYOT						
HUMBOLDT BAY	TOTAL	152	0	70	48	34
	ADMIXED	81	0	52	26	3
	MALES	92	0	46	29	17
	ADMIXED	54	0	34	18	2
	FEMALES	60	0	24	19	17
	ADMIXED	27	0	18	8	1
YUMAN						
COCOPA	TOTAL	245	7	104	105	36
	ADMIXED	2	0	1	1	0
	MALES	130	6	55	52	23
	ADMIXED	0	0	0	0	0
	FEMALES	115	1	49	53	13
	ADMIXED	2	0	1	1	0
DIEGUENO	TOTAL	756	3	377	261	118
	ADMIXED	171	0	124	41	6
	MALES	408	1	193	150	65
	ADMIXED	96	0	63	28	5
	FEMALES	348	2	184	111	53
	ADMIXED	75	0	61	13	1
MARICOPA	TOTAL	386	1	189	136	61
	ADMIXED	2	17	1	1	0
	MALES	195	0	91	70	34
	ADMIXED	2	4	1	1	0
	FEMALES	191	1	98	66	27
	ADMIXED	0	13	0	0	0
MOHAVE	TOTAL	1058	42	434	392	232
	ADMIXED	9	11	6	3	0
	MALES	585	35	242	212	131
	ADMIXED	3	10	2	1	0
	FEMALES	473	7	192	180	101
	ADMIXED	6	1	4	2	0
NORTHERN YUMANS	TOTAL	988	6	458	341	189
	ADMIXED	21	28	18	3	0
	MALES	542	5	251	174	117
	ADMIXED	13	15	13	0	0
	FEMALES	446	1	207	167	72
	ADMIXED	8	13	5	3	0
YUMA	TOTAL	834	1	317	362	155
	ADMIXED	16	2	15	1	0
	MALES	435	1	156	196	83
	ADMIXED	9	0	8	1	0
	FEMALES	399	0	161	166	72
	ADMIXED	7	2	7	0	0

APPENDIX B (Con't)

LINGUISTIC STOCK/TRIBE		POPULATION SIZE	NOT REPORTED	<20 YEARS	20-50 YEARS	51+ YEARS
YUROK						
YUROK	TOTAL	668	2	297	253	118
	ADMIXED	140	0	99	39	2
	MALES	327	1	150	113	64
	ADMIXED	81	0	56	24	1
	FEMALES	341	1	147	140	54
	ADMIXED	59	0	43	15	1
ZUNIAN						
ZUNI	TOTAL	1667	9	745	685	237
	ADMIXED	15	0	12	3	0
	MALES	870	5	368	370	132
	ADMIXED	11	0	9	2	0
	FEMALES	797	4	377	315	105
	ADMIXED	4	0	3	1	0

****

51+ YEARS = ALL INDIVIDUALS WITH 'AGE NOT REPORTED' HAVE BEEN ALLOCATED TO THE 51+ AGE CATEGORY.

ADMIXED = ALL 'ADMIXTURE NOT REPORTED' INDIVIDUALS HAVE BEEN ALLOCATED TO THE NON-ADMIXED COMPONENT OF THE POPULATION.

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Adapted from:

U.S. Department of Commerce. Bureau of the Census. Indian population of the United States and Alaska: 1910. Washington, D.C: U.S. Government Printing Office.

APPENDIX C

AMERICAN INDIANS BY LINGUISTIC STOCK/TRIBE:1930

ALGONQUIAN (15)

AGE GROUP	TOTAL		MALE		FEMALE	
	n(i)	a(i)	n(i)	a(i)	n(i)	a(i)
<5	8059	5745	4121	2957	3938	2788
5-9	8034	5763	4044	2888	3990	2875
10-14	7122	5140	3690	2688	3432	2452
15-19	5867	3992	2939	2012	2928	1980
20-24	4378	2857	2252	1475	2126	1382
25-29	3300	2100	1645	1022	1655	1078
30-34	2768	1727	1435	887	1333	840
35-39	2737	1725	1396	865	1341	860
40-44	2333	1400	1176	698	1157	702
45-49	2111	1262	1149	705	962	557
50-54	1660	950	921	527	739	423
55-59	1429	807	801	447	628	360
60-64	1173	607	634	334	539	273
65-69	974	498	512	262	462	236
70-74	700	343	380	202	320	141
75+	1000	428	485	210	515	218
N.R.	48	692	24	351	24	341
TOTAL	53645	35344	27580	18179	26065	17165

ATHAPASKAN (5)

TOTAL		MALE		FEMALE		AGE GROUP
n(i)	a(i)	n(i)	a(i)	n(i)	a(i)	
7784	335	3878	169	3906	166	<5
7553	279	3815	134	3738	145	5-9
5572	214	2857	109	2715	105	10-14
5024	163	2493	74	2531	89	15-19
4543	149	2213	80	2330	69	20-24
3418	121	1724	64	1694	57	25-29
2859	99	1514	63	1345	36	30-34
2164	78	1141	44	1023	34	35-39
1931	59	1013	28	918	31	40-44
1484	45	785	26	699	19	45-49
1245	51	663	29	582	22	50-54
985	39	524	21	461	18	55-59
1041	50	543	35	498	15	60-64
619	27	334	17	285	10	65-69
412	7	200	5	212	2	70-74
784	8	391	5	393	3	75+
55	2658	39	1333	16	1325	N.R.
47418	1724	24088	903	23330	821	TOTAL

CADDOAN (4)

AGE GROUP	TOTAL		MALE		FEMALE	
	n(i)	a(i)	n(i)	a(i)	n(i)	a(i)
<5	301	118	149	58	152	60
5-9	300	115	155	60	145	55
10-14	269	86	133	40	136	46
15-19	228	86	107	42	121	44
20-24	177	49	84	24	93	25
25-29	156	38	83	21	73	17
30-34	116	20	55	11	61	9
35-39	124	19	60	14	64	5
40-44	95	17	41	10	54	7
45-49	88	6	38	3	50	3
50-54	68	19	42	15	26	4
55-59	43	5	24	1	19	4
60-64	44	4	23	3	21	1
65-69	37	5	27	4	10	1
70-74	19	0	10	0	9	0
75+	50	4	20	0	30	4
N.R.	4	75	1	35	3	40
TOTAL	2115	591	1051	306	1064	285

CHIMAKUAN (0)

TOTAL		MALE		FEMALE		AGE GROUP
n(i)	a(i)	n(i)	a(i)	n(i)	a(i)	
58	11	27	8	31	3	<5
46	4	28	3	18	1	5-9
28	3	9	0	19	3	10-14
31	5	18	3	13	2	15-19
25	6	13	3	12	3	20-24
31	1	15	1	16	0	25-29
16	1	11	0	5	1	30-34
24	1	17	1	7	0	35-39
13	1	8	0	5	1	40-44
15	0	10	0	5	0	45-49
10	1	4	0	6	1	50-54
21	0	10	0	11	0	55-59
24	0	7	0	17	0	60-64
8	0	4	0	4	0	65-69
7	0	5	0	2	0	70-74
18	1	11	0	7	1	75+
0	0	0	0	0	0	N.R.
375	35	197	19	178	16	TOTAL

CHINOOKAN (0)

AGE GROUP	TOTAL		MALE		FEMALE	
	n(i)	a(i)	n(i)	a(i)	n(i)	a(i)
<5	73	48	38	22	35	26
5-9	78	55	36	23	42	32
10-14	59	43	26	18	33	25
15-19	61	40	29	23	32	17
20-24	42	26	27	19	15	7
25-29	36	21	16	8	20	13
30-34	29	14	16	9	13	5
35-39	27	16	10	7	17	9
40-44	32	19	20	11	12	8
45-49	23	17	13	12	10	5
50-54	23	14	14	10	9	4
55-59	12	5	8	2	4	3
60-64	17	8	10	6	7	2
65-69	16	10	10	7	6	3
70-74	20	10	9	4	11	6
75+	13	6	7	4	6	2
N.R.	0	9	0	3	0	6
TOTAL	561	352	289	185	272	167

IROQUOIAN (3)

TOTAL		MALE		FEMALE		AGE GROUP
n(i)	a(i)	n(i)	a(i)	n(i)	a(i)	
7702	6495	3925	3298	3777	3197	<5
7896	6603	3958	3318	3938	3285	5-9
6760	5670	3435	2868	3325	2802	10-14
6324	5074	3233	2638	3091	2436	15-19
4541	3488	2285	1757	2256	1731	20-24
3623	2719	1798	1354	1825	1365	25-29
2903	2166	1452	1085	1451	1081	30-34
2725	1980	1368	980	1357	1000	35-39
2353	1689	1117	786	1236	903	40-44
2092	1412	1065	695	1027	717	45-49
1784	1163	939	573	845	590	50-54
1357	907	750	493	607	414	55-59
829	545	457	298	372	247	60-64
587	356	301	179	286	177	65-69
409	260	199	123	210	137	70-74
572	323	276	160	296	163	75+
14	467	7	219	7	248	N.R.
52457	40850	26558	20605	25899	20245	TOTAL

APPENDIX C (Con't)

AGE GROUP	KAROK (1) TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)
<5	84	73	43	37	41	36
5-9	91	79	40	34	51	45
10-14	78	73	38	37	40	36
15-19	74	67	33	30	41	37
20-24	70	65	37	37	33	28
25-29	47	37	27	22	20	15
30-34	35	29	21	18	14	11
35-39	39	31	25	20	14	11
40-44	43	29	28	17	15	12
45-49	38	26	19	16	19	10
50-54	39	25	24	13	15	12
55-59	32	26	19	16	13	10
60-64	31	23	20	14	11	9
65-69	17	7	7	4	10	3
70-74	14	8	4	3	10	5
75+	23	6	9	3	14	3
N.R.	2	27	1	12	1	15
TOTAL	755	604	394	321	361	283

TOTAL n(i)	a(i)	KERESAN (0) MALE n(i)	a(i)	FEMALE n(i)	a(i)	AGE GROUP
502	16	251	11	251	5	<5
446	13	231	9	215	4	5-9
459	10	230	5	229	5	10-14
492	12	240	7	252	5	15-19
386	8	200	5	186	3	20-24
312	1	163	1	149	0	25-29
238	4	147	1	91	3	30-34
221	1	127	0	94	1	35-39
168	1	96	0	72	1	40-44
227	5	122	3	105	2	45-49
190	2	129	1	61	1	50-54
122	1	69	0	53	1	55-59
113	0	72	0	41	0	60-64
74	0	40	0	34	0	65-69
62	0	29	0	33	0	70-74
122	0	71	0	51	0	75+
10	15	1	7	9	8	N.R.
4134	74	2217	43	1917	31	TOTAL

AGE GROUP	KIOWAN (1) TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)
<5	171	67	85	37	86	30
5-9	146	46	72	22	74	24
10-14	118	39	55	18	63	21
15-19	123	39	64	19	59	20
20-24	110	35	49	17	61	18
25-29	87	31	33	9	54	22
30-34	63	15	30	11	33	4
35-39	51	14	26	6	25	8
40-44	23	4	8	2	15	2
45-49	33	5	15	3	18	2
50-54	30	5	13	3	17	2
55-59	30	4	16	2	14	2
60-64	18	0	14	0	4	0
65-69	18	5	9	2	9	3
70-74	12	2	5	1	7	1
75+	17	0	8	0	9	0
N.R.	1	170	1	72	0	98
TOTAL	1050	311	502	152	548	159

TOTAL n(i)	a(i)	KUTENAIAN (1) MALE n(i)	a(i)	FEMALE n(i)	a(i)	AGE GROUP
26	15	14	7	12	8	<5
33	22	21	14	12	8	5-9
28	18	18	10	10	8	10-14
22	13	9	6	13	7	15-19
20	8	12	4	8	4	20-24
19	4	13	3	6	1	25-29
19	10	8	4	11	6	30-34
13	8	9	7	4	1	35-39
16	5	10	4	6	1	40-44
16	7	9	6	7	1	45-49
18	4	9	2	9	2	50-54
17	5	9	4	8	1	55-59
13	2	4	0	9	2	60-64
15	5	6	4	9	1	65-69
5	2	2	0	3	2	70-74
7	2	4	1	3	1	75+
0	8	0	3	0	5	N.R.
287	130	157	76	130	54	TOTAL

AGE GROUP	MAIDU (1) TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)
<5	14	12	9	8	5	4
5-9	13	10	6	5	7	5
10-14	8	7	7	6	1	1
15-19	11	11	5	5	6	6
20-24	8	7	5	4	3	3
25-29	4	2	1	0	3	2
30-34	2	2	2	2	0	0
35-39	6	4	5	3	1	1
40-44	5	2	3	1	2	1
45-49	4	3	2	2	2	1
50-54	6	6	2	2	4	4
55-59	3	1	2	1	1	0
60-64	2	2	1	1	1	1
65-69	3	3	1	1	2	2
70-74	3	1	2	1	1	0
75+	1	0	0	0	1	0
N.R.	0	1	0	1	0	0
TOTAL	93	73	53	42	40	31

TOTAL n(i)	a(i)	MIWOK (0) MALE n(i)	a(i)	FEMALE n(i)	a(i)	AGE GROUP
57	51	23	21	34	30	<5
60	50	30	24	30	26	5-9
69	54	29	23	40	31	10-14
48	36	27	23	21	13	15-19
40	33	23	19	17	14	20-24
31	21	17	12	14	9	25-29
25	17	15	13	10	4	30-34
26	19	14	11	12	8	35-39
26	20	14	10	12	10	40-44
21	11	12	7	9	4	45-49
20	13	11	9	9	4	50-54
17	13	10	7	7	6	55-59
16	5	12	2	4	3	60-64
13	8	7	5	6	3	65-69
8	2	4	1	4	1	70-74
14	3	4	1	10	2	75+
0	29	0	17	0	12	N.R.
491	356	252	188	239	168	TOTAL

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MUSKHOGEAN (4)

AGE GROUP	TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	4707	3197	2392	1623	2315	1574
5-9	5208	3470	2625	1769	2583	1701
10-14	4464	2997	2256	1484	2208	1513
15-19	4069	2539	2046	1272	2023	1267
20-24	3091	1751	1589	925	1502	826
25-29	2505	1367	1258	699	1247	668
30-34	1869	1017	922	479	947	538
35-39	1829	879	891	415	938	464
40-44	1435	702	696	339	739	363
45-49	1194	552	563	234	631	318
50-54	1107	458	550	220	557	238
55-59	796	353	446	196	350	157
60-64	473	182	256	83	217	99
65-69	316	119	160	67	156	52
70-74	219	79	104	43	115	36
75+	351	100	145	45	206	55
N.R.	26	426	12	228	14	198
TOTAL	33633	19762	16899	9893	16734	9869

PIMAN (2)

TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)	AGE GROUP
1237	50	594	33	643	17	<5
1050	30	543	11	507	19	5-9
929	23	484	13	445	10	10-14
1100	22	532	8	568	14	15-19
912	18	451	10	461	8	20-24
734	17	375	8	359	9	25-29
596	8	334	7	262	1	30-34
524	1	267	1	257	0	35-39
487	2	258	0	229	2	40-44
429	1	237	1	192	0	45-49
407	3	234	1	173	2	50-54
292	2	170	1	122	1	55-59
273	0	137	0	136	0	60-64
216	0	116	0	100	0	65-69
174	0	97	0	77	0	70-74
227	1	114	0	113	1	75+
11	92	7	48	4	44	N.R.
9587	178	4943	94	4644	84	TOTAL

POMO (0)

AGE GROUP	TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	137	82	65	38	72	44
5-9	133	80	65	39	68	41
10-14	119	71	46	23	73	48
15-19	121	65	68	35	53	30
20-24	104	58	55	32	49	26
25-29	69	37	38	22	31	15
30-34	72	34	32	15	40	19
35-39	54	25	27	16	27	9
40-44	61	26	38	15	23	11
45-49	49	13	29	9	20	4
50-54	39	13	19	9	20	4
55-59	36	9	21	7	15	2
60-64	30	8	14	4	16	4
65-69	25	4	15	3	10	1
70-74	32	7	13	4	19	3
75+	62	2	29	0	33	2
N.R.	5	9	2	5	3	4
TOTAL	1143	534	574	271	569	263

SALISHAN (2)

TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)	AGE GROUP
1279	853	643	436	636	417	<5
1287	846	640	434	647	412	5-9
1041	683	518	343	523	340	10-14
902	574	460	298	442	276	15-19
756	430	393	223	363	207	20-24
590	345	305	183	285	162	25-29
479	280	238	147	241	133	30-34
499	259	273	134	226	125	35-39
388	199	220	118	168	81	40-44
377	192	192	100	185	92	45-49
356	163	187	92	169	71	50-54
290	146	156	71	134	75	55-59
306	132	150	70	156	62	60-64
219	81	110	42	109	39	65-69
209	56	118	31	91	25	70-74
339	73	149	35	190	38	75+
33	93	11	51	22	42	N.R.
9317	5312	4752	2757	4565	2555	TOTAL

SHAPWAILUTAN (3)

AGE GROUP	TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	781	378	419	190	362	188
5-9	786	403	369	197	417	206
10-14	687	361	363	203	324	158
15-19	627	283	294	127	333	156
20-24	534	243	294	140	240	103
25-29	429	179	224	100	205	79
30-34	340	138	154	70	186	68
35-39	360	134	187	70	173	64
40-44	281	78	139	36	142	42
45-49	283	104	147	54	136	50
50-54	269	81	123	43	146	38
55-59	210	67	112	40	98	27
60-64	200	54	85	29	115	25
65-69	209	38	103	24	106	14
70-74	108	22	48	17	60	5
75+	248	25	101	11	147	14
N.R.	14	114	3	57	11	57
TOTAL	6352	2588	3162	1351	3190	1237

SHASTAN (0)

TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)	AGE GROUP
80	37	32	18	48	19	<5
96	45	52	23	44	22	5-9
87	22	48	16	39	6	10-14
70	27	31	12	39	15	15-19
52	20	29	15	23	5	20-24
62	17	37	12	25	5	25-29
55	14	31	8	24	6	30-34
64	16	33	9	31	7	35-39
56	12	28	7	28	5	40-44
47	8	25	6	22	2	45-49
40	10	24	8	16	2	50-54
20	5	16	5	4	0	55-59
28	4	17	4	11	0	60-64
22	4	11	3	11	1	65-69
23	2	11	1	12	1	70-74
42	2	19	1	23	1	75+
2	8	0	4	2	4	N.R.
844	245	444	148	400	97	TOTAL

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AGE GROUP	SHOSHONEAN (7) TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	2058	675	1018	342	1040	333
5-9	1944	577	924	280	1020	297
10-14	1618	502	827	259	791	243
15-19	1517	424	728	186	789	238
20-24	1182	299	609	165	573	134
25-29	1122	247	600	136	522	111
30-34	966	193	498	100	468	93
35-39	863	173	451	91	412	82
40-44	793	146	428	80	365	66
45-49	677	123	362	61	315	62
50-54	721	111	381	60	340	51
55-59	621	91	333	49	288	42
60-64	558	63	299	37	259	26
65-69	436	36	222	13	214	23
70-74	328	23	167	8	161	15
75+	581	31	284	12	297	19
N.R.	46	555	18	267	28	288
TOTAL	15985	3714	8131	1879	7854	1835

AGE GROUP	SIOUAN (14) TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	5257	2968	2625	1508	2632	1460
5-9	5018	2904	2511	1461	2507	1443
10-14	4513	2533	2327	1292	2186	1241
15-19	3919	2191	1996	1116	1923	1075
20-24	2929	1492	1528	784	1401	708
25-29	2471	1169	1268	600	1203	569
30-34	2163	966	1120	511	1043	455
35-39	2015	843	1069	447	946	396
40-44	1668	695	906	365	762	330
45-49	1539	594	793	299	746	295
50-54	1353	409	731	228	622	181
55-59	1202	337	635	189	567	148
60-64	952	253	526	141	426	112
65-69	821	186	428	103	393	83
70-74	580	89	266	43	314	46
75+	929	132	422	69	507	63
N.R.	59	300	33	151	26	149
TOTAL	37329	17761	19151	9156	18178	8605

AGE GROUP	TANOAN (0) TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	443	28	218	11	225	17
5-9	425	41	211	17	214	24
10-14	363	34	180	20	183	14
15-19	397	18	205	6	192	12
20-24	274	12	136	7	138	5
25-29	255	9	122	3	133	6
30-34	192	7	104	3	88	4
35-39	201	3	125	1	76	2
40-44	183	5	111	2	72	3
45-49	187	2	111	1	76	1
50-54	147	1	76	1	71	0
55-59	85	3	48	1	37	2
60-64	91	0	52	0	39	0
65-69	79	0	55	0	24	0
70-74	32	1	12	1	20	0
75+	58	4	37	3	21	1
N.R.	0	7	0	7	0	0
TOTAL	3412	168	1803	77	1609	91

AGE GROUP	WASHOAN (1) TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	64	22	31	9	33	13
5-9	66	20	38	11	28	9
10-14	60	20	27	4	33	16
15-19	57	12	33	6	24	6
20-24	47	9	18	1	29	8
25-29	44	14	24	7	20	7
30-34	46	8	19	4	27	4
35-39	44	6	27	3	17	3
40-44	43	10	24	6	19	4
45-49	39	10	24	5	15	5
50-54	31	3	18	3	13	0
55-59	29	1	15	0	14	1
60-64	31	1	19	1	12	0
65-69	23	1	12	1	11	0
70-74	18	0	6	0	12	0
75+	26	0	11	0	15	0
N.R.	1	0	0	0	1	0
TOTAL	668	137	346	61	322	76

AGE GROUP	WINTUN (0) TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	69	59	35	27	34	32
5-9	68	62	26	23	42	39
10-14	45	38	22	19	23	19
15-19	50	39	35	28	15	11
20-24	37	27	18	15	19	12
25-29	34	22	22	14	12	8
30-34	24	18	14	9	10	9
35-39	27	20	17	13	10	7
40-44	32	22	13	9	19	13
45-49	33	27	23	20	10	7
50-54	19	11	8	7	11	4
55-59	18	12	8	6	10	6
60-64	14	5	9	4	5	1
65-69	11	6	7	5	4	1
70-74	13	5	9	5	4	0
75+	18	4	9	2	9	2
N.R.	0	27	0	12	0	15
TOTAL	512	377	275	206	237	171

AGE GROUP	WIYOT (1) TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	38	31	22	18	16	13
5-9	33	27	14	10	19	17
10-14	20	16	10	9	10	7
15-19	18	15	8	7	10	8
20-24	12	8	7	6	5	2
25-29	16	13	10	8	6	5
30-34	13	8	7	4	6	4
35-39	15	9	8	5	7	4
40-44	8	5	6	4	2	1
45-49	9	5	3	2	6	3
50-54	4	3	1	0	3	3
55-59	12	8	7	5	5	3
60-64	9	5	4	1	5	4
65-69	8	6	5	4	3	2
70-74	9	1	6	1	3	0
75+	12	2	5	1	7	1
N.R.	4	0	2	0	2	0
TOTAL	236	162	123	85	113	77

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YOKUTS (1)

AGE GROUP	TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	119	81	57	42	62	39
5-9	141	98	83	63	58	35
10-14	134	89	72	48	62	41
15-19	123	78	66	43	57	35
20-24	86	46	47	25	39	21
25-29	82	49	47	30	35	19
30-34	62	28	33	14	29	14
35-39	71	34	36	18	35	16
40-44	58	24	34	13	24	11
45-49	54	27	29	18	25	9
50-54	45	22	24	12	21	10
55-59	34	20	24	13	10	7
60-64	33	19	15	9	18	10
65-69	28	14	15	9	13	5
70-74	33	8	17	6	16	2
75+	42	3	17	2	25	1
N.R.	0	31	0	16	0	15
TOTAL	1145	640	616	365	529	275

YUMAN (6)

TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)	AGE GROUP
492	119	253	69	239	50	<5
524	104	260	49	264	55	5-9
424	92	210	47	214	45	10-14
392	92	206	48	186	44	15-19
400	57	209	31	191	26	20-24
348	54	193	32	155	22	25-29
307	36	144	17	163	19	30-34
300	33	178	19	122	14	35-39
248	23	142	11	106	12	40-44
213	22	130	14	83	8	45-49
212	18	122	10	90	8	50-54
167	20	96	11	71	9	55-59
139	13	73	9	66	4	60-64
134	7	69	6	65	1	65-69
84	4	45	3	39	1	70-74
153	4	87	2	66	2	75+
2	229	2	128	0	101	N.R.
4537	698	2417	378	2120	320	TOTAL

YUROK (1)

AGE GROUP	TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	49	41	25	22	24	19
5-9	59	43	28	20	31	23
10-14	61	43	25	19	36	24
15-19	55	31	27	15	28	16
20-24	44	23	27	14	17	9
25-29	21	13	11	7	10	6
30-34	24	14	16	10	8	4
35-39	20	9	13	8	7	1
40-44	22	16	14	10	8	6
45-49	17	7	7	3	10	4
50-54	12	5	3	1	9	4
55-59	16	7	9	4	7	3
60-64	15	6	7	3	8	3
65-69	17	5	4	1	13	4
70-74	20	3	13	3	7	0
75+	19	0	7	0	12	0
N.R.	0	0	0	0	0	0
TOTAL	471	266	236	140	235	126

ZUNIAN (1)

TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)	AGE GROUP
243	4	130	3	113	1	<5
195	1	111	0	84	1	5-9
183	0	108	0	75	0	10-14
180	1	93	0	87	1	15-19
139	0	65	0	74	0	20-24
160	1	98	1	62	0	25-29
105	0	60	0	45	0	30-34
80	1	44	1	36	0	35-39
78	0	39	0	39	0	40-44
87	0	55	0	32	0	45-49
75	0	43	0	32	0	50-54
70	0	41	0	29	0	55-59
47	0	25	0	22	0	60-64
45	0	28	0	17	0	65-69
26	0	19	0	7	0	70-74
36	0	28	0	8	0	75+
1	1711	1	956	0	755	N.R.
1749	8	987	5	762	3	TOTAL

RESIDUAL

AGE GROUP	TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	4270	1031	2074	516	2196	515
5-9	4487	1089	2226	554	2261	535
10-14	3631	877	1729	443	1902	434
15-19	3758	730	1848	369	1910	361
20-24	3302	442	1701	232	1601	210
25-29	2937	349	1637	186	1300	163
30-34	2446	257	1342	140	1104	117
35-39	2358	312	1307	184	1051	128
40-44	1821	215	1047	113	774	102
45-49	1660	209	947	113	713	96
50-54	1378	142	784	79	594	63
55-59	1025	112	605	69	420	43
60-64	799	79	447	45	352	34
65-69	687	57	401	37	286	20
70-74	492	46	293	28	199	18
75+	782	54	438	32	344	22
N.R.	101	27339	59	14427	42	12912
TOTAL	35833	6001	18826	3140	17007	2861

APPENDIX C (Cont')

ALGONQUIAN

AGE GROUP	ARAPAHO TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)
<5	203	58	97	25	106	33
5-9	151	45	86	27	65	18
10-14	131	35	67	21	64	14
15-19	111	28	50	12	61	16
20-24	98	13	48	6	50	7
25-29	95	18	47	10	48	8
30-34	85	14	47	8	38	6
35-39	60	10	32	6	28	4
40-44	44	4	19	2	25	2
45-49	62	5	43	4	19	1
50-54	64	3	34	2	30	1
55-59	37	7	22	6	15	1
60-64	40	3	24	2	16	1
65-69	25	0	9	0	16	0
70-74	13	0	6	0	7	0
75+	22	1	15	1	7	0
N.R.	2	35	2	17	0	18
TOTAL	1241	244	646	132	595	112

AGE GROUP	ATLANTIC COAST TRIBES TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	AGE GROUP
<5	221	208	110	103	111	105	<5
5-9	284	261	129	118	155	143	5-9
10-14	222	213	111	106	111	107	10-14
15-19	219	204	109	103	110	101	15-19
20-24	148	134	84	77	64	57	20-24
25-29	100	87	50	44	50	43	25-29
30-34	114	90	56	44	58	46	30-34
35-39	129	122	62	59	67	53	35-39
40-44	88	76	42	37	46	39	40-44
45-49	108	98	60	56	48	42	45-49
50-54	105	94	59	53	46	41	50-54
55-59	70	62	36	31	34	31	55-59
60-64	67	59	41	36	26	23	60-64
65-69	55	46	25	21	30	25	65-69
70-74	28	23	15	13	13	10	70-74
75+	57	43	34	24	23	19	75+
N.R.	0	51	0	23	0	28	N.R.
TOTAL	2015	1820	1023	925	992	885	TOTAL

AGE GROUP	PEIGAN TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)
<5	507	354	266	190	241	164
5-9	450	346	225	176	225	170
10-14	402	296	214	162	188	134
15-19	317	216	163	102	154	114
20-24	248	169	130	88	118	81
25-29	216	136	113	72	103	64
30-34	208	132	111	71	97	61
35-39	144	84	78	42	66	42
40-44	110	63	64	33	46	30
45-49	118	72	65	42	53	30
50-54	120	66	67	41	53	25
55-59	104	49	63	30	41	19
60-64	68	19	38	10	30	9
65-69	44	15	21	8	23	7
70-74	37	10	17	5	20	5
75+	52	21	20	9	32	12
N.R.	15	38	6	19	9	19
TOTAL	3145	2048	1655	1081	1490	967

AGE GROUP	CHEYENNE TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	AGE GROUP
<5	338	94	161	47	177	47	<5
5-9	309	78	148	39	161	39	5-9
10-14	287	78	137	37	150	41	10-14
15-19	286	58	144	35	142	23	15-19
20-24	171	25	88	12	83	13	20-24
25-29	151	26	76	11	75	15	25-29
30-34	156	27	81	11	75	16	30-34
35-39	175	32	83	14	92	18	35-39
40-44	151	23	83	13	68	10	40-44
45-49	142	22	74	11	68	11	45-49
50-54	103	16	54	6	49	10	50-54
55-59	100	9	51	5	49	4	55-59
60-64	86	7	47	5	39	2	60-64
65-69	88	5	53	2	35	3	65-69
70-74	49	2	33	2	16	0	70-74
75+	103	2	45	0	58	2	75+
N.R.	10	30	6	18	4	12	N.R.
TOTAL	2695	504	1358	250	1337	254	TOTAL

AGE GROUP	CHIPPEWA TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)
<5	3277	2815	1697	1451	1580	1364
5-9	3221	2768	1616	1373	1605	1395
10-14	2896	2471	1440	1235	1456	1236
15-19	2334	1918	1180	981	1154	937
20-24	1662	1344	880	714	782	630
25-29	1332	1051	700	551	632	500
30-34	1096	859	597	465	499	394
35-39	1092	841	579	446	513	395
40-44	925	683	491	371	434	312
45-49	815	594	448	335	367	259
50-54	595	418	332	243	263	175
55-59	579	414	324	235	255	179
60-64	508	320	263	175	245	145
65-69	424	259	223	136	201	123
70-74	315	184	158	107	157	77
75+	478	231	235	117	243	114
N.R.	13	358	5	184	8	174
TOTAL	21549	17170	11163	8935	10386	8235

AGE GROUP	DELAWARE/MUNSEE TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	AGE GROUP
<5	111	101	53	49	58	52	<5
5-9	131	117	74	66	57	51	5-9
10-14	136	118	68	59	68	59	10-14
15-19	110	96	59	52	51	44	15-19
20-24	85	62	48	35	37	27	20-24
25-29	71	49	33	23	38	26	25-29
30-34	63	43	30	22	33	21	30-34
35-39	59	40	32	22	27	18	35-39
40-44	47	32	21	13	26	19	40-44
45-49	35	23	16	10	19	13	45-49
50-54	33	21	15	9	18	12	50-54
55-59	33	17	12	7	21	10	55-59
60-64	18	10	9	4	9	6	60-64
65-69	12	6	7	4	5	2	65-69
70-74	14	6	5	3	9	3	70-74
75+	13	3	6	1	7	2	75+
N.R.	1	31	1	19	0	12	N.R.
TOTAL	971	744	488	379	483	365	TOTAL

APPENDIX C (Cont't)

ALGONQUIAN

AGE GROUP	GROS VENTRES TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	KICKAPOO TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	AGE GROUP
<5	110	74	58	39	52	35	77	41	40	20	37	21	<5
5-9	73	53	39	32	34	21	63	38	31	20	32	18	5-9
10-14	95	67	43	32	52	35	57	37	28	16	29	21	10-14
15-19	63	42	38	22	25	20	52	24	26	12	26	12	15-19
20-24	57	27	32	15	25	12	51	22	30	13	21	9	20-24
25-29	29	17	15	7	14	10	40	18	24	12	16	6	25-29
30-34	30	17	14	9	16	8	35	19	18	9	17	10	30-34
35-39	27	17	13	5	14	12	35	14	15	7	20	7	35-39
40-44	29	13	19	9	10	4	23	10	13	4	10	6	40-44
45-49	24	16	18	13	6	3	27	7	13	5	14	2	45-49
50-54	16	4	10	2	6	2	20	7	14	4	6	3	50-54
55-59	20	7	11	2	9	5	14	9	10	5	4	4	55-59
60-64	19	1	11	0	8	1	8	4	4	3	4	1	60-64
65-69	14	2	3	0	11	2	9	5	7	5	2	0	65-69
70-74	9	0	4	0	5	0	3	1	2	0	1	1	70-74
75+	16	0	6	0	10	0	9	2	5	1	4	1	75+
N.R.	0	3	0	2	0	1	0	5	0	2	0		N.R.
TOTAL	631	357	334	187	297	170	523	258	280	136	243	122	TOTAL

AGE GROUP	MENOMINEE TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	MIAMI/ILLINOIS TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	AGE GROUP
<5	271	228	111	96	160	132	29	29	10	10	19	19	<5
5-9	271	221	136	117	135	104	37	36	16	15	21	21	5-9
10-14	243	203	116	95	127	108	50	47	23	22	27	25	10-14
15-19	238	187	132	100	106	87	35	33	23	21	12	12	15-19
20-24	170	125	95	72	75	53	25	24	19	18	6	6	20-24
25-29	127	93	77	52	50	41	10	9	4	4	6	5	25-29
30-34	111	82	58	41	53	41	14	11	7	5	7	6	30-34
35-39	88	58	49	33	39	25	25	25	6	6	19	19	35-39
40-44	81	52	44	30	37	22	20	16	12	12	8	4	40-44
45-49	83	50	55	36	28	14	12	11	5	4	7	7	45-49
50-54	72	48	46	26	26	20	5	5	4	4	1	1	50-54
55-59	65	38	46	25	19	13	2	1	1	1	1	0	55-59
60-64	53	30	32	18	21	12	5	4	2	2	3	2	60-64
65-69	33	18	19	11	14	7	8	4	2	1	6	3	65-69
70-74	31	21	24	16	7	5	4	3	4	3	0	0	70-74
75+	32	17	14	8	18	9	3	2	1	1	2	1	75+
N.R.	0	2	0	2	0	0	0	3	0	0	0	3	N.R.
TOTAL	1969	1471	1054	776	915	693	284	260	139	129	145	131	TOTAL

AGE GROUP	OTTAWA TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	POTAWATOMI TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	AGE GROUP
<5	223	167	109	82	114	85	237	160	121	84	116	76	<5
5-9	231	172	125	90	106	82	239	156	107	68	132	88	5-9
10-14	180	123	100	70	80	53	231	158	116	80	115	78	10-14
15-19	176	120	100	69	76	51	193	124	92	67	101	57	15-19
20-24	150	90	75	45	75	45	173	102	89	47	84	55	20-24
25-29	127	79	70	42	57	37	117	74	70	42	47	32	25-29
30-34	87	49	43	23	44	26	116	68	60	32	56	33	30-34
35-39	95	61	48	29	47	32	117	72	67	39	50	33	35-39
40-44	99	53	56	31	43	22	76	41	31	15	45	26	40-44
45-49	81	45	38	20	43	25	81	45	44	27	37	18	45-49
50-54	70	44	41	24	29	20	69	31	40	18	29	13	50-54
55-59	61	22	35	15	26	7	46	28	24	14	22	14	55-59
60-64	48	29	27	16	21	13	48	22	34	16	14	6	60-64
65-69	41	25	20	14	21	11	42	22	32	16	10	6	65-69
70-74	34	18	19	10	15	8	35	17	19	9	16	8	70-74
75+	42	18	22	10	20	8	34	17	20	8	14	9	75+
N.R.	0	45	0	18	0	27	0	13	0	8	0	5	N.R.
TOTAL	1745	1115	928	590	817	525	1854	1137	966	582	888	552	TOTAL

APPENDIX C (Cont't)

ALGONQUIAN

AGE GROUP	SAUK/FOX TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	SHAWNEE TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	AGE GROUP
<5	124	32	56	13	68	19	155	115	73	55	82	60	<5
5-9	117	35	53	13	64	22	165	118	82	56	83	62	5-9
10-14	100	20	49	10	51	10	135	95	71	47	64	48	10-14
15-19	86	18	41	8	45	10	140	84	70	42	70	42	15-19
20-24	76	19	41	11	35	8	112	79	49	35	63	44	20-24
25-29	72	21	40	11	32	10	71	44	31	20	40	24	25-29
30-34	46	8	20	2	26	6	73	49	35	25	38	24	30-34
35-39	70	14	36	8	34	6	58	33	30	18	28	15	35-39
40-44	50	3	33	1	17	2	55	24	25	13	30	11	40-44
45-49	45	9	23	3	22	6	33	19	14	10	19	9	45-49
50-54	32	8	20	6	12	2	46	23	28	15	18	8	50-54
55-59	27	4	15	1	12	3	35	15	21	7	14	8	55-59
60-64	15	2	6	1	9	1	20	11	9	4	11	7	60-64
65-69	9	2	6	1	3	1	21	11	12	8	9	3	65-69
70-74	8	1	5	1	3	0	20	8	10	4	10	4	70-74
75+	10	4	2	2	8	2	22	5	10	3	12	2	75+
N.R.	0	6	0	3	0	3	0	16	0	6	0	10	N.R.
TOTAL	887	200	446	92	441	108	1161	733	570	362	591	371	TOTAL

AGE GROUP	VIRGINIA/CAROLINA TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	APACHE TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	AGE GROUP
<5	2176	1269	1159	693	1017	576	951	60	427	31	524	29	<5
5-9	2292	1319	1177	678	1115	641	859	35	419	18	440	17	5-9
10-14	1957	1179	1107	696	850	483	659	25	333	12	326	13	10-14
15-19	1507	840	712	386	795	454	590	24	318	9	272	15	15-19
20-24	1152	622	544	287	608	335	521	21	265	13	256	8	20-24
25-29	742	378	295	121	447	257	507	19	278	11	229	8	25-29
30-34	534	259	258	120	276	139	418	14	246	8	172	6	30-34
35-39	563	302	266	131	297	171	318	4	176	4	142	0	35-39
40-44	535	307	223	114	312	193	308	4	172	3	136	1	40-44
45-49	445	246	233	129	212	117	310	8	168	4	142	4	45-49
50-54	310	162	157	74	153	88	240	2	128	2	112	0	50-54
55-59	236	125	130	63	106	62	177	3	100	1	77	2	55-59
60-64	170	86	87	42	83	44	207	3	108	2	99	1	60-64
65-69	149	78	73	35	76	43	170	0	87	0	83	0	65-69
70-74	100	49	59	29	41	20	125	0	59	0	66	0	70-74
75+	107	62	50	25	57	37	177	0	85	0	92	0	75+
N.R.	7	56	4	30	3	26	17	1858	9	931	8	927	N.R.
TOTAL	12975	7283	6530	3623	6445	3660	6537	222	3369	118	3168	104	TOTAL

ATHAPASKAN

AGE GROUP	CALIFORNIA ATHAPASKANS TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	KIOWA APACHE TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	AGE GROUP
<5	149	126	75	59	74	67	31	12	15	8	16	4	<5
5-9	147	108	67	42	80	66	24	11	13	6	11	5	5-9
10-14	125	89	65	47	60	42	18	7	9	3	9	4	10-14
15-19	93	62	45	26	48	36	28	7	15	3	13	4	15-19
20-24	88	61	51	36	37	25	17	3	7	1	10	2	20-24
25-29	80	57	34	21	46	36	14	4	7	3	7	1	25-29
30-34	69	42	48	30	21	12	9	3	5	2	4	1	30-34
35-39	55	35	29	21	26	14	13	4	5	1	8	3	35-39
40-44	58	31	28	15	30	16	3	0	1	0	2	0	40-44
45-49	37	21	23	13	14	8	3	1	0	0	3	1	45-49
50-54	40	22	20	10	20	12	8	2	5	1	3	1	50-54
55-59	46	19	24	7	22	12	8	2	6	2	2	0	55-59
60-64	55	27	29	18	26	9	3	0	2	0	1	0	60-64
65-69	35	20	23	13	12	7	1	0	1	0	0	0	65-69
70-74	14	4	7	3	7	1	1	0	1	0	0	0	70-74
75+	38	3	21	2	17	1	3	0	0	0	3	0	75+
N.R.	0	20	0	12	0	8	0	50	0	23	0	27	N.R.
TOTAL	1129	727	589	363	540	364	184	56	92	30	92	26	TOTAL

APPENDIX C (Con't)

AGE GROUP	NAVAJO TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	OREGON ATHAPASKANS TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	AGE GROUP
<5	6578	74	3329	42	3249	32	75	63	32	29	43	34	<5
5-9	6443	65	3279	37	3164	28	80	60	37	31	43	29	5-9
10-14	4721	51	2422	25	2299	26	49	42	28	22	21	20	10-14
15-19	4267	31	2090	15	2177	16	46	39	25	21	21	18	15-19
20-24	3880	38	1870	18	2010	20	37	26	20	12	17	14	20-24
25-29	2789	22	1386	16	1403	6	28	19	19	13	9	6	25-29
30-34	2328	18	1194	9	1134	9	35	22	21	14	14	8	30-34
35-39	1753	18	918	11	835	7	25	17	13	7	12	10	35-39
40-44	1547	12	807	5	740	7	15	12	5	5	10	7	40-44
45-49	1116	4	584	3	532	1	18	11	10	6	8	5	45-49
50-54	937	6	499	5	438	1	20	19	11	11	9	8	50-54
55-59	741	7	386	6	355	1	13	8	8	5	5	3	55-59
60-64	754	3	389	2	365	1	22	17	15	13	7	4	60-64
65-69	400	2	219	2	181	0	13	5	4	2	9	3	65-69
70-74	264	2	128	1	136	1	8	1	5	1	3	0	70-74
75+	546	1	276	0	270	1	20	4	9	3	11	1	75+
N.R.	38	725	30	364	8	361	0	5	0	3	0	2	N.R.
TOTAL	39064	354	19776	197	19288	157	504	365	262	195	242	170	TOTAL

CADDOAN

AGE GROUP	ARIKARA TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	CADDO TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	AGE GROUP
<5	63	30	30	15	33	15	105	40	58	21	47	19	<5
5-9	66	29	33	15	33	14	81	30	47	16	34	14	5-9
10-14	49	22	20	9	29	13	62	20	28	8	34	12	10-14
15-19	37	23	17	13	20	10	82	31	37	14	45	17	15-19
20-24	35	11	17	6	18	5	55	16	27	8	28	8	20-24
25-29	27	8	13	4	14	4	47	18	28	13	19	5	25-29
30-34	25	4	11	2	14	2	38	6	21	5	17	1	30-34
35-39	20	8	9	6	11	2	29	1	14	0	15	1	35-39
40-44	20	5	7	3	13	2	22	5	13	2	9	3	40-44
45-49	19	1	11	1	8	0	24	2	9	0	15	2	45-49
50-54	16	9	12	8	4	1	21	4	10	2	11	2	50-54
55-59	9	3	4	0	5	3	14	2	8	1	6	1	55-59
60-64	8	1	5	1	3	0	14	2	8	1	6	1	60-64
65-69	11	1	10	1	1	0	8	2	5	1	3	1	65-69
70-74	6	0	4	0	2	0	4	0	2	0	2	0	70-74
75+	9	0	5	0	4	0	19	1	8	0	11	1	75+
N.R.	0	0	0	0	0	0	4	65	1	30	3	35	N.R.
TOTAL	420	155	208	84	212	71	625	180	323	92	302	88	TOTAL

AGE GROUP	PAWNEE TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	WICHITA/KICHAI TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	AGE GROUP
<5	91	44	42	19	49	25	42	4	19	3	23	1	<5
5-9	119	49	62	26	57	23	34	7	13	3	21	4	5-9
10-14	120	39	63	19	57	20	38	5	22	4	16	1	10-14
15-19	81	28	41	14	40	14	28	4	12	1	16	3	15-19
20-24	64	21	27	9	37	12	23	1	13	1	10	0	20-24
25-29	58	11	30	4	28	7	24	1	12	0	12	1	25-29
30-34	40	9	18	4	22	5	13	1	5	0	8	1	30-34
35-39	52	10	25	8	27	2	23	0	12	0	11	0	35-39
40-44	32	6	15	4	17	2	21	1	6	1	15	0	40-44
45-49	29	2	10	2	19	0	16	1	8	0	8	1	45-49
50-54	20	4	13	3	7	1	11	2	7	2	4	0	50-54
55-59	11	0	6	0	5	0	9	0	6	0	3	0	55-59
60-64	19	1	8	1	11	0	3	0	2	0	1	0	60-64
65-69	13	2	9	2	4	0	5	0	3	0	2	0	65-69
70-74	7	0	3	0	4	0	2	0	1	0	1	0	70-74
75+	14	3	4	0	10	3	8	0	3	0	5	0	75+
N.R.	0	4	0	2	0	2	0	6	0	3	0	3	N.R.
TOTAL	770	229	376	115	394	114	300	27	144	15	156	12	TOTAL

APPENDIX C (Cont't)

IROQUOIAN

AGE GROUP	IROQUOIS TOTAL n(i)	IROQUOIS TOTAL a(i)	IROQUOIS MALE n(i)	IROQUOIS MALE a(i)	IROQUOIS FEMALE n(i)	IROQUOIS FEMALE a(i)
<5	901	532	453	278	448	254
5-9	891	537	442	272	449	265
10-14	809	498	397	243	412	255
15-19	735	427	355	209	380	218
20-24	555	288	278	150	277	138
25-29	464	219	242	114	222	105
30-34	374	191	184	98	190	93
35-39	383	176	203	85	180	91
40-44	378	189	192	95	186	94
45-49	323	148	164	66	159	82
50-54	295	141	166	73	129	68
55-59	219	98	126	61	93	37
60-64	171	82	99	49	72	33
65-69	156	64	79	32	77	32
70-74	98	40	61	23	37	18
75+	114	40	68	25	46	15
N.R.	2	118	2	48	0	70
TOTAL	6866	3670	3509	1873	3357	1798

CHEROKEE TOTAL n(i)	CHEROKEE TOTAL a(i)	CHEROKEE MALE n(i)	CHEROKEE MALE a(i)	CHEROKEE FEMALE n(i)	CHEROKEE FEMALE a(i)	AGE GROUP
6750	5912	3443	2991	3307	2921	<5
6962	6023	3498	3028	3464	2995	5-9
5907	5129	3015	2602	2892	2527	10-14
5545	4605	2857	2409	2688	2196	15-19
3957	3173	1994	1595	1963	1578	20-24
3137	2478	1543	1227	1594	1251	25-29
2510	1957	1256	976	1254	981	30-34
2325	1789	1157	887	1168	902	35-39
1958	1483	921	687	1037	796	40-44
1750	1247	891	620	859	627	45-49
1478	1012	768	495	710	517	50-54
1125	796	618	426	507	370	55-59
649	455	353	244	296	211	60-64
427	288	219	144	208	144	65-69
308	218	136	98	172	120	70-74
450	279	203	132	247	147	75+
12	347	5	171	7	176	N.R.
45238	36844	22872	18561	22366	18283	TOTAL

AGE GROUP	WYANDOT TOTAL n(i)	WYANDOT TOTAL a(i)	WYANDOT MALE n(i)	WYANDOT MALE a(i)	WYANDOT FEMALE n(i)	WYANDOT FEMALE a(i)
<5	51	51	29	29	22	22
5-9	43	43	18	18	25	25
10-14	44	43	23	23	21	20
15-19	44	42	21	20	23	22
20-24	29	27	13	12	16	15
25-29	22	22	13	13	9	9
30-34	19	18	12	11	7	7
35-39	17	15	8	8	9	7
40-44	17	17	4	4	13	13
45-49	19	17	10	9	9	8
50-54	11	10	5	5	6	5
55-59	13	13	6	6	7	7
60-64	9	8	5	5	4	3
65-69	4	4	3	3	1	1
70-74	3	2	2	2	1	0
75+	8	4	5	3	3	1
N.R.	0	2	0	0	0	2
TOTAL	353	336	177	171	176	165

KAROK

ORLEANS TOTAL n(i)	ORLEANS TOTAL a(i)	ORLEANS MALE n(i)	ORLEANS MALE a(i)	ORLEANS FEMALE n(i)	ORLEANS FEMALE a(i)	AGE GROUP
84	73	43	37	41	36	<5
91	79	40	34	51	45	5-9
78	73	38	37	40	36	10-14
74	67	33	30	41	37	15-19
70	65	37	37	33	28	20-24
47	37	27	22	20	15	25-29
35	29	21	18	14	11	30-34
39	31	25	20	14	11	35-39
43	29	28	17	15	12	40-44
38	26	19	16	19	10	45-49
39	25	24	13	15	12	50-54
32	26	19	16	13	10	55-59
31	23	20	14	11	9	60-64
17	7	7	4	10	3	65-69
14	8	4	3	10	5	70-74
23	6	9	3	14	3	75+
2	27	1	12	1	15	N.R.
755	604	394	321	361	283	TOTAL

KIOWAN

AGE GROUP	KIOWA TOTAL n(i)	KIOWA TOTAL a(i)	KIOWA MALE n(i)	KIOWA MALE a(i)	KIOWA FEMALE n(i)	KIOWA FEMALE a(i)
<5	171	67	85	37	86	30
5-9	146	46	72	22	74	24
10-14	118	39	55	18	63	21
15-19	123	39	64	19	59	20
20-24	110	35	49	17	61	18
25-29	87	31	33	9	54	22
30-34	63	15	30	11	33	4
35-39	51	14	26	6	25	8
40-44	23	4	8	2	15	2
45-49	33	5	15	3	18	2
50-54	30	5	13	3	17	2
55-59	30	4	16	2	14	2
60-64	18	0	14	0	4	0
65-69	18	5	9	2	9	3
70-74	12	2	5	1	7	1
75+	17	0	8	0	9	0
N.R.	1	170	1	72	0	98
TOTAL	1050	311	502	152	548	159

KUTENAIAN

AGE GROUP	KUTENAI TOTAL n(i)	KUTENAI TOTAL a(i)	KUTENAI MALE n(i)	KUTENAI MALE a(i)	KUTENAI FEMALE n(i)	KUTENAI FEMALE a(i)
<5	26	15	14	7	12	8
5-9	33	22	21	14	12	8
10-14	28	18	18	10	10	8
15-19	22	13	9	6	13	7
20-24	20	8	12	4	8	4
25-29	19	4	13	3	6	1
30-34	19	10	8	4	11	6
35-39	13	8	9	7	4	1
40-44	16	5	10	4	6	1
45-49	16	7	9	6	7	1
50-54	18	4	9	2	9	2
55-59	17	5	9	4	8	1
60-64	13	2	4	0	9	2
65-69	15	5	6	4	9	1
70-74	5	2	2	0	3	2
75+	7	2	4	1	3	1
N.R.	0	8	0	3	0	5
TOTAL	287	130	157	76	130	54

APPENDIX C (Cont't)

MAIDU

AGE GROUP	TOTAL n(i)	TOTAL a(i)	MAIDU MALE n(i)	MAIDU MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	14	12	9	8	5	4
5-9	13	10	6	5	7	5
10-14	8	7	7	6	1	1
15-19	11	11	5	5	6	6
20-24	8	7	5	4	3	3
25-29	4	2	1	0	3	2
30-34	2	2	2	2	0	0
35-39	6	4	5	3	1	1
40-44	5	2	3	1	2	1
45-49	4	3	2	2	2	1
50-54	6	6	2	2	4	4
55-59	3	1	2	1	1	0
60-64	2	2	1	1	1	1
65-69	3	3	1	1	2	2
70-74	3	1	2	1	1	0
75+	1	0	0	0	1	0
N.R.	0	1	0	1	0	0
TOTAL	93	73	53	42	40	31

MUSKHOGEAN

TOTAL n(i)	TOTAL a(i)	CHICKASAW MALE n(i)	CHICKASAW MALE a(i)	FEMALE n(i)	FEMALE a(i)	AGE GROUP
685	566	360	298	325	268	<5
735	618	365	308	370	310	5-9
653	551	321	271	332	280	10-14
599	467	290	223	309	244	15-19
416	296	216	154	200	142	20-24
347	243	164	122	183	121	25-29
269	185	120	81	149	104	30-34
258	157	134	83	124	74	35-39
201	129	93	57	108	72	40-44
159	100	73	42	86	58	45-49
141	66	60	27	81	39	50-54
93	58	54	30	39	28	55-59
75	38	37	18	38	20	60-64
47	25	23	15	24	10	65-69
27	14	12	6	15	8	70-74
40	14	15	5	25	9	75+
2	51	1	22	1	29	N.R.
4745	3527	2337	1740	2408	1787	TOTAL

AGE GROUP	TOTAL n(i)	TOTAL a(i)	CHOCTAW MALE n(i)	CHOCTAW MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	2582	1906	1284	948	1298	958
5-9	2842	2110	1411	1067	1431	1043
10-14	2451	1815	1240	900	1211	915
15-19	2148	1495	1106	765	1042	730
20-24	1652	1040	854	559	798	481
25-29	1284	806	665	419	619	387
30-34	985	615	493	293	492	322
35-39	954	542	468	248	486	294
40-44	706	425	341	208	365	217
45-49	563	304	277	134	286	170
50-54	554	275	275	136	279	139
55-59	411	213	231	117	180	96
60-64	201	94	106	38	95	56
65-69	156	69	76	39	80	30
70-74	115	45	56	25	59	20
75+	153	58	62	27	91	31
N.R.	10	217	5	115	5	102
TOTAL	17757	11812	8945	5923	8812	5889

TOTAL n(i)	TOTAL a(i)	CREEK MALE n(i)	CREEK MALE a(i)	FEMALE n(i)	FEMALE a(i)	AGE GROUP
1188	645	619	340	569	305	<5
1345	663	694	344	651	319	5-9
1098	557	554	271	544	286	10-14
1064	520	517	252	547	268	15-19
839	379	426	194	413	185	20-24
735	294	353	142	382	152	25-29
489	188	251	94	238	94	30-34
505	161	237	76	268	85	35-39
420	129	203	65	217	64	40-44
387	134	172	52	215	82	45-49
340	107	181	51	159	56	50-54
232	77	128	47	104	30	55-59
166	47	96	26	70	21	60-64
92	23	51	12	41	11	65-69
63	20	28	12	35	8	70-74
120	23	52	11	68	12	75+
2	26	0	18	2	8	N.R.
9083	3967	4562	1989	4521	1978	TOTAL

AGE GROUP	TOTAL n(i)	TOTAL a(i)	SEMINOLE MALE n(i)	SEMINOLE MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	252	80	129	37	123	43
5-9	286	79	155	50	131	29
10-14	262	74	141	42	121	32
15-19	258	57	133	32	125	25
20-24	184	36	93	18	91	18
25-29	139	24	76	16	63	8
30-34	126	29	58	11	68	18
35-39	112	19	52	8	60	11
40-44	108	19	59	9	49	10
45-49	85	14	41	6	44	8
50-54	72	10	34	6	38	4
55-59	60	5	33	2	27	3
60-64	31	3	17	1	14	2
65-69	21	2	10	1	11	1
70-74	14	0	8	0	6	0
75+	38	5	16	2	22	3
N.R.	12	132	6	73	6	59
TOTAL	2048	456	1055	241	993	215

PIMAN

TOTAL n(i)	TOTAL a(i)	PAPAGO MALE n(i)	PAPAGO MALE a(i)	FEMALE n(i)	FEMALE a(i)	AGE GROUP
682	30	331	14	351	16	<5
568	16	286	8	282	8	5-9
519	14	270	5	249	9	10-14
647	14	317	5	330	9	15-19
519	11	257	5	262	6	20-24
418	12	221	6	197	6	25-29
305	1	171	1	134	0	30-34
283	1	135	1	148	0	35-39
252	1	135	0	117	1	40-44
223	0	121	0	102	0	45-49
226	1	122	0	104	1	50-54
134	1	82	1	52	0	55-59
127	0	62	0	65	0	60-64
90	0	53	0	37	0	65-69
86	0	48	0	38	0	70-74
126	1	58	0	68	1	75+
5	74	2	41	3	33	N.R.
5205	103	2669	46	2536	57	TOTAL

APPENDIX C (Con't)

AGE GROUP	PIMA TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	555	20	263	19	292	1
5-9	482	14	257	3	225	11
10-14	410	9	214	8	196	1
15-19	453	8	215	3	238	5
20-24	393	7	194	5	199	2
25-29	316	5	154	2	162	3
30-34	291	7	163	6	128	1
35-39	241	0	132	0	109	0
40-44	235	1	123	0	112	1
45-49	206	1	116	1	90	0
50-54	181	2	112	1	69	1
55-59	158	1	88	0	70	1
60-64	146	0	75	0	71	0
65-69	126	0	63	0	63	0
70-74	88	0	49	0	39	0
75+	101	0	56	0	45	0
N.R.	6	18	5	7	1	11
TOTAL	4382	75	2274	48	2108	27

SALISHAN

AGE GROUP	COAST SALISH TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)	AGE GROUP
<5	542	267	272	138	270	129	<5
5-9	572	290	275	146	297	144	5-9
10-14	455	230	214	104	241	126	10-14
15-19	388	195	187	105	201	90	15-19
20-24	340	143	175	69	165	74	20-24
25-29	265	118	144	71	121	47	25-29
30-34	218	104	107	57	111	47	30-34
35-39	210	81	119	41	91	40	35-39
40-44	186	81	100	46	86	35	40-44
45-49	189	83	99	45	90	38	45-49
50-54	164	67	93	40	71	27	50-54
55-59	133	61	76	30	57	31	55-59
60-64	134	47	74	28	60	19	60-64
65-69	91	37	45	18	46	19	65-69
70-74	83	20	46	12	37	8	70-74
75+	136	16	72	10	64	6	75+
N.R.	9	35	4	23	5	12	N.R.
TOTAL	4106	1840	2098	960	2008	880	TOTAL

AGE GROUP	INTERIOR SALISH TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	737	586	371	298	366	288
5-9	715	556	365	288	350	268
10-14	586	453	304	239	282	214
15-19	514	379	273	193	241	186
20-24	416	287	218	154	198	133
25-29	325	227	161	112	164	115
30-34	261	176	131	90	130	86
35-39	289	178	154	93	135	85
40-44	202	118	120	72	82	46
45-49	188	109	93	55	95	54
50-54	192	96	94	52	98	44
55-59	157	85	80	41	77	44
60-64	172	85	76	42	96	43
65-69	128	44	65	24	63	20
70-74	126	36	72	19	54	17
75+	203	57	77	25	126	32
N.R.	24	58	7	28	17	30
TOTAL	5211	3472	2654	1797	2557	1675

SHAPWAILUTAN

AGE GROUP	KLAMATH/MODOC TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)	AGE GROUP
<5	267	192	143	99	124	93	<5
5-9	285	224	137	110	148	114	5-9
10-14	217	168	120	97	97	71	10-14
15-19	213	132	103	62	110	70	15-19
20-24	166	106	94	60	72	46	20-24
25-29	152	87	78	51	74	36	25-29
30-34	126	79	59	40	67	39	30-34
35-39	104	60	57	33	47	27	35-39
40-44	74	27	35	16	39	11	40-44
45-49	86	53	41	23	45	30	45-49
50-54	62	37	31	21	31	16	50-54
55-59	71	32	34	17	37	15	55-59
60-64	49	24	24	14	25	10	60-64
65-69	60	19	28	9	32	10	65-69
70-74	36	10	18	7	18	3	70-74
75+	66	7	27	2	39	5	75+
N.R.	2	9	1	3	1	6	N.R.
TOTAL	2034	1257	1029	661	1005	596	TOTAL

AGE GROUP	SHAHAPTIANS TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	491	180	264	87	227	93
5-9	480	172	220	84	260	88
10-14	453	188	234	102	219	86
15-19	391	149	179	65	212	84
20-24	349	133	188	77	161	56
25-29	266	92	143	49	123	43
30-34	200	58	89	29	111	29
35-39	249	73	126	37	123	36
40-44	194	50	94	20	100	30
45-49	189	50	101	30	88	20
50-54	200	43	86	21	114	22
55-59	130	35	73	23	57	12
60-64	143	30	59	15	84	15
65-69	144	19	73	15	71	4
70-74	69	12	29	10	40	2
75+	171	18	71	9	100	9
N.R.	12	104	2	54	10	50
TOTAL	4119	1302	2029	673	2090	629

AGE GROUP	CAYUSE/MOLALA TOTAL n(i)	TOTAL a(i)	MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)	AGE GROUP
<5	23	6	12	4	11	2	<5
5-9	21	7	12	3	9	4	5-9
10-14	17	5	9	4	8	1	10-14
15-19	23	2	12	0	11	2	15-19
20-24	19	4	12	3	7	1	20-24
25-29	11	0	3	0	8	0	25-29
30-34	14	1	6	1	8	0	30-34
35-39	7	1	4	0	3	1	35-39
40-44	13	1	10	0	3	1	40-44
45-49	8	1	5	1	3	0	45-49
50-54	7	1	6	1	1	0	50-54
55-59	9	0	5	0	4	0	55-59
60-64	8	0	2	0	6	0	60-64
65-69	5	0	2	0	3	0	65-69
70-74	3	0	1	0	2	0	70-74
75+	11	0	3	0	8	0	75+
N.R.	0	1	0	0	0	1	N.R.
TOTAL	199	29	104	17	95	12	TOTAL

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SHOSHONEAN

AGE GROUP	CALIFORNIA SHOSHONEANS TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)
<5	34	21	14	10	20	11
5-9	41	19	16	7	25	12
10-14	45	24	21	9	24	15
15-19	44	13	22	6	22	7
20-24	27	6	15	6	12	0
25-29	24	6	14	4	10	2
30-34	26	8	15	4	11	4
35-39	16	4	10	2	6	2
40-44	18	3	8	0	10	3
45-49	18	2	13	2	5	0
50-54	11	2	5	1	6	1
55-59	11	0	5	0	6	0
60-64	13	0	7	0	6	0
65-69	12	3	9	1	3	2
70-74	5	0	4	0	1	0
75+	16	1	12	1	4	0
N.R.	2	60	1	28	1	32
TOTAL	361	112	190	53	171	59

AGE GROUP	BANNOCK TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	AGE GROUP
	50	20	16	9	34	11	<5
	41	20	20	11	21	9	5-9
	48	21	23	10	25	11	10-14
	35	21	17	9	18	12	15-19
	29	10	17	5	12	5	20-24
	25	9	12	6	13	3	25-29
	23	10	16	9	7	1	30-34
	31	7	21	5	10	2	35-39
	24	12	16	9	8	3	40-44
	18	9	8	3	10	6	45-49
	22	4	14	3	8	1	50-54
	14	3	9	1	5	2	55-59
	17	3	9	2	8	1	60-64
	11	0	4	0	7	0	65-69
	7	1	3	0	4	1	70-74
	20	1	7	0	13	1	75+
	0	65	0	25	0	40	N.R.
	415	151	212	82	203	69	TOTAL

AGE GROUP	COMANCHE TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)
<5	221	142	121	76	100	66
5-9	194	112	97	51	97	61
10-14	171	109	85	54	86	55
15-19	164	104	71	39	93	65
20-24	127	76	59	34	68	42
25-29	70	41	34	21	36	20
30-34	93	33	45	15	48	18
35-39	76	40	35	20	41	20
40-44	51	24	25	11	26	13
45-49	50	29	26	17	24	12
50-54	34	17	17	10	17	7
55-59	50	22	29	13	21	9
60-64	34	15	20	9	14	6
65-69	38	8	17	1	21	7
70-74	17	5	5	2	12	3
75+	33	8	13	2	20	6
N.R.	4	36	1	18	3	18
TOTAL	1423	785	699	375	724	410

AGE GROUP	HOPI TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	AGE GROUP
	382	3	189	0	193	3	<5
	375	1	172	0	203	1	5-9
	286	3	136	3	150	0	10-14
	290	8	146	3	144	5	15-19
	215	0	99	0	116	0	20-24
	200	1	106	1	94	0	25-29
	153	0	87	0	66	0	30-34
	136	0	71	0	65	0	35-39
	120	0	68	0	52	0	40-44
	97	0	50	0	47	0	45-49
	113	2	67	1	46	1	50-54
	125	0	72	0	53	0	55-59
	92	0	55	0	37	0	60-64
	63	0	38	0	25	0	65-69
	23	0	13	0	10	0	70-74
	82	0	48	0	34	0	75+
	5	58	2	22	3	36	N.R.
	2752	18	1417	8	1335	10	TOTAL

AGE GROUP	PAIUTE/MONO/PAVIOTSO TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)
<5	599	218	314	115	285	103
5-9	555	181	257	87	298	94
10-14	487	156	258	90	229	66
15-19	472	154	230	70	242	83
20-24	340	93	183	54	157	39
25-29	351	80	195	43	156	37
30-34	303	70	137	34	166	36
35-39	304	70	156	33	148	37
40-44	287	64	144	30	143	34
45-49	259	44	136	23	123	21
50-54	260	48	123	26	137	22
55-59	186	27	90	12	96	15
60-64	178	19	80	9	98	10
65-69	148	13	66	5	82	6
70-74	118	9	56	2	62	11
75+	213	13	101	4	112	8
N.R.	20	186	6	99	14	87
TOTAL	5060	1259	2526	637	2534	622

AGE GROUP	SHOSHONE TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)	AGE GROUP
	516	223	246	103	270	138	<5
	467	187	228	95	239	137	5-9
	395	147	205	74	190	87	10-14
	329	102	153	47	176	94	15-19
	273	93	139	52	134	74	20-24
	301	89	165	52	136	77	25-29
	243	60	128	31	115	55	30-34
	206	39	101	22	105	37	35-39
	196	33	107	22	89	37	40-44
	159	35	87	15	72	34	45-49
	201	33	110	17	91	35	50-54
	155	32	89	20	66	41	55-59
	153	24	85	16	68	28	60-64
	121	9	61	4	60	16	65-69
	117	8	63	4	54	18	70-74
	162	6	76	4	86	28	75+
	3	124	2	61	1	63	N.R.
	3994	1120	2043	578	1951	936	TOTAL

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AGE GROUP	UTE TOTAL n(i)	UTE TOTAL a(i)	UTE MALE n(i)	UTE MALE a(i)	UTE FEMALE n(i)	UTE FEMALE a(i)	SIOUAN ASSINNIBOIN TOTAL n(i)	SIOUAN ASSINNIBOIN TOTAL a(i)	SIOUAN ASSINNIBOIN MALE n(i)	SIOUAN ASSINNIBOIN MALE a(i)	SIOUAN ASSINNIBOIN FEMALE n(i)	SIOUAN ASSINNIBOIN FEMALE a(i)	AGE GROUP
<5	256	48	118	29	138	19	251	179	126	89	125	88	<5
5-9	271	57	134	29	137	28	225	171	109	89	116	82	5-9
10-14	186	42	99	19	87	23	190	141	103	76	87	64	10-14
15-19	183	22	89	12	94	10	174	129	82	59	92	70	15-19
20-24	171	21	97	14	74	7	114	79	68	49	46	30	20-24
25-29	151	21	74	9	77	12	93	54	48	29	45	26	25-29
30-34	125	12	70	7	55	5	61	34	28	18	33	18	30-34
35-39	94	13	57	9	37	4	64	30	36	13	28	17	35-39
40-44	97	10	60	8	37	2	80	48	47	27	33	21	40-44
45-49	76	4	42	1	34	3	58	34	27	15	31	19	45-49
50-54	80	5	45	2	35	3	38	10	19	3	19	7	50-54
55-59	80	7	39	3	41	4	46	16	28	9	18	7	55-59
60-64	71	2	43	1	28	1	46	13	21	7	25	6	60-64
65-69	43	3	27	2	16	1	49	12	29	9	20	3	65-69
70-74	41	0	23	0	18	0	25	0	12	0	13	0	70-74
75+	55	2	27	1	28	1	67	5	33	3	34	2	75+
N.R.	12	26	6	14	6	12	7	2	2	1	5	1	N.R.
TOTAL	1980	269	1044	146	936	123	1581	955	816	495	765	460	TOTAL

AGE GROUP	CATAWBA TOTAL n(i)	CATAWBA TOTAL a(i)	CATAWBA MALE n(i)	CATAWBA MALE a(i)	CATAWBA FEMALE n(i)	CATAWBA FEMALE a(i)	CROW TOTAL n(i)	CROW TOTAL a(i)	CROW MALE n(i)	CROW MALE a(i)	CROW FEMALE n(i)	CROW FEMALE a(i)	AGE GROUP
<5	28	27	13	13	15	14	264	124	133	66	131	58	<5
5-9	29	29	16	16	13	13	225	115	126	66	99	49	5-9
10-14	19	19	7	7	12	12	185	96	85	46	100	50	10-14
15-19	16	15	10	9	6	6	172	74	81	39	91	35	15-19
20-24	18	17	9	9	9	8	120	50	64	24	56	26	20-24
25-29	11	11	3	3	8	8	109	47	58	24	51	23	25-29
30-34	15	15	8	8	7	7	87	33	47	21	40	12	30-34
35-39	10	9	7	6	3	3	93	28	48	13	45	15	35-39
40-44	2	2	0	0	2	2	63	17	30	9	33	8	40-44
45-49	4	2	2	1	2	1	49	13	31	7	18	6	45-49
50-54	3	2	2	1	1	1	64	18	32	9	32	9	50-54
55-59	5	4	4	3	1	1	79	14	43	12	36	2	55-59
60-64	3	1	2	0	1	1	54	5	28	2	26	3	60-64
65-69	2	2	0	0	2	2	47	1	27	1	20	0	65-69
70-74	0	0	0	0	0	0	26	1	13	1	13	0	70-74
75+	1	1	0	0	1	1	37	1	17	1	20	0	75+
N.R.	0	0	0	0	0	0	4	6	4	6	0	1	N.R.
TOTAL	166	156	83	76	83	80	1674	637	863	341	811	296	TOTAL

AGE GROUP	HIDATSA TOTAL n(i)	HIDATSA TOTAL a(i)	HIDATSA MALE n(i)	HIDATSA MALE a(i)	HIDATSA FEMALE n(i)	HIDATSA FEMALE a(i)	IOWA TOTAL n(i)	IOWA TOTAL a(i)	IOWA MALE n(i)	IOWA MALE a(i)	IOWA FEMALE n(i)	IOWA FEMALE a(i)	AGE GROUP
<5	95	53	52	29	43	24	25	19	15	11	10	8	<5
5-9	84	41	35	13	49	28	24	16	15	11	9	5	5-9
10-14	59	27	34	15	25	12	24	20	9	9	15	11	10-14
15-19	47	23	23	9	24	14	11	8	6	5	5	3	15-19
20-24	37	17	18	8	19	9	10	9	8	7	2	2	20-24
25-29	38	15	17	7	21	8	21	15	10	6	11	9	25-29
30-34	41	9	21	6	20	3	9	5	5	3	4	2	30-34
35-39	27	9	13	5	14	4	14	8	7	4	7	4	35-39
40-44	26	5	13	3	13	2	12	10	6	5	6	5	40-44
45-49	7	2	5	2	2	0	8	5	5	3	3	2	45-49
50-54	15	4	8	1	7	3	5	2	4	2	1	0	50-54
55-59	6	0	2	0	4	0	1	0	0	0	1	0	55-59
60-64	16	4	8	2	8	2	2	2	1	1	1	1	60-64
65-69	8	4	4	2	4	2	4	1	2	0	2	1	65-69
70-74	10	2	4	0	6	2	2	2	0	0	2	2	70-74
75+	12	1	6	1	6	0	4	0	2	0	2	0	75+
N.R.	2	2	1	1	1	1	0	0	0	0	0	0	N.R.
TOTAL	528	216	263	103	265	113	176	122	95	67	81	55	TOTAL

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AGE GROUP	KANSA TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)
<5	43	36	23	20	20	16
5-9	52	49	30	28	22	21
10-14	39	32	25	20	14	13
15-19	36	27	23	19	13	8
20-24	39	26	16	11	23	15
25-29	30	21	17	12	13	9
30-34	18	10	9	5	9	8
35-39	15	7	10	5	5	2
40-44	11	6	5	3	6	3
45-49	7	7	5	5	2	2
50-54	12	5	7	3	5	2
55-59	6	1	4	1	2	0
60-64	6	2	5	2	1	0
65-69	1	0	1	0	0	0
70-74	0	0	0	0	0	0
75+	3	1	3	1	0	0
N.R.	0	12	0	5	0	5
TOTAL	318	230	183	135	135	99

AGE GROUP	MANDAN TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)
<5	49	20	23	10	26	10
5-9	46	20	29	13	17	7
10-14	30	14	13	7	17	7
15-19	29	15	20	11	9	4
20-24	14	7	6	2	8	5
25-29	13	6	4	2	9	4
30-34	14	2	12	1	2	1
35-39	13	1	6	0	7	1
40-44	8	2	2	1	6	1
45-49	13	5	10	3	3	2
50-54	7	2	6	2	1	0
55-59	5	0	3	0	2	0
60-64	7	0	5	0	2	0
65-69	10	1	6	1	4	0
70-74	6	0	3	0	3	0
75+	7	0	2	0	5	0
N.R.	0	0	0	0	0	0
TOTAL	271	95	150	53	121	42

AGE GROUP	OMAHA TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)
<5	148	36	81	22	67	14
5-9	163	35	84	19	79	16
10-14	142	28	66	9	76	19
15-19	125	19	70	9	55	10
20-24	92	18	46	8	46	10
25-29	70	14	35	5	35	9
30-34	67	11	32	7	35	4
35-39	76	8	40	0	36	8
40-44	44	4	28	4	16	0
45-49	50	4	26	3	24	1
50-54	41	4	24	3	17	1
55-59	27	0	14	0	13	0
60-64	29	4	14	2	15	2
65-69	13	2	8	0	5	2
70-74	7	0	2	0	5	0
75+	9	2	6	2	3	0
N.R.	1	11	1	7	0	4
TOTAL	1103	189	576	93	527	96

AGE GROUP	OSAGE TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)
<5	311	264	165	138	146	126
5-9	309	248	170	133	139	115
10-14	336	261	178	135	158	126
15-19	282	205	145	107	137	98
20-24	236	174	133	105	103	69
25-29	189	135	99	69	90	66
30-34	162	123	78	61	84	62
35-39	142	104	73	57	69	47
40-44	93	59	48	32	45	27
45-49	98	58	55	34	43	24
50-54	53	27	24	14	29	13
55-59	43	29	24	18	19	11
60-64	34	23	22	16	12	7
65-69	26	14	16	10	10	4
70-74	10	4	5	2	5	2
75+	20	8	10	4	10	4
N.R.	1	63	0	31	1	32
TOTAL	2344	1736	1245	935	1099	801

AGE GROUP	OTO/MISSOURI TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)
<5	71	39	38	17	33	22
5-9	100	46	42	22	58	24
10-14	144	62	70	30	74	32
15-19	74	41	36	21	38	20
20-24	39	18	23	12	16	6
25-29	40	20	20	10	20	10
30-34	31	10	17	6	14	4
35-39	32	9	18	5	14	4
40-44	24	5	14	2	10	3
45-49	18	7	9	3	9	4
50-54	12	5	5	4	7	1
55-59	18	5	8	3	10	2
60-64	8	1	7	1	1	0
65-69	3	0	2	0	1	0
70-74	4	1	2	1	2	0
75+	9	0	5	0	4	0
N.R.	0	15	0	7	0	8
TOTAL	627	269	316	137	311	132

AGE GROUP	PONCA TOTAL n(i)	a(i)	MALE n(i)	a(i)	FEMALE n(i)	a(i)
<5	125	106	60	47	65	59
5-9	145	120	68	54	77	66
10-14	131	106	56	45	75	61
15-19	96	83	45	38	51	45
20-24	77	59	42	32	35	27
25-29	67	52	38	29	29	23
30-34	59	38	29	20	30	18
35-39	60	37	26	15	34	22
40-44	42	29	21	14	21	15
45-49	36	18	16	8	20	10
50-54	22	11	13	7	9	4
55-59	27	19	14	10	13	9
60-64	10	7	7	4	3	3
65-69	16	8	9	5	7	3
70-74	13	6	5	1	8	5
75+	13	4	6	2	7	2
N.R.	3	3	2	0	1	3
TOTAL	939	703	455	331	484	372

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SIOUAN

AGE GROUP	QUAPAW TOTAL n(i)	QUAPAW TOTAL a(i)	QUAPAW MALE n(i)	QUAPAW MALE a(i)	QUAPAW FEMALE n(i)	QUAPAW FEMALE a(i)
<5	30	26	13	12	17	14
5-9	34	27	16	14	18	13
10-14	26	24	15	13	11	11
15-19	31	25	20	18	11	7
20-24	17	11	8	5	9	6
25-29	16	10	8	6	8	4
30-34	16	10	8	5	8	5
35-39	13	7	6	4	7	3
40-44	14	7	6	3	8	4
45-49	4	3	1	1	3	2
50-54	7	4	3	2	4	2
55-59	2	0	0	0	2	0
60-64	2	1	1	0	1	1
65-69	4	1	1	0	3	1
70-74	2	1	0	0	2	1
75+	4	0	2	0	2	0
N.R.	0	3	0	1	0	2
TOTAL	222	157	108	83	114	74

AGE GROUP	DAKOTA TOTAL n(i)	DAKOTA TOTAL a(i)	DAKOTA MALE n(i)	DAKOTA MALE a(i)	DAKOTA FEMALE n(i)	DAKOTA FEMALE a(i)	AGE GROUP
<5	3632	1999	1784	1010	1848	989	<5
5-9	3382	1942	1685	961	1697	981	5-9
10-14	2997	1669	1566	864	1431	805	10-14
15-19	2649	1483	1359	758	1290	725	15-19
20-24	2008	982	1029	498	979	484	20-24
25-29	1687	746	871	390	816	356	25-29
30-34	1510	649	785	340	725	309	30-34
35-39	1356	572	730	311	626	261	35-39
40-44	1177	486	645	253	532	233	40-44
45-49	1133	427	576	210	557	217	45-49
50-54	1016	300	553	170	463	130	50-54
55-59	900	244	464	130	436	114	55-59
60-64	702	183	388	99	314	84	60-64
65-69	614	135	311	71	303	64	65-69
70-74	462	71	216	38	246	33	70-74
75+	709	105	318	54	391	51	75+
N.R.	41	127	23	64	18	63	N.R.
TOTAL	25934	11993	13280	6157	12654	5836	TOTAL

AGE GROUP	WINNEBAGO TOTAL n(i)	WINNEBAGO TOTAL a(i)	WINNEBAGO MALE n(i)	WINNEBAGO MALE a(i)	WINNEBAGO FEMALE n(i)	WINNEBAGO FEMALE a(i)
<5	185	40	99	24	86	16
5-9	200	45	86	22	114	23
10-14	191	34	100	16	91	18
15-19	177	44	76	14	101	30
20-24	108	25	58	14	50	11
25-29	87	23	40	8	47	15
30-34	73	17	41	10	32	7
35-39	100	14	49	9	51	5
40-44	72	15	41	9	31	6
45-49	54	9	25	4	29	5
50-54	58	15	31	7	27	8
55-59	37	5	27	3	10	2
60-64	33	7	17	5	16	2
65-69	24	5	12	4	12	1
70-74	13	1	4	0	9	1
75+	34	4	12	1	22	3
N.R.	0	56	0	28	0	28
TOTAL	1446	303	718	150	728	153

WASHOAN

AGE GROUP	WASHO TOTAL n(i)	WASHO TOTAL a(i)	WASHO MALE n(i)	WASHO MALE a(i)	WASHO FEMALE n(i)	WASHO FEMALE a(i)	AGE GROUP
<5	64	22	31	9	33	13	<5
5-9	66	20	38	11	28	9	5-9
10-14	60	20	27	4	33	16	10-14
15-19	57	12	33	6	24	6	15-19
20-24	47	9	18	1	29	8	20-24
25-29	44	14	24	7	20	7	25-29
30-34	46	8	19	4	27	4	30-34
35-39	44	6	27	3	17	3	35-39
40-44	43	10	24	6	19	4	40-44
45-49	39	10	24	5	15	5	45-49
50-54	31	3	18	3	13	0	50-54
55-59	29	1	15	0	14	1	55-59
60-64	31	1	19	1	12	0	60-64
65-69	23	1	12	1	11	0	65-69
70-74	18	0	6	0	12	0	70-74
75+	26	0	11	0	15	0	75+
N.R.	1	0	0	0	1	0	N.R.
TOTAL	668	137	346	61	322	76	TOTAL

WIYOT

AGE GROUP	HUMBOLDT BAY TOTAL n(i)	HUMBOLDT BAY TOTAL a(i)	HUMBOLDT BAY MALE n(i)	HUMBOLDT BAY MALE a(i)	HUMBOLDT BAY FEMALE n(i)	HUMBOLDT BAY FEMALE a(i)
<5	38	31	22	18	16	13
5-9	33	27	14	10	19	17
10-14	20	16	10	9	10	7
15-19	18	15	8	7	10	8
20-24	12	8	7	6	5	2
25-29	16	13	10	8	6	5
30-34	13	8	7	4	6	4
35-39	15	9	8	5	7	4
40-44	8	5	6	4	2	1
45-49	9	5	3	2	6	3
50-54	4	3	1	0	3	3
55-59	12	8	7	5	5	3
60-64	9	5	4	1	5	4
65-69	8	6	5	4	3	2
70-74	9	1	6	1	3	0
75+	12	2	5	1	7	1
N.R.	4	0	2	0	2	0
TOTAL	236	162	123	85	113	77

YOKUTS

AGE GROUP	YOKUTS TOTAL n(i)	YOKUTS TOTAL a(i)	YOKUTS MALE n(i)	YOKUTS MALE a(i)	YOKUTS FEMALE n(i)	YOKUTS FEMALE a(i)	AGE GROUP
<5	119	81	57	42	62	39	<5
5-9	141	98	83	63	58	35	5-9
10-14	134	89	72	48	62	41	10-14
15-19	123	78	66	43	57	35	15-19
20-24	86	46	47	25	39	21	20-24
25-29	82	49	47	30	35	19	25-29
30-34	62	28	33	14	29	14	30-34
35-39	71	34	36	18	35	16	35-39
40-44	58	24	34	13	24	11	40-44
45-49	54	27	29	18	25	9	45-49
50-54	45	22	24	12	21	10	50-54
55-59	34	20	24	13	10	7	55-59
60-64	33	19	15	9	18	10	60-64
65-69	28	14	15	9	13	5	65-69
70-74	33	8	17	6	16	2	70-74
75+	42	3	17	2	25	1	75+
N.R.	0	31	0	16	0	15	N.R.
TOTAL	1145	640	616	365	529	275	TOTAL

APPENDIX C (Con't)

YUMAN

AGE GROUP	COCOPA TOTAL n(i)	COCOPA TOTAL a(i)	COCOPA MALE n(i)	COCOPA MALE a(i)	COCOPA FEMALE n(i)	COCOPA FEMALE a(i)	DIEGUENO TOTAL n(i)	DIEGUENO TOTAL a(i)	DIEGUENO MALE n(i)	DIEGUENO MALE a(i)	DIEGUENO FEMALE n(i)	DIEGUENO FEMALE a(i)	AGE GROUP
<5	20	1	10	1	10	0	43	20	24	12	19	8	<5
5-9	16	1	9	1	7	0	31	14	15	9	16	5	5-9
10-14	5	0	1	0	4	0	38	20	19	9	19	11	10-14
15-19	20	0	14	0	6	0	30	16	20	10	10	6	15-19
20-24	9	0	5	0	4	0	27	13	13	8	14	5	20-24
25-29	9	1	9	1	0	0	27	15	17	10	10	5	25-29
30-34	4	0	1	0	3	0	12	4	5	2	7	2	30-34
35-39	6	0	4	0	2	0	5	2	3	2	2	0	35-39
40-44	4	0	2	0	2	0	16	6	12	5	4	1	40-44
45-49	2	0	1	0	1	0	20	5	10	3	10	2	45-49
50-54	3	0	1	0	2	0	13	5	8	3	5	2	50-54
55-59	0	0	0	0	0	0	18	6	10	3	8	3	55-59
60-64	0	0	0	0	0	0	10	5	7	5	3	0	60-64
65-69	0	0	0	0	0	0	10	1	5	1	5	0	65-69
70-74	1	1	1	1	0	0	1	0	1	0	0	0	70-74
75+	0	0	0	0	0	0	21	3	14	2	7	1	75+
N.R.	0	13	0	7	0	6	0	1	0	1	0	0	N.R.
TOTAL	99	4	58	4	41	0	322	135	183	84	139	51	TOTAL

AGE GROUP	MARICOPA TOTAL n(i)	MARICOPA TOTAL a(i)	MARICOPA MALE n(i)	MARICOPA MALE a(i)	MARICOPA FEMALE n(i)	MARICOPA FEMALE a(i)	MOHAVE TOTAL n(i)	MOHAVE TOTAL a(i)	MOHAVE MALE n(i)	MOHAVE MALE a(i)	MOHAVE FEMALE n(i)	MOHAVE FEMALE a(i)	AGE GROUP
<5	37	0	8	0	29	0	78	7	37	3	41	4	<5
5-9	27	2	15	0	12	2	103	3	56	1	47	2	5-9
10-14	32	3	18	1	14	2	73	6	29	3	44	3	10-14
15-19	38	2	18	1	20	1	57	5	30	3	27	2	15-19
20-24	26	1	11	1	15	0	84	6	46	3	38	3	20-24
25-29	30	3	16	2	14	1	62	1	39	1	23	0	25-29
30-34	15	1	6	0	9	1	77	2	37	1	40	1	30-34
35-39	25	0	12	0	13	0	68	2	41	2	27	0	35-39
40-44	14	0	7	0	7	0	51	0	33	0	18	0	40-44
45-49	6	0	4	0	2	0	40	2	27	2	13	0	45-49
50-54	12	0	4	0	8	0	44	0	26	0	18	0	50-54
55-59	17	0	12	0	5	0	26	1	14	1	12	0	55-59
60-64	10	0	8	0	2	0	25	0	12	0	13	0	60-64
65-69	11	0	5	0	6	0	23	0	13	0	10	0	65-69
70-74	9	0	4	0	5	0	19	0	9	0	10	0	70-74
75+	1	0	1	0	0	0	24	0	13	0	11	0	75+
N.R.	0	11	0	5	0	6	0	3	0	2	0	1	N.R.
TOTAL	310	12	149	5	161	7	854	35	462	20	392	15	TOTAL

AGE GROUP	N. YUMANS TOTAL n(i)	N. YUMANS TOTAL a(i)	N. YUMANS MALE n(i)	N. YUMANS MALE a(i)	N. YUMANS FEMALE n(i)	N. YUMANS FEMALE a(i)	YUMA TOTAL n(i)	YUMA TOTAL a(i)	YUMA MALE n(i)	YUMA MALE a(i)	YUMA FEMALE n(i)	YUMA FEMALE a(i)	AGE GROUP
<5	78	3	43	2	35	1	236	88	131	51	105	37	<5
5-9	84	8	37	2	47	6	263	76	128	36	135	40	5-9
10-14	57	3	28	2	29	1	219	60	115	32	104	28	10-14
15-19	38	4	14	0	24	4	209	65	110	34	99	31	15-19
20-24	58	4	27	3	31	1	196	33	107	16	89	17	20-24
25-29	53	3	28	2	25	1	167	31	84	16	83	15	25-29
30-34	36	1	21	1	15	0	163	28	74	13	89	15	30-34
35-39	34	3	22	1	12	2	162	26	96	14	66	12	35-39
40-44	22	1	17	0	5	1	141	16	71	6	70	10	40-44
45-49	25	1	16	1	9	0	120	14	72	8	48	6	45-49
50-54	42	2	25	1	17	1	98	11	58	6	40	5	50-54
55-59	26	1	13	0	13	1	80	12	47	7	33	5	55-59
60-64	25	1	10	1	15	0	69	7	36	3	33	4	60-64
65-69	19	1	9	1	10	0	71	5	37	4	34	1	65-69
70-74	15	1	8	0	7	1	39	2	22	2	17	0	70-74
75+	34	0	19	0	15	0	73	1	40	0	33	1	75+
N.R.	0	6	0	1	0	5	2	195	2	112	0	83	N.R.
TOTAL	646	37	337	17	309	20	2306	475	1228	248	1078	227	TOTAL

APPENDIX C (Con't)

YUROK

AGE GROUP	TOTAL n(i)	TOTAL a(i)	YUROK MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	49	41	25	22	24	19
5-9	59	43	28	20	31	23
10-14	61	43	25	19	36	24
15-19	55	31	27	15	28	16
20-24	44	23	27	14	17	9
25-29	21	13	11	7	10	6
30-34	24	14	16	10	8	4
35-39	20	9	13	8	7	1
40-44	22	16	14	10	8	6
45-49	17	7	7	3	10	4
50-54	12	5	3	1	9	4
55-59	16	7	9	4	7	3
60-64	15	6	7	3	8	3
65-69	17	5	4	1	13	4
70-74	20	3	13	3	7	0
75+	19	0	7	0	12	0
N.R.	0	0	0	0	0	0
TOTAL	471	266	236	140	235	126

ZUNIAN

AGE GROUP	TOTAL n(i)	TOTAL a(i)	ZUNI MALE n(i)	MALE a(i)	FEMALE n(i)	FEMALE a(i)
<5	243	4	130	3	113	1
5-9	195	1	111	0	84	1
10-14	183	0	108	0	75	0
15-19	180	1	93	0	87	1
20-24	139	0	65	0	74	0
25-29	160	1	98	1	62	0
30-34	105	0	60	0	45	0
35-39	80	1	44	1	36	0
40-44	78	0	39	0	39	0
45-49	87	0	55	0	32	0
50-54	75	0	43	0	32	0
55-59	70	0	41	0	29	0
60-64	47	0	25	0	22	0
65-69	45	0	28	0	17	0
70-74	26	0	19	0	7	0
75+	36	0	28	0	8	0
N.R.	1	1711	1	956	0	755
TOTAL	1749	8	987	5	762	3

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75+ = ALL INDIVIDUALS WITH 'AGE NOT REPORTED' HAVE BEEN ALLOCATED TO THE 75+ AGE CATEGORY.

a(i) = NUMBER ADMIXED. ALL 'ADMIXTURE NOT REPORTED' INDIVIDUALS HAVE BEEN ALLOCATED TO THE NON-ADMIXED COMPONENT OF THE POPULATION.

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Adapted from:

U.S. Department of Commerce. Bureau of the Census. The Indian Population of the United States and Alaska. Fifteenth Census of the United States: 1930. Washington, D.C., U.S. Government Printing Office.