Volume VII:
Chemical Dependency
and Diabetes

Report of the Secretary's Task Force on

Black & Minority Health

U.S. Department of Health and
Human Services

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SECRETARY'S TASK FORCE ON BLACK AND MINORITY HEALTH

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INTRODUCTION TO THE TASK FORCE REPORT

Background

The Task Force on Black and Minority Health was established by Secretary of Health and Human Services Margaret M. Heckler in response to the striking differences in health status between many minority populations in the United States and the nonminority population.

In January 1984, when Secretary Heckler released the annual report of the Nation's health, Health, United States, 1983, she noted that the health and longevity of all Americans have continued to improve, but the prospects for living full and healthy lives were not shared equally by many minority Americans. Mrs. Heckler called attention to the longstanding and persistent burden of death, disease, and disability experienced by those of Black, Hispanic, Native American, and Asian/Pacific Islander heritage in the United States. Among the most striking differentials are the gap of more than 5 years in life expectancy between Blacks and Whites and the infant mortality rate, which for Blacks has continued to be twice that of Whites. While the differences are particularly evident for Blacks, a group for whom information is most accurate, they are clear for Hispanics, Native Americans, and some groups of Asian/Pacific Islanders as well.

By creating a special Secretarial Task Force to investigate this grave health discrepancy and by establishing an Office of Minority Health to implement the recommendations of the Task Force, Secretary Heckler has taken significant measures toward developing a coordinated strategy to improve the health status of all minority groups.

Dr. Thomas E. Malone, Deputy Director of the National Institutes of Health, was appointed to head the Task Force and 18 senior DHHS executives whose programs affect minority health were selected to serve as primary members of the Task Force. While many DHHS programs significantly benefit minority groups, the formation of this Task Force was unique in that it was the first time that attention was given to an integrated, comprehensive study of minority health concerns.

Charge

Secretary Heckler charged the Task Force with the following duties:

- Study the current health status of Blacks, Hispanics, Native Americans, and Asian/Pacific Islanders.
- Review their ability to gain access to and utilize the health care system.
- Assess factors contributing to the long-term disparities in health status between the minority and nonminority populations.

- Review existing DHHS research and service programs relative to minority health.

- Recommend strategies to redirect Federal resources and programs to narrow the health differences between minorities and nonminorities.

- Suggest strategies by which the public and private sectors can cooperate to bring about improvements in minority health.

Approach

After initial review of national data, the Task Force adopted a study approach based on the statistical technique of "excess deaths" to define the differences in minority health in relation to nonminority health. This method dramatically demonstrated the number of deaths among minorities that would not have occurred had mortality rates for minorities equalled those of nonminorities. The analysis of excess deaths revealed that six specific health areas accounted for more than 80 percent of the higher annual proportion of minority deaths. These areas are:

- Cardiovascular and cerebrovascular diseases
- Cancer
- Chemical dependency
- Diabetes
- Homicide, suicide, and unintentional injuries
- Infant mortality and low birthweight.

Subcommittees were formed to explore why and to what extent these health differences occur and what DHHS can do to reduce the disparity. The subcommittees examined the most recent scientific data available in their specific areas and the physiological, cultural, and societal factors that might contribute to health problems in minority populations.

The Task Force also investigated a number of issues that cut across specific health problem areas yet influence the overall health status of minority groups. Among those reviewed were demographic and social characteristics of Blacks, Hispanics, Native Americans, and Asian/Pacific Islanders; minority needs in health information and education; access to health care services by minorities; and an assessment of health professionals available to minority populations. Special analyses of mortality and morbidity data relevant to minority health also were developed for the use of Task Force. Reports on these issues appear in Volume II.

Resources

More than 40 scientific papers were commissioned to provide recent data and supplementary information to the Task Force and its subcommittees. Much material from the commissioned papers was incorporated into the subcommittee reports; others accompany the full text of the subcommittee reports.

An inventory of DHHS program efforts in minority health was compiled by the Task Force. It includes descriptions of health care, prevention, and research programs sponsored by DHHS that affect minority populations. This is the first such compilation demonstrating the extensive efforts oriented toward minority health within DHHS. An index listing agencies and program titles appears in Volume I. Volume VIII contains more detailed program descriptions as well as telephone numbers of the offices responsible for the administration of these programs.

To supplement its knowledge of minority health issues, the Task Force communicated with individuals and organizations outside the Federal system. Experts in special problem areas such as data analysis, nutrition, or intervention activities presented up-to-date information to the Task Force or the subcommittees. An Hispanic consultant group provided information on health issues affecting Hispanics. A summary of Hispanic health concerns appears in Volume VIII along with an annotated bibliography of selected Hispanic health issues. Papers developed by an Asian/Pacific Islander consultant group accompany the data development report appearing in Volume II.

A nationwide survey of organizations and individuals concerned with minority health issues was conducted. The survey requested opinions about factors influencing health status of minorities, examples of successful programs and suggestions for ways DHHS might better address minority health needs. A summary of responses and a complete listing of the organizations participating in the survey is included in Volume VIII.

Task Force Report

Volume I, the Executive Summary, includes recommendations for department-wide activities to improve minority health status. The recommendations emphasize activities through which DHHS might redirect its resources toward narrowing the disparity between minorities and nonminorities and suggest opportunities for cooperation with nonfederal structures to bring about improvements in minority health. Volume I also contains summaries of the information and data compiled by the Task Force to account for the health status disparity.

Volumes II through VIII contain the complete text of the reports prepared by subcommittees and working groups. They provide extensive background information and data analyses that support the findings and intervention strategies proposed by the subcommittees. The reports are excellent reviews of research and should be regarded as state-of-the-art knowledge on problem areas in minority health. Many of the papers commissioned by the Task Force subcommittees accompany the subcommittee report. They should be extremely useful to those who wish to become familiar in greater depth with selected aspects of the issues that the Task Force analyzed.

The full Task Force report consists of the following volumes:

Volume I: Executive Summary

Volume II: Crosscutting Issues in Minority Health:
- Perspectives on National Health Data for Minorities
- Minority and other Health Professionals Serving Minority Communities
- Minority Access to Health Care
- Health Education and Information

Volume III: Cancer

Volume IV: Cardiovascular and Cerebrovascular Diseases

Volume V: Homicide, Suicide, and Unintentional Injuries

Volume VI: Infant Mortality and Low Birthweight

Volume VII: Chemical Dependency
Diabetes

Volume VIII: Hispanic Health Issues
Survey of Non-Federal Community
Inventory of DHHS Program Efforts in Minority Health

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The Subcommittee gratefully acknowledges Gail Herzenberg of Technassociates Inc. and Brenda Hewitt, Special Assistant to the Director, National Institute on Alcohol Abuse and Alcoholism, for their valuable assistance in preparing this report.

REPORT OF THE

SUBCOMMITTEE ON CHEMICAL DEPENDENCY

SUBCOMMITTEE ON CHEMICAL DEPENDENCY

REPORT

OVERVIEW

This report reviews the role that chemical dependency plays in contributing to the health disparity between Blacks, Hispanics, Asians/Pacific Islanders, and Native Americans and the non-minority population. Based on excess mortality rates in minority populations due to cirrhosis, cancer, and unintentional injuries, the Subcommittee chose to include alcohol abuse, illicit drug abuse, and cigarette smoking as elements of chemical dependency. The Subcommittee chose not to include the abuse or misuse of licit drugs. Although these substances may contribute to the health disparity, few data are available on which to base an analysis.

The impact of chemical dependency on the health of the general U.S. population is one of major proportion. The 1979 Surgeon General's Report, Healthy People, indicates that alcohol misuse is a factor in more than 10 percent of all deaths and may be higher among minorities (1). The National Institute on Alcohol Abuse and Alcoholism has estimated that about one-half of all homicides in the United States are related to use of alcohol (2). An estimated 10 percent of homicides nationwide are associated with use of illegal drugs (3). In some of the nation's largest cities, the number of drug-related homicides is more than 20 percent (4). Tobacco use is a factor in more than 16 percent of all deaths, and nearly 90 percent of all lung cancers are caused by cigarette smoking (5).
Data on the prevalence of chemical dependency for the minority population and the resultant impact are limited on health status. However, data on excess deaths among minorities due to cirrhosis, heart disease, unintentional injuries, homicide, and cancers of the mouth, larynx, tongue, esophagus, and lung provide an indication that chemical dependency has had a greater negative impact on the health of minorities.

ALCOHOL

Overview

In focusing on the health-related risks for minorities as a result of the use/abuse of alcohol, it is important to note that alcohol as a subject of scientific inquiry is a relatively recent phenomenon. In 1969 a major United States Government publication noted that "available methods of research on alcoholism and excessive drinking have received virtually no significant support." (6) At the time of that report, except for anecdotal information regarding the prevalence of alcohol-related problems, national databases were virtually non-existent and research on these problems was minimal at best.

Since 1969, the alcohol research field has made impressive gains in developing and enhancing the knowledge base with respect to the incidence

and prevalence of alcohol-related problems, as well as many of the biological, psychological, social and economic factors involved in alcohol use and abuse. There remains a need to further refine the alcohol abuse and alcoholism database to assess the impact of alcohol use and related problems on minority as well as other sub-populations. For example, although the National Institute on Alcohol Abuse and Alcoholism has funded national surveys on alcohol use since 1971, these surveys were designed to elicit much-needed baseline data on the general population. As a result, minority samples from these surveys generally are too small to draw definitive statements and conclusions about alcohol use and the nature and/or extent of alcohol-related problems among the minority groups. Research focused on minorities has also suffered from inadequate sampling techniques, providing small and/or isolated samples from which information cannot be extrapolated to the entire minority group studies with any scientific credibility.

The need for scientifically based data on which populations are at risk for what types of alcohol-related pathology is well-recognized as being crucial to the development of appropriate and effective prevention and treatment approaches. There is also emerging consensus among scientists and clinicians that alcoholism and related problems are coupled, and involve a wide range of medical, social, and legal problems which impact different populations at risk in different ways. These factors, among others such as growing maturity in the alcohol research field, have led epidemiological researchers to begin to design surveys with special sampling techniques to help develop a picture of alcohol use and abuse in sub-population groups, including minorities, and their risk for alcohol-related problems. Additionally, several major national databases have recently become available from the National Center for Health Statistics and/or NIAAA-funded surveys which are expected to yield more comprehensive and statistically reliable information concerning alcohol use among minority groups. These national databases along with a number of regional datasets were highlighted at a national state-of-the-art conference, The Epidemiology of Alcohol Problems among U.S. Minority Groups, sponsored by NIAAA in September, 1985. This conference brought together researchers with expertise concerning U.S. minority groups and those who collect and analyze epidemiological data sets concerning alcohol use and abuse to discuss the most recent data on incidence and prevalence of alcohol problems among Black Americans, Hispanic Americans, American Indians, Asian Americans/Pacific Islanders. A set of proceedings will be published which will provide interested researchers with national and regional databases presented at the Conference, and an assessment of priority needs in future epidemiologic research concerning minorities.

In addition to epidemiological research, basic research is also underway aimed at understanding some of the underlying biological mechanisms that could be a factor in the apparent differential risk for some alcohol-related problems among minorities. For example, sensitivity to the effects of alcohol varies greatly among individuals. There is evidence of

a high prevalence of alcohol sensitivity among Asians or people of Asian decent which recent studies suggest may be based on genetic variation in the enzymes involved in alcohol metabolism. This difference may explain the apparently low risk for alcoholism in such persons and the low prevalence of alcohol problems in Asian populations. Further, research has also demonstrated differences in these enzymes among Blacks and Caucasian as well as Asians (7). It must be noted that these data at present are too preliminary to suggest more than the need for additional basic research (the discovery of a Black enzyme variant, for example, is based on a sample of biopsies from 23 liver specimens from Black Americans, of which 29 percent were found to have a variant not yet seen in Caucasian liver specimens). They do, however, demonstrate the long-term investment which needs to be made to answer many of the questions concerning the health consequences of alcohol use and abuse on minority groups as addressed by this Task Force effort.

MAGNITUDE OF THE PROBLEM

Blacks

Prevalence

Since the 1950s, regular nationwide surveys of drinking patterns and problems have been conducted in the United States. Although these surveys cannot be assumed to be reliably representative of the Black population as a whole due to the small number and skewed geographical distribution of Black respondents, they do provide a general idea of Black drinking patterns over time.

A 20 year-old national survey of drinking practices in the general population included 200 Black respondents (8). This survey showed that Black and White men varied little in their drinking patterns, but that Black women had a higher proportion than White of abstainers (51 percent vs. 39 percent) and of heavy drinkers (11 percent vs. 7 percent). Two followup studies of still smaller numbers of "problem drinkers" in the Black group indicated that Blacks had a higher rate of "social-consequence" drinking problems (9, 10). However, further analysis of these data suggested that high problem rates among Blacks may be more related to their poverty, urban residence and youthfulness than racial identity. A 1979 survey of American drinking practices found contrasting results to the earlier national survey. It found that both Black men and Black women were more likely to classify themselves as "abstainers" (30 percent and 49 percent respectively) than White men and women (25 percent and 39 percent respectively). Moreover, White men had a 50 percent higher rate (21 percent vs. 14 percent) of heavier drinking than Black men while White women had lower rates of heavier consumption than their Black counterparts (4 percent vs. 7 percent). White men in this survey were twice as likely as Black men to exhibit social problems as a result of drinking (6 percent vs. 3 percent) although White women and Black women on this measure were

quite similar (3 percent vs. 2 percent). Among Blacks of both sexes who reported drinking, however, the proportion of heavier drinkers and of drinkers with alcohol-related problems were similar to the proportions for most other groups (11). According to a recent study, when rates of excessive drinking and rates of self-reported drinking problems are examined for the Black population, no consistent pattern of high alcohol consumption or high problem rates emerge for the groups as a whole. Black drinking patterns appear heterogeneous and differ along lines similar to patterns reported in the general American population. Rates of drinking vary greatly by geographical region, sex, and religious background (12). While many questions remain to be answered with respect to drinking practices and the prevalence of alcohol-related problems among Blacks, reliable data have been reported for some biomedical consequences. Perhaps the most compelling of these consequences is cirrhosis of the liver, where Black cirrhosis death rates appear to be significantly higher than White.

According to a paper commissioned by the Department of Health and Human Services for the Task Force on Black and Minority Health, mortality rates based on data from death certificates and population data collected by the U.S. Census indicate that for all ages, the non-White cirrhosis mortality figures are twice as high as for Whites.* Further, although deaths from cirrhosis have been consistently greater for males than for females, regardless of race, the most dramatic change in cirrhosis mortality since 1950 occurred among non-White males, whose rate increased fourfold between 1950 and 1973 (14). Mortality from liver cirrhosis has consistently declined among all race-sex groups in this country since 1973, with rates appearing to have stabilized since 1979, although rates among non-White males remain substantially higher than levels of the three other race-sex groups (15). In 1979, age-adjusted death rates for non-Whites were 21.1 per 100,000 population as compared to 11.1 per 100,000 persons for Whites (16). There are some encouraging reports in recent literature of a decline in cirrhosis deaths in White and non-White populations, lending cautious optimism that this trend will continue.

Other medical problems for which Blacks may be at disproportionate risk as a result of alcohol include esophageal cancer and hypertension. National

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* The non-White classification is used by the U.S. Census to designate racial groups other than Caucasians in U.S. mortality reports and population tables. The non-White rates provide a rough estimation of Black cirrhosis mortality since Blacks accounted for about 92 percent of the U.S. non-White population during most of the years covered in this analysis. (13)

Cancer Institute data show that between 1979-1981, Black males in the 35-44 age group had an esophageal cancer incidence rate 10 times that of Whites (18). Further, according to one researcher, trends in mortality due to cancer of the esophagus share many similarities with the patterns observed in cirrhosis rates, with recent case control studies arguing that alcohol consumption may be a primary etiological agent in developing this tumor among Blacks (19). Hypertension is of concern in that Blacks suffer from a significantly higher rate of hypertension than other groups. This already high rate can be further complicated by excessive use of alcohol (20).

There are references, although minimal, in the literature to the higher prevalence of Fetal Alcohol Syndrome/Fetal Alcohol Effects (FAS/FAE) among children of Black women who drink. The data, however, are inconclusive at best. Although the significantly higher abstention rates for Black women as compared to White women have been substantiated through a number of surveys, as previously noted, survey data suggest the greater frequency of heavier drinking among Black women than among White women (7 percent vs. 4 percent). Because FAS/FAE have been positively associated with heavy use of alcohol, these data would tend to suggest that the prevalence of FAS/FAE in the Black population may be higher than in the White population. Given the demonstrated differences in infant mortality rates between the Black and White populations, and the relationship between alcohol use and adverse pregnancy outcome, it is clear that this area needs more extensive investigation.

In terms of Black youth, national surveys have consistently supported the contention that Black youths drink less than White youths, have consistently higher abstention rates and consistently lower rates of heavy drinking and alcohol-related social consequences than their White counterparts (21). A 1977 review of the literature from 1960-1975 reported that most surveys of Black youth showed that they were less likely to use alcohol or to exhibit problems related to drinking than White youth (22). This was further confirmed in a 1978 national survey of adolescent drinking practices in which Black 10th-12th graders reported higher rates of abstention that White 10th-12th graders (36.1 percent vs. 21.1 percent) and lower heavier drinking rates (3.9 percent vs. 12.1 percent) (23). While these are positive revelations, it should be noted that Black males appear to begin to report high rates of heavy drinking and social problems due to drinking after the age of 30 compared to White males where heavy and problem drinking is concentrated in the 18-25 years-olds. This pattern of late onset drinking, if it leads to prolonged, heavy consumption, may put Black males at greater risk for chronic diseases related to alcohol consumption (24).

Treatment

Most of what is know about treatment for alcohol abuse and alcoholism among Black Americans is based on the observations of health care professionals involved in providing services to Black clients. According to the director

of a large alcohol and drug abuse treatment program serving a primarily urban Black community, Black individuals and families tend to seek help for alcohol problems later in the progression of the illness than their White counterparts. As a consequence, Black families are significantly more dysfunctional and resistant to messages of recovery than comparable White families (25). Another author on alcohol and Blacks noted that the problem of alcoholism has not yet been recognized and accepted in the Black community so as to allow for community-defined standards, folkways, and mores on the subject of drinking. Studies are needed in all areas of alcohol abuse among Black Americans--psychological, cultural, biological, and socioeconomic (26).

Hispanics

Prevalence

Studies of "Hispanic" drinking practices and consequences are, if anything, even more seriously lacking than those of Blacks. Until 1976, most common measures of alcohol-related problems (mortaility, arrests, and treatment) did not provide a Hispanic category. Additionally, most surveys and other types of research have not been designed specifically to address the heterogeneity of the Hispanic American popultion which is made up of quite different sub-cultural groups with cultural drinking practices which may be markedly different. Samples of Hispanic Americans in national surveys also are generally too small to make any but the most general statements about Hispanic patterns of use and abuse of alcohol. Nonetheless, there is some indication that Hispanics, particularly young males, suffer disproportionate health consequences as a result of their use of alcohol.

Self-reports of drinking patterns in a 1979 national survey suggests that Hispanic groups of both sexes, but especially males, have relatively high levels of heavier drinking and of problems associated with drinking (27). It should be noted, however, that the samples of Hispanics in this survey were too few to arrive at "statistically meaningful conclusions." Hence, only glimpses of drinking patterns in certain subgroups are offered. These data contrast with the findings from some regional surveys which show marked differences in the drinking practices and problems of Hispanic males and females. A statewide survey done in California, for example, showed a striking difference in the Chicano population between men and women, with far fewer women classified as frequent, heavy drinkers (3 percent) than men (13 percent) (28). With respect to the drinking patters of Hispanic women, a survey which consisted of a series of representative samples of the population in the San Francisco Bay Area between 1977 and 1980 found that Hispanics as well as Black women exhibited much higher abstention rates (32 percent, 29 percent respectively) than White women (18 percent). Hispanic women also had lower heavy drinking rates (3 percent) than both Black women (6 percent) and White women (4 percent) (29).

Mortality statistics for the United States do not separately identify Hispanics and information from regional surveys is not only limited but cannot be generalized to provide a national picture of alcohol-related deaths among Hispanic Americans (30). Several studies, however, suggest that death rates from cirrhosis of the liver among Hispanic Americans may be higher than for the general population. These results have been reported for Mexican-Americans, and Puerto Ricans (31). In terms of overall mortality, one local study done in Southern California reported a sharp rise from approximately 4 to 18 percent in the proportion of alcohol-related deaths among Mexican-Americans autopsied in a Southern California University Medical Center between 1950 and 1970, although alcohol-related was not defined. For 1970, the results published in this study indicated that 52 percent of all autopsies performed at the Medical Center on Mexican-American men between the ages of 30 and 60 were alcohol-related compared with 24 percent for White men, 23 percent for White women, 22 percent for Black men, 21 percent for Black women, and 20 percent for Mexican-American women. Another study using autopsy data from this Medical Center from 1970-1976, however, showed a decline in the proportion of Hispanic male alcohol-related deaths declined to 26 percent, and female Hispanic alcohol-related deaths declined to 7 percent (32). These studies, however, were undertaken by different investigators; their methodology may not be comparable and the results in terms of indicating a trend should be viewed with caution.

Studies have also reported higher arrests rates for public drunkenness and for drunk driving among Hispanic Americans than for the general population which may increase the risk for alcohol-related accidents and death in this population.

While there is some indication that Hispanics are overrepresented among those dying of alcohol-related causes, these data stem mainly from studies in a few cities or countries located mainly in the Southwest. Little is known about the health consequences of alcohol use in the rest of the country. Further, although statistics on public drunkenness and drunk driving show a disproportionate number of Hispanics, it is uncertain whether this is as a result of more drunkenness or of more police surveillance in Hispanic neighborhoods (33).

Alcohol use and abuse among Hispanic youth have also been studied, although the data at this point are inconclusive. A self-reported sample of Hispanic American youth in a 1978 National survey on adolescent drinking had a lower percentage of heavier drinkers (4.2 percent) than the White youths samples (12.2 percent). However, in this survey, the percentage of Hispanic youths who reported abstaining from alcohol was equal to that of the White students (21 percent) (34). It should be noted that the sample of Hispanic youth (10th-12th graders) was far too small (n=264; total sample, n=4,198) to make any but the most general interpretations. Contrasts in reported data of alcohol use among Hispanic college students also is also inconclusive. A 1973 study on alcohol use among college

students found that White students had higher rates of alcohol use than Blacks, Asian Americans, or Hispanic Americans. Another study done in 1979 found that Puerto Rican adolescents had lower overall alcohol consumption rates than American adolescents. However, a 1976 study found a predominantly Hispanic American sample of secondary school students reported using alcohol as often as the predominantly White student group (35). According to the author of a report on patterns and problems of drinking among U.S. Hispanics commissioned by the Secretary's Task Force, drinking rates among Hispanic male age cohorts varies, with the rate of heavy drinking dropping continuously with age so that the percentage of frequent heavier drinkers among younger men is almost four times higher than among those 50-59 years of age (36). The author concludes that targeting prevention efforts on the group most severely affected -- youth and young adult males -- should be a primary feature of any prevention strategy.

American Indians/Alaskan Natives

Prevalence

Alcohol use varies tremendously from one tribe to the next -- some tribes have fewer drinking adults than the U.S. population (30 percent compared to 67 percent for the U.S.) while other tribes have more drinkers (69-80 percent) (37). The prevalence of alcohol-related problems are also highly variable. Of the top ten causes of death among American Indians, five are directly related to the use of alcohol. Clearly, the health consequences of alcohol use and abuse for American Indians is a major public health concern which must be addressed.

A recent report based on age adjusted mortality rates found that the mortality rate from alcohol-related causes of death was more than three times higher among Native Americans than among other groups. The Indian Health Service lists five of the top ten causes of death among Indians as being directly related to alcohol--accidents, cirrhosis of the liver, alcoholism, suicide and homicide. These five categories account for 35 percent of all deaths among the American Indian people (38).

Accidents are the number one cause of death within the American Indian population and account for an estimated 21 percent of all deaths. The Indian Health Service estimates that 75 percent of all accidental deaths among Indians are alcohol-related (39).

The fourth ranked cause of death among Indians is cirrhosis of the liver, accounting for nearly 6 percent of the total death within this group, compared with 1.7 percent of the total deaths for the Nation as a whole. According to one study, the cirrhosis mortality rates for American Indians are higher than rates for Blacks or Whites at every age level, and the highest rates for Indians occur at younger ages. By examining the sex-specific data separately, this study also shows that Indian women have

much higher cirrhosis mortality rates than either Black or White women at all age levels (40).

The diagnosis of alcoholism accounts for an estimated 3.2 percent of all Indian deaths, which is approximately four times the rate for the nation as a whole. Researchers suggest that the ranking of this diagnosis might be even higher if all deaths from alcoholism were reported accurately. A study of alcohol-related morbidity and mortality among Oklahoma Native Americans reported the total Indian death rate from alcoholism between 1974 and 1976 as 59.8 per 100,000 population, compared with 8.6 per 100,000 for the total population (41).

Suicide accounts for 2.9 percent of all deaths within the American Indian population, or twice the national percentage. It is estimated that 80 percent of all deaths by suicide within the Indian community are alcohol-related (42).

The 10th ranked cause of death in American Indian communities is homicide, which accounts for an estimated 2 percent of total deaths. The Indian Health Service reports that 90 percent of homicides committed within Indian communities occur while either the perpetrator or the victim or both are under the influence of alcohol (43).

According to one paper commissioned by the National Institutes on Alcohol Abuse and Alcoholism for the Navajo tribe, the largest tribe in the United States, the average life expectancy of a Navajo male (58.8) years could be increased a full 6.2 years by the elimination of motor vehicle accidents and cirrhosis of the liver alone (44).

Another medical consequence of alcohol abuse for which Native Americans appear to be at risk is Fetal Alcohol Syndrome/Fetal Alcohol Effects (FAS/FAE), although the risks appear variable depending upon the sub-population group. An epidemiological study of FAS among American Indians of the southwest concluded that the incidence and patterns of recurrence of FAS among the three groups studied (Plains Indians, Navajo, and Pueblo) showed consistent differences ranging from a high of 10.3 per 1,000 live births for Plains Indians, to 1.3 per 1,000 live births in the Navajo population. The authors conclude that these differences were of greater magnitude than had been expected and could best be explained by the unique social and cultural dynamics of each of the three populations studied. The study also showed that 25 percent of all mothers who had produced one FAS child had also produced others. From a prevention standpoint, the authors of this study note that the ability to define sub-populations at risk is an important public health issue in terms of designing education and other measures targeted at women of childbearing years (45).

Treatment

According to one study, an extensive evaluation of nine Indian alcoholism programs for Navajos (the largest U.S. Native American tribe) in 1979 documented the major problems common to many Indian alcoholism projects. These programs were found to have inadequate funding, extremely poor pay and no career ladder for counselors and other employees; counselors with little or no professional training; counseling generally limited to the individual, adult clients with little emphasis on family and community; isolation from professional and community input, neglect of the Indian spiritual aspects of life; little followup; lack of diversified staff and treatment modalities; and no guiding theoretical or ideological perspective. According to the author, 73 percent of all Indian community leaders in the survey rated the programs as "inadequate" and many specifically mentioned a lack of outreach and youth services. However, the author concludes, even if existing Indian alcohol treatment programs were to improve dramatically, "their particular problem oriented, client centered approach would not be adequate to solve this major public health problem." Three types of programs were described which need to be developed and implemented: the reduction of the adverse medical consequences of alcohol and drug abuse which would seek to apply a public health or primary prevention approach to minimize alcohol-related morbidity and mortality among Indians; community based preventive education for reducing alcohol and drug abuse in the future; and multi-faceted rehabilitation for chronic abusers with therapies tailored to the needs of the particular individual. At the very least, such treatment should be able to accommodate people in need of a modern or traditional treatment track (46).

Alaskan Natives

Prevalence

With respect to Alaskan Natives, available data suggests that a wide variety of factors affect the drinking practices of Native Alaskans including climate, daylight hours, the forceful introduction of modern technology (post World War II) and dramatic urbanization, with new leisure time that replaced a subsistence way of life. Alcoholism and alcohol-related problems can be considered the number one health problem. One study states that Alaskan Natives (who comprise only 17 percent of the State) account for 60 percent of the deaths due to alcoholism; 67 percent of all client admissions to State-funded alcoholism programs; and 25 percent of the deaths due to cirrhosis of the liver. This same study cites 43 percent of all suicides; 38 percent of all homicides; 42 percent of all homicide arrests; 44 percent of all aggravated assault arrests; and 31 percent of arrests for forcible rape associated with the Alaskan Native population (47). While it cannot be said with certainty that alcohol is the cause of these violent episodes, the relatedness of alcohol to many acts of violence is generally accepted.

Asian Americans/Pacific Islanders

Prevalence

Asian Americans remain one of the less visible populations in the United States, a fact influenced by several factors; their comparatively small numbers, their geographic distribution, housing patterns and culturally derived lifestyle which historically has involved reliance on family and community rather than social or other service agencies. As a result, much of what is thought about Asian Americans borders on the stereotypical, especially regarding alcohol use and abuse (48). It should be noted, however, that there are over 20 nationalities covered by the term Asian American, and there are wide variations in drinking between and among these subgroups.

Research on the enzymes involved in alcohol metabolism have shown that some individuals, particularly persons of Oriental derivation, metabolize alcohol much more quickly than do non-Orientals. It is estimated that some 50 percent of Asian populations even at moderate alcohol intake, experience an "alcohol flush reaction," a systemic reaction consisting of facial flushing and rapid heart rate and, in severe cases, nausea, vomiting and low blood pressure (49). It has been hypothesized that this flushing reaction may provide some protection against heavy drinking and related problems, however, some researchers and clinicians believe that alcohol problems including medical consequences of alcohol use such as cirrhosis, may exist in spite of this. The relationship between this sensitivity and the use of alcohol and the incidence and prevalence of alcohol problems among the Asian American population needs further examination and clarification.

The very limited data available on alcohol-related consequences among Asian Americans shows that in general, both Chinese and Japanese Americans have minimal arrest records (according to FBI statistics). If arrested, however, individuals from these two groups are most likely to be charged with an alcohol-related violation, such as driving under the influence or drunkenness. These alcohol-related offenses accounted for 27.8 percent of Japanese American arrests in 1978 and 13.1 percent of Chinese American arrest rates. By contrast, the White arrest record for alcohol-related offenses in this same year was 31.9 percent, Blacks, 14.6 percent, and American Indians, 47.2 percent (50).

Native Hawaiians

Prevalence

Native Hawaiians are a minority group often overlooked in survey data and reports on minority group problems in the U.S. However, there is some evidence to suggest that Native Hawaiians' appear to be at greater risk than all other ethnic groups in Hawaii, including Caucasians, for death from alcohol-related motor vehicle accidents. Based on available data, Native Hawaiians also appear more likely to report heavier drinking than other Hawaiian population groups.

A 1979 report on Mental Health and Substance Abuse Among the Native Hawaiian population included state-wide statistics to compare Native Hawaiians with all other groups in the state. (The other groups were not further broken down into ethnic/racial categories.) In this study, Native Hawaiians appear to be arrested for driving while intoxicated with less frequency than would be predicted on the basis of their numbers in the Hawaiian population (256.7 per 1,000 population vs. 449.5 per 100,000 population for all other groups), however, they appear to be at somewhat greater than expected risk for involvement as drivers in fatal motor vehicle accidents due to intoxication (15.3 per 100,000 population vs. 13.9 per 100,000 population for all other groups). In this same study, Native Hawaiians were also more likely to report heavier drinking, i.e., 12 or more drinks per week, than all other groups in the Hawaiian population (30.5 percent for Native Hawaiians vs. 18 percent for all other groups). (51)

CONCLUSIONS AND FUTURE DIRECTIONS

It is clear from the above discussion that alcohol contributes significantly to the health disparity which exists between persons from minority groups and those from the non-minority population. It is equally clear, however, that minority group status alone is not a factor in the health disparity, and all persons of a particular minority group are not at equal risk for alcohol-related adverse health consequences. The need for culturally-appropriate prevention and treatment programs is acknowledged, as well as the clearer need for the continuing support of research.

DRUG ABUSE

Overview

During the late 1960's and 1970's drug abuse reached alarming proportions across most racial groups. Although the projected size of the adolescent and young adult population in the 1980's and 1990's will decrease, and drug use generally is inversely proportional to age (52), preliminary data suggest that the intensity and impact of drug abuse among minority populations is of significant proportion and will not necessarily diminish. These data suggest that certain minority populations may suffer certain adverse consequences of drug abuse disproportionately to their representation in the population.

In the past, national surveys of drug and alcohol abuse were designed to focus on the general population. Consequently, there are no national data on race or ethnic specific rates for drug abuse or the health consequences of drug abuse.

Estimates of the prevalence of drug abuse obtained from household surveys must be viewed conservatively, since certain potentially high risk subgroups are not included in the sample. These would include, for example, persons with no fixed residence, prison inmates, and students living in college dormitories. In addition, there is a scarcity of direct measures of drug abuse prevalence; consequently the use of secondary or implied measures of prevalence is necessary. Data on admissions to treatment centers, emergency room cases, and medical examiner cases among minorities can be viewed as secondary indicators of prevalence and can indicate to a degree the extent and consequence of drug abuse among minority populations.

Another problem in obtaining data on minorities is that Blacks, Hispanics, Native Americans, and Asian Americans are sampled proportionately to their numbers in the general population. The actual sample size for minorities is substantially smaller than that for Whites (i.e., 1,093 minorities were sampled in the 1982 National Household Survey on Drug Abuse (NHSDA) as compared to 4,520 Whites). Thus, estimates for minorities are subject to larger sampling errors than are estimates for Whites and estimates cannot be made for separate race/ethnic groups. The 1985 NHSDA is oversampling Blacks and Hispanics in an effort to provide more reliable estimates of drug abuse prevalence in minority populations.

Data from the 1982 NHSDA indicate that the prevalence of reported drug use within the household population is generally higher in urban areas than in suburban or rural areas (53). Therefore, to the extent that minorities are more likely to reside in inner city areas, they may be at greater risk of drug abuse and ultimately the negative social and health consequences associated with drug abuse.

The overall prevalence of drug abuse in the general household population, ages 12 and older, is about the same for minorities as it is for Whites. Data from the 1982 NHSDA showed that about one-third (32 percent) of Whites and minorities had used drugs illicitly at some time in their lives (54). This would include having at least tried an illicit drug, such as marijuana, heroin, hallucinogens or cocaine, or having used a prescription psychotherapeutic drug, such as tranquilizers, sedatives, stimulants or analgesics, for nonmedical reasons. Similar levels of current illicit use (use during the month prior to interview) were also reported by both groups (12 percent of Whites and 13 percent of minorities).

It is interesting to note that while Whites and minorities in the general household population experience about the same overall levels of drug abuse, minorities were more likely than Whites to report marijuana as their only form of illicit drug use. For example, the 13 percent current illicit drug use cited above for minorities was comprised of 10 percent reporting marijuana only and 3 percent reporting other drugs with or without marijuana use. The corresponding figures for Whites were 7 percent and 5 percent, respectively.

Among both minorities and Whites, the highest levels of current drug use were reported by young adult males, 18-25 years old. Thirty-six percent of young adult minority men reported current use of marijuana only; an additional five percent reported use of other drugs (with or without marijuana use). Among young adult White men, 21 percent reported current use of marijuana only, and 18 percent reported use of other drugs (55).

Another important aspect of marijuana use is that unlike the pattern for young adult Whites, a decreasing trend in use has not been observed among young minority adults, ages 18-25. A decreasing trend of marijuana use also has been noted among White youths, ages 12-17, and this trend does appear to be paralleled by a decreasing trend among minority youths in that same age group (56). The marijuana trend data are shown in Table 1.

The use of heroin, even though included in the general household population questionnaire, cannot be measured adequately in household surveys both because it is a relatively rare event and because it is more likely to involve the nonsampled population subgroups and also more likely to be underreported. This is a particularly important consideration in any assessment of drug abuse problems among minorities since the data available from hospital emergency rooms and from drug abuse treatment programs indicate that heroin use is a more serious problem among Blacks and Hispanics than among Whites. (See the discussion of these data under the minority specific sections of this report.)

The 1982 National Drug and Alcoholism Treatment Utilization Survey (NDATUS) is a national survey of all known existing public and private treatment units. When used in conjunction with 1980 census data, information from

this survey on clients, ages 15-64, provide race- and ethnic-specific rates for clients in treatment. The survey data indicates that the number of minority clients in treatment in the Nation per 100,000 population is greater than it is for Whites (57). (See the discussion of the data under the minority specific section of this report.)

There are many potential negative health consequences of drug abuse. To the extent that some minorities are more involved proportionately in drug abuse the health consequences are greater. Some of the negative consequences include fatal and nonfatal overdose, hepatitis B infection, Acquired Immune Deficiency Syndrome (AIDS) and bacterial endocarditis. Drug abuse may increase the risk of homicides and crime, accidents and injuries, Parkinson's disease, low birth weight, and suicide and psychiatric problems.

In addition, drug abuse may have negative effects on employment, school achievement, socioeconomic status, and family stability, although it is difficult to determine if these factors are causes or effects of drug abuse. The associations between drug abuse and many of these negative consequences are based primarily on case studies or case reports. There are few known methodologically sound epidemiological case-control or prospective studies that have been done in either White or nonWhite populations.

Intravenous drug use appears to increase the risk of potentially fatal infections from hepatitis B, AIDS, and bacterial endocarditis. A 1984 national surveillance of AIDS has determined that 17.2 percent of AIDS patients were intravenous drug users (58). However, no breakdown by race was provided for the abusers.

There are also several small studies which indicate that the incidence of fatal infections from Hepatitis B (59) and bacterial endocarditis (60) is associated with intravenous drug administration, while some of these studies included race/ethnicity. The limited data does not support the conclusion that race, independent of pareuteral drug abuse is a risk factor for these conditions.

Data from the Cliented Oriented Data Acquisition Process (CODAP) indicate that certain minorities are more likely to report intravenous use than Whites (61). To the extent that minorities are more involved in the intravenous use of drugs, they are at increased risk for multiple negative health consequences. Health consequences studies which report data with racial and ethnic identifiers are discussed in the minority specific sections of this report.

MAGNITUDE OF THE PROBLEM

Blacks

Data from the 1980 census indicate that Blacks constitute 11.7 percent of our population, however, they constitute 22.5 percent of the population of the inner cities (62). As such, they may be at greater risk of drug abuse and its consequences.

Evidence of higher rates of drug use in populations having no fixed residence is provided by a 1983 study of drug use among tenants of single room occupancy hotels (S.R.O.) in New York City (63). Results suggest that Blacks have higher rates of drug use than Whites for marijuana, cocaine, heroin, and illicit methadone. This is important since Blacks and Hispanics constitute 67 percent of the S.R.O. population compared to 40 percent of the household population in New York City. Further analysis of a sample of Blacks matched for age and sex from the household population and the S.R.O. population indicated that the Black S.R.O. tenants were three times as likely to have used drugs recently as were the Black New York City household residents (63).

Data obtained from the 1982 National Drug and Alcoholism Treatment Utilization Survey (NDATUS), a national survey of public and private treatment units, suggest that Blacks are three times more likely to be in treatment for drug abuse-related problems than are Whites (64).

Through 1981, treatment data were collected nationally through the Client Oriented Data Acquisition Process (CODAP). Since 1982, States have submitted data on a voluntary basis. In the past, the data have been criticized as biased since they represent primarily clients admitted to publicly-funded programs. Even if the overall distributions of admissions by race did differ from admissions to privately-funded programs, it is however, legitimate to examine the distributions within race/ethnic categories.

The following discussion will focus on treatment data submitted by 23 States, Puerto Rico, Washington, D.C., Guam, and the Virgin Islands during part or all of the year of 1983. In looking at these data it is important to know that California accounted for approximately 46 percent of the admission data. Of the 182,002 clients admitted to treatment in 1983, over half were White and 23.4 percent were Black.

Black clients were more likely than White clients to report a primary problem with heroin, cocaine, and PCP. Black clients were also more likely to report "other" drugs than White clients.

Black clients were likely to be older than White, Hispanic, or American Indian clients at admission for each of the four drugs--heroin, cocaine, marijuana, and PCP (65).

The majority of Black clients admitted to treatment for those four drugs had multidrug problems; Black clients with a primary problem with heroin

were more likely than White clients to report a problem with at least one other drug.

Thirty-one percent of Black clients reporting a primary problem with heroin at admission reported a secondary problem with cocaine. This figure was three times the figure reported by primary White heroin clients as shown in Table 2.

Twenty-seven percent of Black clients admitted to a drug abuse treatment program with a primary problem with cocaine reported smoking (or freebasing) as their preferred route of administration, compared to five percent of White clients. Black primary cocaine clients were more likely to report intravenous use than Whites as shown in Table 3.

It should be noted that this does not include "speedballing" which is the intravenous combination of heroin and cocaine. Speedballing is reported with heroin as a primary problem and cocaine as secondary problem. Analysis of these data indicate that this particular problem predominates among the minority population, particularly Blacks and Puerto Ricans who represent 76 percent of speedballing admissions.

Drug abuse-related hospital emergency room cases provide one measure of the morbidity associated with drug abuse. While such data cannot provide prevalence estimates, per se, they do indicate which drugs are associated with medical emergencies. Over time, they indicate if problems associated with a particular drug are increasing or decreasing. In addition to prevalence, these trends may be influenced by a number of factors, such as increased dosages, increased frequency of use, aging of existing users, more dangerous routes of administration, and the concomitant use of two or more drugs.

Data on emergency room episodes is collected by the Drug Abuse Warning Network (DAWN). This data is gathered in 27 metropolitan areas and a panel of emergency rooms outside these metropolitan areas. Since DAWN emergency rooms are located primarily in metropolitan areas, they reflect individuals who seek emergency room treatment who reside near DAWN participating emergency rooms in those areas. Because these facilities do not constitute a statistical sample, inferences cannot be made to the general population.

Of the 96,047 emergency room episodes reported to the DAWN in 1984, 53.7 percent of the patients were White and 29.7 percent were Black (66). Black patients were more likely than were White patients to mention one of the major illicit drugs -- heroin, cocaine, marijuana, or PCP -- in conjunction with an emergency room visit. This was generally true for both males and females as shown in Table 4.

The percentages of males reporting use of one of these four major illicit drugs was greater than that reported by their female counterparts. It is

interesting to note that the percent of Black females mentioning heroin, 18.0 percent, was greater than the percent of White males, 10.2 percent.

As in treatment admission data, Blacks tended to be older than Whites and Hispanics in emergency cases involving cocaine, heroin, and/or marijuana. For PCP, however, somewhat similar percentages of Blacks and Whites (49 percent and 55 percent, respectively) were under 25 years of age.

Individuals who abuse drugs frequently use two or more drugs (including alcohol) in combination. Of the top 10 drug combinations reported by DAWN emergency rooms in 1984, 8 of the 10 involved alcohol-in-combination with another drug. Cocaine and heroin combinations were the second most frequently reported drug combinations.

Table 5, which shows the 6 of the 10 top combinations that contain an illicit drug, incidates that of the patients reporting combination use of cocaine and heroin, alcohol and heroin, and alcohol and PCP, Blacks clearly predominated.

Another factor that may contribute to a cocaine-related medical emergency is the route used to administer the drug. Consistent with treatment data, Blacks were somewhat more likely than were Whites to use the more dangerous routes of cocaine administration--injection (used by 49% of Black patients and 40% of White patients) and smoking or freebasing (9% of Blacks and 3% of Whites) (67).

The most dramatic recent trend in DAWN emergency room data involves cocaine-related cases. Between 1982 and 1984, cocaine-related cases more than doubled. Similar trends have occurred in each race/ethnic group. Heroin trends have been relatively stable for each race/ethnic group over the same period, following substantial increases in the early 1980's. Recent increases in PCP mentions, however, have primarily involved Blacks and other minorities (51% of all clients mentioning PCP in 1984 were Black compared to 46% in 1983) (68).

The Drug Abuse Warning Network, in addition to providing a measure of morbidity associated with drug abuse also provides a measure or mortality by providing information on drug related deaths as reported by medical examiners in 26 metropolitan areas. Data from the New York metropolitan area, whose data were reflected in the emergency room data, are not included in mortality data. As with the emergency room component, information on decedent demographics, drugs most frequently found in the decedents, drug concomitance and preferred route of administration, in addition to other types of data, are collected. Also, these data do not represent a statistical sample, thus, generalizations to the total population cannot be made.

Of the 3,297 decedents reported to DAWN in 1984, 57.8 percent were White and 32 percent were Black. This is two-and-a-half times the proportion of Blacks in the United States population (69).

The two illicit drugs most frequently involved in drug-related deaths among Blacks, Whites, and Hispanics were heroin and cocaine. For Blacks 45.3 percent of the deaths were heroin-related as compared to 23.1 percent for Whites. The percentage of cocaine-related deaths cocaine was approximately the same for Blacks and for Whites. PCP was not included in the top five drugs for Whites, but it ranked number three among Blacks causing 11.9 percent of the deaths (70).

Differences among male and female decedents by race (Black, White, and Hispanic) are shown in Table 6. It is interesting to note that although the actual numbers were much smaller, the percentage of deaths in Black females related to heroin, PCP, and cocaine was greater than for Black males.
As with CODAP treatment admissions and emergency room DAWN patients, Black decedents tend to be older than White or Hispanic decedents in medical examiner cases involving cocaine or heroin. For PCP-related deaths, Black decedents were older than White decedent (71).

A majority of DAWN medical examiner reports frequently show combination use. The majority of the decedents in cases involving heroin, PCP, and cocaine were using other drugs. Eighty-six percent of the Black decedents using heroin were using other drugs; 81 percent of White heroin-caused decedents used other drugs. For PCP, the percentages were 71 percent of Black decedents and 75 percent of White decedents. This distribution differs from the one displayed in the emergency room section of this report in which a majority of the heroin-related and PCP-related emergency cases among Blacks did not involve other drugs. Seventy-six percent of Blacks and 68 percent of Whites in cocaine-related deaths were using other drugs at the time of death. The most frequently used drugs in combination with cocaine were heroin, PCP, and alcohol (72).

As was the case for emergency room episodes, recent medical examiner data involving cocaine show dramatic increases over the past 3 years. Between 1982 and 1984 cocaine-related deaths among Blacks tripled. Among Whites, cocaine-related deaths doubled. Heroin trends have been relatively stable over the same period following substantial increases in the early 1980's. The recent increases in PCP-related deaths have been primarily involved with Blacks and other minorities. The percent of PCP-related deaths involving Blacks increased from 50 percent in 1983 to 58 percent in 1984 (73).

Health Consequences

Although there are many commonly known negative health consequences associated with drug abuse, there are very few known methodologically sound epidemiological case-control studies on the subject that have been done.

Of those few, they are small, local studies which generally do not look at race as a factor. The little information that is known on health consequences for Blacks will be reported.

A recent review of drug abuse patients diagnosed with endocarditis at Cook County Hospital in Chicago determined that there was a high degree of correlation between intravenous pentazocine and tripelennamine (T's and Blue's) abuse and endocarditis caused by Pseudomonas aeruginosa (74). No information was given on the racial or ethnic background of the cases; however, 1983 data from the Drug Abuse Warning Network showed that 707 of 818 pentazocine and tripelennamine emergency room episodes occurred in Blacks. It is not known if these data are representative of pentazocine and tripelennamine users, but to the extent that users are more likely to be Black, then Blacks are at greater risk of endocarditis caused by Pseudomonas aeruginosa (75). Reports of other hospital-based series occur in the literature, but the racial or ethnic characteristics of the individuals probably only reflect the characteristics of the population served by the hospital(s).

Some data are available to suggest a drug-homicide relationship. The Crime Analysis Unit of the New York City Police Department found that in 1981, 393 (23.7%) of 1,656 homicides that were able to categorized by circumstance in New York City were drug-related. Similarly, in 1982, 349 (21%) of 1,663 homicides were determined to be drug-related. In 1981 and 1982, 53.1 and 46.4 percent of drug-related homicides involved Black victims (76). Although the racial and ethnic background of perpetrators is not known in a large proportion of drug-related homicides, 60 (42%) of 143 drug-related homicides in 1982 involved a Black victim and a Black perpetrator. These results cannot be generalized to other areas of the United States; however, they do suggest that Blacks are overrepresented in drug-related homicides in New York City.

There have also been several reviews of medical examiners cases of sudden and unexpected deaths. Several reports based on New York City medical examiner cases noted marked increase in the number of deaths of narcotic addicts from 1967 through 1970, a rise that appeared to parallel a marked increase in the addict population (77, 78). Investigation of the 591 deaths in 1967 that were considered by the Office of the Chief Medical Examiner of New York City to have occurred in narcotics users determined that 52 percent of the deaths occurred in Blacks and 22 percent in Whites (79). A similar investigation of 927 deaths among New York City narcotic addicts during a 9-month period in 1971 found that 56 percent of deaths were in Blacks, 28 percent were in Whites (80). Since 23.4 percent of the population of New York City in 1970 was non-White (81), these figures indicate an overrepresentation of Black narcotic addicts' deaths.

An epidemic of heroin-related deaths that occurred in Washington, D.C. from 1979 through 1982 was investigated to try to determine the cause of the epidemic. A case-control study based on toxicological analyses of

postmortem blood samples indicated that concentrations of both heroin and ethanol were substantial risk factors for heroin-related deaths (83). In this epidemic, 93 percent of the decedents were Black; this large proportion of Blacks reflects the fact that the population of the District of Columbia is largely Black. However, these data suggest that heroin in combination with alcohol is an important risk factor for death related to heroin use. To the extent that Blacks and other minorities compared with Whites are more likely to use heroin in combination with alcohol, they are at greater risk of heroin-related deaths.

Hispanics

Data from the 1980 census indicate that Hispanics constitute 6.4 percent of our population; however, they constitute 10.8 percent of the population of the inner cities (41). As such, they may be at a somewhat greater risk of drug abuse and its consequences. Results from the 1983 S.R.O. study of drug abuse in New York City suggest that Hispanics have higher rates of drug use than non-Hispanic Whites for marijuana, cocaine, heroin, an illicit methadone. This is important since Blacks and Hispanics constitute 67 percent of the S.R.O. population compared to 40 percent of the household population in New York City.

The 1982 National Drug and Alcoholism Treatment Utilization Survey (NDATUS) suggests that Hispanics are almost three times more likely to be in treatment for a drug abuse-related problem than are Whites (85). Of the 182,002 clients admitted to treatment in 1983 and accounted for by the Client Oriented Data Acquisition Process (CODAP), 22.3 percent were Hispanic.

Hispanic clients were more likely than White clients to report a primary problem with heroin and PCP. They were also more likely to report "other" drugs than White clients. The most common drug included in the "other" category is inhalants (see Table 2) (86).

Recently, it has been suggested that prevalence of inhalant use by Hispanic youths is high. While this cannot be supported by household and high school population surveys, a 1979 study of Mexican-American children and adolescents in Los Angeles barrios found prevalence of inhalants 14 times the prevalence found among the general population (87).

As shown in Table 3, Hispanic clients tend to be younger at admission than White clients for the three primary drug categories of heroin, PCP, and cocaine. For Hispanics, 21 percent of heroin clients, 73 percent of PCP clients, and 46 percent of cocaine clients were under the age of 25 at admission compared with 16 percent, 63 percent, and 45 percent for Whites (88). With the exception of Hispanic clients reporting a primary cocaine problem, Hispanic clients were less likely than were White clients to report a problem with at least one other drug at admission (89).

According to 1984 DAWN data, Hispanic patients were more likely than were White patients to mention the four major illicit drugs in conjunction with an emergency room visit. This was generally true for both males and females as shown in Table 4.

Sixty-eight percent of Hispanics admitted as emergency room patients for PCP-related cases involved persons under age 25. This is a higher percentage than for Blacks and Whites (90).

A majority of DAWN emergency room cases involve the use of two or more drugs (including alcohol) in combination. Approximately four out of five of the marijuana-related emergency room visits reported to DAWN in 1984 involved other drugs, with 84 percent of both Hispanics and Whites reporting combination marijuana use. Blacks reported lower combination marijuana use. For cocaine-related cases Hispanics (60%) and Blacks (61%) were somewhat less likely than were Whites (66%) to report such use (91).

While Hispanics accounted for approximately 9% of all emergency room episodes reported to DAWN in 1984, The accounted for 10-24% of those episodes incolving drug combinations as shown in Table 5.

The 1984 DAWN data indicates that those treated for emergency room episodes, 42 percent of Hispanics as compared to 40 percent of Whites administer cocaine by injection; 6 percent of Hispanics as compared to 3 percent of Whites administer cocaine by smoking or freebasing. Both are more dangerous routes of cocaine administration (92).

Cocaine-related DAWN emergency room cases more than doubled between 1982 and 1984 for Hispanics. During those same years, medical examiner data involving cocaine show the same dramatic increases. Between 1982 and 1984 cocaine related deaths among Hispanics tripled, while they doubled among Whites (93).

Of the 3,297 decedents reported to DAWN in 1984, 9 percent were Hispanic. Heroin, cocaine, and PCP were the three illicit drugs most frequently involved in the deaths among Hispanics with 37.2 percent of the heroin-related, 15.8 percent cocaine-related, and 13.4 percent caused by heroin and 20.6 percent caused by cocaine. PCP was not included in the top five drugs for Whites (94). As with CODAP treatment admissions and emergency room DAWN patients, Hispanic decedents were older than White decedents in PCP-related deaths.

The majority of decedents in cases involving heroin or PCP in the DAWN medical examiner reports were using other drugs. Seventy-seven percent of Hispanic decedents using heroin were using other drugs. This is 4 percent less than Whites and 9 percent less than Blacks. For PCP deaths, 70 percent of Hispanics were using other drugs, again less than both Blacks and Whites. This distribution differs from data on emergency room cases in which a majority of heroin- and PCP-related emergency cases among Hispanics

did not involve other drugs. In cocaine-related deaths, Hispanics had the highest percentage (79%) of other drug use compared to Whites (68%) and Blacks (76%).

Health Consequences

Studies on specific health consequences which include Hispanics are even more limited than for Blacks. Recently, intravenous use of a "designer" drug, MPTP was associated with early onset of chronic Parkinson-type disease symptoms in California drug addicts. Identification of individuals exposed to MPTP and case ascertainment is still continuing, so that the ethnic and racial composition of the cases is not yet known; however, a large proportion of the initial cases was Hispanic (96).

The 1981 and 1982 New York City Police Department Study, mentioned earlier, found that in 1981, 34.2 percent of the drug-related homicides involved Hispanic victims. In 1982, the percentage of Hispanic victims increased to 41.8 percent. Although the racial and ethnic background of perpetrators is not known in a large proportion of drug-related homicides, 38 (26.6%) of 143 drug-related homicides in 1982 involved a Hispanic victim and an Hispanic perpetrator. These results cannot be generalized to other areas of the United States; however, they do suggest that Hispanics are overrepresented in drug-related homicides in New York City (97).

Investigation of the 591 deaths in 1967 in New York City that were considered by the Office of the Chief Medical Examiner to have occurred in naroctics users determined that 24 percent of the deaths were Puerto Rican (defined by Spanish surname) (98). A similar investigation of 927 deaths among New York City narcotic addicts during a 9 month period in 1971 found that 16 percent of deaths were Puerto Rican (99).

American Indians/Alaskan Natives

Data obtained from the 1982 NDATUS suggest that American Indians are almost twice as likely to be in treatment for a drug abuse-related problem than are Whites (100).

Treatment data were collected nationally in 1983 on a voluntary basis through the Client Oriented Data Acquisition Process (CODAP). The proportion of 1983 CODAP client admissions (see Table 7), excluding alcohol, was 0.5 percent for American Indians and 0.1% for Alaskan Natives. CODAP also indicated that American Indian clients were more likely than White clients to report a primary problem with heroin, marijuana, or PCP (see Table 8). American Indians also were more likely to report the use of "other" drugs than White clients. The most common type of "other" drugs category reported was inhalants (101).

Multidrug usage is also a problem among American Indians according to the CODAP data. American Indian clients with a primary problem with heroin were more likely than White clients to report a problem with at least one other drug (40.9 percent of American Indians as compared to 38.6 percent of Whites). Indian

clients with a primary cocaine problem were also more likely than White clients to report a problem with at least one other drug (86 percent of Indians as compared to 81.3 percent of Whites). This same greater usage of more than one drug was also true of Indians whose primary drug was marijuana. Data on Table 9 indicates that 80.5 percent of Indian marijuana users used at least one other drug whereas 72.7 percent of White clients used at least one other drug (102).

According to 1984 DAWN data only 212 or 0.2 percent of the 96,047 emergency room episodes reported were attributable to American Indians and Alaskan Natives (103). The race/ethnic distribution for the 3,297 decedents reported to DAWN in 1984 reflects the same percentages as the emergency room episodes. That is, only 8 (0.2 percent) of the decedents were American Indian/Alaskan Native (104). This low percentage may be explained by the fact that DAWN emergency rooms are located primarily in metropolitan areas, and a large percentage of American Indians and Alaskan Natives live in rural areas.

Few studies and surveys of drug abuse have focused on minority subgroups of the population, however, one survey of American Indian youth, (7th through 12th grade students in Indian reservation schools) has been conducted annually since 1975. Results from this survey for 1980-81 (see Table 10), on the lifetime prevalence of substance use for American Indian high school seniors show that for 10 of 12 substance categories, American Indians have higher lifetime prevalence rates of substance use than high school seniors nationally. "Ever-use" of marijuana (88 percent) and inhalants (34.4 percent) by American Indian seniors, in particular, far exceeds that for national high school seniors, which is 59.5 percent and 12.3 percent respectively (105). While lifetime prevalence rates provide an indication of exposure, figures on frequency of use for a given time period provide a better indication of consequences and/or problem use. When frequency of substance use for American Indian youth (in grades 7-12) is compared to a sample of similarly aged non-American Indian urban youth, a striking difference is evident for marijuana. In 1980-81, 13.4 percent of American Indian youth reported daily use of marijuana in the 2 months before the susrvey as compared with 2.6 percent of the non American Indian urban youth (106).

Asian American/Pacific Islanders

There is a paucity of data on prevalence of drug abuse among Asian Americans. The little informtion that is known suggests that the incidence of drug abuse is lower than that of the White population; however, existing data are insufficient to draw any definitive conclusions.

The 1983 treatment data collected through CODAP reported that only 0.8 percent of all the clients admitted were Asian/Pacific Islanders (107).

A 1972 investigation of 927 deaths among narcotic addicts in New York City during a 9-month period, found that only 2 percent of the deaths were Asian American, although a much larger Asian American population resides in the area (108).

CONCLUSION

In summary, while there is no evidence to suggest that the prevalence of drug use differs between Whites and non-Whites in the household population, there is evidence to suggest different patterns of use in selected treatment and decedent populations. To the degree that particular minorities are more involved in intravenous administration and the use of drugs in combination, they may be at greater risk of fatal and nonfatal consequences of drug abuse and therefore may be suffering disproportionate complications associated with drug abuse. To what extent these differing patterns of use are affected by environmental conditions such as poverty, overcrowding, illiteracy, and unemployment is unknown. What is clear, however, is that more epidemiological studies are needed on the causes and consequences of drug abuse in all racial and ethnic groups.

SMOKING

Cigarette smoking is the chief preventable cause of death in the United States. Cigarette smoking is responsible for 30 percent of all cancer deaths, nearly 90 percent of all lung cancer, and across all smoking-related disease, for over 340,000 premature deaths each year in the United States. It is a causative factor in coronary heart disease and arteriosclerotic peripheral vascular disease, cancer of the lung, larynx, oral cavity, esophagus, and chronic bronchitis and emphezema. It is a contributing factor in cancers of the bladder, pancreas, and kidney. Cigarette smoking is also associated with ulcer disease and low birthweight (109, 110, 111).

Differences exist in the smoking behavior of minorities and non-minorities, and the incidence and gravity of cigarette-related diseases varies. The majority of existing data on smoking and minorities is focused on Blacks. Less extensive information exists for Hispanics, and very limited data exist for American Indians and Asian Americans. Thus, while the report will address each minority group, the primary thrust will be devoted to the Black population.

MAGNITUDE OF THE PROBLEM

Blacks

Prevalence

The National Health Interview Surveys (NHIS), conducted by the National Center for Health Statistics, are the major sources of data on smoking behavior of the United States population. The prevalence of cigarette smoking is greater among Blacks than among Whites.

Across all categories there has been a reduction in the prevalence of smokers. In 1965, 52.1 percent of all males age 20 years and above were current cigarette smokers; by 1983, 35.4 percent of all males were current smokers.

In 1983, 34.7 percent of White males, 20 years and older, were current smokers, whereas, 42.6 percent of Black males were current smokers. The higher rate of prevalence among Black males has continued through time from 1965 to 1983 as demonstrated in Table 11 with a fairly consistant differential of approximately 8 percent. The prevalence rate for males, both Black and White, declined by approximately 17 percent between 1965 and 1983. The prevalence of current Black male smokers declined from 59.6 percent in 1965 to 42.6 percent in 1983. Among White males, the prevalence of current smokers declined from 51.3 percent in 1965 to 34.7 percent in 1983. The disparity in the reduction of prevalence between White and Black males has persisted from 1965 to 1983, although it has been fairly constant (112, 113).

Among females, the reduction in smoking prevalence between 1965 and 1983 was considerably less than for males, (i.e., approximately 4.3 percent vs. 17 percent). In 1965, 34.2 percent of all females smoked, and in 1983, the rate was 29.9 percent. There was a reversal in White-Black prevalence during this period as well--in 1965, smoking prevalence among White females exceeded that of Black females by approximately 1.8 percent but by 1983 Black female prevalence was 2.7 percent greater than that of White females. While White females have showed a slow but steady decline from 34.5 percent in 1965 to 29.8 percent in 1983, Black females have had an increase-decrease-increase pattern of smoking prevalence over the years (i.e., 32.7 percent in 1965, 34.7 percent in 1976, 30.6 percent in 1980, and 32.5 percent in 1983) (114, 115). Table 12 illustrates female prevalence rates.

There has been a steady increase from 1965 to 1983 of former smokers for White and Black males (see Table 13) and White females (see Table 14). For White males the rate increased from 21.2 percent in 1965 to 32 percent in 1983. The rate for Black males increased from 12.6 percent in 1965 to 23.2 percent in 1983. For White females, the prevalence of former smokers went from 8.5 percent in 1965 to 17.2 percent in 1983. However, the rate of Black female former smokers, although it has increased from 1965 (5.9 percent), declined from a high in 1980 of 11.8 percent to 10.7 percent in 1983 (116).

Combined data from the 1978, 1979, and 1980 cycles of the NHIS indicate that two-fifths of Black males (39.1 percent) and nearly three-fifths of Black females (59.1 percent) have never smoked.

The prevalence of never smokers among Whites was lower than that among Blacks for both genders - 34.3 percent for White males and 54.5 percent for White females (117).

Substantial differences exist between cigarette smoking patterns of Blacks and Whites. Differences have been observed in total smoke exposure as measured by family income, education level, age of initiation, number of cigarettes smoked per day, and tar and nicotine content of cigarettes smoked. The following sections will explore those differing patterns. The figures used are combined data from the 1978, 1979, and 1980 cycles of NHIS.

Family Income

There were no consistent relationships between family income and never smokers or former smokers for Black or White males. However, it is noteworthy that the highest prevalence of never smokers for White males (42.4 percent) was in the lowest income level, below $3,000, while the lowest prevalence of never smokers among Black males (30.5 percent) was in the lowest income level (118).

Black males had higher prevalence levels of never smokers in all income levels except $25,000 and above where the prevalence was similar among Black and White males and the less than $3,000 income level where Black males were lower in never smoker prevalence. White males had a much higher prevalence of former smokers at every level (ranging from 1.5 to 2 times as high) than did Black males except for the lowest income level where the two groups were similar (119).

Black males had a higher prevalence of current smokers than did White males throughout the range of annual family income levels except $7,000 to $10,000. The prevalence of current smokers declined for Black males as income increased from less than $3,000 (49.0 percent) to $7,000 to $10,000 (38.7 percent) and fluctuated thereafter. The prevalence of current smokers rose slightly across the range of income levels for White males and declined to 34.5 percent in the $25,000 and above income level (120).

Neither the prevalence of current smokers nor the difference in the prevalence of current smokers between Black and White females showed any consistent pattern in relation to family income. The prevalence of never smokers showed a gradual decline with increased income for White females -- 60.3 percent at less than $3,000 to 52.0 percent at $25,000 and above. Black females had a higher prevalence of never smokers than did White females at every income level above $5,000. However, there was not consistent relationship between the prevalence of never smokers and income level for Black females. The prevalence of former smokers showed no consistent pattern in relation to income level for Black females. However, the prevalence of former smokers showed a gradual increase with income level for White females -- 10.7 percent at less than $3,000 to 16.6 percent at $25,000 and above. White females were higher in prevalence than were Black females in this category at every income level except $3,000 to $5,000 annual family income (121).

Education

The prevalence of current smokers among both White and Black males rose with education level from those with the lowest education level (no education) to those who had completed grades 9 to 11. The prevalence rose from 36.8 percent for White males with no education to 45.7 percent for those with 9 to 11 years of education. The prevalence of current smokers among Black males rose from 16.1 percent for those with no education to 51.4 percent for those with 9 to 11 years of education. Thereafter, the prevalence of current smokers declined with education level with the lowest prevalence of current smokers among college graduates -- 27.0 percent of White males and 32.6 percent of Black males. Black males showed a higher prevalence of current smokers than did White males at every level of education from 1 to 8 years of education to college graduates (122).

The prevalence of former smokers showed no consistent relationship with education level for White males but decreased for Black males up to 9 to 11 years of education and then increased for high school graduates and beyond.

The prevalence of former smokers was higher for White males of every education level from 1 to 8 years of education to college graduates. The prevalence of never smokers generally increased with education level for both races with Black males higher at every education level than White males.

The prevalence of current smokers among White females showed the same relationship to education level as did White and Black males, increasing up to 11 years of education (15.9 percent to 41.6 percent) and decreasing from among high school graduates (33.7 percent) to college graduates (24.0 percent). Black females showed a similar pattern except that those with a college degree showed a slight increase in prevalence. Current smokers comprised 13.6 percent of Black females with no education, 37.7 percent with 9 to 11 years of education, 34.5 percent of high school graduates, and 34.7 percent of college graduates. Black females had a lower prevalence of current smokers than did White females through 9 to 11 years of education and a higher prevalence at the level of high school graduates and beyond (123).

White females had a higher prevalence of former smokers at every level of education except those with 1 to 8 years of education where Black females were higher. The prevalence of those who had never smoked decreased with education level up to 9 to 11 years and generally increased thereafter for females of both races. Black females had a higher prevalence of never smokers at every education level except 1 to 8 years and college graduates where Black and White females had a similar prevalence of never smokers (124).

Age of Initiation

Black and White males and females offered little in the age in which they began to smoke regularly. Black and White males started at a median age of 17.2 years and 17.0 years, respectively. The median age of initiation for Black and White females was 18.5 years and 18.3 years respectively. The differences between Blacks' and Whites' median age of initiation for both genders was about one-fourth of a year with Whites starting just slightly earlier than Blacks. In addition, the percentage of smokers starting at each age was consistently close for the two races for both genders (125).

Number of Cigarettes Smoked Per Day

Although smoking prevalence rates among Blacks are greater than those of Whites, heavy smoking (i.e., 25 or more cigarettes per day) is considerably more prevalent among Whites. Tables 15 and 16 compare, for males and females, the average number of cigarettes smoked per day by White and Black smokers in 1965, 1976, 1980, and 1983.

Among males, the percentage of smokers who smoke heavily increased by approximately 9.5 percent between 1965 and 1983, accounting for one-third of all male smokers. White males, however, are over three times as likely to be heavy smokers as Black males (36.3 percent vs. 11.6 percent) (126).

Among females, the percentage of smokers who heavily increased by approximately 7.5 percent between 1965 and 1983, accounting for one-fifth of all female smokers. White females are over four times as likely to be heavy smokers as Black females (21.7 percent vs. 5.3 percent) (127).

From 1965 to 1980 there was a steady increase in the number of heavy smokers for all groups, i.e., White and Black males and females. However, the 1983 data show a decline in the prevalence of heavy smokers for all the groups.

Type of Cigarettes

Both Black and White smokers smoked predominantly filter tip cigarettes. Among White smokers, 91.7 percent smoked filter tip cigarettes; among Black smokers, 90.9 percent smoked filter tip cigarettes (128).

Tar

In contrast, both Black males and females smoked cigarettes of higher tar content than did either White males or females. Among Black male smokers, 72.2 percent smoked cigarettes with 15 to 19 milligrams of tar, and 13.1 percent smoked cigarettes with 20 or more milligrams of tar. By comparison, 57.0 percent of White male smokers smoked cigarettes with 15 to 19 milligrams of tar, and 12.7 percent smoked cigarettes with 20 or more milligrams of tar.

Among Black female smokers, 69.3 percent smoked cigarettes with 15 to 19 milligrams of tar, and 6.8 percent smoked cigarettes with 20 milligrams or more of tar. Among white female smokers, 51.0 percent smoked cigarettes with 15 to 19 milligrams of tar, and 6.0 percent smoked cigarettes with 20 milligrams or more of tar (129).

Nicotine

As with tar, Black male and female smokers smoked cigarettes of higher nicotine content than did either White male or female smokers. Among Black make and female smokers, 84.9 percent and 71.8 percent, respectively, smoked cigarettes with a nicotine content of one milligram or more. By comparison, 69.9 percent of White males smokers and 53.8 percent of female White smokers smoked cigarettes with a milligram or more of nicotine.

Thus while Black smokers smoked fewer cigarettes than did White smokers, they smoked cigarettes of higher tar and nicotine content (130).

Health Consequences

Cancer

Blacks are more likely to develop cancer than Whites or other large minority populations in the U.S. (131, 132, 133). This is especially true of smoking-implicated cancers (e.g., oral, pancreatic) and, in particular, for the cancer most closely associated with cigarette smoking, lung cancer.

Data indicate that the incidence of lung cancer among Blacks was, in the late 1970's, 20 times higher than it was 40 years previously (134). Between 1971 and 1976, the incidence of lung cancer in the Black population increased by 24 percent (135).

Table 17 portrays estimates of Black-White differences in expected lung cancer incidence between 1980 and 1990. As indicated, incidence among males is expected to increased 21 percent among Whites, compared to 32 percent among Blacks; among females, a significantly greater increase is expected -- 86 percent among White females and nearly 99 percent among Blacks.

Looking at lung cancer incidence rates for one year only, 1977, the age-adjusted rate for Black males (112.7 per 100,000) was approximately 30 percent higher than that for White males and approximately 75 percent higher than, for example, for Hispanic males. Although the lung cancer incidence rate for Black females (28.4 per 100,000) was also higher than that for both White and Hispanic females, the rate differentials were considerably less than those of the males (Black females were nearly 4 percent higher than White females and approximately 8 percent higher than Hispanic females). As Table 17 indicates, however, these differentials are expected to grow (136).

Blacks are more likely than Whites to die from lung cancer in the U.S. and the difference in mortality rates between these two groups is increasing. To demonstrate this, Tables 18 and 19 compare, for Whites and Blacks, the age-adjusted death rates per 100,000 population for lung cancer in the U.S. between 1969 and 1981.

Among all males, there has been a considerable increase in the rate of lung cancer mortality, but the rate of increase in the difference between White and Black males has been dramatic. In 1969 there was a mortality rate difference of approximately 8 per 100,000 between White males and Black males (i.e., 69.9 vs 94.9). The average annual percent increase in mortality for Black males between 1969 and 1981 was nearly twice that of White males (1.9 vs. 3.4) (137).

Among females (Table 19), the lung cancer death rates per 100,000 population more than doubled between 1969 and 1981. There were, however, virtually no difference between White females and Black females (i.e., from

10.3 to 21.7 for Whites and 10.6 to 21.7 for Blacks). Nevertheless, as lung cancer incidence rate differences increase between White and Black females (Table 17), differences in the mortality rate between these two groups will become evident as the year 2000 approaches (138).

Finally, as was noted earlier, there are areas of considerable difference in 5-year cancer survival rates between Whites and Blacks in the U.S. The data in Table 20 demonstrate these differences. Among the smoking-related cancers listed in this table (i.e., lung/bronchus, esophagus, larynx), the survival rate for Blacks is less than that for Whites in each case (i.e., 10 percent vs. 12 percent, 3 percent vs. 5 percent, and 57 percent vs. 67 percent, respectively). (139)

Cardiovascular Disease

The impact of cigarette smoking on coronary heart disease (CHD) risk in Blacks has been examined in small number of studies. A history of cigarette smoking was a significant predictor of CHD incidence in Blacks and Whites in the Evans County heart disease study. In a 20-year Evans County followup, a history of current smoking was also a significant independent predictor of death attributed to CHD in Black men. In a 5-year study, the 5-year age-adjusted CHD mortality rates were very similar for Blacks and Whites at different levels of cigarette consumption, except for those who smoked 26-35 cigarettes per day. The study showed a positive association between cigarette smoking and CHD mortality. In the American Cancer Society prospective study of one million Americans followd for 12 years (1960-1972), about 25,000 Blacks were enrolled. CHD mortality ratios in subjects grouped according to the number of cigarettes smoked were similar at given smoking levels in Black and White men, and slightly lower in Black women as compared to White women. There was, however, evidence of an enhanced effect of smoking on the risk of CHD death in individuals with a history of high blood pressure or other cardiovascular disease. This is significant because there is a high prevalence of hypertension in the U.S. Black population (140).

Blood pressures are higher in Black men than in White men. In addition, an excess of definite hypertension, borderline hypertension, and isolated systolic hypertension is seen in Blacks compared to Whites. The most recent national data show that, among adults ages 18-74 years, the prevalence of definite hypertension in Blacks is 1.4 times that observed in the White population. The prevalence of borderline hypertension is 11.9 percent for White adults and 12.5 percent for Black adults in the 18-74 year age range. The prevalence rate of isolated systolic hypertension in Blacks ages 54-74 was 8.1 percent as compared to 4.8 percent among White adults of the same ages (141).

As a result of the increased incidence of hypertension among Blacks, Blacks who smoke and have a history of high blood pressure are at an increased risk of dying from coronary heart disease.

Antecedents of Smoking and Characteristics of Smokers in the Black Population

As may be seen above, there is a reasonable body of reliable, population-based data available which characterizes the smoking-related cancer risks and smoking patterns in the U.S. Black population. There is, however, considerably less information available dealing with the activity and predictive character of the events leading up to this behavior and descriptions of those who are at risk through their smoking. Nevertheless, limited data are available, the most relevant of which are summarized below.

In an effort to determine the antecedent conditions that predispose Black youth to smoke, Brunswick and Messeri used a multidimensional ecological model of influence on behavior of Harlem youth. Predictors were assessed, and between 6 and 8 years later smoking outcome was measured. For boys, four variables were most strongly predictive of future teenage smoking: higher peer orientation, poorer expectations for personal achievement, pessimism about changes for the world becoming better, and the tendency to report more good health practices earlier in adolescence. For girls, the four predictors were recent migration from the south, poor scores on standardized reading tests, shorter time perspective (indicative of a future orientation), and higher levels of food consumption (142, 143).

The Harlem youth study also suggests a strong relationship between educational level and both the initiation and the subsequent extent of smoking. Smoking rates for tenth-grade dropouts were higher than for high school graduates. Lower scholastic achievements prior to the onset of smoking was observed, with a stronger relationship between the two for girls than for boys. Worrying about school made an independent contribution to the initiation of smoking by girls.

In another study of smoking patterns among children, the Bogalusa Heart Study reported that Black children lag behind White children in early experience of and adoption of smoking behavior. White children were more influenced by parents, and Black children were more influenced by peers and siblings in their smoking behavior (144).

A 1980 American Cancer Society-sponsored survey of 750 Black men and women revealed several motivational factors involved in cigarette smoking (145). More than one-third of the smokers interviewed reported that they smoked in order to relieve tension; about half reported that, for them, smoking was very enjoyable (one-third, fairly enjoyable); and about one-third of non-smokers and one-half of smokers expressed the belief that they are likely to get lung cancer.

The American Cancer Society study also reported that Blacks were more interested than Whites in giving up smoking (30 percent compared with 24 percent). Interest in quitting was highest for Black women and for higher

income levels ($15,000+). Blacks also felt quitting would be less difficult than did Whites (39 percent compared with 22 percent). However, as the data in Tables 13 and 14 indicate, Whites are considerably more likely than Blacks, among males and females, to be former smokers.

Finally, in a study which considered the psychological and social correlates of smoking patterns among Black females, the following observations were made: personalization of risk was not the trigger event that led to smoking cessation, though it occurred later as part of the decision to change behavior; quitters believed that smoking is related to disease; successful quitters reported the most sources of information about the relationship between smoking and disease, especially through the mass media and interpersonal sources; and suffessful quitters were most likely to have mothers and sisters who were non-smokers (146).

Hispanics

Prevalence

Overall prevalence rates of smoking among Hispanics are the lowest reported among the groups compared. Data from the 1980 NHIS indicate an overall prevalence rate of 31.0 percent for Hispanics, 34.5 percent for Whites, and 36.9 percent for Blacks. However, when male and female prevalence rates were separated, Hispanic males were found to report higher rates in every category except Black males. Hispanic women reported the lowest rates for all groups. The 1980 NHIS data report 40.9 percent of Hispanic males to be current smokers, 38.2 percent for White males, and 45.0 percent for Black males. Only 22.9 percent of Hispanic females are current smokers, whereas 31.4 percent White females and 31.9 percent of Black females are current smokers (see Table 20 for further details) (147). The 1979 California Hypertension Survey and the San Antonio Heart Study (148) confirm these results. In a combined sample of the 1976 and 1977 Los Angeles Health Survey, overall Hispanic smoking prevalence was, as is usually reported, the lowest among the groups compared (White, Hispanic, Blacks). However, Hispanics males were found to report the highest rates among the three groups with 41.5 percent current smokers being Hispanic males, 40.0 percent Black males, and 39.3 percent White males (149).

The differential in smoking rates between Hispanic males and females holds true for Puerto Ricans, Mexican/Mexico-Americans, other Latin Americans, and "other Spanish" according to 1979-1980 combined samples of Health Information Survey data analyzed for percent of current smokers by sex and Spanish origin (150). (The HIS uses the term "Spanish Origin" as an umbrella term for those of Latino and/or Spanish ancestry).

The assumption that cigarette smoking is not a problem for U.S. Hispanics is based on data examining adult prevalence. Youth are relatively ignored and yet it is among this group that the greatest opportunity either for cancer prevention or development of cancer in the next century exists.

The data that are available suggest that the current generation of Hispanic youth--male and female alike--may not significantly differ from their White/Anglo or Black counterparts, either in smoking prevalence or, consequently, in cancer incidence. Results from a 1982 study and a 1984 study of Mexican American youth show a marked increased in smoking among these youths. More of the Mexican-American youths smoke than their Black and White peers (i.e., 28.9 percent vs. 15.2 percent and 19.1 percent respectively) (151).

D'Onofrio et al. and Rivers and McCoy each reporting on limited surveys suggest that Hispanic adolescents, in Northern California and South Florida respectively, equal or exceed other adolescent groups in smoking prevalence. Marcus and Crane examined data from the 4th and 5th grade-based Los Angeles "Know Your Body (KYB)" program, and found (see Table 22) that male and female Hispanics exceeded both male and female Whites and Blacks in self-reported current cigarette use (152).

These data suggest that the smoking prevalence of Hispanic youth needs to closely monitored and that when the issue of "Hispanic" smoking is considered, that the problem of adolescent use not be ignored just because the overall Hispanic data are not considered to be as problematic as that for other groups.

Type of Cigarettes Smoked

In a study done in New Mexico from 1980 to 1982 comparing Hispanics to non-Hispanics, among males and females of both ethnic groups, filter cigarettes had been smoked longer by subjects younger than 70 years; whereas non-filter use predominated in subjects 70 years and older. Older Hispanic males and females had used handrolled cigarettes for a much longer period of time (14.7 years longer for Hispanic males over 70 and 8.8 years longer for Hispanic female smokers over 70.). Data from this study and Buell, et al., while not definitive, suggest that the use of handrolled cigarettes may explain the excess lung cancer mortality and incidence in older Hispanic women in the southwest (153).

Number of Cigarettes Smoked Per Day

In addition to smoking prevalence, consumption of cigarettes has significance for the public health implications of smoking behavior. In Table 23 consumption levles obtained from the 1979-1980 HIS are reported separately by sex and race/ethnicity. Among both male and female smokers, Hispanics are much more likely to consume 10 or fewer cigarettes per day, while their White counterparts are much more likely to smoke over 20 cigarettes per day (154). The New Mexico study confirm these lower consumption levels.

The New Mexico study data indicate that New Mexican Hispanic males and females in all the age cohorts smoke fewer average daily cigarettes than

the non-Hispanic subjects. The older the study population, the greater the difference. In the males 55 years and under group, there was only a difference of one cigarette a day. The difference increased to 8 cigarettes a day fewer for male Hispanics ages 55 to 69 and 13 fewer a day for the over 70 cohort. Hispanic females under 55 years smoked 9 fewer cigarettes a day; 2 cigarettes fewer in the 55-60 age cohort; and 15 cigarettes fewer a day in the over 70 age cohort (155).

Health Consequences

Lung and esophageal cancer morbidity and mortality rates, known to be related to smoking, are lower for Hispanics than for non-Hispanic Whites and Blacks. According to SEER data collected from 1978 to 1981, Hispanics had the lowest incidence rate for cancer of the esophagus. However, an anomaly exists among New Mexico Hispanic females where the incidence of esophageal cancer is 20 percent higher. Studies suggest a link between the development of esophageal cancer and smoking and alcohol consumption, with the latter two having a synergestic effect.

SEER data indicate that the lung cancer incidence rate for New Mexican Hispanics is half the incidence rate for Whites, and for Puerto Rican Hispanics the incidence rate is less than half that of Whites. New Mexico Hispanics have rates of cancer of the pancreas that are higher than those of Whites. An upward trend for pancreatic cancer in Puerto Rican females is becoming apparent. Excess risk for this cancer has been found among cigarette smokers (156).

While Hispanic men appear to be smoking as frequently as their White counterparts, their reported consumption levels would seem to be lower. Since there is a case-response relationship between consumption of cigarettes and lung cancer, these data might suggest that the epidemiologic consequences of Hispanic smoking will be minimized. It is important to note that even light to moderate smokers have rates of lung cancer that are two to four times higher than non-smokers (157). Moreover, there are no assurances that Hispanics in general will continue to maintain this relatively low consumption pattern. Indeed, the surveys of Hispanic adolescents in Northern California and South Florida indicate smoking prevalence levels which equal or exceed other adolescent groups.

Hispanics, as a group, appear to be at lower risk for coronary heart disease. Consequently, there is no evidence of increased risk of cardiovascular disease among Hispanics as a result of smoking behavior (see the Subcommittee Report on Cardiovascular Disease in Minorities for more detail) (158).

The findings summarized above suggest that rates of lung cancer and other cigarette-linked diseases among Hispanic males may increase within this decade, and continue to increase into the next century. The current lower rate of lung cancer among Hispanics of today reflect a period in time when

Hispanics smoked less frequently than Whites. Current evidence suggest that Hispanic males are now as likely to be smokers as their White counterparts.

American Indians/Alaskan Natives

Prevalence

Very little is known about smoking prevalence and patterns in American Indian and Alaskan Natives due to the scarcity of data. The available information is available will be discussed below.

Data do exist for Native American high school seniors and the prevalence of smoking among this population. Based on a study that compared the lifetime prevalence of substance use for American Indian high school seniors and national high school seniors, between 1980-81, Native American high school seniors exhibited a prevalence rate of cigarette smoking of 72.3 percent as compared to 71.0 percent for national high school seniors (166). These data suggests that the prevalence of smoking in Native American youth is similar to the prevalence of smoking for youth nationally.

A 1968 study documented cigarette and alcohol use patterns in American Indians in a report based on interviews of patients at the Phoenix Public Health Service Hospital. The findings indicated that heavy cigarette smoking (i.e., more than one pack a day) was rare among Southwestern Indians, that smoking habits of non-Southwestern Indians were similar to those of the general population, and that Indian women outside the Southwestern area were likely to be heavy smokers (167). While this study is quite dated, however, current cancer and coronary heart disease (CHD) incidence and mortality rates reflect these same patterns of smoking.

Health Consequences

Overall, American Indians and Alaskan Natives have smoking-related cancer rates below Whites for lung cancer; however, the relative frequency of lung cancer differs among tribes. For example, among Oklahoma Indians, where the lung cancer standardized mortality ratio is higher, both cigarette smoking and lung cancer mortality more closely mirror the national average. In contrast, Indians of the southwest, who seldom smoke have low rates of smoking-related lung cancer (168). Environmental and cultural factors undoubtedly play a role in this discrepancy--those populations having substantially non-Indian ancestry and living off reservations (principally tribes in Oklahoma) have mortality for most sites that is between the national average and the rates of tribes in the southwest living on the reservations and of mostly Indian heritage.

In terms of CHD, American Indians and Alaskan Natives show evidence of reduced heart disease mortality in males and females compared to the

comparable White populations. Mortality from heart disease is significantly lower than for Black males and females (169), at all ages.

Preliminary prevalence and incidence data suggest that coronary heart disease and stroke risk may be increasing substantially in this population, especially among those residing outside the southwestern states (170) which is reflective of the smoking patterns previously identified.

The heart disease death rate for American Indians under 35 years of age is approxiamtely twice as high as for all other groups. However, above the age of 35 years, heart disease mortality increased much less steeply with age in Indians than in the general population. By age 45, the mortality rates for this group are lower than those in all other groups and continue in that pattern for all the remaining age cohorts. The excess mortality rates due to cirrhosis of the liver, homicide, and accidents among American Indians raises the possibility that the reduced mortality for coronary heart disease and cancer may be due, at least in part, to competing causes of death rather than to a basic reduction in CHD and cancer risk.

Asian Americans/Pacific Islanders

Prevalence

Due to the paucity of data very little is known about the prevalence of smoking or smoking patterns among Asian/Pacific Islanders. Only a few very limited studies are available. Because of the restricted nature of the study area and population, the information must be viewed cautiously and should not be generalized.

In a 1979 survey of Japanese Americans in California, 50.6 percent of the Japanese-American men were classified as "ever smoked" (159). Using the 1980 HIS data and combining current and former smoker statustics (see Table 11 and 13) for White males, approximately 69 percent of White males could be classified as "ever smoked." Data on smoking from a small study by Shiriki and Savage (1984) on Chinese-Americans show that fewer young Chinese males were smokers than young White males (26.6 percent vs. 34.6 percent) but more older Chinese males were smokers than older White males. In all the age cohorts, a significantly larger percentage of White females smoked than Chinese-American females. Regardless of age and gender, Whites smoked more cigarettes on the average than Chinese-Americans (160).

Data from California on the prevalence of smoking and patterns of smoking among younger and older Filipino males and females compared to Whites show that fewer Filipino males and females in all age groups are current regular smokers as compared to their White counterparts (26 percent vs. 63 percent, respectively, among males and 14.3 percent vs. 29.4 percent among females). Filipino males smoked 17.7 cigarettes on the average vs. 27.4 cigarettes smoked by White males. Filipino females smoked 8.0 cigarettes vs. 23.2 cigarettes smoked by White females.

Of those who were smokers, slightly more Filipino males than White males expressed a desire to quite smoking though comparable or fewer Filipino females wanted to quite smoking than White females (161).

In sum, the Filipino,, Japanese, and Chinese Americans in California have, in general, a lower prevalence of smokers and smoke less than their White counterparts.

Health Consequences

On the basis of both published and unpublished National Center for Health Statistics data, the Heart Association Report on Cardiovascular Disease Mortality in Los Angeles County data, and data from the Honolulu Heart Study, it appears that Asians are at a lower risk of mortality from cardiovascular disease than Whites and other minorities. Among Asians, women appear to be at lower risk than men across all groups, and Koreans, Filipinos and Chinese appear to be at lower cardiovascular disease risk than both Japanese men and women (162). (See the Cardiovascular Disease Subcommittee Report for more detail.)

Although Asian Americans have a lower incidence of cardiovascular disease, certain subgroups within the Asian population do exhibit excess incidence and mortality or some smoking-related cancers. For example, Hawaiians have excess incidence and mortality for cancer of the lung. Lung cancer is associated with cigarette smoking. This high cancer rate is closer to the rates of Blacks and Whites than to those of Chinese, Japanese, or Filipinos (163). Since this is based on a small number and may be artifically inflated, these figures should be viewed with caution.

The incidence of esophageal cancer is higher for Japanese males and Chinese males and females than for Whites. The rate for Japanese males is 2.5 times higher, for Chinese males it is 1.8 times higher, and for Chinese females it is 1.6 times higher. Most studies into the causes of esophageal cancer suggest that the major risk factors are smoking and alcohol consumption, with the use of both having a synergistic effect; although, the consumption of hot beverages also has been associated with esophageal cancer. In addition, in Japan a strong direct relationship was found between esophageal cancer and high intake of tea-cooked rice gruel (164).

Pancreatic cancer incidence is about 20 percent higher among Chinese females than among Whites, and an upward trend in incidence exists for Chinese of both sexes. Japanese, particularly Japanese females, show considerably lower incidence than Whites. Excess risk for pancreatic cancer has been found among cigarette smokers, and some studies have suggested a link with diabetes mellitus (165).

While prevalence rates of smoking for Asian Americans are virtually unknown, it is clear than an increased incidence for certain smoking-related cancers exist among subgroups of the Asian population. Because so little is known about the smoking behavior of Asians, data needs to be collected to understand the extent and nature of the health consequences related to smoking in this population.

CONCLUSIONS AND OPPORTUNITIES FOR PROGRESS

The various forms of chemical dependency discussed in this chapter, alcohol abuse, illicit drug abuse and smoking, are known to have a major adverse impact on the health status of the general population. As this chapter has explored, Blacks and other minority populations (Hispanics, Asian Americans and Native Americans) may not be at an equal risk compared to the general population for the adverse health consequences of these chemical dependencies.

Mortality rates in minority populations due to cirrhosis of the liver, various cancers and unintentional injuries which are associated with certain substance abuses exceed those for the general population. While excess adverse health consequences and death rates associated with chemical dependency cannot be attributed solely to minority status, and though all persons of a particular minority group are not at equal risk for these outcomes, it is clear that alcohol abuse, illicit drug abuse, and smoking contribute to the overall poorer health status of minority populations.

Although the prevalence rates of smoking for Asian/Pacific Islanders are unknown, it is clear that an increased incidence for certain smoking-related cancers exist among subgroups of the Asian population.

Opportunities for Progress

Interventions proposed by the Subcommittee follow:

- Promote the initiation and/or expansion of efforts to develop coping skills in children and adolescents, ages 9 to 15 years, to delay or prevent the use of substances such as tobacco, drugs, and alcohol, with special emphasis on the needs of minorities.

- Foster the development of peer-group instruction programs in school settings designed to strengthen resistance to the use of substances such as tobacco, drugs, or alcohol, with special emphasis on the needs of minorities.

- Perform research into cirrhosis, including studying the basic biological mechanisms involved in the development of cirrhosis of the liver in Black, Native American, and Hispanic populations.

- Develop programs to prevent alcohol-related unintentional death and injury among Blacks, Hispanics, Native Americans, and Native Hawaiians. Epidemiological research is needed to define further the subpopulations of each minority group that are at greatest risk so that prevention and education efforts as well as early intervention and treatment programs can be developed and targeted with greater likelihood for success.

- Investigate the biological consequences of alcohol use in terms of its contribution to excess mortality among minority groups. The role of alcohol use in hypertension, the role of alcohol use in the development of some cancers in Blacks, and the extent to which alcohol is a factor in the adverse pregnancy outcomes among all minority groups, especially Black and Native American women, are suggested topics.

- Determine the nature and extent to smoking among Hispanics, Native Americans, and Asian/Pacific Islanders so that the health consequences associated with smoking in these populations might be understood and appropriate prevention strategies developed.

- Study the prevalence, etiology, and consequences of drug abuse among Blacks, Hispanics, Native Americans, and Asian/Pacific Islanders through case-control cohort, or historical cohort epidemiological studies utilizing culturally sensitive instruments.

- Develop improved incidence and prevalence data gathering techniques to assess alcohol and drug abuse among all minority groups.

- Develop mechanisms in concert with appropriate state and local entities to support specialized drug abuse prevention and treatment program in rural and urban Native American/Alaska Native communities.

- Encourage Blacks to enter smoking cessation programs and maintain cigarette abstinence.

- Review DHHS health professionals' training programs to ensure the inclusion of education about alcohol and drug abuse in the curricula.

- Provide assistance to appropriate organizations for health care professionals to ensure that education on alcohol and drug abuse is included in their training curricula. This includes training in the diagnosis and prevention of alcohol and drug abuse in a variety of patient populations, incuding ethnic minorities; in referring patients to appropriate treatment settings; and, in the provision of direct service and treatment that is relevant to the specific minority patient.

- Encourage private sector organizations to train minority research scientists and health care providers in substance abuse research, diagnosis, and treatment.

Table 1

Marijuana Use for Whites and Minorities by

Age Group for 1977, 1979, and 1982

National Surveys on Drug Abuse

	Age Groups			
	Youth Youth 12-17	Young Adults Adults 18-25	Mid Adults Adults 26-34	Older Adults Adults over 35
Marijuana Use for the Year Preceding the Surveys				
Minorities				
1977	17%	33%	26%	3%
1979	21	37	20	7
1982	16	40	21	4
White				
1977	24%	40%	21%	2%
1979	24	47	25	3
1982	21	40	28	5

Minorities include respondents who identified themselves as Black, American Indian, or Alaskan Native, Asian or Pacific Islander, or Hispanic

TABLE 2

Percent Distribution of Primary Heroin Clients by Secondary Drug of Absue According to Select Race/Ethnicity Groups at Admission CODAP, 1983*

Secondary Drug	Primary Heroin	
	White	Black
None	61.5%	45.9%
Other Opiates	12.2	7.0
Marijuana	4.3	4.7
Barbiturates	1.3	0.8
Amphetamines	1.8	2.5
Alcohol	5.6	6.1
Cocaine	10.1	30.7
PCP	0.4	0.2
Other Hallucinogens	0.2	0.1
Tranquilizers	1.7	0.8
Other Sedatives	0.9	0.5
Other	0.2	0.8

*Based on 23 States, Washington, D.C., and territories; California represented 46 percent of treatment admissions.

Table 3

Percent Distribution of Primary Cocaine Clients

by Route of Administration According to

Selected Race/Ethnicity Groups at Admission

CODAP, 1983*

Primary Cocaine

Route of Administration	White	Black
Oral	2.3%	1.3%
Smoking (freebasing)	5.3%	27.4
Inhalation	66.9	41.4
Intramuscular	0.7	0.5
Intravenous	24.8	29.4

*Based on 23 States, Washington, D.C., and territories; California represented 46 percent of treatment admissions.

TABLE 4

Most Frequently Mentioned Drug Categories
for Emergency Room Patients
According to Race and Sex
(alcohol-in-combination excluded)
DAWN, 1984*

Black Male (N episodes = 16,121)	
Heroin	32.9%
Cocaine	19.1
PCP	15.6
Marijuana	6.3
Diazepam	2.5

Black Female (N episodes = 12,325)	
Heroin	18.0%
Cocaine	11.9
PCP	8.8
Acetaminophen	6.4
Diazepam	6.3

Hispanic Male (N episodes = 4,700)	
Heroin	25.4%
Cocaine	20.6
PCP	15.4
Marijuana	7.0
Diazepam	5.5

Hispanic Female (N episodes = 4,074)	
Diazepam	9.5%
Acetaminophen	9.5
Heroin	8.8
Cocaine	8.6
Aspirin	8.1

(N episodes = 22,955)	
Diazepam	11.9%
Cocaine	11.4
Heroin	10.2
Marijuana	6.5
PCP	4.7

(N episodes = 28,521)	
Diazepam	12.5%
Aspirin	8.8
Acetaminophen	7.1
Cocaine	5.0
Heroin	4.3

*Based on 27 metropolitan areas and a panel of emergency rooms outside these metropolitan areas; generalizations to total population cannot be made.

TABLE 5

Sex, Race, and Age Distributions for Six Leading Combinations of Illicit Drugs in DAWN Emergency Rooms January-August 1984*

	Cocaine and Heroin	Alcohol and Cocaine	Alcohol and Heroin	Alcohol and Marijuana	Cocaine and Marijuana	Alcohol and Marijuana
Sex						
Percent Male	70	65	81	70	71	74
Race						
Percent White	27	48	26	53	49	29
Black	55	35	57	31	34	56
Hispanic	13	12	14	10	13	12
Age						
Percent 20	2	9	1	29	18	11
20-29	43	53	28	49	56	60
30	55	37	71	24	26	29
Total Number	1,442	1,320	1,316	1,139	922	818

*Based on 27 metropolitan areas and a panel of emergency rooms outside these metropolitan area generalizations to total population cannot be made.

TABLE 6

Most Frequently Mentioned Drugs by
Decedents According to Race/Ethnicity and Sex
(alcohol-in-combination excluded)
DAWN, 1984*

Black Male (N episodes = 818)	
Heroin	43.8%
Cocaine	18.6
PCP	10.9
Codeine	7.3
Diazepam	2.8
Methadone	2.3

Black Female (N episodes = 235)	
Heroin	50.6%
Cocaine	22.6
PCP	15.7
Codeine	12.3
Amitriptyline	11.1
Phenobarbital	8.1

Hispanic Male (N episodes = 258)	
Heroin	38.8%
Cocaine	15.5
PCP	12.8
Codeine	4.7
Diazepam	4.3
D-Propoxphene	2.7

Hispanic Female (N episodes = 40)	
Heroin	27.5%
Cocaine	17.5
PCP	17.5
Methadone	12.5
Diazepam	10.0
D-Propoxphene	10.0

White male (N episodes = 1,181)	
Heroin	28.9
Cocaine	25.6
Codeine	15.7
Diazepam	12.5
D-Propoxyphene	9.5
Methadone	8.9

White Female (N episodes = 723)	
D-Propoxyphene	19.5
Amitriptyline	17.4
Codeine	13.8
Heroin	13.6
Cocaine	12.6
Acetaminophen	11.8

*Based on 26 metropolitan areas, excluding New York; generalizations to the total population cannot be made.

TABLE 7

Distribution of 182,002 Clients by Race/Ethnicity
at Admission (excluding alcohol)
CODAP, 1983*

Race/Ethnicity	No. Client Admissions	Percent
White	98,504	54.1
Black	40,538	23.4
Hispanic	40,625	22.3
American Indian	862	0.5
Alaskan Native	12	0.1
Asian/Pacific Islander	1,461	0.8

*Based on 23 States, Washington, D.C., and territories; California represented 46 percent of treatment admissions.

TABLE 8

Percent Distribution of Clients by
Primary Drug According to Race/Ethnicity
at Admission (excluding alcohol)
CODAP, 1983*

Primary Drug	White	Black	Hispanic	American Indian
Heroin	43.8%	60.3%	70.6%	44.8%
Other Opiates	8.5	3.4	1.0	2.3
Marijuana	19.1	12.0	13.0	27.4
Barbiturates	2.0	1.2	0.5	1.0
Amphetamines	9.0	2.9	1.2	5.6
Cocaine	8.3	9.7	2.8	5.0
PCP	2.2	7.1	7.8	5.0
Other Hallucinogens	1.5	0.3	0.3	1.0
Tranquilizers	2.0	0.7	0.3	1.0
Other Sedatives	2.2	0.5	0.3	1.2
Other	1.5	1.9	2.1	5.2
TOTAL	98,504	40,538	40,625	862

*Based on 23 States, Washington, D.C., and territories; California represented 46 percent of treatment admissions.

TABLE 9

Percent of Distribution of Clients by Age
According to Race/Ethnicity Selected Primary Drug
CODAP, 1983*

Primary Drug	White		Black	
	Under 25	25 and Over	Under 25	25 and Over
Heroin	16.1	83.9	8.2	91.8
Cocaine	45.2	54.7	31.0	69.0
Marijuana	76.4	23.6	68.5	31.5
PCP	63.3	36.7	47.4	52.6

Primary Drug	Hispanic		American Indian	
	Under 24	24 and Over	Under 24	24 and Over
Heroin	21.4	78.6	17.1	82.9
Cocaine	46.4	53.6	39.5	60.5
Marijuana	74.4	25.6	83.1	16.9
PCP	73.4	26.6	69.8	30.2

*Based on 23 States, Washington, D.C., and territories, California represented 46 percent of treatment admissions.

TABLE 10

Lifetime Prevalence of Substance Use for
American Indian High School Seniors
and National High School Seniors
1980-81

Substance	American Indian High School Seniors 1980-81	National High School Seniors 1981
Alcohol	95.3%	92.6%
Marijuana	88.0	59.5
Cigarettes	72.3	71.0
Inhalants	34.4	12.3
Stimulants	38.5	16.5
Cocaine	19.4	16.5
Sedatives	12.0	16.0
Hallucinogens	19.1	13.3
Tranquilizers	11.0	14.7
PCP	10.2	7.8
Heroin	2.4	1.1

Source: Oetting ER, Beauvais F, Edwards R, et al. Drug use among Native American youth: Summary of findings (1975-1981). Fort Collins, CO: Western Behavioral Studies, Colorado State University.

TABLE 11

Current Cigarette Smokers Among Males 20 Years of Age and Over, by Race; United States, 1965, 1976, 1980, 1983

Race	Current Smokers			
	1965	1976	1980	1983
All Males	52.1	41.6	37.9	35.4
White Males	51.3	41.0	37.1	34.7
Black Males	59.6	50.1	44.9	42.6

Source: National Health Interview Surveys, National Center for Health Statistics.

TABLE 12

Current Cigarette Smokers Among Females 20 Years of Age and Over, by Race; United States, 1965, 1976, 1980, 1983

Race	Current Smokers			
	1965	1976	1980	1983
All Females	34.2	32.5	29.8	29.9
White Females	34.5	32.4	30.0	29.8
Black Females	32.7	34.7	30.6	32.5

Source: National Health Interview Surveys, National Center for Health Statistics.

TABLE 13

Former Cigarette Smokers Among Males 20 Years of Age and Over, by Race; United States, 1965, 1976, 1980, 1983

Race	Former Smoker			
	1965	1976	1980	1983
All Males	20.3	29.6	30.5	31.1
White Males	21.2	30.7	31.9	32.0
Black Males	12.6	20.2	20.6	23.2

Source: National Health Interview Surveys, National Center for Health Statistics.

TABLE 14

Former Cigarette Smokers Among Females 20 Years of Age and Over, by Race; United States, 1965, 1976, 1980, 1983

Race	Former Smoker			
	1965	1976	1980	1983
All Females	8.2	13.9	15.7	16.4
White Females	8.5	14.6	16.3	17.2
Black Females	5.9	10.2	11.8	10.7

Source: National Health Interview Surveys.

TABLE 15

Cigarettes Smoked per Day by Male Current Smokers 20 Years of Age and Over, by Race; United States, 1965, 1976, 1980, 1983

Race	Cigarettes Smoked per Day											
	Less than 15				15 - 24				25 or More			
	1965	1976	1980	1983	1965	1976	1980	1983	1965	1976	1980	1983
All Males	30.1	24.9	24.2	23.5	45.7	44.4	41.7	42.9	24.1	30.7	34.2	33.6
White Males	27.7	22.3	20.0	19.6	46.3	44.4	42.7	44.1	26.0	33.3	37.3	36.3
Black Males	49.8	43.7	48.4	49.3	41.6	45.6	37.9	37.9	8.6	10.8	13.8	11.6

Source: National Center for Health Statistics.

TABLE 16

Cigarettes Smoked per Day by Female Current Smokers 20 Years of Age and Over, by Race; United States, 1965, 1976, 1980, 1983

Race	Cigarettes Smoked per Day											
	Less than 15				15 - 24				25 or More			
	1965	1976	1980	1983	1965	1976	1980	1983	1965	1976	1980	1983
All Females	46.2	37.6	34.7	33.8	40.8	43.4	42.0	45.6	13.0	19.0	23.2	20.6
White Females	43.7	34.3	30.7	30.6	42.4	44.9	44.1	47.7	13.9	20.9	25.7	21.7
Black Females	70.3	64.5	61.1	61.1	25.0	30.0	30.4	33.7	4.6	5.6	8.6	5.3

Source: National Center for Health Statistics.

Table 17

ESTIMATES OF LUNG CANCER INCIDENCE PER 100,000 PERSONS (BASED ON SEER DATA)

Source: Surveillance Epidemiology, & End Results (SEER), National Cancer Institute.

TABLE 18

Age-Adjusted (1970 U.S. Standard) Death Rates per 100,000 Population for Lung Cancer in the United States, 1969-1981

Year of Death	White Males	Black Males
1969	55.55	63.68
1970	57.39	65.54
1971	59.11	66.70
1972	60.86	73.35
1973	61.58	74.76
1974	63.16	78.10
1975	64.16	79.29
1976	65.69	81.56
1977	66.82	87.34
1978	68.18	88.31
1979	68.76	89.22
1980	70.03	92.70
1981	69.86	94.93
AAPC*	1.91	3.36

*AAPC = average annual perc ent change from 1969 to 1981.

Source: National Cancer Institute

TABLE 19

Age-Adjusted (1970 U.S. Standard) Death Rates per 100,000 Population for Lung Cancer in the United States, 1969-1981

Year of Death	White Females	Black Females
1969	10.30	10.56
1970	11.01	11.54
1971	11.94	12.50
1972	12.76	12.44
1973	13.28	13.53
1974	14.34	14.17
1975	15.27	14.80
1976	16.51	15.78
1977	17.37	17.25
1978	18.72	17.78
1979	19.46	19.11
1980	20.96	21.41
1981	21.69	21.74
AAPC*	6.19	5.92

*AAPC = average annual percent change from 1969 to 1981.

Source: National Cancer Institute

Table 20

TRENDS IN SURVIVAL BY SITE OF CANCER, BY RACE
Cases Diagnosed in 1960-63, in 1970-73 and in 1973-80

Site	WHITE			BLACK		
	1960-63[1] Relative 5-Year Survival (%)	1970-73[1] Relative 5-Year Survival (%)	1973-80[2] Relative 5-Year Survival (%)	1960-63[1] Relative 5-Year Survival (%)	1970-73[1] Relative 5-Year Survival (%)	1973-80[2] Relative 5-Year Survival (%)
Prostate	50	63	68	35	56	58
Kidney	37	46	50	38	44	52
Uterine Corpus	73	81	88	31	44	58
Bladder	53	61	73	24	36	48
Colon/Rectum	41	48	50	31	35	42
Uterine Cervix	58	64	68	47	61	62
Breast	63	68	74	46	51	62
Ovary	32	36	37	32	32	30
Brain and Central Nervous	18	20	21	19	19	23
Lung and Bronchus	8	10	12	5	7	10
Stomach	11	13	14	8	13	14
Esophagus	4	4	5	1	4	3
Hodgkin's Disease	40	67	70	*	*	70
Lymphocytic Leukemia-Acute	4	28	43	*	*	*
Leukemia	14	22	32	*	*	27
Non-Hodgkin's Lymphoma	31	41	46	*	*	46
Larynx	53	62	67	*	*	57
Melanoma of Skin	60	68	79	*	*	*
Testis	63	72	82	*	*	67
Thyroid	83	86	92	*	*	80

SOURCE: Biometry Branch, National Cancer Institute.

[1]Rates are based on data from a series of hospital registries and one population-based registry.

[2]Rates are from the SEER Program and include patients diagnosed through 1980 and follow-up on all patients through 1981. They are based on data from population-based registries in Connecticut, New Mexico, Utah, Iowa, Hawaii, Atlanta, Detroit, Seattle-Puget Sound, and San Francisco-Oakland.

*Rates could not be calculated because of insufficient number of cases.

TABLE 21

Health Interview Survey

Percent Current Smokers by Race and Sex

1979 and 1980

		White	Black	Latino
1979	All	35.3	37.7	30.0
	Male	38.7	44.6	38.3
	Female	32.5	32.7	23.1
1980	All	34.5	36.9	31.0
	Male	38.2	45.0	40.9
	Female	31.4	31.9	22.9

Source: Marcus and Crane (1983)

TABLE 22

Los Angeles "Know Your Body" Smoking Data

	Have you smoked a whole cigarette?				Do you smoke cigarettes now?			
	Boys		Girls		Boys		Girls	
	%	N	%	N	%	N	%	N
White	6.7	(371)	4.3	(343)	0.8	(371)	0.9	(343)
Black	9.3	(257)	3.0	(266)	3.5	(237)	1.1	(266)
Hispanic	13.1	(377)	3.4	(376)	3.3	(377)	1.6	(376)

Source: Marcus and Crane (1983)

TABLE 23

1979-1980 Health Interview Survey (Combined Samples)
Number of Cigarettes Smoked Daily by Race/Ethnicity and Sex

Cigarettes Daily	Male			Female		
	White*	Hispanic	Black	White*	Hispanic	Black
Under 10	16.9%	53.1%	45.7%	27.4%	60.8%	58.7%
11-20	45.4	31.4	42.1	47.5	28.6	31.9
21-40	32.2	13.8	10.7	22.4	9.4	7.8
over 41	5.5	1.7	1.5	2.7	1.2	1.7

Source: 1979 and 1980 Health Interview Survey Public Use Tapes, distributed by the National Center for Health Statistics, National Institutes of Health, Hyattsville, Maryland.

*Excludes persons of Latin American, Native American, and Asian ancestry.

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A Review of Drinking Patterns and Alcohol Problems Among U.S. Blacks

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INTRODUCTION

Historical Background: From Black Temperance to Alcoholization 1830-1930

> . . . being mercifully redeemed from human slavery, we do pledge ourselves never to be brought into the slavery of the bottle, therefore we will not drink the drunkard's drink: whiskey, gin, beer, nor rum nor anything that makes drunk come. (Temperance Tract for Freedman; cited in Cheagle, 1969:29).

Blacks of the early nineteenth century were characterized by strong support for the American temperance movement and unusually low rates of alcohol-related problems. The temperance movement had special appeal for blacks due to its close political connection with anti-slavery reform. Abstinence was regarded as a means of support for emancipation and equality. Blacks were inspired to develop a full-blown "Colored Temperance Movement" and to support temperance issues through the press and numerous religious and self-betterment organizations (Quarles, 1969; Cheagle, 1969; Herd, forthcoming c).

After the Civil War and emancipation of slaves, blacks continued to promote temperance through the church, the "colored" women's club movement, and temperance societies such as the Women's Christian Temperance Union, the Sons of Temperance, Friends of Temperance, and Independent Order of Good Templars (Meir, 1964; Sellers, 1943; Lefler, 1954).

In the wake of their continued association with temperance reform, blacks exhibited comparatively low rates of drunkenness and problems due to drinking. John Koren's exhaustive analysis on the "Relations of the Negroes to the Liquor problem" (1899) concluded that chronic drunkenness was so rare among blacks that they were thought to be physiologically immune from prolonged inebriety. Making a similar point, Brinton (1891) argued that blacks were not as prone to acute alcoholism as whites due to the "inferior susceptibility (of the blacks') nervous system". These findings are supported by the 1880 U.S. mortality statistics which reported that for alcoholism "the proportion in those parts of the country in which the color distinction is made is much greater among whites than among the colored, the figures being for the Irish 6.7, for the Germans 2.7, for the whites 2.5 and for the colored 0.7 per 1,000 deaths from known causes. A large proportion of the deaths reported as due to alcoholism occur in connection with delirium tremens, and this form of disease is rare in the colored race (U.S. Census Office, 1880).

By the early 20th century, black participation in the temperance movement had declined enormously. Southern prohibition had become blatantly racist and openly supported the policies of white supremacy including Jim Crow laws and black political disfranchisement (Herd, 1983). The press circulated a number of articles asserting that blacks were liquor crazed, violent, and sexually depraved (Herd, 1983). In response, most black leaders withdrew support from the prohibition movement and began to agitate for voting rights and black social equality.

These shifts in the prohibition movement coincided with major demographic changes in the black population. Beginning around 1900, a massive wave of migration shifted large numbers of blacks from the rural south to the urban centers of the north (Gwinnell, 1928). In the cities to which blacks migrated -- New York, Detroit, Chicago,

Cleveland -- they quickly became a focus of the night-life and heavy drinking sub-cultures. Liquor flowed freely and blacks were closely identified with the illegal liquor traffic, both as small-time manufacturers and retailers, and heavy consumers. Blacks turned to bootlegging, operating speakeasies and throwing "liquor parties" as a means of economic support, especially during the depression years (Winston and Butler, 1943; Larkins, 1965). Blacks also became a prime market for illegal alcohol peddled by white rackateers (Drake and Cayton, 1945; McKay, 1968).

With the increasing urbanization and alcoholization of black communities, statistics on alcohol problems began to rise abruptly. An analysis from 1928 noted:

> From the year 1918 the death rate per 100,000 from alcoholism has steadily increased among Negro policy-holders. And since 1911, only one year, that of 1917 (a war year), was the rate higher than for the year 1927. In the past two years the rate increased from 4.12 to 5.3, while the rate for white policy-holders declined from 3.1 to 1.8 per 100,000 (Carter, 1928).

Similarly, Malzberg (1944) reported that black rates of hospital admissions for alcoholic psychoses in New York State between 1929-1931 greatly outstripped rates in the white population:

> Average annual standardized rates of first admissions with alcoholic psychosis were 22.2 per 100,000 Negroes and 6.5 for the white population, the former being in excess in the ratio of 3.4 to 1, an excess of 240 percent (Malzberg, 1944).

The changes initiated during this period set the trend for subsequent decades as blacks became increasingly urbanized and alcohol use gained a major foothold in social and economic life.

Indicators of Alcohol Problems Among Contemporary U.S. Blacks

The following review examines black drinking patterns and alcohol-related problems as they emerged since the Repeal Era. The focus of the review is on changes in indicators of alcohol problems among blacks from roughly the 1950's through the 1980's.

The review will examine both medical and psycho-social indicators of alcohol problems in the U.S. black population. Chronic diseases (such as liver cirrhosis and esophageal cancer) will be the primary focus of the discussion on medical consequences. The review of psycho-social indicators will focus on two major areas: (1) statistics of alcohol treatment and alcohol-related arrests from official records; and (2) information on social problems related to alcohol use at the personal, familial, and community level gathered from survey data.

The various types of alcohol-related problems represented in these indicators may involve different patterns of alcohol consumption and interaction with different sets of normative values and social conditions. Acute medical consequences such as alcohol overdoses or drownings are often related to "binge drinking" or rapid, high quantity alcohol consumption in combination with hazardous environmental conditions. In contrast, physiological diseases like liver cirrhosis are principally the result of heavy long-term alcohol consumption, whether or not it is accompanied by overt intoxication or untoward social consequences.

Psycho-social indicators of alcohol problems are affected not only by drinking patterns but also by prevailing norms and attitudes towards the effects of alcohol both at the family and at the broader community level. Hence, personal and family problems attributed to drinking, such as divorce and job troubles, may be directly influenced by social expectations around drinking (e.g., tolerance for drunkenness) held by one's family and friends. Rates based on official statistics such as arrests for public drunkenness or drunk driving are often affected by law enforcement practices and legal norms. Similarly, treatment statistics for alcohol problems reflect familial and community norms, as well as institutionalization practices within the society.

Black drinking patterns will be analyzed to determine how patterns of alcohol consumption (e.g., quantity and frequency) and normative values toward alcohol use may affect rates of alcohol problems. Variations in drinking patterns among gender, class, age, regional and religious groups within the black population will be examined to ascertain which groups are at highest risk for alcohol-related problems.

Through the analysis of alcohol problem indicators and drinking patterns, key problem areas and vulnerable population sub-groups will be identified. Specific strategies for problem intervention and prevention will then be discussed.

Liver Cirrhosis

Prior to the early 1950's, age-adjusted rates of liver cirrhosis mortality[1] in the non-white population[2] were generally lower than rates in the white population. This trend rapidly changed after 1955. In the ten year span between 1960 and 1970, the cirrhosis mortality rate of the non-white population doubled, increasing from 11.9 to 23.8 deaths per 100,000 persons. For the entire period between 1950 and 1973, non-white rates increased 242% while rates among whites rose only 60%.

Since 1973, cirrhosis rates in both races have declined slightly, but rates among black Americans are still disproportionately high (Herd, forthcoming b). According to a recent report (De Luca, 1981), non-white males in the 25-34 year age bracket who reside in seven major cities are ten times more likely to die of liver cirrhosis than whites. Andfor all ages, the cirrhosis mortality rate for blacks is almost twice as high as the rate for whites. In 1979, age-adjusted cirrhosis rates for non-whites were 21.1 per 100,000 population as compared to 11.1 per 100,000 persons for whites.

---

1. Mortality rates are based on data from death certificates and population data collected by the U.S. Census. It is well known that both of these data sources are biased in recording information for non-whites. However a combined number of factors suggest that the time trend data we are looking at says something "real" about changes in the relative incidence of mortality between the races. First, several studies suggest that in general, physicians' practices of recording cirrhosis deaths on death certificates have remained stable over time (Speizer et al., 1977; Kramer et al., 1968). Second, census coverage of the non-white population has improved substantially in the last several decades (Siegel, 1974); so that black rates have been increasing disproportionately even while the population base has been growing. Third, the increase in mortality is not sporadic, but is highly patterned by geographical region, occurring primarily in areas that have had consistently accurate reporting of cirrhosis for several decades. Finally, clinical and epidemiological studies indicate that increasing numbers of blacks are experiencing chronic diseases related to long term heavy alcohol consumption (Ernster et al., 1979; Pottern et al., 1981; Rogers et al., 1982)

2. Cirrhosis statistics used in this analysis are based on the "non-white" classification used to designate racial groups other than Caucasians in U.S. mortality reports and population tables. "Non-white" rates provide a rough estimation of black cirrhosis mortality since blacks accounted for about 92% of the U.S. non-white population during most of the years covered by this analysis (MacMahon and Pugh, 1970). In the analysis of cirrhosis rates by selected geographical regions, regions with large non-black minorities such as the Pacific and Mountain areas, are excluded to provide a more accurate portrait of trends in black rates.

FIGURE 1

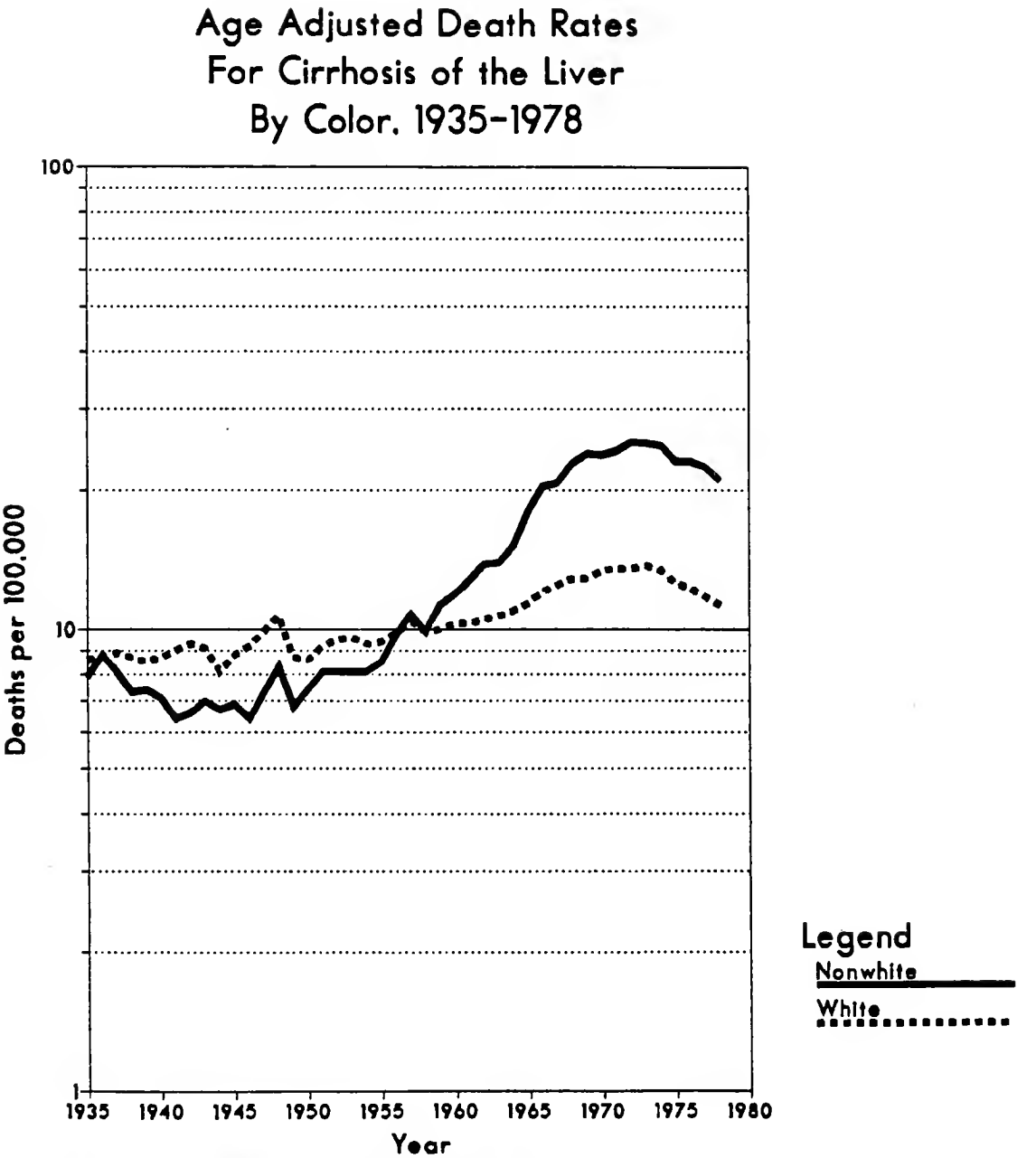


Figure 1: Rates reported per 100,000 population.

Source: Herd (forthcoming, b)

FIGURE 2

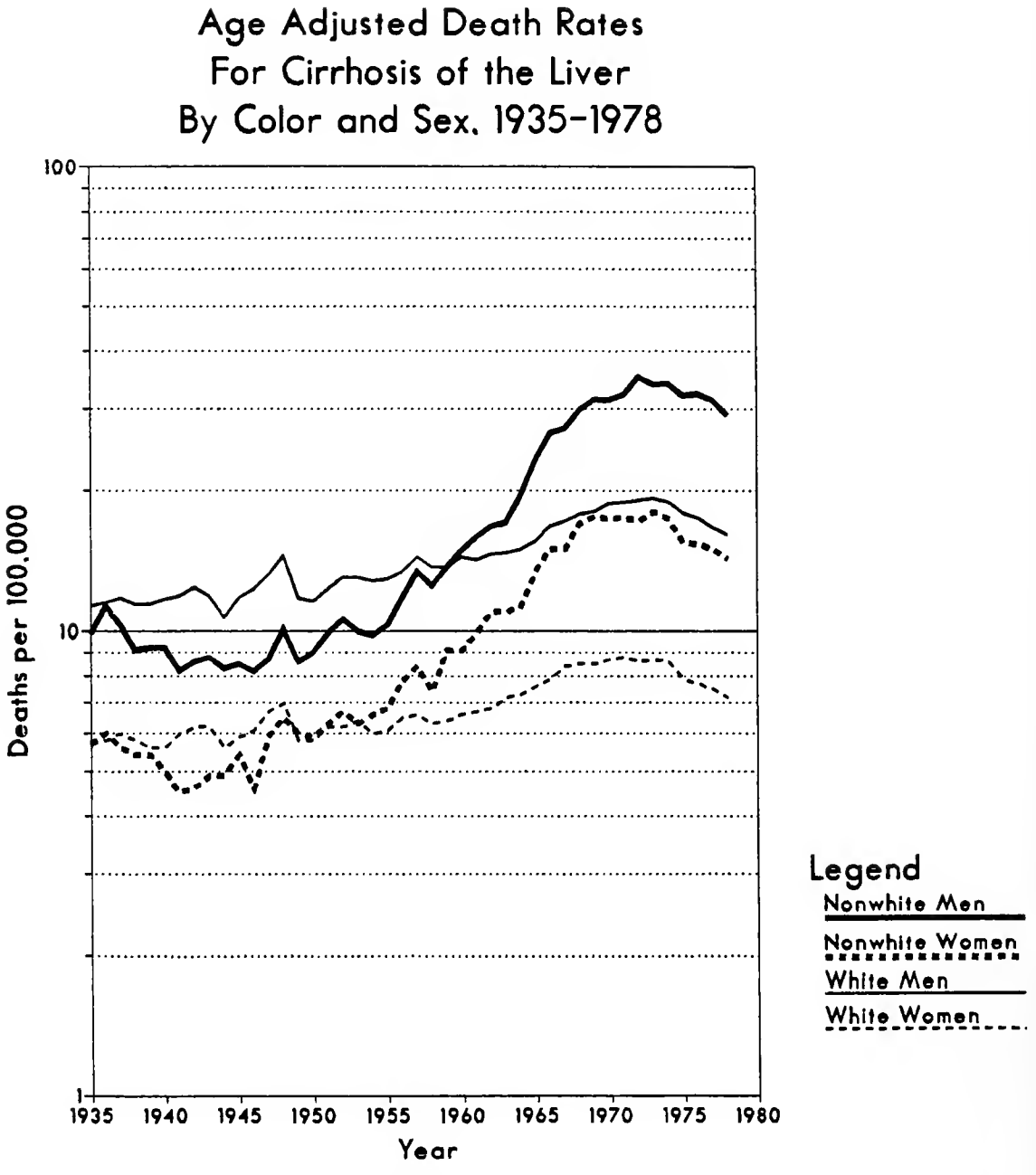


Figure 2: Rates reported per 100,000 population.

Source: Herd (forthcoming, b)

Sex Differences in Cirrhosis Rates

The recent increase in non-white age-adjusted cirrhosis mortality rates has been equally dramatic for non-white males and females. Between 1950 and 1973 the increase in mortality for non-white males was 276% versus 66% for white males. Over the same period, cirrhosis rates for non-white females increased 205% as compared to 54% for white females.

Age-Specific Mortality Rates

In recent years, a greater proportion of non-whites died at younger ages of cirrhosis than whites. In 1975, cirrhosis deaths for non-white men reached their peak at ages 55-64, while mortality for white males peaked in the 65-74 year age group. On the whole, women exhibited higher cirrhosis rates at younger ages than men, but again non-white womens' rates peaked at earlier ages than rates for whites. The highest rate of cirrhosis occurred in the 45-54 age range for non-white women compared to 55-64 for white women.

In the older age groups, non-whites exhibited lower cirrhosis death rates than whites. From 65 years old onward, white men appear at considerably greater risk of dying of cirrhosis than non-whites. For women, non-whites over 75 are less likely to die of cirrhosis than whites.

Cohort Effects

The contemporary age distribution of cirrhosis mortality in both races is shaped to a large extent by cohort effects in the wake of National Prohibition and Repeal. Persons maturing during the turn-of-the-century temperance and prohibition movement exhibited lower mortality rates than cohorts which came of age before or after this time. Hence the cirrhosis mortality rates of each successive cohort born from 1865 through 1895 was lower than the previous one.This trend began to reverse in cohorts born after 1900, and their mortality rates increased sharply. Cohorts of 1920 and 1930 showed particularly high increases. Recent studies suggest that this upward trend is slowing based on the minimal increases and even slight drop in mortality experienced by the cohorts born between 1935-1944.

Cohort effects are more dramatic for non-whites than whites. Blacks born during the 19th century and through about 1904 exhibited lower cirrhosis mortality rates than whites. By the cohort of 1910, which came of age in the 1920's and 1930's, this pattern shifted and non-white death rates began to outstrip white death rates. With each successive cohort, the mortality level of non-white groups further surpassed the white population contributing to the current excess of mortality among non-whites.

The lower current rate of cirrhosis mortality among older non-whites is a reflection of these historical changes. The black elderly are members of cohorts born prior to 1910, which have been characterized by lower cirrhosis rates throughout their life-span.

FIGURE 3

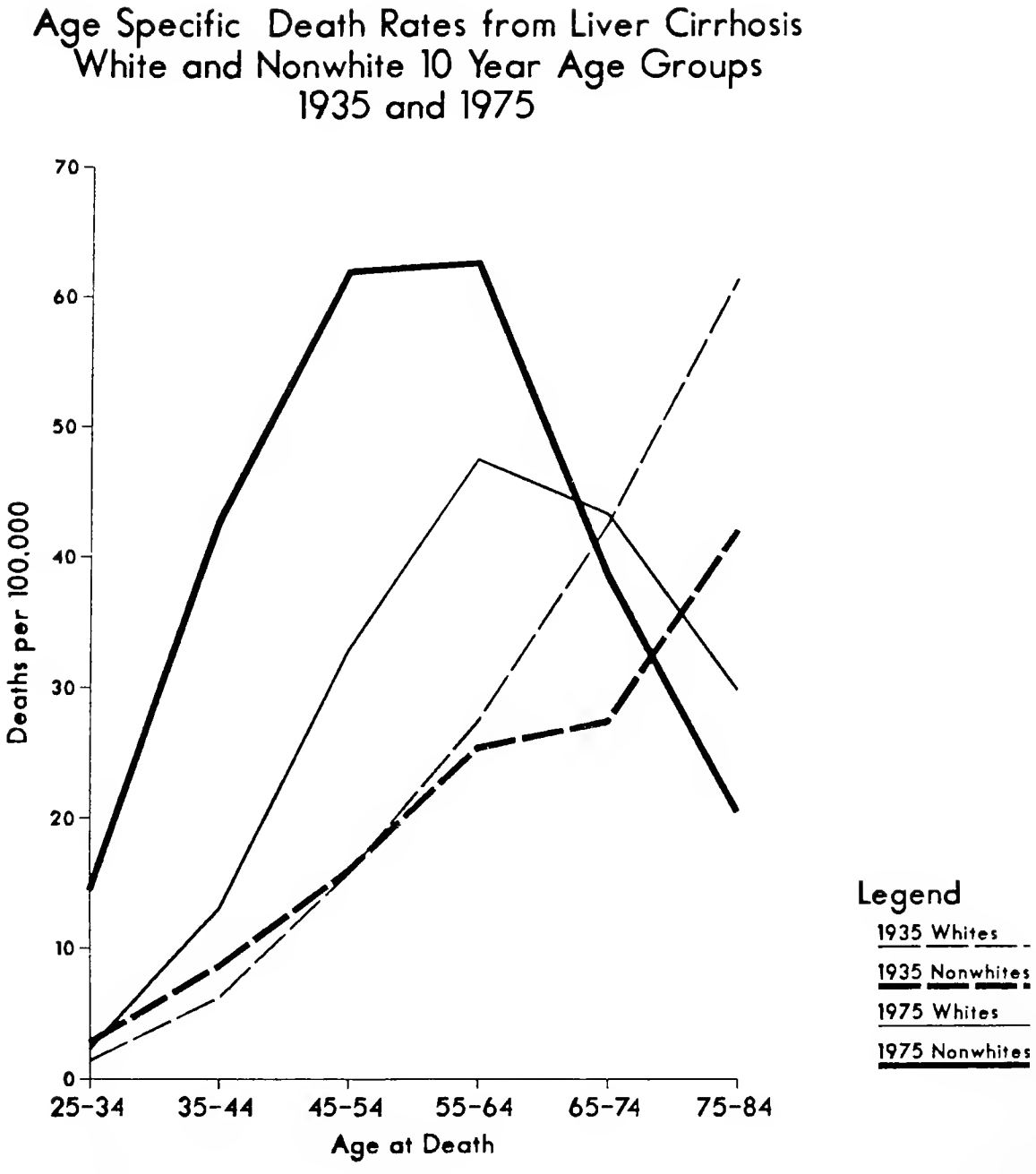


Figure 3: Rates reported per 100,000 population.

Source: Herd (forthcoming, b)

Figure 4

Death Rates for Liver Cirrhosis by Age for White Birth Cohorts United States, 1851-1950

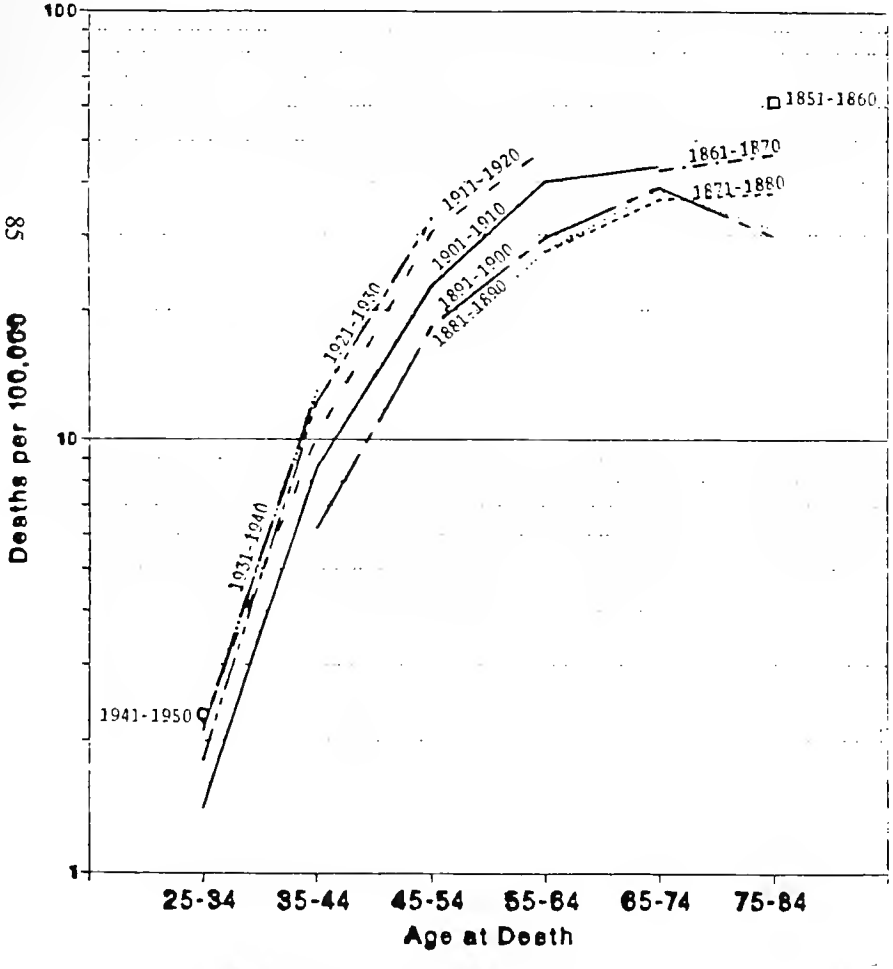


Figure 4: Annual age-specific liver cirrhosis mortality rates per 100,000 by cohort for U.S. whites born between 1851-1950.

Source: Herd (forthcoming, b)

Figure 5

Death Rates for Liver Cirrhosis by Age for Nonwhite Birth Cohorts United States, 1851-1950

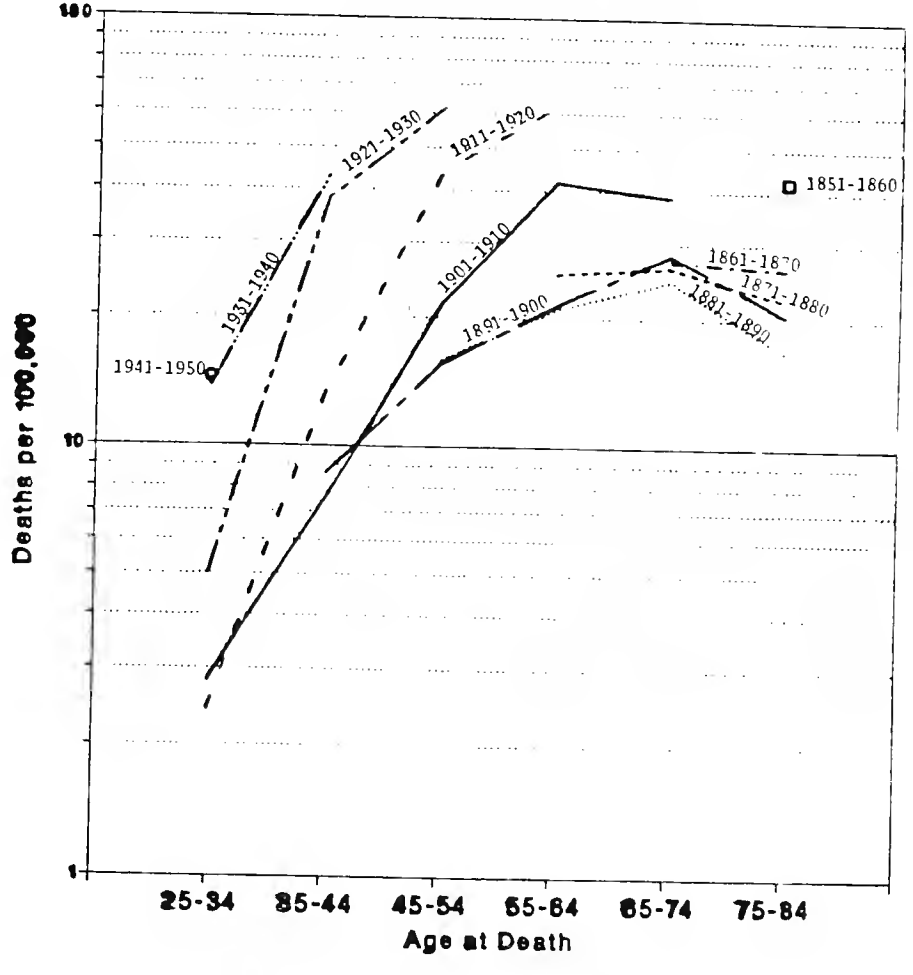


Figure 5: Annual age-specific liver cirrhosis mortality rates per 100,000 by cohort for U.S. nonwhites born between 1851-1950.

Regional Differences

Between 1949 and 1970, the pattern of increase in non-white cirrhosis mortality rates varied greatly by geographical region. Age-adjusted rates rose to dramatic proportions in the Mid-Atlantic, East North Central and the South Atlantic regions, while in the South Central regions they remained low. Thus in 1971, blacks in the North and Coastal South were from 2 to 4 times more likely to die of cirrhosis than blacks in the Deep South.

The geographical pattern of changes in the non-white population differs in important ways from the pattern observed for whites. Whereas black rates escalated dramatically in the Middle Atlantic and East North Central regions, they only increased slightly for whites. Mortality rates for whites rose more in the interior south than they did in the urban north. Among blacks, cirrhosis rates in the interior south were among the most stable and showed only modest increases between the 1950's and 1971. This differential pattern of change suggests that elevated rates among blacks in the north may be related to the migratory influx and increasing urbanization of the black population in these areas.

However, the South Atlantic region witnessed the greatest relative increase in cirrhosis mortality among both blacks and whites. The low rates in this region in 1949 which were similar to rates in the deep South, rose to nearly the same level as rates in the East North Central region by 1971. The escalation of both white and non-white cirrhosis mortality in this area might be caused by the increasing urbanization and liberalization of attitudes towards alcohol use which have occurred in these regions since the 1950's.

TABLE 1

CIRRHOSIS MORTALITY
Age-Adjusted Rates
Selected Regions: White/Non-White
1949 - 1971

	1949 - 1951		1959 - 1961		1969 - 1971		% Change	
	White	Non-Whites	White	Non-Whites	White	Non-Whites	W	N
Middle Atlantic	10.5	11.7	12.2	22.7	15.33	40.18	46%	243%
East North Central	8.7	9.1	10.11	12.13	12.8	25.6	47%	181%
South Atlantic	7.6	5.7	8.5	8.6	12.6	21.2	66%	272%
East South Central	6.0	4.9	5.8	5.6	8.2	8.9	37%	67%
West South Central	6.7	5.3	7.4	6.8	10.8	10.9	62%	105%

Source: U.S. Bureau of the Census and National Center for Health Statitistics

FIGURE 6

Age Adjusted Regional Cirrhosis Rate By Color, 1959-1971

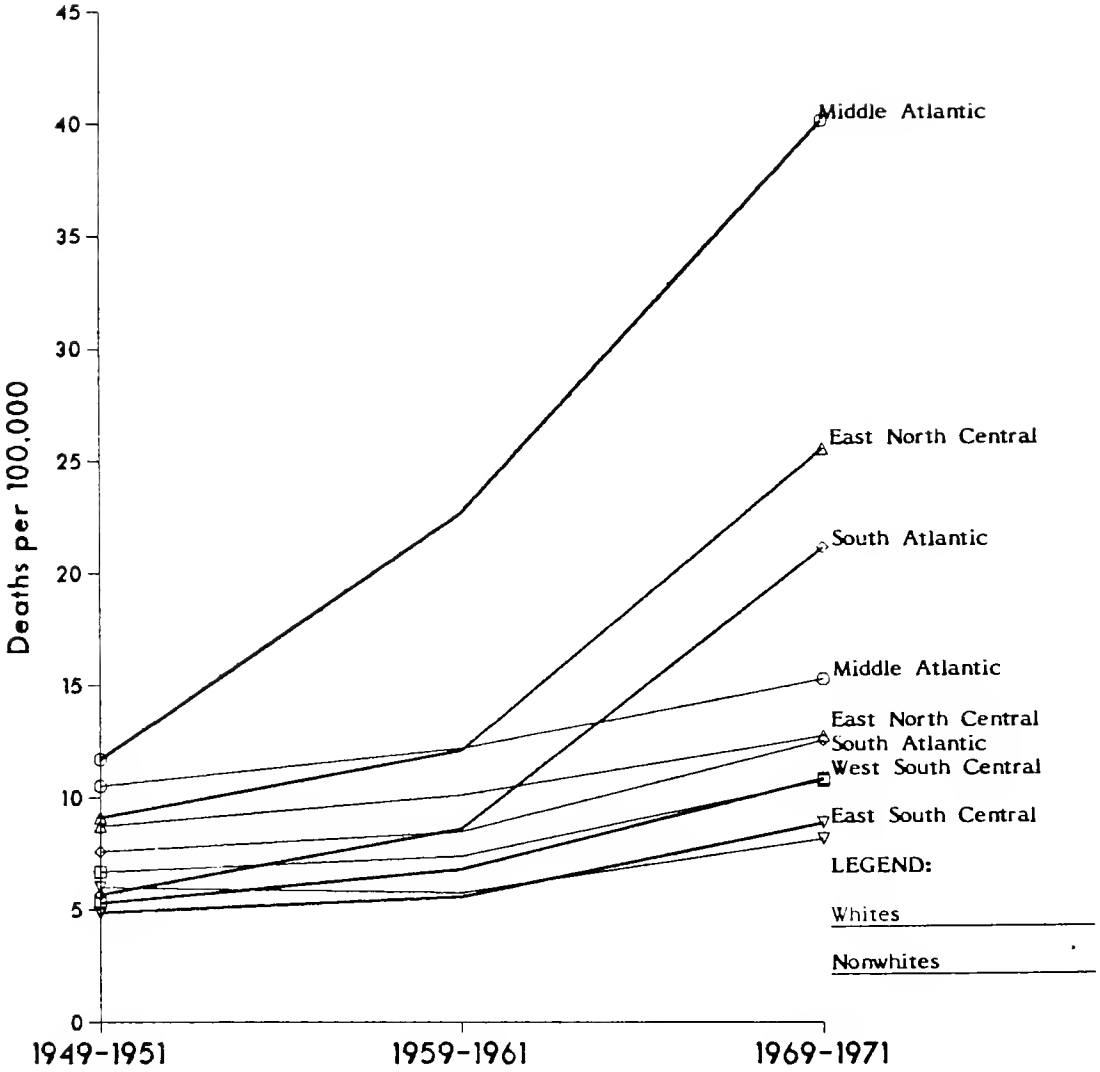


Figure 6" Rates reported per 100,000 population.

Source: Herd (forthcoming, b)

Etiological Factors in Elevated Non-White Cirrhosis Mortality Rates

The problem of increasing non-white cirrhosis mortality is complex and seems to represent the interaction of several possible factors. First, recent studies show higher proportions of morbidity and mortality from acute liver diseases -- fatty liver and alcoholic hepatitis -- among non-whites (Garagliano et al., 1979; Kuller et al., 1969) The excess in fatty liver and hepatitis occurs primarily in young adult males. Alcohol consumption is specified as the primary etiological agent for acute liver disease in these studies, although it is possible that other factors such as the elevated rate of hepatitis B virus among non-whites (Alter, 1983) could increase disease susceptibility (Hislop et al., 1981; Mills et al., 1979).

High rates of mortality from fatty liver and hepatitis probably contribute significantly to the steep increase in reported cases of liver cirrhosis deaths among young black males, given that true cirrhosis is rare in youthful populations. However, the increasing rates of acute liver disease among black males cannot account for the general increase in liver cirrhosis mortality among non-whites since it is the high rates of mortality in middle-aged and older adults which contribute the most to overall death rates.

The high prevalence of mortality in the older age groups undoubted reflects the importance of a major factor in cirrhosis etiology -- lengthy duration of heavy alcohol consumption. Clinical research by Lelbach (1975) indicates that the risk for cirrhosis is directly influenced by the number of years of heavy drinking. From a similar perspective, using aggregate statistical data, Skog (1980) points out that mortality outcome represents the cumulative effects of previous and current alcohol consumption level.

The importance of duration of heavy consumption may provide insight into the disparity between white and non-white cirrhosis mortality despite the similar rates of heavy drinking reported for blacks and whites in most surveys (Cahalan et al., 1969; Clark et al., 1982). A recent study by Caetano (1984) suggests that there may be differences in the stability of heavy drinking over the life span among black and white males. His analysis showed that for white men, frequent heavy drinking is most prevalent in young adults, but rapidly falls off as they reach their 30's. In contrast, among blacks, frequent heavy drinking is more common in men over 30, suggesting that it is a stable pattern of mid-life. If so, this would increase the numbers of drinkers in the black population at risk for cirrhosis -- despite the similarity in proportions of heavy drinkers in the two groups at a single point in time.

While provocative, Caetano's research leaves a major question unanswered. The differences in the age structure of heavy drinking described for the two groups could reflect either differences in the onset and socialization of drinking among contemporary blacks and whites, or they could stem from historical differences, resulting in "cohort effects" which predispose blacks over 30 to heavy drinking.

A recent analysis by Herd (forthcoming b) focussed on the importance of historical changes in black drinking patterns in explaining the dramatic "cohort effects" in black cirrhosis mortality. This work suggests that black attitudes towards alcohol use rapidly transformed from traditional abstinence values held throughout the 19th century to a focus on heavy drinking lifestyles in the 1920's and 1930's. The period coincided with great waves of black northern migration to urban areas. These social changes, along with continuing urbanization, appear to have led to increasing alcoholization of the black community, making blacks more vulnerable to cirrhosis in the context of the general expansion of alcohol and drug use in American society in the 1960's and 1970's.

Esophageal Cancer

Incidence

The reported incidence of esophageal cancer among blacks is extraordinarily high. Between 1969-71, black males in the 35-44 age group had an incidence rate 10 times that of whites. Among the older age group where the disease predominates, the rate among black males is still almost fourfold that of whites. Although females of both races experience much lower rates of the disease, the gap between white and black women looms large. The rates among black women are from 3 to 7 times higher than whites.

Table: 2 Esophagael Cancer Annual Incidence Rates per 100,000 Population
(Third National Cancer Survey 1969-71, Ernster, et al., 1979)

Males	White	Black
35-44	0.5	5.3
45-54	4.2	30.7
55-64	14.9	58.8
	Females	
35-44	0.4	2.7
45-54	1.2	9.0
55-64	4.6	13.9

Time Trends/Regional Differences

Trends in mortality due to cancer of the esophagus share many similarities with the patterns observed in cirrhosis rates. In a cohort analysis of mortality during the period 1930-67 (Schoenberg et al., 1971), the non-white population experienced steadily and rapidly rising rates, while those of the white population remained relatively stable. The rising non-white mortality occurred at all ages and in all areas of the country and was more pronounced among males than females. When mortality rates were analyzed by U.S. geographical divisions for 1940-66, the highest rates for each race and sex were in the Northeast and the lowest were in the South. The geographical differential was more prominent for non-whites (threefold) than for whites (twofold). Over time, the non-white population showed increasing rates in all divisions, but the most rapid increase has been in the South.

A correlation analysis of mortality from 1950-66 on urbanization, cigarette and alcohol sales in 41 states in 1960 revealed that urbanization was the strongest predictor of mortality rates. It was concluded that migration may be a significant factor in the pattern of cancer deaths since "the rising mortality from esophageal cancer among non-whites has paralleled the increasing proportion of non-whites living in urban areas" (Schoenberg et al., 1971).

More recent case control studies argue that alcohol consumption may be a primary etiological agent in the development of this tumor among blacks. Pottern et al. (1981) showed that the age-adjusted death rate for esophageal cancer in Washington, D.C. for non-white males in 1970-75 was 28.6/100,000, far higher than the national rate of 12.4/100,000 and rates in other metropolitan areas. This study concluded that the major factor responsible for the excess in esophageal cancer death rates was alcoholic

beverage consumption, with an estimated 81% of the esophageal cancers attributed to its use. The relative risk (RR) of esophageal cancer associated with use of alcoholic beverages was 6.4 (95% confidence interval: between 2.5 and 16.4. The relative risk increased with amount of ethanol consumed and was highest among drinkers of hard liquor, although the risk was also elevated among consumers of wine and/or beer only. By contrast, the high risk associated with cigarette smoking was 1.9 (1.0, 3.5) when controls with smoking-related causes of death were excluded, but declined to 1.5 (0.7, 3.0) when adjusted for ethanol consumption. It was noted that "the per capita 'apparent consumption' of alcoholic beverages on the basis of revenues for the District of Columbia surpasses the national level by nearly fourfold for hard liquor and about threefold for wine, although part of the excess is related to purchases by non-residents."

Rogers et al., (1982) study of the increasing frequency of esophageal cancer among black male veterans in Baltimore also emphasized the role of alcohol as a major etiological factor. Heavy alcohol intake occurred more frequently in esophageal cancer patients than in control patients and many of these patients experienced multiple alcohol-related complications.

ALCOHOL-RELATED HOSPITALIZATION AND TREATMENT

Psychiatric Treatment

Since the 1930's blacks in the urban north have been characterized by disproportionately high rates of psychiatric admissions for alcohol-related diagnoses (Malzberg 1944, 1960). The excess in black rates for alcoholic psychoses in New York in the 1930's and 1940's was attributed to high rates of urban migration, low social and economic status, and high rates of disease and social problems (Malzberg 1944). Between 1940 and 1950, black rates of hospital admissions for alcoholic psychoses in New York declined considerably, although they were still in excess of rates among whites. The decline in rates was attributed to an overall improvement in the social and health status of New York blacks.

However, by the 1960's blacks were still greatly overrepresented in psychiatric admissions for alcohol-related diagnoses in some states. In a study of 3,339 first admissions to Ohio State public mental hospitals from July 1958-December 1961 (Locke and Duvall, 1964), the rate for non-white males residing in metropolitan areas was more than double that of metropolitan whites (61.6 per 100,000 population as compared to 24.2 per 100,000 population). In a similar study of Maryland hospitals over a three year period ending in 1964 (Gorowitz et al., 1970) the rate for black men was approximately 1 1/2 times the rate for white men (656 per 100,000 population compared to 433 per 100,000 population). Among females there was an even greater gap between blacks and whites: the rate for black women was twice as great as the rate for white women (219 per versus 99 per 100,000 population).

Rosenblatt's analysis (1971) of admissions for treatment of alcohol-withdrawal symptoms in a psychiatric hospital in Brooklyn, New York revealed that black admissions were from 3.5 to 12 times higher than whites depending on zone of residence. The following socio-demographic factors were significantly correlated with the rate of admissions in a zone -- overcrowded housing, high rates of aid to dependent children, venereal disease, juvenile delinquency, tuberculosis, unemployment, homicide, and low educational level, median income and residential stability.

A nationwide survey (Meyer, 1974) of admissions to state and county mental hospitals in 1972 also showed that admissions for alcohol disorders were higher for non-whites (69.6 per 100,000 population) than whites (50.3 per 100,000 population). However, the same survey reported that the proportion of alcohol-related diagnoses (with respect to all psychiatric conditions) for non-whites was slightly lower than that for whites, 22.7% versus 27.3%.

The latter finding was repeated in an analysis of mental hospital admissions for 1975. Blacks in state and county mental hospitals were more likely to be diagnosed as having schizophrenia, while whites and Hispanics were more often designated as having alcohol and drug disorders and depression. In other types of mental health facilities, the proportion of black admissions for alcohol and drug problems was lower than or similar to that for whites, except in outpatient psychiatric and private general hospitals, for which the percentage for blacks was considerably higher than for whites (American Public Health Association 1975).

In general it appears that the disparity between black and white psychiatric admissions and institutionalization for alcohol-related disorders may have decreased by the middle 1970's. However, it is difficult to document this hypothesis given the lack of consistent trend data on blacks at the regional and national level. Further analysis

on the change in population rates for psychiatric disorders and on the change in the proportion of black alcohol-related diagnoses relative to other psychiatric disorders over time is needed before any firm conclusions can be drawn.

Treatment in Alcohol-Specific Agencies

While publicly financed alcohol treatment agencies were set up in many states in the 1950s and 1960s, the early 1970's witnessed the establishment of the National Institute on Alcoholism and Alcohol Abuse (NIAAA) and the development of a wide range of alcohol-specific treatment agencies across the country. These agencies now constitute the primary institutional base for handling alcohol-related problems.

Recent large-scale surveys of alcohol and drug-specific treatment agencies show that disproportionate numbers of blacks are being seen in alcohol treatment programs. One of the earliest evaluations of forty-four NIAAA funded Alcoholism Treatment Centers and five special population programs, showed greater percentages of black clients than would be expected in all program types (Towle, 1974). They were overrepresented in the Alcohol Treatment Centers by about 40% and only slightly overrepresented in the employee-based industrial alcohol programs (IAC's). However in the public inebriate and drinking driver programs, the proportion of blacks in treatment was 200-300% greater than than their proportion in the U.S. population.

A survey of alcohol treatment programs for 1977-1980 (NIAAA, 1982) showed that blacks constituted about 18% of the client population although they only comprised roughly 11% of the U.S. population. Similarly, surveys which included both alcohol and combined alcohol and drug treatment programs reported that for 1980 and 1982, blacks comprised 15% of the treatment population (NIAAA, 1980, 1983). In 1982, over 44,000 blacks were seen in alcohol or combined alcohol and drug treatment programs. Population rates were over 50 percent higher for blacks than whites, or 159.58 versus 101.15 per 100,000 population.

Table 3: Percentage of Black Clients Receiving Treatment for Alcoholism, Selected States, 1980-1982

State	1980 All Clients	1980 % Blacks	1982 All Clients	1982 % Blacks	% Blacks in State Population
Alabama	2,411	33.8	1,632	28.2	25.6
Arkansas	3,336	24.2	1,750	26.2	16.3
California	65,853	8.0	37,542	11.11	7.7
Connecticut	4,000	15.4	3,185	19.0	7.0
Delaware	461	22.3	650	16.6	16.6
Florida	8,998	15.8	11,008	15.8	13.8
Georgia	6,656	28.6	4,964	26.8	26.8
Illinois	8,115	16.0	8,722	22.2	14.6
Indiana	6,169	14.2	4,601	11.2	7.6
Kansas	2,635	8.4	2,878	7.4	5.3
Kentucky	4,244	13.2	2,378	7.8	7.1
Louisiana	4,089	35.9	6,088	37.8	29.4
Maryland	7,867	33.9	9,098	31.2	22.7
Massachusetts	11,422	9.4	15,905	6.9	3.8
Michigan	11,992	15.2	10,814	16.4	12.9
Mississippi	2,260	28.4	2,291	33.6	35.8
Missouri	4,173	21.1	2,088	14.8	10.4
New Jersey	3,945	22.8	6,675	23.6	12.6
New York	22,404	28.8	24,332	29.7	13.7
North Carolina	7,990	27.8	7,070	27.7	22.4
Ohio	8,419	13.4	9,649	14.1	10.0
Oklahoma	4,573	10.0	2,845	16.8	6.8
Pennsylvania	7,742	20.9	6,499	26.5	8.8
South Carolina	3,629	31.5	3,237	27.9	30.4
Tennessee	4,426	18.3	2,894	16.5	15.8
Texas	11,617	19.2	8,100	13.0	12.0
Virginia	8,804	22.6	6,390	24.6	18.9
Washington	6,980	6.2	8,823	5.6	2.3
West Virginia	1,481	8.8	1,814	8.4	3.0
Washington, D.C.	2,244	79.0	2,708	87.0	70.3
NATIONAL TOTALS (52 states inclusive)	**318,633**	**14.4**	**283,166**	**15.6**	**11.7**

Source: 1980 and 1983 National Drug and Alcoholism Treatment Utilization Surveys, U.S. Department of Health and Human Services, Public Health Services.

Statistical Abstract of the United States, 1982-1983.

Table 4: Alcohol Client Treatment Admissions Data for Blacks, Fiscal Year 1983

State	All Clients	% Blacks	% Blacks in State
Alabama	6,883	22.6	25.6
Arkansas	4,077	16.5	16.3
California	33,696	4.3	7.7
Connecticut	11,836	13.5	7.0
Delaware	5,073	26.7	16.6
District of Columbia	5,681	70.0	70.3
Florida	51,531	12.6	13.8
Georgia	26,664	25.4	26.8
Illinois	56,923	18.4	14.6
Kansas	14,943	7.4	5.3
Maryland	23,514	27.3	22.7
Massachusetts	64,422	7.1	3.8
Michigan	32,039	18.0	12.9
Mississippi	6,410	29.1	35.8
Missouri	14,839	15.0	10.4
New Jersey	15,364	28.5	12.6
New York	114,182	27.8	13.7
North Carolina	25,843	25.2	22.4
Ohio	18,779	17.7	10.0
Pennsylvania	41,660	28.3	8.8
South Carolina	18,459	24.4	30.4
Tennessee	4,990	13.8	15.8
Virginia	39,460	25.2	18.9
Washington	92,318	3.6	2.3
West Virginia	5,290	4	3.0
TOTALS	**924,630**	**15.0**	
	(38 states)	(38 states)	

Source: State Resources and Services Related to Alcohol and Drug Abuse Problems: An Analysis of State Alcoholism and Drug Abuse Profile Data, National Association of State Alcohol and Drug Abuse Directors, Inc. Washington, D.C.

Statistical Abstract of the United States, 1982-1983.

An analysis of the prevalence of blacks in alcohol treatment facilities by states for 1980 and 1982 showed important regional differnces in patterns of utilization (NIAAA, 1980, 1983). In some of the large, densely populated states in the Northeastern Seaboard area, the proportion of blacks in treatment was 2-3 times higher than the proportion of blacks in the states' populations. Blacks were moderately overrepresented in treatment agencies in the Mid-West, the West, and a few southern states. However, in the interior South, the percentage of blacks in treatment was very similar to their proportion in the population.

A similar pattern of regional differences in admissions to alcohol treatment units was described in a 1983 survey of state alcohol and drug programs (National Association of State Alcohol and Drug Abuse Directors, 1984) and is depicted in chart 7.

Age Distribution of Blacks in Alcoholism Treatment Settings

A number of studies in different treatment settings have reported that blacks in alcohol treatment are considerably younger than whites.

An analysis of the characteristics of 2831 alcoholics admitted into Maryland psychiatric facilities from June 1963 to July 1964 showed that the median age of non-white men and women was 38 years, while comparable ages for white men and women were 46 and 44 years, respectively (Gorowitz et al., 1970). Two years later a study in the same facility revealed that among non-white men and women the highest rates of admission with alcohol-related diagnoses were in those aged 35 to 44 years, while among white men and women peak rates occurred in persons between 45 and 54 years of age (Gorowitz et al., 1970).

Similar patterns are reported in a series of studies on characteristics of patients hospitalized for acute alcoholic psychoses in New York. Gross et al. (1963) reported that for a sample of 147 male patients, blacks had a mean age that was 8 years younger than whites. In a later study of 567 men (Gross et al., 1972) blacks were also found to be approximately 8 years younger than whites. There were twice as many black patients in the 20-34 age group; yet, in the oldest age groups, there were nearly three times as many white, as black patients. It was suggested that black patients probably develop alcoholism in response to the problems of late adolescence and early adulthood, while white men appear to resort to heavy drinking and develop alcoholism in reaction to the problems of middle age.

An analysis of clinical records of 1400 men (Gross et al., 1971) reported that blacks experienced hallucinations more often and at younger ages than whites. Among blacks the largest percentage of hallucinations was in the age group 25-34 (39%) while among whites the highest percentage was in the age group 35-44 (62%).

A survey by Zax et al., (1967) of alcoholics in a variety of agencies (Salvation Army, criminal justice system, hospitals, and psychiatric facilities) in Monroe County, New York showed a strong overrepresentation of non-white males and females in the younger age groups. Seventy-four percent of the non-white men and 80% of the non-white women with a primary diagnosis of alcoholism were under 50 years of age, compared with 47% and 64% of white men and women respectively. The authors suggested that the relative youthfulness of non-whites in alcohol treatment may be attributed to the following factors: (1) the excessive use of alcohol is probably a relatively new problem for nonwhites; (2) non-whites who use alcohol excessively have a shorter life-span; or (3) the non-white population of the locale under study is expanding very rapidly by reason of both a high birth rate and the inward migration of young people.

Studies of treatment facilities in Missouri showed the same pattern. In an analysis of psychiatric admissions for alcoholism in Kansas City at both public and private facilities, it was observed that considerably more blacks (70%) than whites (46%) were under 45 years of age when admitted for treatment (Hornstra and Udell, 1973).

Similar findings were reported for a study of 100 black and 100 white male alcoholics at another treatment facility in St. Louis (Viamontes and Powell, 1974). The mean age for blacks in the facility was 37 years and for whites it was 46. In general, blacks had started drinking earlier, and lost control sooner than the white patients. Blacks began drinking at about age 15½ years, compared to 19 years for whites. Unmanageability of drinking problems began, on the average, at age 28 for blacks and age 33 for whites. It was suggested that blacks may enter treatment earlier because of lack of family support, since a greater proportion are unmarried or divorced.

Locke and Duvall (1964) reported on alcoholic first admissions for Ohio state mental hospitals in 1960. Among the major findings, they focused on the prominent age differences between black and white admissions:

> It is particularly noteworthy that among nonwhites 69% of the alcoholic first admissions were under 45 years of age, whereas only 49% of the while alcoholic admissions were under this age. Among whites, the peak ages of admission were 45-49, followed closely by the 40-44 and 50-54 age groups. Among nonwhites, the peak ages were 40-44. Among metropolitan males the non-white:white ratios ranged from 4.4:1 at ages 25-29 to 2.1:1 at ages 60-64. . . .The marginal economic status of non-whites, possibly involving a lower nutritional level, may produce an earlier advent of the psychophysiological effects of alcohol. The earlier entrance of non-whites into the "working world" (non-whites generally have less years of schooling), the fact more than three-fourths of the non-whites aged 25-64 are out-of-state migrants, and that a greater percentage of the non-white females are in the labor force, would limit the availability of a custodial relative, thus militating against the retention in the home of the non-white alcoholic (p. 525).

BLACKS, ALCOHOL CONSUMPTION AND TRAFFIC ACCIDENTS

There are a limited number of studies which examine the relationship between blacks, alcohol consumption, and automobile accidents, but the existing studies conclude that blacks are at greater risk for accidents due to drinking than whites. This research suggests that during accident situations, blacks either exhibit higher blood alcohol concentrations (BAC) levels than whites, or are more vulnerable to accidents and arrest at the same BAC level as whites.

A study by Waller et al., (1969) of persons involved in traffic fatalities found that more blacks had been drinking than other groups and that a greater proportion had a BAC of .15% or higher. Of the blacks, 69% had been drinking while only 45% of whites were drinking; 50.6% of the blacks had BAC's above .15% whereas only 26.5% of whites had BAC's at this level.

In a study of 152 respondents and 8014 drivers in Grand Rapids Michigan (Cosper and Mozersky, 1968), blacks stood out as having the highest percentage (24%) of BAC's of .01% and over .04%. This was in spite of the fact that blacks were more likely to abstain and less likely to drive than whites. Blacks also exhibited disproportionately high rates of drivers who were considered to be drinkers.

Research on arrests for driving while intoxicated (ADWI) in Columbus, Ohio, and Santa Clara County (Hyman, 1968b) found an overrepresentation of Blacks in Ohio and those with Spanish surname in California. Blacks were at least twice as likely to be arrested as other men, especially in age groups between twenty and sixty-four. Since the proportion of ADWI involved in accidents with above average BAC's was not lower among blacks, Hispanics, and unemployed than among others, the authors argued that police bias was not a significant factor in the overrepresentation of these groups for drunk driving arrests. In both areas, men living in low SES census tracts were vulnerable to arrest despite the fact that such households generally have less access to cars.

In a related study of 9953 drivers who had been involved in accidents in Michigan, Hyman (1968a) found that there was little difference in the distribution of BAC's between blacks and whites. Yet blacks were more vulnerable to arrest in every category of BAC. Blacks tended to have higher accident vulnerability (AV) at each educational level in comparison to whites. For whites, educational attainment was inversely proportionate to AV level; for blacks those completing college and high school were more vulnerable than those with less education.

Explanations for blacks' greater risk for high BAC levels and higher accident and arrest rates have focussed on factors such as social alienation, status deprivation, and psychic stress (Cosper and Mozersky, 1968; Hyman 1968a,b). However, since the mid-1960's when these studies took place, white rates of arrest for driving while intoxicated have risen greatly, equalling rates for blacks (see the section below). The new patterns coincide with the increased focus on drinking and driving in American society, signalled by the rise of grass roots movements such as Mothers Against Drunk Driving and tougher drunk driving laws. The decline in black predominance in drunk driving seems to be largely related to new enforcement patterns which crack down on white drivers as well as blacks, rather than to changes in blacks' intra-psychic make-up or changes in status and power relations between blacks and whites.

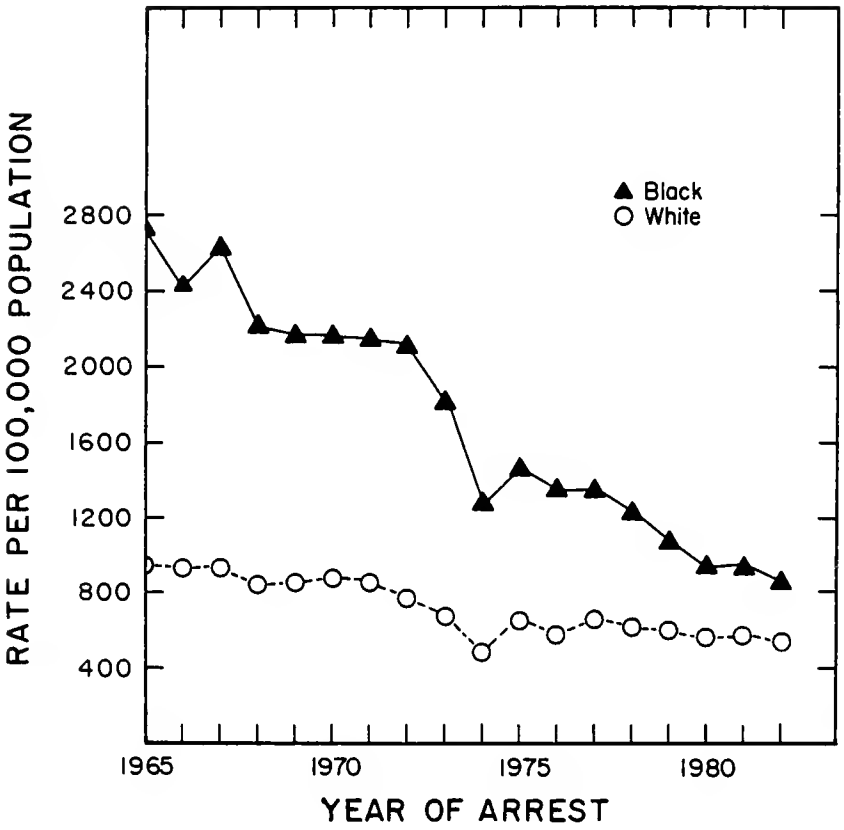
BLACKS, ALCOHOL AND CRIME

Arrests for Alcohol-Related Offenses:

The most striking finding regarding black arrests for alcohol-related offenses has been their enormous decline relative to white rates over the past two decades. In 1965 the rate of black arrests for drunkenness in adults 18 years and above was over 2½ times the rate for whites (2741.9 versus 949.3 per 100,000 population). Blacks accounted for nearly one-fourth of all arrests for drunkenness although they constituted only a tenth of the U.S. population. In the intervening years, the rate of arrests for drunkenness has greatly declined in both groups, but the change has been more pronounced among blacks. By 1980, black arrests were occurring at only a slightly greater percentage than white arrests. Blacks accounted for about 16% of arrests for drunkenness, which is only about 5% in excess of their representation in the population. Much of this difference can be attributed to the greater urbanization and lower socio-economic status of blacks, since these factors were shown to influence rates of drunkenness arrests in some states (Skolnick, 1954). The large decline among both blacks and whites in the overall arrest rate is probably due to decriminalization of intoxication, changes in enforcement practices, and the expansion of treatment services.

Racial differences in arrests for driving under the influence (DUI) exhibit a similar convergence. In 1965, black arrests for DUI were substantially higher than whites (303.5 versus 168.6 per 100,000 population), although blacks were less likely to drink and probably less likely to drive. Over time, arrests have increased in both groups, but the increase has been greater for whites (almost a four-fold versus about a two-and a half fold difference). Currently, blacks are about equally represented in DUI arrests in relation to their proportion of the population, and population rates between the two groups are very similar, 813.4 versus 808.2 per 100,000 persons.

Fig. 7 U.S. Arrest Rates for Drunkenness
Persons 18 Years and Over by Race
1965—1982



Source: Uniform Crime Reports, Current Population Reports

Fig. 8 U.S. Arrest Rates for Driving Under the Influence
Persons 18 Years and Over by Race
1965– 1982

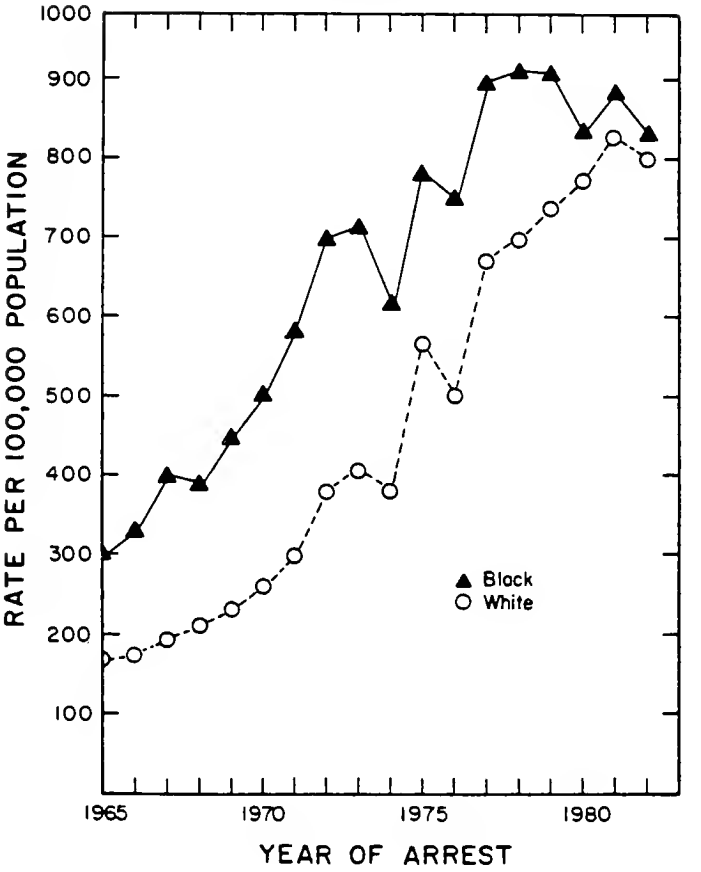
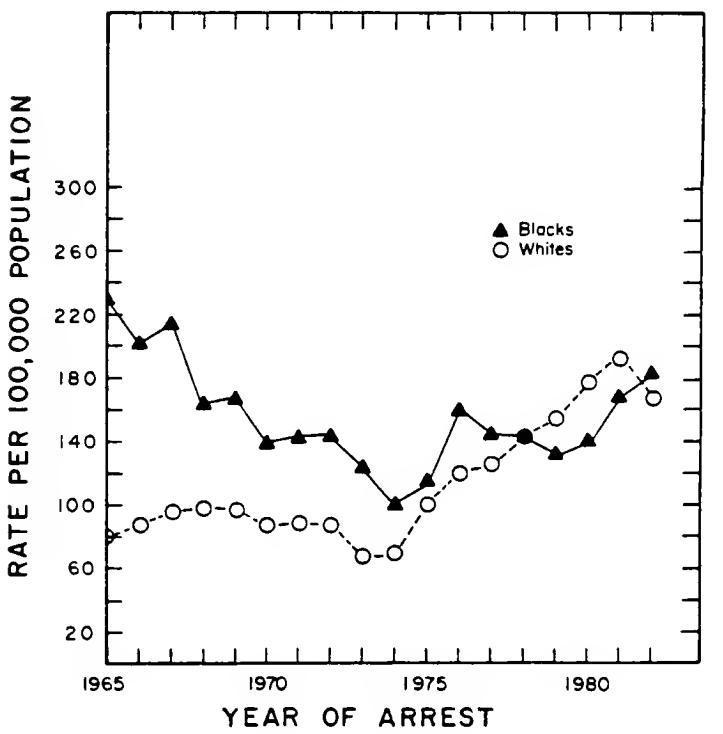


Fig. 9 U.S. Arrest Rates for Liquor Law Violation
Persons 18 Years and Over by Race
1965– 1982



Source: Uniform Crime Reports, Current Population Reports

Arrests for violation of liquor laws (the category includes alcohol beverage license violations, unlawful possession, and illegal manufacture and sale) show a similar reversal of racial predominance. In 1965, the rate of arrests among blacks was nearly three times that of whites (231.0 versus 80.3 per 100,000 population). Blacks accounted for about one-third of all arrests although they comprised about a tenth of the population. Since the 1960's black rates have declined slightly and white rates have steadily increased. By the late 1970's, white rates surpassed those of blacks, and remained elevated until 1982. In 1982, black rates were slightly above rates for whites, 184.6 versus 166.2 per 100,000 persons.

Alcohol Involvement in Serious Crimes[3]

Data from arrest records, prison records, and interviews do not generally support the view that blacks are more likely than whites to have been involved in a crime with alcohol. When blacks with serious social and personal problems -- such as those found among black prison offenders -- are compared to similar whites, they are less likely to have drinking problems or to be heavy drinkers than whites (Roizen, 1981).

Prison studies show that a smaller proportion of black than white male offenders were drinking at the time of the crime. Grigsby (1963) found that 26% of Black male offenders in Florida were intoxicated at the time of the crime, compared with 32% of whites. Mayfield's (1972) analysis showed that 53% of blacks in North Carolina were intoxicated, compared with 60% of whites. The 1974 LEAA survey (U.S. Department of Justice, LEAA, 1975) found 37% of blacks drinking at the time of the crime, compared with 50% of whites. The single study of women (Cole, Fisher and Cole, 1968), a study of women homicide offenders only, reports a larger proportion of black women drinkers (56%) compared to white women (45%).

The differences between black and white samples in proportion drinking diminish dramatically with age for both broad categories of crime. Black property offenders over 40 are only slightly less likely than Whites to have been drinking. Among those having committed crimes against the person, older black offenders are about as likely as whites to have been drinking. However, among young offenders -- who are overrepresented in prison populations -- blacks were less likely than whites to have been drinking at time of the crime. Again, blacks were less likely than whites to have been drinking heavily.

Another measure of the relationship of drinking and crime is the prevalence of reported drinking problems in prison populations. Grigsby (1963) found in Florida that 43% of white offenders were "regular drinkers" compared with 30% of non-whites; Globetti et al., (1974) found in Mississippi that 56% of whites compared with 34% of blacks were "regular drinkers". Guze et al., (1962) found that 47% of white offenders in Missouri were labeled alcoholics, compared with 27% of blacks. The 1960 State of California survey of drinking problems of newly committed offenders, the largest of these studies, reports twice as many white as black offenders with drinking problems.

Finally, homicide studies of jailed offenders show a more equal pattern of black/white alcohol involvement. Black offenders were as likely or more likely than white offenders to have been drinking at the time of the homicide (Roizen, 1981).

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3. This section draws heavily from a review on blacks, alcohol, and crime by Roizen (1981)

SURVEYS OF DRINKING PATTERNS AND PROBLEMS IN THE ADULT POPULATION

National Surveys

Since the 1950's, regular nationwide surveys of drinking patterns and problems have been conducted in the U.S. These surveys have included small subsamples of blacks which yield general information on black drinking patterns. Due to the small number and skewed geographical distribution of black respondents, they cannot be assumed to be reliably representative of the black population as a whole. In addition, because of differences in drinking measures, comparisons across different studies should be viewed with caution. Rates of drinking should be regarded as rough indicators for comparing differences between blacks and whites in the same study, and not as absolute measures of drinking patterns.

The 1964-65 national survey of drinking practices (Cahalan et al., 1969) included 200 black respondents. The study showed that black and white men varied little in their drinking patterns. Roughly, 30% of the men in both races abstained or drank infrequently, nearly 50% were in the light-to-moderate category, and about 20% of the men were heavy drinkers. However black women differed from white women both in their much higher proportion of abstainers (51% versus 39%) and in their higher rate of heavy drinkers (11% versus 7%).

In a study of problem drinkers based on a 1967 re-interview with a sub-sample from the 1964 national survey (Cahalan, 1970), blacks, along with those of Caribbean and Latin, ancestry showed among the highest rate of social-consequence drinking problems. Blacks also exhibited very high scores for measures of alienation, and maladjustment, and for unfavorable expectations regarding personal achievement and happiness goals.

Similar findings on the relatively high prevalence of black alcohol-related problems were described in a later study of problem drinking among American men (Cahalan and Room, 1974). The study combined two national samples (the data from 1967 with a new sample from 1969) with a total of 1561 adult males ages 21-59. The number of blacks in the sample was approximately 100. Blacks, along with those of Latin-American and Caribbean ancestry, showed the highest rates of heavy drinking. Blacks also exhibited among the highest rates of problem consequences from drinking. By controlling for socio-economic and other socio-demographic factors, black/white differences in the rates of black problems were considerably reduced. This finding suggests that high problems rates among blacks may be more a reflection of high risk social characteristics (e.g., poverty, residence in a large city, youthfulness) than of strictly racial or cultural factors.

In more recent national surveys, blacks have reported higher rates of abstention and similar rates of heavy drinking compared to whites. In a study of attitudes towards alcohol education campaigns (Rappaport et al., 1975) blacks were more likely than whites to classify themselves as abstainers (47% compared with 33%); both were equally likely to classify themselves as semi-abstainers (10%). Among those who reported drinking, about half (49%) of the blacks were classisfied as infrequent drinkers, compared with 40% of the whites. At the other extreme, 23% of blacks were classified as heavy drinkers, compared with 28% of whites.

Clark and Midanik's report (1982) on the 1979 national survey of drinking practices also showed higher rates of abstention among black males and females (30% and 49% respectively) when compared to white men and women (25% and 39% respectively).

The study showed that white men had considerably higher rates of very heavy drinking than blacks (21% versus 14%); while black women had higher rates of heavy consumption than white women (7% versus 4%). White men were twice as likely as black men to exhibit social problems as a result of drinking (6% versus 3%), although black and white women were quite similar on this measure (2% and 3% respectively).

Regional Surveys

Urban North

Studies examining black drinking patterns and problems in northern cities during the 1960's tended to show relatively high rates of heavy drinking and alcohol-related problems. However, most studies focussed on populations concentrated in high density, low socio-economic areas, which may limit their applicability to blacks in other settings.

A study of drinking patterns among adults in Western New York State (Barnes and Russell, 1977), showed that rates of heavy drinking were considerably higher than national rates for the sample as a whole, as well as for black respondents The study was based on personal interviews with 1039 respondents randomly selected to represent households in Erie and Niagara counties. Blacks were proportionately represented in the study, but the number of black respondents was quite small (N=59). The major differences between black respondents and others was the high proportion of blacks (35%) who were abstainers, when compared to whites (13%). However, rates of heavy drinking were very similar, 24% and 23% respectively for blacks and whites. The rates of heavy drinking recorded in this region for both groups were about twice the rates recorded in the 1964-65 National Survey (Cahalan et al., 1969). The difference was attributed not only to increases in the rate of heavy drinking over time, but to regional differences in drinking patterns. The Northeast is traditionally "wetter" than other areas; hence, in the 1964-65 survey this area exhibited higher rates of heavy drinking than for the country as a whole (19% versus 12%).

The comparatively "wet" patterns for New York State were replicated in a study of drinking patterns in the Boston area (Wechsler et al., 1978). A household survey of 1043 adults, including 112 black respondents, showed that generally there was a higher percentage of heavy drinkers than was found in Cahalan's national sample. Only about 17% of the total sample was classified as abstainers while 23% were described as heavy drinkers. Black and white males differed little in drinking patterns; about 13% of each group were abstainers, nearly half ranged between infrequent and moderate drinking, and 39% were categorized as heavy drinkers. However, black women had nearly double the rate of abstainers as white women (36% versus 17%, p .01). In contrast, the two groups of women exhibited very similar rates of heavy drinking, 11% and 12% respectively.

In one of the first epidemiological studies of "alcoholism" in a community setting (Washington Heights in New York City), Bailey et al. (1965) showed that blacks, particularly black women, are subject to higher rates of "alcoholism" (defined as excessive drinking and/or presence of difficulties and problems due to drinking) than whites. Rates per 1,000 population were 37 for black men as compared to 31 for white men. Black women, however, exhibited a rate four times that of white females (20 versus 5 per 1,000 persons). When the sex ratio of alcoholism was calculated by race, the ratio for whites was 6.2 men to 1 woman, while that for blacks was 1.9 to 1. The high rates of "alcoholism" among black women were attributed to a permissive culture for female drinking, and to the greater tendency of black women to head households and be the major breadwinners.

Higher rates for blacks as a whole were reported in a related study on problem drinking in New York City residents (Haberman and Sheinberg, 1967). Blacks had a rate of "implicative" or problem drinking which was twice the rate for white Protestants -- 105 versus 49 per 1,000 persons. The low sex ratio of problem drinking among blacks observed in the previous study was also reported. The sex ratio for whites was 4.0 men to 1 women, whereas for blacks it was 1.2 males to 1 woman.

A more recent survey (Weissman et al., 1980) of alcoholism prevalence in the New Haven, Connecticut area echoed the findings of previous studies. Alcohol problems and psychiatric symptoms were assessed in a longitudinal study of a mental health catchment area in New Haven. The final wave of data were collected from 457 whites and 53 non-whites that had also been interviewed during 1967 and 1969. Respondents were asked a series of questions from the schedule for Affective Disorders and Schizophrenia (SADS) and the Research Diagnostic Criteria for Alcoholism (RDC). On the basis of these measures, the point-prevalence and lifetime-prevalence of probable and definite alcoholism was considerably higher among non-whites than whites. The point prevalence of Probable + Definite alcoholism was 9.5 per 100 persons for non-whites and 1.8 per 100 persons for whites. The lifetime prevalence of alcoholism for non-whites was 18.9 per 100 persons and only 5.2 per 100 persons for whites. In general, alcoholism rates were highest among males, the lower social classes, middle-aged and older groups and divorced, single or separated persons.

Studies conducted in the St. Louis, Missouri area drew similar conclusions about high alcohol problems rates among blacks. Research on samples of men selected from elementary school records in St. Louis, revealed that heavy drinking was twice as common among blacks as among whites; and that problems from drinking were more than three times as common (Robins et al., 1968). Black men reported a broad range of legal, social, medical, and family problems due to drinking. About a third had a history of medical problems and family complaints; half reported personal concern about drinking excessively, and a fifth had either been arrested for alcohol-related offenses or had a public record of some drinking problem.

Unlike other studies, Robins et al. (1968) de-emphasized the relationship between social status and prevalence of drinking problems among black males. Instead, high problem rates were attributed to the greater frequency of unstable homes and juvenile delinquency among blacks. The authors failed to recognize that socio-economic factors invariably affect family lifestyle, school performance and other "predictors" of adult drinking problems.

A survey of housing project residents in St. Louis (Sterne and Pittman, 1972) reported very high rates of heavy drinking for a small sample of black men (50%) and very high rates of abstaining in black women (47%). No comparison group of white project residents was surveyed. However, when the findings were compared with survey results from groups of California blacks (see Berkeley 1960 and San Francisco 1962 samples below), St. Louis project males had considerably higher rates of heavy drinking, but women in both places exhibited high rates of abstention. Drinking patterns were found to be related to sex, church attendance, attitudes toward drinking, and to a lesser extent, age, socioeconomic status and some aspects of sociability. Little direct information on alcohol-related problems was collected in this study. However, "street drinking" health, and marital problems were discussed by project residents in another survey and in ethnographic interviewing.

In contrast to the high rates of heavy drinking and alcohol problems described for most black adults in the urban north, a study of drinking patterns of the black

elderly (Johnson, 1974) suggested this group may be at less risk for problems than younger blacks. In a study of the drinking patterns and health status of persons over 65 in the upper east side of Manhattan, considerably more blacks were described as being abstainers than whites, 51% and 37% respectively. Similarly blacks were about half as likely to report being frequent drinkers as whites (17% versus 32%). Among blacks and whites, those in good health were more likely to be drinkers than those in poor health.

Southern States

Very few studies have explored the drinking patterns of black adults in the South. Only three surveys were described in the contemporary literature, and two of these took place in Mississippi prior to 1965 when much of the state was under prohibition.

All three of the surveys report high rates of abstention among black respondents; rates which are somewhat higher than whites in the South and considerably higher than whites and blacks in other regions.

Globetti's survey of 108 black respondents in Mississippi reported that only 36% of the sample had used alcohol twice in the year prior to the study. (A comparable study showed about 44% of whites in Mississippi to be drinkers). Among blacks, 60% of the males and 76% of females were classified as abstainers. Of the drinkers, most drank infrequently (1-15 times per year) and in small quantities (1-2 drinks per sitting.)

Reasons for high rates of abstaining and low rates of drinking among blacks were attributed to the same socio-environmental factors that affect rates among whites. These include legal prescriptions against alcohol use and restrictive religious norms, and socio-demographic factors such as low levels of educational attainment and low socio-economic status.

High rates of abstention were also reported in a study of contrasting Mississippi communities (Windham and Aldridge, 1965). Blacks (N=183) and whites (N=395) were surveyed in a study of alcohol attitudes in two Mississippi communities -- one located in a Delta community where use of beer is permitted, the other in a completely "dry" hill community. In general, black rates of abstention (74%) were higher than white rates (67%). As expected, rates of drinking were higher for both blacks and whites in the more permissive Delta area than in the hill community. However, black rates of drinking were lower than respective rates for whites in each community.

Low rates of black alcohol consumption were again reported in a more recent epidemiologic study of drug use in a Florida county (Warheit et al., 1976). Although there are few racial differences in overall rates of drug use, there were significant differences in the use of alcohol by race. About 71% of the whites compared to 43% of the blacks reported using alcohol. Black males were more than twice as likely as black females to report drinking (61.3% versus 30%). There was less difference between white males and females (80% versus 60%).

Whites also reported using alcohol more frequently (frequent use was defined as use everyday, all of the time or often) than blacks. The race-sex differences were quite dramatic; 31% of the white males said they drank alcoholic beverages frequently compared to only 3% of the black females. About 20% of both white females and black males reported frequent use of alcohol.

The low rates of reported consumption by blacks was attributed to strong religious proscriptions regarding drinking, which would both inhibit actual drinking and also make drinkers less willing to report their use of alcohol.

The West

Data on black drinking patterns in California have been collected through a series of larger general population surveys dating from the early 1960's through the mid-1970's. The studies generally portray similarity in overall patterns of black and white drinking, except for higher rates of abstention among blacks, particularly women.

One of the first studies to report on black drinking practices in California took place in Berkeley in 1960 (Knupfer and Lurie, 1961). About 100 blacks were interviewed in a study involving a probability sample of the adult population of the entire city. Considerably more blacks were abstainers than whites (32% versus 20% of those interviewed). Black and white males exhibited similar rates of heavy drinking (28% and 29%, respectively), but significantly more white females were heavy drinkers than black females (15% as compared to 7%).

Similar results were obtained in a survey of drinking patterns in San Francisco in 1962. About 123 black respondents were included in the study. Again, a considerably greater proportion of blacks were abstainers when compared to whites (32% versus 21% of those interviewed) and significantly more white females were heavy drinkers than black females (15% as compared to 7%).

A later study (Cahalan and Treiman, 1976) of drinking patterns in a general population survey of San Francisco showed particularly low rates of heavy drinking, intoxication, and drinking problems among black respondents compared to white Protestants. Only 1% of blacks compared to 10% of white Protestants, were characterized as frequent heavy drinkers. Over half the black respondents (56%), but only a quarter (25%) of white Protestants, were described as infrequent drinkers or abstainers. Blacks were ranked considerably lower than white Protestants on alcohol problems indices such as high intake, symptomatic drinking, and loss of control. However blacks reported similar rates of marital problems as whites.

A more recent study of an all-black sample in San Francisco (Lipscomb and Trocki, 1981) found higher rates of heavy drinking than the Cahalan and Treiman study (1976) using a similar quantity-frequency measure of drinking patterns. The later study found that 7% as opposed to 1% of blacks interviewed were frequent-heavy drinkers. However, identically high rates of abstention and infrequent drinking were recorded for blacks in both surveys. The discrepancy in rates of heavy drinking observed in the two surveys could be due to increases in heavy drinking among blacks. However, the stability of abstaining and moderate drinking suggests that the differences may be due to the difference in sample bases in the two studies. The later study included a much larger number of blacks living only in black neighborhoods, and would be expected to give a broader range of variation in drinking patterns.

In contrast to the moderate rates of heavy drinking described for San Francisco blacks, a statewide study of California drinking patterns in 1974 with 83 black respondents (Cahalan, 1976, and Cahalan et al., 1976) showed comparatively high rates of heavy drinking among blacks. About 15% of blacks and only 9% of whites interviewed were heavy drinkers. Yet, as in earlier studies, blacks were considerably more likely to be abstainers than whites (29% versus 15%). Rates of problems were similar as a whole for blacks and whites (10% and 9%, respectively).

Black Drinking Patterns in Northern California

Between 1977 and 1980, a large-scale survey of black drinking patterns took place in the San Francisco Bay Area. The study was conducted through three surveys on random samples of the general population in three California counties. Personal interviews were conducted over a period of three years with a total of 4,510 adults between the ages of 18 and 59 years to evaluate a state funded alcohol problems prevention campaign (Wallack and Barrows, 1981). Combined samples included 1,206 persons who identified themselves as "Black, Afro-American or Negro." Data on substantial numbers of whites and Hispanics were also provided through the survey.

The results of the study permitted a more detailed analyses of the effect of social-demographic variation on black drinking patterns than had previously appeared in the literature (Caetano, 1984). At the aggregate level, the survey showed a picture of black drinking that was highly consistent with previous studies. Black and white males had almost identical rates of frequent heavy drinking, although black men were considerably less likely to be frequent high-maximum drinkers than white men. Black men were also more likely to be abstainers than white men. Hispanic men had lower rates of abstention and higher rates of frequent heavy drinking than men of the other two groups.

Black and Hispanic women exhibited much higher rates of abstention than white women. Women's drinking in all three ethnicities was concentrated in the occasional or infrequent categories. White women were more likely to be frequent drinkers in either the low or high quantity category than either black or Hispanic women. However, black women were more likely than white or Hispanic women to be classified as frequent heavier drinkers.

One of the major findings of the study which had not previously been reported in the literature, was that there are striking differences between the ethnicities in rates of heavy drinking for males according to age group. Among whites, frequent heavy drinking was concentrated among young males between 18-29 years old, but rapidly declined and stabilized after males reached the 30-39 year age group. Among black males, however, frequent heavy drinking was relatively uncommon in the younger age group, but rose dramatically for men between 30-39 years old. Rates of heavy drinking gradually declined mong middle-aged and elderly blacks. Hispanics showed a different pattern in which heavy drinking was very high in young men and in men aged 30-39. However, rates of heavy drinking declined substantially in late middle-aged and older Hispanics.

As previously noted, the prevalence of heavy drinking in older blacks may increase their vulnerability to physiological problems. The later onset of heavy drinking among blacks may be associated with more sustained patterns of high consumption than among whites, where heavy drinking is a short-term youthful phenomenon. This prolonged pattern of heavy drinking is associated with high risk for alcohol-related chronic diseases.

Black and white men exhibited similar rates of current alcohol problems, which were lower than rates reported by Hispanics. The highest ranked problem for men, regardless of ethnicity, was spouse or family concern about drinking. Health problems due to drinking ranked second among blacks, whites, and Hispanics. Very low rates of alcohol problems were recorded for women of all three ethnicities. However, black and Hispanic women were more likely than white women to report spouse or family member upsets due to drinking.

For all three ethnicities, the number of drinks per month and frequency of drunkenness were the strongest predictors of the number of drinking problems. For males, the prevalence of four or more problems paralleled differences in the peak ages of heavy drinking. Problem prevalence for white males was highest for men between 20-29 years, after which it declined sharply. Among blacks and Hispanics problems were low in young males and abruptly rose in the 30-39 group. Problem rates declined considerably for males over 40 and even more dramatically for those over 50.

In a separate analysis of black respondents using the same data set, additional insight was gained on specific factors influencing black drinking problems (Herd and Caetano, forthcoming). In general, the analysis revealed that socio-economic factors are less strongly associated with black drinking patterns than is true in the general population. The association of income, education and employment status with amount of drinking did not reach significance in a regression analysis on male drinking patterns. Only the variable of fundamentalist religious affiliation reached statistical significance -- and as might be expected, the association with drinking was negative. Among females, however, marital status (being married or living together) and being older, along with religious fundamentalism, were negatively associated with drinking. Employment was positively associated with drinking for women.

In general, the study concluded that internalized norms -- like religious beliefs and attitudes towards womens' roles and conduct -- may have comparatively more influence on black drinking patterns than socio-economic factors.

SURVEYS OF DRINKING PATTERNS AND PROBLEMS AMONG YOUTH AND COLLEGE STUDENTS

Studies of Adolescents

Until recently, the literature on black drinking practices argued that blacks were "precocious" in adopting lifestyles of heavy and problem drinking. Alcohol was believed to be pervasive in ghetto environments, leading to the early and widespread initiation of black youth into adult drinking patterns (Sterne and Pittman, 1972). These patterns were seen as a precursor to blacks' involvement in alcoholism treatment and contact with alcohol problems agencies at younger ages than whites (Robins et al., 1968).

However, surveys of youth in the general population have been consistent in showing that fewer black than white adolescents drink at all and that those who do drink, get drunk less often than whites, and have lower rates of heavy and problem drinking than whites.

Blane and Hewitt's review (1977) of the literature on adolescent drinking from 1960-1975 reported that most surveys of black youth showed that they were less likely to use alcohol or to experience problems related to drinking. Surveys of high school students usually indicated lower rates of lifetime and current alcohol use, lower drinking frequency, and lower rates of problem drinking. Similar findings were reported for black youth respondents in household general population surveys and in a study of selective service registrants. The results of studies on delinquent and problem youth were less consistent -- with some showing higher rates of heavy and problem drinking among blacks than whites. But even in this population, the review concluded that overall use rates were lower among blacks than white high school students.

Studies of adolescents published since this review continue to report lower rates of drinking among blacks. A national survey of drug use among the youth and adult population (Fisburne et al., 1979) found that black youths aged 12-17 were less likely to be current drinkers than whites (29% vs. 38%) and that the proportion of drinkers among blacks increased less over a 5 year period than among whites (10% vs. 14%). A nationwide survey of youth in secondary schools (grades 7-12) (Wilsnack and Wilsnack, 1978) found that black girls and boys were more likely to abstain than whites, Spanish American, or Native American youth across all grade levels. In grades 11-12, only 44.2% of black girls reported drinking in comparison to 67.7% of whites, 53.9% of Hispanics, and 61.2% of Native American girls. The same trend held for males. Only 63.3% of black males, compared to 80.4% of whites, 84.1% of Hispanics, and 72.3% of Native Americans were drinkers. Blacks also ranked low on mean quantity-frequency scores and scores of symptomatic drinking. Wilsnack and Wilsnack (1980) also reported that drinking was not as predictive for problems with achievement motivation or sense of responsibility among blacks, Jews, or Catholics, as among the majority population.

A recent analysis of a nationwide survey of senior high school students examined the drinking patterns of a representative sample of 496 black students (Harford et al., 1982). The results of the study showed that more black boys (34.3%) and girls (40.6%) abstained or used alcohol less than once a year than white boys (19%) or girls (23%). Blacks also reported higher rates of infrequent drinking than whites. Although the study found that black students' drinking levels were influenced by demographic factors (grade level, sex, geographical region) and academic performance, these factors failed to completely explain the difference between white and black drinking patterns. The study concluded that there are important stylistic differences between blacks and whites

in the use of alcohol and other drugs which relate to a delay in onset of drinking among black youth.

Youth and Criminal Offenses Related to Alcohol

Data on arrest rates for alcohol-related offenses for youth under 18 years of age offer strong support for the findings from general population surveys which show that black adolescents and high school students abstain more, drink less frequently, and drink lower quantities of alcohol. These data reveal that rates for blacks are currently far below those of whites, and that over time, rates for white youth have increased much more dramatically than rates for blacks.

In 1965, black rates for driving under the influence among those under 18 were about half those of whites (1.2 versus 2.8 per 100,000 population). Over the years, particularly after 1974, rates among both groups increased greatly, but increases for whites were much higher than for blacks. Between 1965 and 1979, the rate for blacks increased about ninefold (from 1.2 to 10.4 per 100,000 population), but in the white population, rates increased almost 20 times above their former level (2.8 to 54.8 per 100,000 population). Currently, rates for whites are about 6 times higher than in the black population, 46.8 and 7.2 per 100,000 population respectively.

Changes in arrest rates for liquor law violations show a similar pattern. In the mid-1960's, rates among white youth were about 2½ times in excess of rates for blacks, or 70.9 versus 23.0 per 100,000 population. Between 1965 and 1982, rates among blacks almost doubled; but they nearly tripled in the white population. In 1982 rates for whites were nearly 6 times those in the black population (218.8 versus 41.3 per 100,000 population).

Arrest rates for drunkenness exhibit a different pattern, yet they also illustrate the strong predominance of white relative to black alcohol-related offenses. Since 1965, black arrrest rates have fluctuated, showing modest increases in the late 1960's and early 1970's, but eventually declining to about half their initial level. In 1965, black arrest rates for drunkenness were 31.2 per 100,000 persons; yet by 1982 the rate had fallen to 17.9 per 100,000 population. In contrast, rates among whites have shown steady increases over time. By 1977, rates among whites had more than doubled, from 35.0 to 85.5 per 100,000 population. Since that time, white rates have declined but they remain considerably higher than rates for blacks, 60.7 versus 17.9 per 100,000 population.

Fig. 10 **U.S. Arrest Rates for Driving Under the Influence**
Persons Under 18 Years By Race
1965—1982

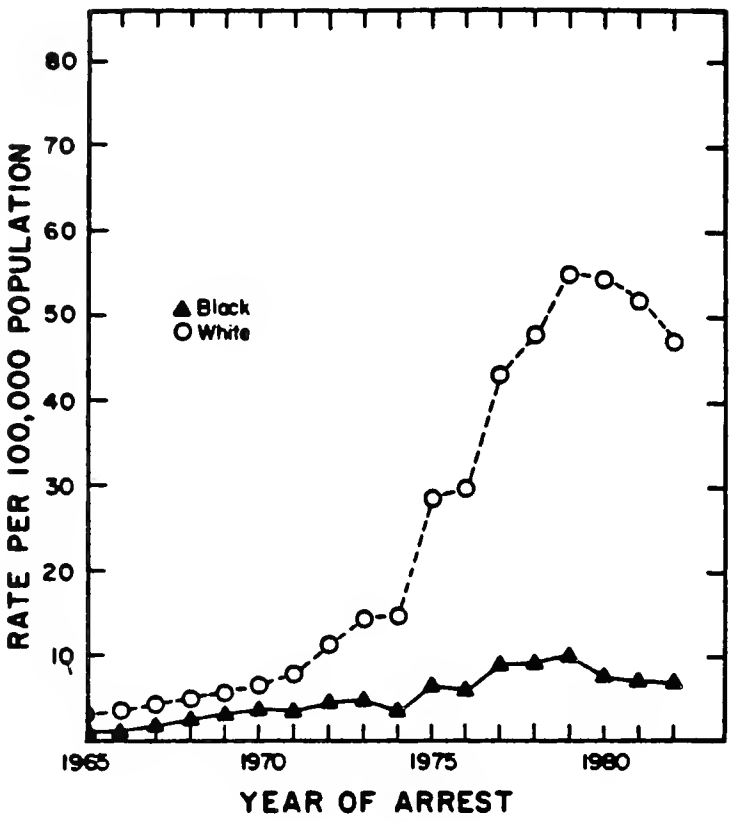
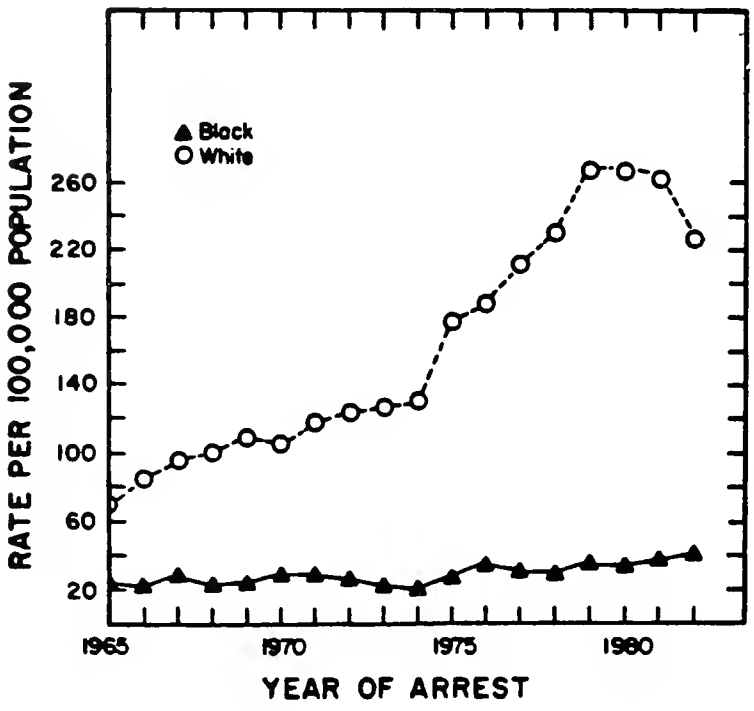
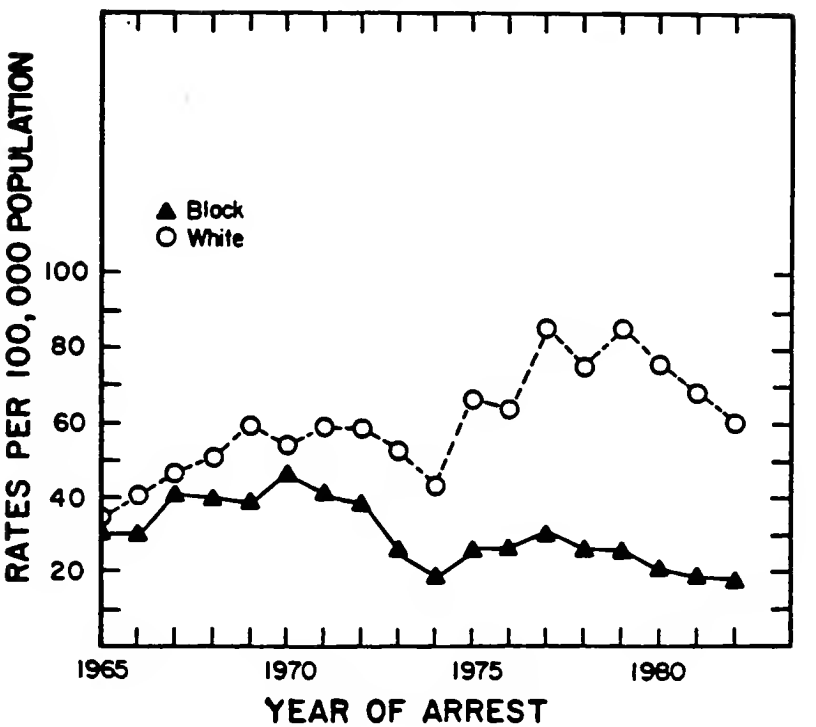


Fig. 11 **U.S. Arrest Rates for Liquor Law Violation**
Persons Under 18 Years By Race
1965—1982



Source: Uniform Crime Reports, Current Population Reports

Fig. 12 **U.S. Arrest Rates for Drunkenness**
Persons Under 18 years By Race
1965—1982



Source: Uniform Crime Reports, Current Population Reports

College Student Surveys

Earlier studies of college drinking indicated either that black and white males exhibited similar drinking patterns (Straus and Bacon, 1953) or that blacks were more likely to be heavy drinkers than whites (Maddox, 1968). Reported rates of problems and social complications due to drinking were similar between the two groups, although blacks were believed to be more "preoccupied" with alcohol and to experience more feelings of ambivalence and low self-esteem about drinking (Maddox and Borinski, 1964).

More recent studies, however, report findings that are consistent with the low rates of drinking described for black high school age youth. Eng's study (1977) of 13 colleges included 2 predominantly black colleges, leading to the inclusion of 194 blacks in the study. The findings revealed that considerably more whites (84%) than blacks (60%) drank and about three times as many whites as blacks appeared to be heavy drinkers. When the findings were broken down by sex, they showed moderate differences in overall rates of drinking and striking differences in rates of heavy drinking among males. More white men (86%) than blacks (72%) reported drinking at least once a year and over four times as many white men as blacks were classified as heavy drinkers, 22% versus 5%. Considerably more black woman were non-drinkers than white women (48% versus 18%); yet approximately the same percentage of white (5%) and Black (4%) women were reported to be heavy drinkers.

A survey of drug use (Strimbu, 1973) in a large southeastern university system echoed these findings. Overall, blacks were less likely to use alcohol and drugs than whites. Blacks in predominantly white schools were more likely to be drinkers than those in black schools.

The apparent shift in black college drinking patterns may be a reflection of several factors. First the change may reflect cohort differences in rates of heavy drinking, where drinking was more popular for youth in earlier decades. Second the shift may stem from changes in the socio-economic status of black college students as this population has expanded from a small well-to-do group in the 1950's to a more diverse group which includes middle and working class blacks.

NORMS AND VALUES REGARDING ALCOHOL USE

Afro-Americans like other Americans of Protestant and rural southern heritage, exhibit polarization in attitudes towards alcoholic beverage use. This polarization is evident in the disparate images which have emerged regarding black drinking. The first, drawing on popular stereotypes and anthropological studies of ghetto life (Hannerz, 1970; Liebow, 1967; Lewis, 1955) characterizes drinking and drunkenness as prominent and thoroughly integrated features of black life.

In contrast, other studies suggest that anti-alcohol attitudes are pervasive in the black population. Borker et al., (1980) found ambivalent, or even hostile attitudes towards alcohol use among lower and working San Francisco blacks from fundamentalist backgrounds. The study concluded that among blacks there may be many norms restricting the use of alcohol, and general acceptance of abstaining or drinking infrequently by community members.

A previous ethnographic study of a St. Louis lower income housing project (Sterne and Pittman, 1972) drew similar conclusions. The authors suggested that although alcohol was "near-successfully" integrated into black culture, liquor was negatively regarded and subject to ambivalent norms even among informants who were regular drinkers. They concluded that "consensus regarding alcohol use and consistency between drinking practices and attitudes is incomplete" (p. 653).

Support for both perspectives -- e.g. that black culture supports attitudes for patterns of heavy drinking and for abstaining -- is evident in the previous review of survey data and social indicators of drinking patterns and problems. The findings illustrate that a significant portion of the population abstains, but that heavy drinking and high rates of alcohol problems are prominent in some sub-groups.

A recent analysis by Herd (forthcoming a) suggested that the "two worlds" of drinking in black life stem from historical changes in the shift from the temperance-oriented values of the 19th century to the emphasis on liquor and the nightclub culture in the prohibition era. The Protestant church, especially its fundamentalist branches, has retained its sanctions against alcohol use and continues to be a force for abstinence in the black community. The orientation towards abstinence extends to church-based self-help groups and even to secular organizations for self-improvement (Borker et al., 1980).

The importance of religious values in shaping black perceptions of alcohol use are illustrated by the data from a recent anthropological study of black drinking patterns among urban blacks (Herd, 1980). Respondents from fundamentalist backgrounds reported a pattern of non-drinking by parents and female relatives. These informants reported that alcoholic beverages were seldom kept at home or served with meals, and were used only during holidays or special events. The respondents' current attitudes towards alcoholic beverage use was often quite ambivalent. Even among drinkers, alcohol was described as a potent and dangerous substance.

In addition to negative attitudes towards alcohol itself, negative attitudes towards drunkenness have been described as characteristic of blacks in anthropological studies (Borker et al., 1981; Sterne and Pittman, 1972). These studies report that there is great emphasis on maintaining control of oneself in drinking situations and minimizing social disruption due to drinking.

Although anti-alcohol sentiments are sanctioned and reinforced in many black social contexts, the focus on drinking establishments and alcohol use associated with the nightclub culture during and after prohibition has also left a lasting impression on black social life. Bars, taverns and nightclubs have retained an important place in black society because they provide a context for sociability, dancing and listening to music. Alcohol is intrinsically associated with these establishments, as it is with informal contexts -- such as house parties -- which have the same focus. In these settings, drinking alcohol is regarded as an important symbol of sociability and pleasure (Borker et al., 1980).

As a holdover from prohibition, liquor also plays a key role in the economy of black communities. Off-sale liquor establishments are regarded as one of the most viable forms of individual entrepreneurship available to blacks (Mosher and Mottl, 1981). The liquor industry views blacks as a primary market for distilled liquors, and thus is very visible through advertisements and promotional campaigns in local and national black publications.

SUMMARY

This review has examined a range of social indicators of alcohol problems among the U.S. black population. These include physiological consequences such as alcohol-related morbidity and mortality as well as pyscho-social indicators such as records on hospitalization or treatment for alcohol problems, arrest statistics, and self-reported social problems due to drinking.

The findings of the review illustrate that, except for the youth population, blacks are overrepresented on most indirect measures of alcohol problems. However, there is considerable variation in the level of disparity between blacks and whites on different types of problem indicators, and variation in whether indicators of specific problems have been declining or rising in recent years.

Medical problems associated with heavy drinking have increased very dramatically in the black population. Rates of acute and chronic alcohol-related diseases among blacks, which were formerly lower than or similar to whites, have in the post-war years increased to almost epidemic proportions. Currently, blacks are at extremely high risk for morbidity and mortality for acute and chronic alcohol-related diseases such as alcoholic fatty liver, hepatitis, liver cirrhosis, and esophageal cancer.

The literature has pointed out that heavy alcohol consumption, both in the past and the present are strong predictors of increases in alcohol-related diseases (Schmidt and DeLint, 1972; Skog, 1980; Bruun, et al., 1975). With reference to past alcohol consumption patterns, Herd's research (forthcoming b) has described the shift in black cultural attitudes towards alcohol which has lead to alcoholization in many urban black communities since the Repeal era. The significance of these historical shifts was affirmed in an epidemiological analysis which showed the importance of cohort changes in mortality patterns and demographic shifts -- such as urban migration -- in partially explaining the rise of liver cirrhosis among blacks. An analysis of contemporary black drinking patterns suggested that blacks may be at greater risk for physiological diseases due to a later onset and more prolonged pattern of heavy drinking than whites.

Aside from alcohol consumption level, other factors which may be important in explaining the high black rates of alcohol-related diseases have not been specifically explored. These include the possibility that high hepatitis rates, inferior nutritional status, and low socio-economic status may be leading to substantial increases in morbidity and mortality among blacks who drink heavily.

In contrast to the rise of medical problems related to alcohol use among blacks, reflected in a widening disparity of problem rates between blacks and whites, some social indicators have shown have shown a relative decline in black predominance and a convergence of black with white rates. This has been the case with statistics on arrests for alcohol-related offenses.

Arrests for drunkenness have decreased more substantially for blacks than whites, making the two groups more similar in rates than they were in the 1960's. Although black rates are still significantly higher than white rates, the disparity between the two groups has lessened greatly. Arrest rates for violation of liquor laws have also declined for blacks, but have increased in the white population, making rates between the two groups very comparable. Among both blacks and whites, arrest rates for driving while intoxicated have increased substantially, but the increase in white rates has been twice that of blacks. DUI arrest rates for blacks are now almost identical to rates for whites.

The decline of black predominance in arrest statistics seems to be related to general changes in the social and legal response to alcohol problems. These include the decriminalization of public drunkenness and expansion of alcohol detoxification and treatment centers. Legal responses refer in part to the increases in drinking and driving legislation and rise of grass roots anti-drunk driving movements. The changing legal response to alcohol problems have made white drinking drivers more vulnerable to arrest, thus helping to equalize black and white arrest rates.

Black Americans are currently overrepresented in the alcohol treatment system, particularly in the urban areas of the Northeast. The excess involvement of blacks in the alcohol treatment system is consistent with the high rates of psychiatric hospitalization for alcohol problems described for urban, migrant blacks in earlier decades. Within the current alcohol treatment system, blacks appear to be modestly overrepresented in programs emphasizing voluntary treatment for working or middle-class people such as employee assistance programs. In contrast they appear greatly overrepresented in programs designed for persons in the lower socio-economic strata, such as public inebriates.

The high proportion of blacks in the alcohol treatment system, particularly in agencies serving the poor and homeless, may be related in part to the general over-institutionalization of blacks in the mental health and criminal justice system. Blacks may be channeled into alcohol treatment agencies in a disproportionate manner due to their vulnerability to the legal system and to their lack of adequate socio-economic resources. Hence, alcohol treatment agencies may used to provide public welfare and employment rehabilitation services for economically marginal blacks, as much as to provide specific treatment for alcoholism.

When rates of excessive drinking and rates of self-reported drinking problems are examined for the black population, no consistent patterns of high alcohol consumption or high problems rates emerge for the group as a whole. Black drinking patterns appear heterogeneous and differ along lines similar to patterns reported in the general American population. Rates of drinking vary greatly by geographical region, sex, and religiosity. Rates of alcohol problems show similar variation, with rates particularly high in urban, ghetto areas.

There are however, important differences reported in black/white drinking patterns. Blacks differ from whites in consistently reporting higher rates of abstention, particularly among women, across all geographical regions. At the same time, the black population exhibits a lower male/female ratio for heavy drinking and alcoholism than the white population. Hence, black women appear at greater risk for alcohol dependency and associated problems than their white counterparts.

Another major difference in black versus white drinking patterns appears to be the ages of onset and termination of heavy drinking (Caetano, 1984). Among white males, heavy and problematic drinking is concentrated in the young, while among blacks this pattern is associated with early middle age. Accordingly, black youth report lower rates of drinking and drunkenness than whites and have extremely low rates of alcohol problems indicators such as arrests for alcohol-related offenses. Black males begin to report high rates of heavy drinking and social problems due to drinking after the age of 30. This pattern of later onset, if it leads to prolonged, heavy consumption, may put black males at greater risk for chronic diseases related to alcohol consumption such as liver cirrhosis and esophageal cancer.

Ironically, despite the fact that blacks appear to adopt heavy drinking lifestyles at older ages than whites, the treatment population of blacks with alcoholism and

similar disorders seems considerably younger than the white population. This dilemma has not been adequately addressed in the literature, but may stem from differences in the social and economic background of the treatment population when compared to the population of respondents in general population surveys.

RECOMMENDATIONS FOR INTERVENTION AND RESEARCH

Strategies for Intervention into Black Alcohol-Related Problems

The previous review and summary suggests that medical problems associated with heavy alcohol consumption present the area of greatest disparity in black/white alcohol problems indicators. Reducing morbidity and mortality from liver disease and cancer and other alcohol-related diseases should thus be a major focus of alcohol problems intervention and prevention in the black population. The following section will discuss direct and indirect approaches for decreasing problem prevalence in both clinical and non-clinical populations.

Prolonged heavy alcohol consumption is regarded as a key etiological agent in chronic liver disease (non-biliary cirrhosis), fatty liver, alcoholic hepatitis, and cancers of the esophagous and pancreas (Bruun et al., 1975; Turner et al., 1977). Epidemiological and clinical research has shown that heavy drinkers (persons consuming over 160 grams of alcohol per day) are at substantial risk for developing alcohol-related diseases (Lelbach, 1975, 1976; Pequignot, 1978). Reducing or eliminating alcohol consumption is thus regarded as the primary direct means of reducing incidence of these diseases or improving their prognosis once they have been diagnosed (Rankin et al., 1975; Hermos, 1984).

In clinical populations, reducing alcohol consumption has been attempted both through alcoholism treatment and through routine medical advice. Although both approaches are valuable, medical advice to cut down on drinking may be a more efficient means of reaching large numbers of the population. Medical advice has been shown to be effective in reducing alcohol-intake for persons diagnosed with liver disease (Hermos, 1984) and for persons with marital and social problems related to alcoholism (Edwards et al., 1977). Implementation of medical advice for reducing drinking would involve more emphasis on assessing patient drinking patterns and more systematic patient education about the effects of alcohol on the body than is currently accepted in medical practice.

Reducing and preventing alcohol problems in the general population is associated with lowering rates of per capita alcohol consumption through price controls, taxation, restriction in number of alcohol outlets and hours of sale, and raising the legal age of alcohol consumption (Beauchamp, 1980; Cook, 1983; Rankin et al., 1975). Several black communities in California have initiated efforts to reduce numbers of alcohol outlets to help alleviate crime and social problems in their communities (Wittman, 1980). These efforts could be enhanced by strengthing the power of local communities to regulate the number, type, and hours of sale of alcohol outlets within their bounds. However, placing controls on alcohol beverage outlets need to be augmented with other strategies since the relationship between alcohol outlets and disease prevalence is complex. The association of alcohol beverage outlets with cirrhosis rates has been shown to be greatly influenced by other factors such as urbanization and low socio-economic status (Tokuhata et al., 1971).

Other means of controlling alcohol availability such as taxation and age controls on drinking could not be implemented at the local level since they are under state or federal jurisdiction. In addition, these measures may not respond to the specific problems of alcohol availability experienced by blacks. For example, raising the age of alcohol beverage consumption is a measure to reduce alcohol-related problems among youth. Hence, this strategy would be inappropriate for significantly reducing black

alcohol problems since black youth are already at very low risk for problems, while those over 30 experience very high problem rates.

Economic factors may be a particularly important area to take into consideration when planning intervention strategies which address the special needs of the black population. Alcohol use appears to be more directly tied to economic factors among blacks than among other sectors of the population due to the limited economic base of most black communities. For example, alcohol outlets appear to be one the more viable forms of entrepreneurship available to blacks. These outlets were regarded as a good economic risk by the Small Business Administration -- in 1978 38% of alcoholic beverage loans and 50.9% percent of liquor store loans went to minority applicants compared with 18.9% of nonalcoholic beverage loans (Mosher and Mottl, 1981). Concerns about employment opportunities for blacks have made some politicians vocal in urging that more blacks be hired by the alcoholic beverage industry (e.g. the boycott against Budweiser beer led by Jesse Jackson to force the company to hire more blacks at the management level).

The problem of increasing blacks occupational association with alcoholic beverages is illustrated by Terris' (1967) epidemiological analysis which showed that persons in occupations where alcoholic beverages are regularly used or served (bartenders, waiters, retailers, workers in entertainment and recreational businesses) experience much higher rates of cirrhosis mortality than persons in other occupational groups. Reducing the occupational association of blacks with alcoholic beverages may thus be an important measure for intervening in alcohol-related diseases among blacks. This strategy requires an expansion of economic and social opportunities for blacks which could be facilitated in part by economic incentives that favor non-alcohol related businesses.

Blacks also appear to be a prime target for advertising by the alcohol beverage industry. Alcoholic beverage advertising specially tailored for black audiences is pervasive in all forms of black-oriented media. Although the relationship between alcohol beverage advertising, alcohol consumption, and rates of alcohol problems is complex, some research suggests that blacks account for a disproportionate share of the market for expensive brands of hard liquor (Bauer, 1964).

To counteract the effects of heavy alcoholic beverage advertising, alcohol education awareness needs to be fostered among the professional and lay black population. Political leaders, health professionals and the public at large have little knowledge of the extent to which blacks are affected by alcohol-related diseases. Nor is there adequate knowledge about the medical consequences of alcohol use. Public campaigns to facilitate awareness and knowledge about alcohol-related diseases may help prevent or facilitate early-case finding for these diseases among blacks.

Along with focussing on reducing alcohol consumption, raising the general health status of the black population may help reduce morbidity and mortality from alcohol-related diseases. The disparity in black/white mortality levels may be generated in part by high case fatality rates due to undernutrition, poor health status, and lack of access to medical care.

Differences in rates of hepatitis among blacks and whites may also influence the disparity in black rates for certain alcohol-related diseases. The presence of hepatitis B infection and antibodies or antigens seems to be associated with elevated risk for liver cirrhosis and liver cancer among heavy drinkers (Mills et al., 1972; Hislop et al., 1980; Brechot et al., 1982). Hepatitis appears endemic in lower income black areas due to overcrowding, poor health and sanitary conditions, and high rates of drug

abuse (Cherubin et al., 1972; Alter, 1983). Reducing the level of hepatitis by improving living conditions and medical care, and reducing the population of drug abusers may thus be important for intervening into the cycle of high rates of alcohol-related morbidity and mortality.

Implications for Research

Designing effective intervention and prevention strategies for health problems in a special population group requires a good knowledge base about the etiology of such problems in the particular population. For the most part, this kind of knowledge is lacking with reference to blacks. There are few in-depth studies which examine alcohol-related problems or diseases among blacks. Most existing analyses rely on studies with very small sub-samples of blacks or on data on blacks gleaned from aggregate statistics. Rarely do these studies provide enough information to understand the specific processes related to the development of alcohol-related problems.

Three broad areas of research need to be greatly expanded in the black population. First, more clinical and epidemiological studies on alcohol-related diseases need to be conducted. These studies are needed to provide insight into the contribution of alcohol consumption and other risk factors for disease. Establishing relative risks for consumption is important for determining safe levels of alcohol beverage use. Intervention strategies based on this kind of knowledge may be much more effective than the vague references to "moderate drinking" which are common in alcohol education campaigns.

Second, research data on blacks from alcohol problems reporting systems needs to be made more available. Although data on race and ethnicity may be collected in these systems, they are often omitted when the data are reported or analyzed. More complete data on the racial breakdown of alcohol-related accidents, suicides, treatment and hospitalization, and related topics are needed to assess the magnitude of black alcohol problems and plan interventions.

Third, much more research on the social and cultural factors influencing black drinking should be implemented. For example, the issue of age of transition into heavy drinking is a key problem in the literature on black drinking. Currently, blacks in early middle-age appear to be at high risk for social problems related to alcohol use. However it is not known whether this pattern is related to specific socialization or maturational features in black culture which delay age of drinking, or to "cohort effects" or historical events which make blacks in this age group more vulnerable to drinking. If this phenomenon is more related to cohort effects than to maturational differences in drinking, it may mean that high rates of heavy drinking will persist in the older age groups as this cohort ages. Knowledge about the social factors which influence age of drinking and patterns of socialization to drinking thus hold implications for the populations and the social forces to be addressed in intervention measures.

A related concern regarding the transition into heavy drinking involves the question of why blacks in alcoholism treatment are so much younger than whites. In contrast to the youthfulness of blacks in alcoholism treatment, numerous studies showed that black youth in the general population are, on the whole, at much lower risk for drinking, drunkenness, and arrests for alcohol-related offenses. Examining this issue has important implications for determining which youth populations are at risk for developing alcohol problems and designing appropriate strategies for intervention.

The drinking practices of black women are another major area of concern which has been little explored in the literature. Given the apparent polarization of female drinking patterns, and low ratio of male to female alcohol problems, research is needed to ascertain the socio-cultural factors associated with heavy drinking among black women. The special problems of intervening and responding to problems among women should also be addressed since the current literature is heavily biased toward male drinkers.

Finally, more knowledge is needed about black cultural values and social norms regarding alcohol consumption, alcohol problems, and health behavior in general. Prior studies have suggested that blacks' attitudes towards alcohol consumption are polarized and ambiguous. The implications of these findings for explaining drinking patterns, rates of alcohol problems, and community responses to problems need to be explored in greater detail. This knowledge can be used to formulate intervention strategies which are culturally appropriate and relate to the perceived needs of the black community.

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APPENDIX

Table 1

U.S. AGE-SPECIFIC DEATH RATES** FOR CIRRHOSIS OF LIVER
BY RACE AND SEX: ALL DEATH REGISTRATION STATES 1910-1978

ALL RACES, BOTH SEXES; 1910-1978

YEAR	TOTAL	25-34 Years	35-44 Years	45-54 Years	55-64 Years	65-74 Years	75-84 Years	85 Years and Over
1978	13.8	3.5	14.4	32.1	43.5	41.6	30.8	18.0
1977	14.3	3.8	15.3	33.8	45.4	42.6	30.2	16.9
1976	14.7	3.7	16.9	35.0	47.6	42.6	29.3	18.0
1975	14.8	3.8	15.7	36.0	49.0	42.8	29.0	16.9
1974	15.8	4.2	18.6	38.7	50.9	45.9	29.5	18.5
1973	15.9	4.2	19.4	39.1	52.5	44.6	28.8	19.9
1972	15.6	4.3	20.3	38.9	50.3	43.1	29.5	20.3
1971	15.4	4.2	19.4	38.4	50.1	43.4	29.6	22.0
1970	15.5	4.4	19.6	38.3	49.3	42.2	30.9	20.3
1969	14.8	4.3	19.0	36.5	47.7	40.9	28.8	21.8
1968	14.6	4.2	18.1	36.6	46.7	41.6	28.8	22.8
1967	14.1	4.0	17.2	34.8	45.7	41.1	27.4	22.8
1966	13.6	3.8	16.6	33.8	43.3	39.8	29.8	24.3
1965	12.8	3.5	15.0	31.9	40.1	38.0	29.9	21.7
1964	12.1	3.3	13.9	29.5	38.2	36.8	29.4	25.4
1963	11.9	3.3	12.7	29.9	36.4	37.6	29.5	26.1
1962	11.7	3.2	13.0	28.9	35.4	37.1	29.4	26.2
1961	11.3	3.1	12.3	27.5	34.2	35.7	30.1	25.9
1960	11.3	2.9	11.8	27.6	32.7	37.4	32.1	28.8
1959	10.9	2.8	11.5	26.1	31.8	34.9	33.0	28.6
1958	10.8	2.5	11.1	24.9	31.3	36.6	34.0	31.2
1957	11.3	2.9	12.1	25.6	33.0	38.2	35.3	32.3
1956	10.7	2.4	11.2	23.6	30.9	36.8	37.3	32.7
1955	10.2	2.1	10.5	22.8	28.8	36.1	35.9	37.0
1954	10.1	2.2	10.4	21.5	29.1	35.5	35.7	37.4
1953	10.4	2.3	10.7	23.0	29.9	34.7	38.8	37.8
1952	10.2	2.4	10.6	22.4	29.9	34.4	37.6	37.9
1951	9.8	2.3	10.1	21.1	28.7	34.0	38.7	40.6
1950[1]	9.2	2.1	9.3	19.1	27.2	33.8	36.9	39.0
1949	9.2	2.1	9.4	18.9	28.3	31.9	38.3	37.5
1948	11.3	2.4	11.0	23.3	33.5	40.8	52.9	60.7
1947	10.4	2.1	9.8	20.6	31.1	39.5	52.9	57.3
1946	9.6	2.1	9.0	18.7	28.5	36.3	49.2	52.8
1945	9.5	2.2	8.5	18.1	27.0	35.7	44.9	54.6
1944	8.6	2.0	7.1	15.3	26.3	35.6	47.8	49.1
1943	9.3	1.9	7.8	18.0	28.5	39.8	52.0	50.4
1942	9.4	2.1	8.5	18.5	29.1	39.2	52.0	51.2
1941	8.9	2.1	7.8	17.6	27.7	39.9	48.8	50.3
1940	8.6	1.8	7.2	16.5	27.8	39.2	51.8	60.0
1939	8.3	1.7	6.6	15.5	27.8	40.3	55.6	58.6
1938	8.3	1.7	6.9	16.2	27.1	40.7	58.3	54.9
1937	8.5	1.7	7.2	17.0	28.3	41.3	59.4	57.3
1936	8.3	1.7	7.1	15.8	28.8	41.6	57.7	66.7
1935	7.9	1.6	6.4	15.7	27.3	41.5	60.2	60.3
1934	7.7	1.8	6.4	15.1	27.2	40.4	60.1	52.8
1933	7.4	1.6	5.9	14.3	26.9	41.9	59.9	58.1
1932	7.2	1.4	5.7	14.0	26.1	41.2	58.4	57.6
1931	7.4	1.7	5.9	14.8	26.8	42.2	59.4	68.1
1930	7.2	1.5	6.1	14.0	26.8	43.0	57.5	64.4
1929	7.2	1.5	6.3	14.5	26.1	43.8	57.1	69.5
1928	7.5	1.6	6.4	15.0	27.7	46.3	63.6	68.3
1927	7.4	1.5	5.9	14.4	26.7	48.8	66.6	76.0
1926	7.2	1.6	5.6	13.7	27.8	44.0	71.2	77.6
1925	7.2	1.4	5.8	14.1	27.5	46.1	71.7	83.8
1924	7.3	1.5	5.2	15.3	27.1	50.2	64.8	84.9
1923	7.1	1.2	4.9	14.0	27.5	49.7	73.1	96.8
1922	7.4	1.4	5.1	13.7	28.9	52.6	78.8	99.7
1921	7.3	1.4	4.4	13.2	29.9	54.4	78.6	84.5
1920	7.1	1.3	4.5	12.9	28.1	53.2	78.2	76.6
1919	7.9	1.4	5.8	15.4	34.4	55.3	83.7	73.2
1918	9.6	2.4	8.5	19.2	38.4	60.9	80.9	74.0
1917	10.9	2.7	10.3	24.6	43.2	66.9	90.6	81.1
1916	11.8	3.7	11.9	25.8	48.1	70.3	89.2	78.7
1915	12.1	3.5	12.2	26.7	46.7	73.1	90.6	86.2
1914	12.4	3.6	13.3	29.5	45.4	76.9	95.2	76.1
1913	12.9	3.8	14.3	30.0	49.5	80.1	86.5	77.2
1912	13.1	3.9	14.0	29.7	53.2	78.8	94.0	75.8
1911	13.6	4.3	14.4	32.5	52.6	82.8	100.0	75.9
1910	13.3	4.3	14.7	31.4	54.2	77.0	86.6	77.2

** Death rates are per 100,000 resident population for specified groups.

[1] Based on enumerated population adjusted for age bias in the population of races other than white.

Source: Malin, et al (1980)

Table 2: U.S. Arrest Rates for Drunkenness, Per 100,000 Population, Persons Age 18 Years and Over, By Race, 1965-1982

Year	Blacks	Whites
1965	2741.9	949.3
1966	2430.4	922.7
1967	2650.9	917.4
1968	2215.2	849.8
1969	2192.4	841.3
1970	2192.1	872.3
1971	2085.9	841.4
1972	2005.0	778.5
1973	1717.4	666.2
1974	1261.2	499.2
1975	1488.4	652.9
1976	1330.6	593.9
1977	1355.1	672.8
1978	1231.1	615.3
1979	1085.0	603.4
1980	948.7	570.8
1981	928.7	592.2
1982	885.9	557.0

Source: Arrest Statistics -- Uniform Crime Reports, Federal Bureau of Investigation, 1965-1982.

Population Data -- Current Population Reports, Series P-25, Nos. 321, 352, 385, 416, 441, 721, 870, 929.

Note: For years 1965 and 1966 the population base for blacks was the "non-white" population. For years 1968 and 1969 the population base for black females included non-whites.

Table 3: U.S. Arrest Rates for Driving Under the Influence, Per 100,000 Population, Persons Age 18 Years and Over, By Race, 1965-1982

Year	Blacks	Whites
1965	303.5	168.6
1966	330.6	175.9
1967	395.6	190.4
1968	386.6	207.1
1969	448.3	231.7
1970	509.3	262.4
1971	580.5	295.8
1972	700.5	380.1
1973	711.7	408.7
1974	617.6	382.0
1975	781.9	567.0
1976	755.1	505.8
1977	902.8	672.3
1978	916.6	701.5
1979	910.3	737.9
1980	829.4	767.7
1981	884.8	831.8
1982	813.4	808.2

Source: Arrest Statistics -- Uniform Crime Reports, Federal Bureau of Investigation, 1965-1982.

Population Data -- Current Population Reports, Series P-25, Nos. 321, 352, 385, 416, 441, 721, 870, 929.

Note: For years 1965 and 1966 the population base for blacks was the "non-white" population. For years 1968 and 1969 the population base for black females included non-whites.

Table 4: U.S. Arrest Rates for Liquor Laws Violation, Per 100,000 Population, Persons 18 Years and Over, By Race, 1965-1982

Year	Blacks	Whites
1965	231.0	80.3
1966	202.6	89.5
1967	214.7	95.3
1968	163.2	98.8
1969	167.8	96.5
1970	139.5	88.4
1971	143.6	89.6
1972	145.6	84.4
1973	126.0	68.6
1974	104.1	71.7
1975	125.7	103.0
1976	163.4	120.4
1977	145.6	126.7
1978	144.6	143.5
1979	134.3	155.0
1980	141.7	179.6
1981	172.4	192.0
1982	184.6	166.2

Source: Arrest Statistics -- Uniform Crime Reports, Federal Bureau of Investigation, 1965-1982.

Population Data -- Current Population Reports, Series P-25, Nos. 321, 352, 385, 416, 441, 721, 870, 929.

Note: For years 1965 and 1966 the population base for blacks was the "non-white" population. For years 1968 and 1969 the population base for black females included non-whites.

Table 5: U.S. Arrest Rates for Drunkenness, Per 100,000 Population, Persons Under Age 18 Years By Race, 1965-1982

Year	Blacks	Whites
1965	31.2	35.0
1966	30.0	40.7
1967	41.3	46.1
1968	39.6	50.5
1969	38.7	59.9
1970	46.2	54.2
1971	41.3	59.3
1972	37.2	57.9
1973	26.2	52.3
1974	18.7	44.5
1975	26.7	66.3
1976	26.6	65.6
1977	30.3	85.5
1978	26.3	75.2
1979	25.8	81.6
1980	20.6	75.3
1981	18.3	67.3
1982	17.9	60.7

Source: Arrest Statistics -- Uniform Crime Reports, Federal Bureau of Investigation, 1965-1982.

Population Data -- Current Population Reports, Series P-25, Nos. 321, 352, 385, 416, 441, 721, 870, 929.

Note: For years 1965 and 1966 the population base for blacks was the "non-white" population. For years 1968 and 1969 the population base for black females included non-whites.

Table 6: U.S. Arrest Rates for Driving Under the Influence, Per 100,000 Population, Persons Under 18 Years, By Race, 1965-1982

Year	Blacks	Whites
1965	1.2	2.8
1966	1.2	3.5
1967	1.9	4.2
1968	2.3.	4.7
1969	2.8	5.8
1970	3.4	6.6
1971	3.2	8.0
1972	4.2	11.7
1973	4.4	14.3
1974	3.7	14.3
1975	6.5	28.4
1976	6.1	29.4
1977	9.2	43.1
1978	9.6	47.9
1979	10.4	54.8
1980	8.0	54.4
1981	7.3	52.5
1982	7.2	46.8

Source: Arrest Statistics -- Uniform Crime Reports, Federal Bureau of Investigation, 1965-1982.

Population Data -- Current Population Reports, Series P-25, Nos. 321, 352, 385, 416, 441, 721, 870, 929.

Note: For years 1965 and 1966 the population base for blacks was the "non-white" population. For years 1968 and 1969 the population base for black females included non-whites.

Table 7: U.S. Arrest Rates for Liquor Laws Violation, Per 100,000 Population, Persons Under 18 Years, By Race, 1965-1982

Year	Blacks	Whites
1965	23.0	70.9
1966	21.4	85.3
1967	27.3	95.4
1968	22.6	103.4
1969	23.8	110.5
1970	27.8	106.6
1971	27.7	119.4
1972	25.8	122.7
1973	22.1	122.0
1974	20.6	131.3
1975	27.3	179.3
1976	33.3	187.3
1977	29.0	211.4
1978	29.8	229.5
1979	33.9	257.3
1980	32.4	259.0
1981	37.4	254.2
1982	41.3	218.8

Source: Arrest Statistics -- Uniform Crime Reports, Federal Bureau of Investigation, 1965-1982.

Population Data -- Current Population Reports, Series P-25, Nos. 321, 352, 385, 416, 441, 721, 870, 929.

Note: For years 1965 and 1966 the population base for blacks was the "non-white" population. For years 1968 and 1969 the population base for black females included non-whites.

Chemical
Dependency

Patterns and Problems of Drinking Among U.S. Hispanics

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Introduction

Drinking and alcohol-related problems are patterned by a number of characteristics of the user. Men drink more than women, the young drink more than the old, in the U.S. northeners drink more than southeners. Cultural norms and values associated with different ethnic groups in the U.S. also influence alcohol use and the level of alcohol problems in these groups. Alcohol research has paid considerable attention to the way in which these cultural traditions shape drinking behavior and there are by now many papers describing the relationship between ethnicity and alcohol consumption. This body of research contains overwelming evidence attesting to the many ways in which drinking practices are shaped by folkways. However, most of the available evidence describes alcohol use among Jews Italians and Irish-Americans (Bales, 1946, 1962; Snyder, 1958; Lolli, 1958; Knupfer and Room, 1967).

In contrast to the amount of available information regarding drinking by these American ethnic groups, little is known about alcohol use and the prevalence of alcohol problems among Hispanics in the U.S. The available data suggest that this ethnic group has a high proportion of heavy drinkers, drunkenness and alcohol-related problems and that as such Hispanics should be singled out as a target group for prevention interventions (Cahalan and Room, 1974; Caetano, 1984a, 1984b). However, the design of effective prevention strategies requires the identification of specific target groups as defined by, for instance, major sociodemographic characteristics as well as the identification of specific problems to be prevented. This is especially true of U.S. Hispanics, who form a very hetergeneous group with people from various nationalities and with different social and cultural backgrounds.

As a whole Hispanics comprise 6% of the American population. Mexican-Americans are in majority, constituting 60% of all Hispanics. Puerto Ricans comprise another 15%, Cuban-Americans, 6%, and "other" Hispanics 20% (Bureau of the Census, 1981). Perhaps the most marked contrast among these groups in terms of socioeconomic status and migration history occurs between Cubans and Mexican-Americans. The first wave of Cuban immigration to the U.S. occurred mainly because of political reasons and the immigrants were mostly of middle-class background. Subsequent immigrants have a more mixed class background and have also come for economic reasons. Mexican-Americans have been coming to the U.S. mostly for economic reasons, and are from the lower socioeconomic stratum of rural and urban areas of Mexico. Puerto Ricans also come to the U.S. for economic reasons and are, at least in this respect, closer to Mexican-Americans than to Cubans. The "other" Hispanic group is difficult to characterize. It is formed by people who come from all the other countries of Central and South America. Some have come to the U.S because of political persecution. Others have come for economic reasons. They have diverse cultural origins, as can be exemplified by the case of Brazilians, who are sometimes included in this group but have a different language, different colonial history and markedly different cultural traditions from the rest of the people from South and Central America. The importance of this heterogeneity for research has been stressed (Hernandez et al., 1973; Hayes-Bautista, 1980; Aday et al., 1980). It should be kept in mind as the findings from alcohol research among Hispanics are examined, since results are always given for Hispanics as a whole as if this was a homogeneous group.

This report examines the alcohol literature on U.S. Hispanics in hope that such review will provide enough information to recognize target groups and target problems for which specific prevention interventions can be proposed. With this objective in mind, this report was developed according to the following plan. The first section examines epidemiological data in the areas of mortality, traffic accidents, arrests, and

treatment for alcohol-related psychiatric conditions or alcoholism among Hispanics. The second section reviews studies of drinking patterns and prevalence of alcohol-related problems in the community. In this section special attention is given to the results of a recent analysis of alcohol use and prevalence of problems among Hispanics living the San Francisco Bay Area. The final section presents the conclusions, suggests future lines for research and proposes policy and prevention strategies to minimize alcohol problems among U.S. Hispanics.

Indirect Indicators of Alcohol-Related Problems: Mortality, Arrests, and Treatment for Alcohol-Related Problems

Any attempt to portray alcohol-related problems among Hispanics in the U.S. with the use of indirect indicators will face considerable difficulty. The alcohol literature has very few examples of such attempts (Alcocer, 1979; Hall et al., 1977) and these do not cover more recent data. Official publications are incomplete with regard to their coverage of ethnicity, and they usually concentrate on social rather than health indicators. Griffith (1980) reports that updated coverage for this group at the national level is being implemented by a number of federal agencies in response to Public Law 94-311. This law was passed on June 16, 1976 and mandates the Departments of Commerce, Agriculture, Labor, and Health, Education and Welfare to improve and expand statistical coverage for Hispanics in the U.S. The 1981 report from the F.B.I. on Crime in the United States reports nationwide statistics on alcohol-related crimes by persons of Hispanic origin for the first time and these data are discussed below (F.B.I., 1982). The future may bring other improvements to this situation. Meanwhile, the statistics below give some indication of the extent to which alcohol-related problems affect the Hispanic group.

Mortality Data

The association between alcohol intake and mortality is usually assessed by statistics on cirrhosis mortality, although other causes of death such as suicide, traffic fatalities, certain cancers of the upper digestive tract, and deaths with alcohol-related psychiatric diagnoses also hold a close association with heavy alcohol ingestion. However, alcohol-related mortality statistics offer a limited coverage of the Hispanic population in the U.S. Regular publications on mortality statistics for the U.S., for instance, do not recognize Hispanics as a racial or ethnic group. As a result, a search for mortality data for the U.S. as a whole on this ethnic group resulted in failure. Some of the available information comes from regional studies (usually in counties of states with large Hispanic populations) and therefore have limited applicability. Mortality statistics produced for the U.S. as a whole are still divided into White and Non-White, or into racial or ethnic groups such as Black, Indian, Chinese, Japanese. The existing literature - no more than a handful of papers - covers the Hispanic population of the Southwest, mostly Mexican-Americans living in Texas and California. Other reviewers have commented on these difficulties. In a recent report on general mortality among minority populations, Markides (1983) limited his discussion of research results to the experience of this same group of Hispanics in the Southwest, since this was the only group for which information was available.

Edmandson (1975), for instance, reports findings from a study of autopsies performed at the University of Southern California's Medical Center in Los Angeles County. Analyzing data collected at several points in time between 1918 and 1970, he reports a sharp rise in alcohol-related deaths (no definition for alcohol-related is given) between 1950 and 1970 affecting all ethnic groups in the study. The increase for Mexican-Americans is the sharpest and alcohol-related deaths in this group rose

from approximately 4% of all autopsies in 1950 to 18% in 1970. Among Mexican-American men 30 to 60 years of age, this group of deaths is responsible for 52% of all deaths, and among Mexican-American women in the same age span for 20% of all deaths. Still in the same age group, the proportion for White men and White women is 24% and 23%, respectively; for Black men it is 22% and for Black women, 21%. The increased rate of deaths associated with alcoholism among Mexican-Americans is confirmed in another study by Edmanson (1976, cited in Hall et al., 1977). Data on another series of autopsies covering the period from 1970 to 1976 shows that while the proportion of alcoholism deaths is 20% of all deaths in men and 10% of all deaths in women in the general population of California, among Mexican-American men the percentage is 26%, and among Mexican-American women 7%. Among other Whites the proportions are 19% in males and 12% in females.

Taken together, the results reported by Edmandson suggest that the proportion of alcohol-related deaths in all deaths among Hispanics increased rapidly from 1918 up to 1970 and declined thereafter. Whether these changes reflect reality or some artifact of methodology is difficult to say. The data for Edmandson's first series, 1918 to 1970, come from testimony to the Subcommittee on Alcoholism of the State of California. This is not a formal paper and it does not give much information as to how the data were collected. Hall's discussion of the second series of autopsies, 1970 to 1976, does not provide information as to the comparability of data collection procedures and data analysis between the two studies.

Moustafa and Weiss (1968, cited in Schreiber and Homiak, 1981) report a cirrhosis death rate for Hispanics of San Antonio, Texas equal to 11/100,000 population, while the rate for Anglos was 9.7/100,000 population. Engmann (1976) reports on alcohol-related deaths (alcohol-dependence, alcohol psychosis, and cirrhosis of the liver attributed to alcohol) among Hispanics in California for the years 1970-1974. In this time span alcohol-related deaths for Hispanics varied from 14% of all alcohol-related deaths for all races in 1970 to 15% in 1971, to 14.5% in 1974. Since the proportion of Hispanics in the state population was 15% at the time, there is no overrepresentation of Hispanics among all alcohol-related deaths occurring in the state. When broken down by sex, Engmann's data show that Hispanic men are equally represented (15%) both among alcohol-related deaths which occurred between 1970 and 1974 and in the state's population of 1970. Hispanic women are underrepresented among those who died of alcohol-related deaths. Their rate ranged from 6.9% to 10.4% between 1970 and 1974, while according to the 1970 Census they comprised 15% of California's female population. When the alcohol-related deaths among Hispanics are examined by age, a greater proportion of the deaths in this population occur at younger ages than would be expected. In the general population, 3.7% of all alcohol-related deaths are in the 21-34 age group; among Hispanics the proportion is twice as high, 7.4%. The 35-44 age group accounts for 19% of all alcohol-related deaths in the general population, while among Hispanics the proportion is 31%.

Results of a study by Burns (1983) with mortality data for Los Angeles County confirm the Edmanson and Engmann findings. Areas of the county predominantly populated by Hispanics (Central Los Angeles and East Los Angeles-Highland Park) have the highest rates of alcohol-related mortality. The relationship between alcohol use and problems is further confirmed by Burns in an analysis of the relationship between mortality and number of alcohol outlets available in the community. In West San Fernando Valley, an affluent area of the county predominatly populated by Whites, the alcohol-related mortality rate is 1.23 deaths per 10 000 population and there is one outlet per 871 residents. In Hispanic East Los Angeles, the death rate is almost three times higher, 3.14, and there is one outlet for every 500 residents. In Central Los

Angeles the death rate is even higher, 4.68/10,000 population, and there is one outlet per 400 residents.

Finally, the association between alcoholism and violent death was studied by Haberman and Baden (1974) in a sample of 1,000 violent, sudden, medically unattended deaths in New York City. The deaths comprised those investigated by the city's Office of the Chief Medical Examiner from February 14 to April 11, 1972. Decedents were classified as alcoholics by means of information collected from relatives or by autopsy findings. Of the 1,000 decedents, 30% (297) were identified as alcoholics. Approximately 9% of the sample (88 individuals) had been born in Puerto Rico and about 10% of those diagnosed as alcoholics had the same origin.

Alcohol-Related Arrests

Numerous studies have revealed higher arrest rates for drunk driving and public drunkenness than expected for Hispanics. May and Baker (1974) report a randomly selected sample of 200 traffic accidents which occurred between 1972 and 1973 in ernadillo County, New Mexico. Out of 4,000 alcohol-related accidents which occurred in 1972 and 1973, 200 were randomly selected for the study. The results show that Hispanic drivers are overrepresented. While Hispanics comprise 39% of the county's population, their percentage of accident drivers is 46%. Similar results are reported for Kern County, California (Kern County Department of Mental Health Services, 1974). While this ethnic group comprised 17% of the county's population, their proportion of those arrested for an alcohol offense was 28%. Alcocer (1979) also reports high rates of alcohol-related arrests for areas of Los Angeles with predominantly Hispanic populations. Reviewing Los Angeles Police Department data for traffic accidents which resulted in injury or fatality, he found that while Anglo neighborhoods have rates of .92%, areas where Hispanics are a majority have rates of 1.32%. The rate for drunk driving arrests (felony and misdemeanor) in the Hispanic area is 1.3%, against .91% and .71% for Anglo areas. Speiglman (1984) analyzing 1979 data on alcohol-related arrests in Fresno County, California, informs us that Hispanics (mainly Mexican-Americans) comprised 60% of all persons arrested for public drunkenness while their proportion in the county population according to the 1980 Census was 30%.

Examining data for California, Engmann (1976) reports that in 1974 Hispanics accounted for 21% of all arrests for drunk driving and for 27% of all arrests for public drunkenness. Once again they are overrepresented, since the proportion of the state's population identified as belonging to this ethnic group was not more than 16% at that time. Statewide data on alcohol-related arrests in California during 1980, as reported by the state's Department of Justice (1980), confirms Engmmann's findings About 33% of those arrested for drunkenness and 28% of those arrested for drunk driving are Hispanics compared to 19% of those in the state's population. Among those arrested for public drunkenness, the Hispanic group comprises twice their share of the population, while among those arrested for drunk driving 1.8 times their share.

National data on alcohol-related arrests as reported by the F.B.I. confirm the higher rate of arrests among Hispanics when compared to non-Hispanics (F ¯ .I., 1982). Arrests for driving under the influence, liquor law offenses and drunkenness are the source of 43% of all arrests among Hispanics 18 years of age and older, while in the non-Hispanic group this proportion is 33% (Table 1). The proportion of all arrests represented by arrests for driving under the influence and liquor law violations is similar for Hispanics and non-Hispanics, but Hispanics are twice as likely to be arrested for

drunkenness as non-Hispanics. Among those 18 years of age and older, arrest rates[1] for driving under the influence are twice as high among Hispanics as among non-Hispanics (Table 2). Arrest rates for drunkenness are three and a half times higher for Hispanics than for non-Hispanics. In group under 18 years of age the largest difference between the two groups in Table 2 is for the arrest rate for drunkenness: Hispanics have a rate which is almost four times higher than that for non-Hispanics. Rates for DUI are similar between the two groups, while arrest rates for liquor law violations are higher among non-Hispanics than Hispanics.

However, there is controversy over whether the overrepresentation of Hispanic individuals among drunk driving arrests represents a greater prevalence of drunk driving behavior or police bias against this ethnic group. Morales (1970) studied alcohol-related arrests in two areas of Los Angeles: East Los Angeles, which is 50% to 60% Hispanic, and West Valley, which is 95% Anglo in population. Although these two areas have approximately the same population -- 260,000 inhabitants -- East Los Angeles had 6 times more alcohol-related arrests (9,676 versus 1,552) in 1968. Morales charges that such differences do not arise from high levels of alcohol consumption by the East Los Angeles population but from differences in police enforcement of alcohol-related laws in the two areas. According to him, although East Los Angeles has half the square mileage of the West Valley (26 versus 54) and the same major crime rate (1.4% versus 1.3%), it has four times more police officers per square mile (13.5 versus 3.5).

Contrary to Morales, Hyman (1968) and Hyman et al. (1972) in their study of drunk driving arrests in Santa Clara County, California, and Columbus Ohio report that they could not find evidence of police discrimination against Hispanics. In Santa Clara County the proportion of Hispanic men among those arrested for drunk driving in a 6 month time span in 1962 was 21%, or twice the proportion of Hispanics in the county's population in the 1960 Census. According to Hyman et al. (1972) police bias would be present if a large proportion of Hispanics arrested had a lower blood alcohol concentration or a lower rate of accident involvement than "Others" arrested. This was not the case. Hispanics had the same level of blood alcohol concentration as the "Others" and had higher rates of accident involvement than Whites, 40% versus 30%. Hyman's conclusion is based on the assumption that a similar distribution of BAL results for Hispanics and other groups would indicate that police enforcement of drunk driving laws affects all the groups studied equally. This assumption, however, does not take into account a scenario where police enforcement would be unbiased but police surveillance would not. That is, while enforcing drunk driving laws equally across ethnic groups police could still have a higher number of offices patrolling Hispanic neighborhoods. Also contradicting Morales is Gordon's (1979) report of apparent police tolerance of drunk driving and public drunkenness in a Hispanic neighborhood. This account comes from Gordon's experience of law enforcement in a New England city with a large Hispanic community, most of whom had come from Santo Domingo.

In New Haven, and contrary to what seems to be a California experience, Abad and Suarez (1974) reveal that Puerto Ricans are underrepresented among the alcohol-

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1. Population denominators for these rates were taken from the 1980 Census (Bureau of the Census, 1981). The base for the rates among those less than 18 years of age should use the population 13 to 17 years old. This is the population responsible for most the offenses in this age group. However, census figures for Hispanics can only be grouped for those 10 to 19 years of age, and this is the denominator used in the calculation.

related arrests. Thus, of the 3,600 arrests for public intoxication in 1971, only 4.7% were Puerto Ricans, while their representation in the population was 8.7%.

Admission for Alcoholism Treatment

The proportion of Hispanic persons receiving treatment for "alcoholism" varies according to the source of data, the type of facility being considered, and the region of the country. Until some years ago, data on alcohol-related admissions to mental hospitals were the primary indicators for studying the demographic characteristics of individuals in treatment. With the phasing out of the mental hospitals, and the development of a diversified system of treatment facilities for alcoholism other than psychiatric wards, these statistics became less valid. Some states, California for instance, stopped publishing statistics on alcohol-related admissions to psychiatric hospitals altogether, since the proportion of individuals receiving treatment with such diagnoses has been minimal in the last 10 years (Cameron, 1981).

However, some recent U.S. government special publications have analyzed these kind of data with reference to minority groups. Table 3 shows admissions with drug and alcohol-related disorders in different types of psychiatric facilities for the year of 1975 (American Public Health Association, 1982). The proportion of Hispanic individuals in treatment varies dramatically according to the facility under consideration. It is as low as 6% in outpatient services, but rises to seven times that in State and County mental hospitals. When compared to Whites and Blacks, there seems to be a concentration of Hispanic persons both in these latter type of institutions and in private mental hospitals. Why there should be more Hispanics than Whites in private mental hospitals is difficult to explain. The contrary would be expected because of the differences in socioeconomic status between these two groups. It is quite possible, however, that the difference stems from the type of facilities covered by the data in the table.

A more recent and more specific indicator of clients receiving treatment for alcoholism are the data depicted in Table 4. The information comes from the State Alcoholism Profile Information System - and was collected by the National Drug and Alcoholism Treatment Utilization Surveys -- NDATUS (SAPIS, 1981; Department of Health and Human Services, 1983). This is a cooperative federal-state program for collecting information on cases treated in publicly supported treatment facilities. The data in this Table were collected in two point prevalence surveys two years apart, September 30, 1980 and 1982. States in the Table are those known to have a large percentage of Hispanic individuals in their population. In 1980, the proportion of Hispanic persons in treatment ranges from 5% in Florida to 35% in New Mexico In Arizona, Florida, and New Mexico this ethnic group is underrepresented among the clients In all the other states Hispanics are overrepresented. Such overrepresentation is slight in Texas (difference of 2%), a little larger in New York (difference of 4%) and California (difference of 4%), and very large in Colorado. In this latter state the Hispanic group comprises 12% of the State's population but their proportion in the treatment group is twice that. In the Southwest as a whole (Arizona, California, Colorado, New Mexico, Texas), the Hispanic group is overrepresented among those in treatment by 3 percentage points over their proportion in the regional population. For the U.S. the difference is larger: the proportion of Hispanics in treatment is substantially greater than their representation in the population. Data for 1982 do not vary a great deal from that for 1980. There is a slight decrease in the proportion of Hispanics in treatment in Colorado and Texas and an increase in New Mexico.

In California the proportion of Hispanic persons in treatment varies accordng to the type of facility. According to the California Department of Alcohol and Drug

Programs (1984), on a typical day of fiscal year 1980-1981 Hispanics comprised 17% of the patients in privately funded treatment programs, 25% of those in publicly funded programs, 26% of those in drink driving programs and 13% of those in all other programs. Regarding their representation in the state population, 19%, Hispanics are thus overrepresented both in publicly supported programs and among participants in drinking driving programs.

Community Surveys of Drinking Patterns and Alcohol-Related Problems

The first survey of alcohol use and alcohol-related problems to present data on the Hispanic group is that by Cahalan et al. (1969). Respondents constituted a probability sample representative of the U.S. population 21 years and older. Among those interviewed there were 58 individuals who identified themselves as "Latin American, Caribbean". The rate of abstention in this group is 37%, higher than the 32% of the total sample. There are fewer infrequent, light, and moderate drinkers among Latin Americans than among the total sample but more heavy drinkers (19% versus 12%). When Cahalan calculated the percentage of drinkers that belonged in the heavy drinker category, he found that 30% of the Latin Americans were thus recognized, the highest proportion of all national groups in his sample and 1.5 times more than the total sample (30% versus 18%).

Cahalan and Treiman (1976) also report a high rate of abstention and occasional drinking (62%) among 80 "Latinos" in San Francisco, but they did not find a high rate of heavy drinking. Respondents in this study comprised a representative sample of San Francisco residents 12 years of age and older, and the data were collected through a mail survey. Their rates of frequent heavy drinking or frequent high maximum intake are lower than those for Whites (4% and 6%, respectively), higher than those for Asians and Blacks, and similar to those for Jews.[2] With regard to the total sample, Latinos have a higher proportion of combined abstaining, infrequent, and occasional drinkers (62% versus 42%), but lower rates of frequent heavier drinkers (4% versus 7%) and infrequent high maximum drinkers (6% versus 12%).

Latinos have a distribution of alcohol problems similar to that of the total sample. They have less "high intake" drinking, that is, drinking high quantities frequently (16% versus 24% for the total sample), less symptomatic drinking (12% versus 17%) and less loss of control (7% versus 11%).[3] They report slightly more binge drinking (5% versus 3%), more job problems (4% versus 2%), and more spouse problems (14%

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2. Cahalan and Treiman's definitions for these drinking categories were as follows:
frequent heavier drinker: drinks nearly daily and drinks 4+ drinks a day at least times per week.
frequent, high maximum: drinks nearly daily and drinks 4+ drinks a day at least monthly.
frequent, low maximum: drinks nearly daily but not 4+ drinks on any day during month.
less frequent, high maximum: drinks 1-4 days a week and drinks 4+ drinks at least once a month.
less frequent, low maximum: drinks 1-4 days a week but does not drink 4+ drinks on any day during the month.
occasional, infrequent or abstainer: drinks on 1-3 days a month, or less than monthly, or never.

3. Considered present when the respondent reported one or more of the following as present during the previous year: drinking first thing in the morning, having several drinks before a party, sneaking drinks, drinking more when alone, drinking to shake-off a hangover, unable to remember events that happened during the previous night.

versus 10%). The rates for police problems, health problems, and alcohol-related accidents are approximately the same as those for the total sample.

Cahalan (1976) reports on a representative sample of adults residing in California of whom 61 identified themselves as "Chicanos". Results for this survey do not agree with those reported by Cahalan and Treiman (1976) for San Francisco. This is possibly due to a change in the definitions of the quantity-frequency categories employed to describe drinking patterns, to differences in the ethnic composition of Hispanics in these two studies (most Hispanics in San Francisco are of Central American origin while in other parts of California they are mostly Mexican-Americans) and to real differences in drinking habits between San Francisco and California as a whole.[4] Thus, while Latinos in San Francisco have a higher proportion of infrequent drinkers, occasional drinkers and abstainers than the total sample (62% versus 42%), in the statewide survey the situation is reversed. About 28% of the Chicanos are classified as "infrequent drinkers or abstainers", against 37% of the total sample. Other differences appear in the "frequent high maximum" category. In San Francisco Latinos have half as many drinkers in this category as the total sample (6% versus 12%), while in California Chicanos have more drinkers than the total sample (30% versus 20%).

This California survey also shows striking differences between drinking patterns of men and women in the Chicano group. While 3% of the women are classified as frequent heavy drinkers, this category includes 13% of the men. Men also have a higher number of frequent high maximum drinkers than women, 43% versus 16%. Women are concentrated in the infrequent low maximum, infrequent, and abstainer categories. Combined, these three categories include 49% of all the women but only 13% of the men.

Finally, Chicanos in the California survey report more alcohol-related problems than the total sample in the following areas: friendship and social life, 7% versus 3%; marriage and home life, 12% versus 4%. Chicanos have fewer problems in the health area (3% versus 6%) and about the same proportion as the total sample in the work and financial position area (3% versus 2%). Chicano women report very few problems, and the differences between this ethnic group and the others stems from the high rate of problems among Chicano men, especially in the areas of "friendship and social life" and "marriage and home life". In the first area, 13% of the Chicano men report problems, against 4% of the males in the total sample. In the second area the prevalence of problems among Chicano men is 20%, while among all males in the sample it is 7%.

Alcocer (1979) reports one of the few alcohol studies in the U.S. specifically carried out to study drinking habits of Hispanics. Three communities in California were surveyed: East Los Angeles Montebello, East San Jose in Santa Clara County, and the cities of Huron, Mendota and Orange Cove in Fresno County. Respondents were randomly selected from the population 18 years old and over for inclusion in the survey. However, changes in the sampling process and additional interviewing may

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4. Quantity-frequency categories were defined as follows for this California survey:
frequent, heavier drinkers: 5+ drinks at least once a week.
frequent, high maximum: drinks every week, sometimes 5 or more drinks.
frequent, low maximum: drinks every week but never as many as 5 drinks per occasion.
infrequent, high maximum: drinks less than weekly, sometimes 5 or more drinks per occasion.
infrequent, low maximum: drinks less than weekly, never 5 or more drinks.
infrequent: drinks less than once a month.
abstainer: had not drunk alcohol in last year.

have compromised the randomness of the sample, especially in San Jose and East Los Angeles Montebello. These considerations on sample representativeness are important due to the striking differences between some of Alcocer's results and those reported by Cahalan et al. (1974) for California. To facilitate comparisons between these two surveys Alcocer's respondents were grouped together by the present author, achieving an N of 603. However, the overall differences still hold when each of his communities is separately compared to Cahalan's findings.

While using the same measures of alcohol consumption applied by Cahalan, the rates of abstention and infrequent drinking in Alcocer's data are 34% and 24%, respectively.[5] These rates are twice as high as those in Cahalan's survey. However, when we look at the two topmost categories of the drinking typology (frequent heavier drinker plus frequent high maximum), Cahalan's data show twice as high a proportion as Alcocer's, 38% versus 20%. This difference occurs not so much because of the proportion of drinkers in the frequent heavier category (Cahalan, 8%; Alcocer, 6%) but more because of the difference in the proportion of frequent high maximum drinkers. Cahalan finds 30% of his drinkers in this category, while Alcocer has half that, or 14%. When the data are broken down by sex, the differences between these two studies remain.

When broken down by sex and locale, Alcocer's data show important differences. Women have a high proportion of abstainers and infrequent drinkers. This is especially so in Fresno, where approximately 80% of the women are in these two categories. The rate for East Los Angeles is also very high at 66%. Among males abstention rates are much lower, ranging from 24% in East Los Angeles to 12% in East San Jose; Fresno has 17%. A large proportion of men are in the two highest categories of drinking (frequent heavy drinking and frequent high maximum). In East Los Angeles the rates of these combined categories is 39%; in East San Jose it is 43%; and in Fresno it is 47%.

When combined, Alcocer's samples show remarkably consistent rates for all type of problems. A total of 10 areas are examined in the study: a physician saying the respondent's drinking is harmful, accidents, drunk driving, trouble with the law, trouble with friendships, health problems, marriage problems, being afraid of becoming an alcoholic, being afraid of losing control, feeling that one should stop but could not. The rates vary from 7% (health problems) to 5% (harmful to friendship). Women have very few problems, with a rate ranging from 1% to 3%. Rates for men are much higher, varying from 10% to 14%. When problem rates are broken down by sex within community, the following picture emerges: men in San Jose are more liable to report drinking problems than men in East Los Angeles and Fresno; the problem rate among women is very low across all communities, and no inter community distinctions seem to emerge. The variation of rates for men and uniformity for women may have been caused by sample variation, since the number of respondents in each sex group and locale was small, ranging from 130 to 70.

A detailed study of drinking problems in a sample of men 21 to 59 years of age is reported by Cahalan and Room (1974). The data come from two U.S. national samples and from a survey done in San Francisco, which is analyzed separately. In the national data a total of 1561 men were interviewed, of which 42 were identified as of "Latin American/Caribbean" ancestry. This group has the highest rate of problems (43% of the group has high consequences of drinking) among all the ethnoreligious

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5. The typology is described in footnote 4.

groups studied. Cahalan and Room suggest caution when interpreting this result since the clustering sample technique used to combine the national samples does not guarantee representativeness, especially for small and highly segregated groups like Latin Americans/Caribbeans. The high rate of alcohol problems among Latin Americans could also be explained by some of the socio-demographic characteristics of this group, such as rate of work-instability and low socio-economic status. However, using multiple regression and automatic interaction detection techniques (AID), Cahalan and Room were able to confirm Latin American ancestry as an important predictor of problem drinking. This was especially so when the analysis was extended to predicting a high rate of problems among those with a high rate of alcohol intake.

There were 786 men 21 to 50 years of age in the San Francisco survey analyzed by these authors. Of these, 96 were grouped under the "Latin American" heading by having indicated that most of their ancestors had come from these countries. This group of Latin Americans residing in San Francisco has a high rate of heavy alcohol intake (18%) and a high rate of binge drinking (10%) when compared to other ethnic groups. However, in the areas of symptomatic drinking and problems with police, work, and marriage, their rate is not very different from that found for the other ethnic groups nor from the San Francisco average. To explain this contrast between the rate of alcohol problems for Latin Americans in the San Francisco and the national samples, Cahalan and Room underline differences in sample composition. Thus, the Latin American group in the national sample is basically composed of men of Puerto Rican or Mexican ancestry, while in San Francisco there is a high percentage of Central Americans together with Mexicans.

Difference in sample composition is only one of the factors hampering comparisons across the surveys mentioned so far. The data collection instruments, the drinker typologies and the problem definitions also change from study to study. Contrasts in problem rates such as those summarized in Table 5 might well be artifacts of these methodological differences. In the Table the only recognizable pattern is the uniformity of rates across problems shown in Alcocer's data when his three samples are combined.

Cahalan and Cisin (1975), Cahalan (1970), Haberman (1970), and Haberman and Scheinberg (1967) also report rates of alcohol problems higher than average for Hispanics. Cahalan and Cisin (1975) describe drinking practices and problems of naval personnel. Among the enlisted men there were a group of 54 "Mexican-American/Chicanos". Their rate of alcohol problems (as defined by the presence of at least one serious consequence to interpersonal relationships or health) is 26%. This rate is four times higher than that for "Orientals", 2.5 times higher than that for "Blacks/Negro/Afro-American", and 1.3 times higher than that for "White/Caucasian".

Cahalan (1970) reports on a small group of 24 Hispanics taken from a reinterview of the national sample of respondents 21 years and older first described in Cahalan et al. (1969). This group shows one of the highest rates of social consequences of drinking (problems in areas such as marriage, police, work, friendship, relatives). Haberman (1970) and Haberman and Sheinberg's (1967) study is a survey of drinking practices of a representative sample (N=706) of New York City adults. The Puerto Rican group, as identified by place of birth of subject or father of subject, has again one of the highest scores of "implicative drinking" (Haberman and Scheinberg, 1967). This was an index derived from affirmative answers to a question covering the presence of alcohol-related problems (health, job, money, family), quantity of drinking (too much drinking), and personal reasons for drinking (for pains, to sleep, for energy, to relax).

Haberman's (1970) data, as was the case with that of Alcocer's and others previously described, confirms the differences between the sexes in patterns of drinking and alcohol problems among Hispanics. All the problem drinkers in the New York City sample of Puerto Ricans are males. While the proportion of abstainers among Puerto Rican women is 74%, among Puerto Rican men it is 16%. Thus, the female/male ratio of reported non-drinkers among Puerto Ricans is 4.6:1, much higher than in any other ethnic group in the study. Data from the Health and Nutrition Examination Study (HANES) analyzed by Hartsock et al. (1979) show a rate of abstention for "Spanish women" (no definitions for this and other ethnic classifications are given) which is 2.5 times higher than that for "Spanish" men (72% versus 29%), while "Mexican" women have a rate 1.8 times higher than "Mexican" men. Rates for heavier drinking (1 or more oz. ethanol per day) are equal for both Spanish and Mexican women, 2%. However, Spanish men have a rate of 40% while for Mexican men the proportion is 23%. This is slightly higher than the proportion for "other" men which is 17%.

Further confirmation of these sex differences in regard to drinking practices can be found in Maril and Zavaleta's (1979) report on drinking patterns of low income Mexican-American women. A total of 785 women, representing 11.5% of all low income Mexican-American women in the city of Brownsville Texas, were sampled. Approximately 86% of the women are abstainers (no alcohol consumption during the previous year). The preferred beverage for the women who drink (N=108) is beer. Of these, 59% report drinking 2 beers or less occasionally, 9% report drinking 3 or 4 beers, and 32% report drinking 6 or more beers. Women drinkers are more likely to be young and middle aged, married, and educated up to junior-high or high-school.

A study by Holck et al. (1984) of alcohol use along the U.S.-Mexico border provides further insights on drinking by Mexican-American women by dividing this group among those who were born in Mexico and those who were born in the U.S A total of 2135 women 15-44 years of age were interviewed; 1233 indentified themselves as Mexican-Americans, 799 as Anglo and 104 as Blacks or from another ethnic group. In accordance with previous results, Mexican-American women have higher rates of abstention than Anglo women (47% versus 28%) but lower rates of heavy drinking (2% versus 6%). Among Mexican-American women unemployment, higher education and previous marriage are all associated with less abstention and more drinking. Women born in Mexico have higher rates of abstention than Chicanas (47% versus 28%) independent of age, marital and employment status and years of education.

A comparison of drinking practices and problems among different ethnic groups in the U.S. is reported by Jessor et al. (1968). The community studied is located in southwestern Colorado and for a community survey of this population the authors interviewed a random sample, stratified by sex and ethnicity, of 93 Anglos, 60 Hispanics, and 68 Indians. A comparison of mean scores on measures of frequency of intoxication, and drinking problems shows that Hispanics drink twice as much as the Anglos, but neither have a higher frequency of drunkenness nor a higher rate of drinking problems. The Indians drink seven times as much alcohol as the Anglos and three times as much as the Hispanics. Their rate of intoxication is seven times higher than that for the other two groups and they have six times as many alcohol related problems.

Results for rate of deviance and alcohol use show Hispanics in the intermediate position between Anglos and Indians. Thus, while 9% of the Hispanics are described as "usually heavy" drinkers, only 2% of the Anglos are so characterized, against 26% of the Indians. Approximately 50% of the Indians report 5 or more occurrences of drinking-related deviance (e.g., fights while drinking), while the rate among Hispanics is 15% and among Anglos 14%. "Drinking in the morning sometimes or often" is

reported by 33% of the Indians, 22% of the Hispanics and 9% of the Anglos. The proportion of those who report having being drunk three or more times "last year" is also high among Indians, 38%, intermediate among Hispanics, 15%, and lower among Anglos, 3%. When broken down by sex, males report higher rates of problems than females in all three ethnic groups.

Norms and Attitudes toward Alcohol Use

One explanation as to why Hispanic men have a high rate of heavy drinking and alcohol problems comes from survey data on norms and attitudes toward drinking among Hispanics. These data show that norms and attitudes governing the use of alcohol by Hispanic men are more liberal than those of Hispanic women or of Anglos of both sexes. Part of this evidence comes from a study by Johnson and Matre (1978) carried out in two areas of Houston Texas, one a predominantly Mexican-American neighborhood and the other an Anglo area. A total of 109 Mexican-Americans and 73 Anglos were selected from the population 18 years and older. Selection methods were not strictly random, which limits the generalizability of the findings.

Results show that Mexican-American men and women prefer to drink with friends, while Anglos have preference for drinking with the family. Mexican-American men are more likely than Mexican-American women and Anglos to see a "few beers as a good way to unwind". A total of 37% of the Mexican-American women think that it is all right for a man to be drunk at home, but only 7% allowed that of a women. Among Mexican-American men the proportion allowing a woman to be drunk at home is 15%, while 53% permit the same behavior in men. Anglos, independently of sex, have much more restrictive views on drunkenness: 12% of the men and 15% of the women allow drunkenness by a woman, and 16% of the men and 23% of the women think it is all right for a man to be drunk at home. In general agreement with their drinking behavior 44% of the Mexican-American men think it is all right for a person to be drunk at a party. The proportion of Mexican-American women, Anglo men, and Anglo women approving such behavior was much smaller: 25%, 16% and 12%, respectively.

Paine (1977) presents evidence that corroborates Johnson and Matre's findings. In fact they seem to have analyzed data from the same survey although by reading their papers this is not readily apparent. Paine's sample also comes from a Mexican-American working class neighborhood in Houston, Texas. He had 138 respondents, 32 men and 106 women, and this sex disparity may have been a result of non-random selection of respondents. Drinking is very much a man's activity among these individuals. A total of 72% of the men surveyed are drinkers, against only 16% of the women. Men are allowed to ingest larger amounts of alcohol more frequently. 49% of the men and 38% of the women agree that it is all right for a man to get drunk at his house. The proportion of respondents accepting the same behavior in a woman was much lower: 15% of the men and 6% of the women. In reference to alcohol use in general, 25% of the sample agreed that "a few drinks help a person to get through the day", and 29% thought was "all right to get drunk at a party". Finally, 49% of the drinkers (N=40), and 29% of the nondrinkers (N=98) thought that "it is good to take a drink when you are feeling tense".

Alcocer's (1979) study of drinking in East Los Angeles, Fresno, and San Jose also has data on drinking norms and attitudes among Hispanics. A substantial proportion of his respondents allow large amounts of drinking in some specific social situations: 30% condone being "high at a party", 39% accept being drunk with a friend at a bar, and 19% approve being drunk during recreational activities. There is practically no support for drinking at work and before driving. There is support for mild drinking (1 or 2

drinks) when visiting friends (62% agree), during recreational activities (60% agree), by someone at home (31% agree), when visiting parents (40% agree), and for a couple having dinner (74% agree). When this data is broken down by sex, men consistently show more liberal attitudes than women. This pattern holds for all three communities in the study, although there were some differences among regions. Thus, respondents' liberality with regard to drinking was highest in Fresno and lowest in East Los Angeles. These regional differences were consistently found for all questions regarding drinking norms and attitudes.

Drinking and Alcohol Problems Among Hispanics in the San Francisco Bay Area

Between 1977 and 1980 a series of representative samples of residents of three counties of the San Francisco Bay Area were interviewed as part of a project to evaluate an alcohol prevention campaign (Wallack and Barrows, 1981). The prevention interventions and the evaluation study were funded by the state of California. A special component whose aim was to develop strategies to prevent alcohol problems among Hispanics was part of the overall project, and was funded by the National Institue on Abuse and Alcoholism through a grant to the California Commission on Alcoholism for the Spanish-Speaking, Inc. In the course of the evaluation of this Hispanic component it was realized that a combination of the collected samples would yield a total of 634 Hispanics respondents. This number was larger than that in other studies and would allow for more detailed analysis of drinking patterns and alcohol problems among this ethnic group than in any previous study. A series of analyses were then undertaken in an attempt to better understand the ways in which alcohol is used by Hispanics. For detailed results of these analyses see Caetano (1984a, 1984b, 1984c).

The samples were all collected with the same methodology. In each study area a sample of housing units was selected by area probability methods, and one respondent between 18 and 59 years of age was randomly selected from each household for interviewing. The institutional population was not covered. Also, because the subjects were interviewed in different surveys, the sample cannot be regarded as representative of any one particular Hispanic population at one moment in time. The total number of persons interviewed is 4510. The 634 respondents who identified themselves as "Latino, Mexican, Mexican-American, Chicano, or Hispanic Heritage" were all grouped under the rubric "Hispanic" and analyzed together. The sex and age distribution of the sample and the proportion of respondents who are high school graduates and unemployed do not differ from that of the Hispanic population of the Standard Metropolitan Statistical Areas (SMSA) of San Francisco, Oakland and Stockton (Bureau of the Census, 1982; 1983a; 1983b). However, the combined sample shows some variation in sociodemographic characteristics from the Hispanic population in the SMSAs. The combined sample has fewer people in the "$20,000 and more" income category (22% versus 42%) than the Hispanic population of the SMSAs under comparison (Bureau of the Census, 1983a). The combined sample also has fewer people who are single (19% versus 33%) (Bureau of the Census, 1983a). Finally, there are more people of Mexican origin among respondents than in the Hispanic population of the SMSAs (80% versus 60%) (Bureau of the Census, 1982). This is probably because the Hispanic population of San Francisco, which is predominantly from Central America, is included in one of the SMSAs although it was not sampled for the survey.

The results of this series of analyses confirmed previous findings in the literature, besides providing new insights on patterns of alcohol use among Hispanics. Abstention is high among females (32%) and low among males (14%). In contrast, a quarter of

the males are frequent heavier drinkers[6], but only 3% of the females are so. Among males drinking is positively associated with being young and separated or divorced. Among females drinking is positively associated with being young, being more educated and being single, separated or divor The best predictors of alcohol consumption according to a regression analysis are being a male, having liberal attitudes toward alcohol consumption and being more educated. Comparison of Hispanics with Whites and Blacks in the same sample throws further light on these findings. Table 6 shows that Hispanic males have a rate of abstention lower than Blacks but comparable to Whites. Hispanic males also have more frequent heavier drinkers than the other two ethnic groups. Hispanic females, as in other surveys, have more abstainers and fewer frequent heavier drinkers than females in the other groups. Results in Table 7 provide deeper understanding for the differences across groups. The most important finding in this table in the difference across groups in the patterning of frequent heavy drinking. Among Whites, the rate for frequent heavy drinking drops by half from the 19-29 to the 30-39 age group, remaining stable after that. Among Blacks frequent heavier drinking follows an inverse pattern, it almost doubles from the 19-29 to the 30-39 age group, declining in older groups. Among Hispanics, there is a third pattern. The rates drop continuously with age so that the percentage of frequent heavier drinkers among younger men is almost four times higher than among those 50-59 years of age.

Hispanic men also have a higher rate of alcohol problems than men in the other two groups. Since alcohol consumption is closely associated with rate of problems, the distribution of problems by age follows very closely the pattern of frequent heavier drinking depicted in Table 7. The prevalence of four or more problems among men in each of the ethnic groups under comparison is shown in Figure 1. The patterning unveiled offers quite a contrast across groups. Hispanics have more problems than Blacks and Whites throughout. Among Whites the patterning of problems by age is in accordance to that traditionally described in surveys of the U.S. general population. It fits well with the notion that drinking problems in the general population are concentrated among young males and are part of a youthful life style (Cahalan and Room, 1974). Among Blacks and Hispanics, however, drinking problems cannot be seen as a characteristic of the young for they are more often present among more mature adults than among men in their twenties. The important significance of this finding for the identification of target groups for prevention will be discussed below.

The prevalence of specific problems by sex among Hispanics and Whites is depicted in Table 8. Men have far more problems than women. Among Hispanic men the most prevalent problem is the harmful effect of drinking on health. About a tenth of these men also report harmful effects of drinking on financial position, home life and friendships and social life. As a comparison, the prevalence of these same problems among White men is two thirds of that for Hispanics. The rate for each of these problems among Hispanic women is low and not very different from that among White

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6. Quantity-frequency categories were defined as follows: a) frequent heavier drinkers: drinks five or more drinks at a sitting, once a week or more often; b) frequent high maximum drinkers: drinks once a week or more often and drinks five or more drinks at a sitting at least once a year; c) frequent low maximum: drinks once a week or more often but never drinks as many as five drinks at a sitting; d) infrequent: drinks less than once a week but at least once a month, may or may not drink five drinks at a sitting; e) occasional: drinks less often than once a month; f) abstainer: has not drunk alcohol beverages in the last six months. One drink means 1 oz of spirits, a 4 oz glass of table wine or a 12 oz can of beer, each of which contains approximately 9 g of absolute alcohol.

women. Among Hispanics the best predictors of problems as determined by regression analysis are the number of drinks consumed per month, the frequency of drunkenness, being a male and being unemployed (Table 9). Together these four variables are responsible for 26% of the variance in problems data in the sample.

Since frequency of drunkenness is an important predictor of problems, and since drinking by Hispanics in the U.S. has been characterized as "fiesta drinking", i. e., drinking to intoxication in special occasions, a detailed analysis of self-reported intoxication in the sample was undertaken (Caetano, 1984c). Results show that the frequency of getting intoxicated at least once a month is 20% among Hispanic men and 15% among Anglo men. Data breakdown by age shows that 22% of Hispanic men in the 18-29 and in the 30-39 age groups get drunk at least once a month. This frequency declines in older age groups, being 17% for the age group 40-49 and 11% for the age group 50-59. When compared with findings for Whites in the same sample, Hispanics have higher levels of intoxication for every age group with exception of the 19-29 group where 26% of the Anglo men get drunk at least once a month. Intoxication is less prevalent among women than among men. About 6% of Hispanic women and 5% of Anglo women report intoxication at least once a month. Rates of drunkenness once a week or more often by age show that Hispanic women have higer rates of intoxication than Anglo women in the 30-39 (7% versus 4%) and 40-49 age groups (6% versus 0%). Anglo women have higher rates in the 18-29 age group (10% versus 6%), while rates in the 50-59 age group are similar (1% and 0%).

Because about 80% of the Hispanics in the California sample being analyzed are of Mexican origin, a comparison with patterns of drunkenness among a random sample of residents from rural and urban areas near Mexico city is enlightening. Results for the Mexican data were published by Calderon et al. (1981) and Caetano (1984d). Among the men in Mexico, 29% reported intoxication once a month or more often, a rate higher than that found among Hispanic men in California (20%). Further, among Mexican men 22% of regular drinkers (drink once a week or more often), 35% of intermediate drinkers (drink one to three times a month) and 51% of the occasional drinkers (drink less than once a month) report drunkenness with the same frequency with which they drink. Using the same classification of drinkers, results for Hispanic men in California are as follows: 21% of regular drinkers, 4% of intermediate drinkers and 7% of the occasional drinkers report drinking and becoming intoxicated with the same frequency. Thus, while the rates for regular drinkers are similar in Mexico and California, intermediate and occasional drinkers in Mexico seem to get drunk much more frequently than their counterparts in California. Overall, 50% of male drinkers in the Mexican sample get drunk everytime they drink, while among Hispanics in California only 17% do so.

This high frequency of drunkenness together with a comparatively low frequency of drinking suggests that drinking and drunkenness in Mexico are more closely associated than in the U.S. This is in accordance with "fiesta drinking", and even though occasional and infrequent drinkers in California do not get drunk as oftenly as in Mexico, it also suggests that the increased frequency of drunkenness among Hispanic men in California may be a pattern of drinking brought from Mexico which has not undergone total acculturation. Finally, the increased frequency of drunkenness among Hispanic men in California is also of importance for prevention During intoxication one has a higher chance of experiencing a number of alcohol problems. It is easier to fall down and hurt oneself, it is easier to get into bar-room fights, and if one drinks and drives, it is easier to be involved in a car accident. Thus, minimizing the frequency of this drinking behavior may help reduce alcohol problems among the Hispanic population.

Attitudes toward alcohol use are also an important predictor of drinking behavior. The analysis of drinking by Hispanics in the San Francisco Bay Area looked at differences in attitudes by sex and age as well across Anglos, Blacks and Hispanics (Caetano, 1984a). Within the Hispanic group liberal attitudes toward alcohol use are associated with being a male, being young, less educated, single and separated or divorced. When compared to Anglos and Blacks, Hispanics had more liberal attitudes than the other two groups (Table 10). This is especially true for those items which support drunkenness as an emotional outlet or as a vehicle for having fun, as well as for items that tap the power of alcohol as a social lubricant. These results confirm previous findings in the literature (Johnson and Matre, 1978; Paine, 1977; Alcocer. 1979) discussed earlier on this review, and they also map well onto Hispanics' higher rate of alcohol use and higher frequency of drunkenness. They also provide important directions for prevention, underlining once more the importance of focusing interventions in changing specific perceptions of alcohol use in the Hispanic community -- alcohol as a social lubricant -- as well as specific drinking behaviors -- drunkenness.

Finally, Hispanics' knowledge about drinking and its effects was also analyzed using the items in Table 11 (Caetano, 1983). The truth or falsity (T or F` of the statements are indicated in parenthesis in the Table. It is immediately apparent that the majority of respondents know the effects of alcohol use, independent of sex. The items on amount of drinking and speed of intake (no. 3) and that on drinking and weight (no. 4) have a lower proportion of correct answers. This is interesting because ignorance about the relationships expressed in these items could lead to inadvertent intoxication, a drinking behavior which is shown by other results in the Bay Area study to be high among Hispanics. Examining the results across ethnicity shows that both Whites and Blacks also give a lower proportion of correct answers to these two items. Hispanics' answers are similar to those of Blacks and lower than those of Whites. The items on how Californians drink also have a lower proportion of correct answers, a pattern that cuts across ethnic groups. Among Hispanics, analysis by age did not show any significant patterns. It is not possible to compare these results with previous findings in the literature since knowledge as represented by the items depicted in Table 11 has not been assessed before. It is possible however to see that the results are relevant for prevention. Hispanics seem to have a good knowledge of the basic effects of alcohol such as that it is a stimulant, that it can be an addictive drug, that use may bring serious damage to health, that it is a drug commonly associated with drugs and violent acts. Therefore, the use of preventive campaigns to impart this type of knowledge hoping that increase in knowledge will minimize alcohol use and problems is bound to fail. Other strategies different from those which rely exclusive in alcohol education need to be developed for alcohol prevention among Hispanics and some suggestions in this area will be given below.

Community perception of alcohol problems as legitimate areas for official intervention are also of importance for prevention. The study of Hispanics in the Bay Area asked respondents about their ranking in degrees of importance for a number of alcohol-related problems. These data were analyzed by Randolph (1984) and Table 12 reproduces some of her results. In general, Hispanics are more concerned than the other two groups about almost all the problems in the Table, and Blacks are more concerned than Whites. Concern seems to be especially high for drunk driving, family troubles, teenage drinking, littering and public drinking. This latter problem, which is known to occur much more frequently in poor, inner city, ethnic neighborhoods is of more concern for Blacks and Hispanics than for Whites. Littering and public drinking have also been associated with the disproportionate number of liquor outlets in ethnic neighborhoods, and both Hispanics and Blacks are more concerned than Whites about this particular problem. In California, Engmann (1976) found that 60% of the zip codes

with highest concentration of retail alcoholic beverage licenses statewide were areas with Hispanic population above the statewide average. Other analyses have shown that both Black and Hispanic neighborhoods in Los Angeles (Burns, 1983) and Milwaukee (Farrel et al., 1984) have a higher concentration of alcohol outlets than residential areas with a predominantly White population. The relationship between the increased presence of these outlets and alcohol-related problems is supported by data from Milwaukee where 80% of alcohol-related criminal activities in 1981 could be related to ten taverns in three districts of that city.

Ethnographic Research

The focus of this review is on the epidemiological literature on alcohol use among Hispanics. However, the ethnographic research cannot be forgotten due to its important contribution to the understanding of drinking by members of this ethnic group. There have been a number of reviews of the contribution of anthropologists to the alcohol field in general (see Heath 1975, Bennett 1984; Room, 1984). The four papers briefly reviewed below cover each one of the major national groups of Hispanics and are a good example of this contribution. They have a richness of description that complements well the epidemiological data. Their findings show the heterogeneity of drinking patterns of the various Hispanic groups but also underline the commonalities among these groups. A good example of the latter is the sharp contrast between the drinking practices of Hispanic men and women which is an epidemiological finding confirmed in this ethnographic research.

Gilbert (1984) describes variations in drinking practices according to social context among Mexican-Americans in California. In family celebrations such as weddings and birthdays the emphasis is on conviviality. Drinking goes together with eating, and the presence of women and children is a powerful restraining factor on how much alcohol is consumed. When someone exceeds acceptable limits of drinking, friends and famly members immediately intervene to limit or stop alcohol consumption by that person. In contrast with this familiar scene there is the drinking that occurs outside family boundaries, in cantinas. These are male-oriented establishments and the rules that govern drinking behavior in this context are much more lax. There is an emphasis on heavy drinking and sexual overtures to the women are accepted. A third drinking setting described by Gilbert is that of the nightclub. Drinking is heavier among men than among women. Attitudes governing drinking behavior vary from one club to the other and are class related.

Gilbert's description of the sharp contrasts between drinking practices by men and women map well onto the epidemiological findings. Among men, drinking is an important vehicle for social interaction in same-sex situations as well as in social situations that involve interaction with women. Men drink together as respite from work. If one fulfill one's obrigations at work and as a family provider, drinking is a right. Among women "respite drinking" and drinking in same sex situations are not common patterns. Women restrict their drinking to family reunions, where drinking is limited by restrictive norms. Acculturation and entrance into the work force may, however, be changing these practices and blurring the contrasting drinking practices between the two sexes.

Drinking among Mexican-Americans in South Texas is also a men's activity. Alcohol use among women is constrained by the concepts of "virtue" and "respect" (Trotter, 1984). Role differentiations between the sexes lead to different preferences for drinking settings and different choices of drinking companions. There is a tendency for males to drink with other males and outside the home, and for females to drink

at home and in those public places where drinking occurs but where the emphasis is in other kinds of activities, like dancing. Alcohol use among these Mexican-Americans also varies according to lifestyles associated with working conditions. Alcohol use is widespread in migrant-worker camps of the Eastern Seaboard where the population is composed mainly of single males. Migrant workers laboring in Midwestern farms travel with their family to camps where drinking is not allowed. Among the working poor with steady employment, drinking is patterned by age, with the young having more liberal attitudes than the old. Among the middle class and the elite, women have relatively more freedom to drink.

Gordon (1984) compares alcohol use among Dominicans, Guatemalans and Puerto Ricans in New England and his findings underline the variation in drinking practices across different groups of Hispanics. Dominicans' drinking has diminished as a result of immigration to the U.S. and subsequent upward social mobility. Social drinking still is an accepted activity but there is also a strong emphasis on self-control. Drunkenness and heavy drinking during weekends are proscribed. Guatemalans drink more heavily than Dominicans. Guatemalan men arrive in the U.S. alone, and this lack of family ties facilitates excessive use of alcohol consumption. Drinking occurs mainly outside the home and with other men, leading frequently to drunkenness and prolonged binges that last from Thursday to Sunday. Puerto Ricans are more acculturated to the U.S. than the other two groups and have incorporated U.S. drinking practices along with more traditional ones. They drink lightly during weekdays and heavily during weekends. Drug use is more prevalent among them than among other Hispanic groups.

Cuban-Americans residing in Miami have been studied by Page et al. (1984). Unfortunately, the men interviewed in this study were all polydrug users and, as the authors acknowledge, hardly representative of men in the general Cuban-American group. Traditionally, there are norms that strongly proscribe drunkenness both among men and women. There is an emphasis on alcohol use without loss of self-control and men consistently deny intoxication to comply with this norm. Cuban-American women drink little, and younger women drink more frequently than older women.

Conclusions

This has been a review of the epidemiological literature on alcohol use among U.S. Hispanics. This body of papers has some faults, and many of its findings need to be interpreted with caution. The knowledge obtained from studies with indirect indicators of alcohol problems is very limited. This research says nothing about abstinence or light drinking and gives little information on the long term results of heavy alcohol intake. There is some indication that Hispanics are overrepresented among those dying of alcohol-related causes. However, this evidence is limited to a few cities or counties located mainly in the Southwest. Little is known about the status of this problem in the rest of the country. There are also limitations in those studies based on treatment statistics or alcohol-related arrests. The former provides scant information, which is usually biased by the many factors that operate in determining who receive treatment and who doesn't.

Statistics on public drunkenness and drunk driving offer a consistent picture: Hispanics are overrepresented among those in police custody for alcohol-related arrests. But is it really that because Hispanics drink more than other ethnic groups they have more problems with the police and a high rate of arrests, or this is just a result of increased police surveillance of minorities? The evidence at hand is controversial and as of now cannot provide a satisfactory answer to this question. However, the problem is increasingly important. Drunk driving is now under considerable attention from the public and authorities. So far the response to the problem has been characterized by

an amplification of police powers, which has resulted in the use of random road checks, stiffer penalties and mandatory treatment for first offenders. The long term results of these measures are yet to be evaluated. It seems narrow minded and over-optimistic to think that police enforcement by itself will solve a problem with roots in the norms that regulate alcohol use among minority groups as well as in the secondary place that these groups occupy in American society. Independent of whether minority groups have indeed a disproportionate number of drunk drivers, if police efforts to curb this problem result in the aprehension of a large number of minority persons these measures may be seen by minority groups as yet another instance of discrimination.

The results of surveys of alcohol use also have limited value with regards to Hispanics. Most of these projects were not developed to study this ethnic group, and the number of respondents identified as Hispanics is a small percentage of the total sample. Therefore, most descriptions of patterns of alcohol use by members of this group are but underdeveloped branches of larger analyses directed to other groups or to the general population as a whole. Alcohol studies with Hispanics have not provided insights on the associations among alcohol consumption, drinking problems and sociodemographic variables, on the evolution of drinking problems over time, on the associations among different problems, and on problem predictors, to mention but a few areas. Exceptions are the studies by Alcocer and the analysis of drinking among Hispanics in the San Francisco Bay Area discussed in this report. But these two studies also have limitations that affect the generalizability of their results.

Shortcomings aside, community studies of alcohol use have provided a tentative picture of Hispanic drinking in the U.S. that deserves some attention. Hispanics seem to be concentrated at the extremes of the drinking scale distribution, that is, in the heavy drinking and the light drinking/abstaining categories. They have a higher rate of alcohol problems than the U.S. general population. The norms and attitudes that govern alcohol use in the Hispanic community are liberal for men and restrictive for women and more so than the norms of the general population of the U.S. As a result, there are sharp contrasts between male and female drinking practices. The heavy drinking category is mostly populated by men, while the women are mostly abstainers. Consequently, most problems are reported by men and often, in what may well be a tribute to the tension between an abstaining wife and a heavy drinking husband, affect family relations or marriage. Drunkenness seems to be an accepted drinking pattern, more so than among Whites and Blacks, and as such may contribute to the high prevalence of alcohol problems among Hispanics. The constrasting drinking patterns of men and women and the variation in drinking practices across different national groups or different subgroups of Hispanics is underlined in ethnographic research.

Recommendations for Research

The criticisms developed here underscore the limited nature of the information on alcohol use by Hispanics It would seem that before moving ahead into new areas of inquiry some of the unsettled issues raised by this literature should be dealt with in an adequate manner. One area to be addressed is that of indirect indicators of alcohol problems. There is urgent need for future research in alcohol-related mortality among Hispanics. At present death certificates do not have a place for coding ethnicity and therefore mortality information cannot be tabulated by this characteristic. This code should be created so that these data can be made available at national and state level. In the meantime, the coding for country of birth in the death certificate can be used to provide information on those Hispanics who were born outside the country. Alternatively, it is possible to use Spanish surname as an indicator of ethnicity. This procedure has well known limitations such as inclusion of non-Hispanic individuals who

for reason of marriage or otherwise have Spanish-surnames, and exclusion of Hispanics who do not have traditional Spanish surnames. However, such studies could provide a base for assessment of alcohol-related mortality among Hispanics while the ethnic code in the death certificate does not become available.

It is also important to develop studies to evaluate both police handling of alcohol-related arrests and long term effectivenes of increased police enforcement of drunk driving among Hispanics. These investigations should be more than mere analysis of changes in official statistics with time. It is important that these studies provide details of police enforcement practices as well as a description of arrestees in terms of usual drinking habits and sociodemographic characteristics. Description of arrest in term of place, time, reasons for and behavior that prompted arrest are also very important if this alcohol-related problem is to be better understood and if police bias is to be ascertained. P rhaps the most profitable methodological approach for such studies is a mixture of ethnographic-like descriptions of police enforcement and quantitative analyses.

Another area in need of further development is that of survey research. One of the requisites for future efforts in this territory is the study of larger and representative samples of Hispanic individuals and the use of more sophisticated techniques of data analysis. At the moment of this writing a national study of alcohol use and drinking problems among Hispanics which will satisfy these and other requirements is being conducted by the Alcohol Research Group with support from the National Institute of Alcohol Abuse and Alcoholism. This study will interview approximately 1,500 Hispanics nationwide, in accordance to a probability sample design of this ethnic group in the U.S' Data is being collected by trained personnel in face to face interviews. The questionnaire asks detailed information in the areas of demographic characteristic, drinking patterns, drinking in the context of family life, work setting, and social group affiliations, attitudes and norms on drinking and responses to drinking problems, drinking problems, treatment experiences, life experiences, depression, migration and acculturation. The study will also interview a representative sample of Blacks and it is also being conducted together with a nationwide probability sample of the adult U.S. population. Because these three samples are being interviewed with the same questionnaire, findings can be compared across populations which will enrich the descriptions and provide a deeper understanding of characteristics of alcohol use and its relationship with problems in each populational group.

Also at the national level there are data on Hispanics collected by the Hispanic Health and Nutritional Examination Survey (Hispanic HANES). This survey will yield rich information about Hispanics' health status, covering such areas as alcohol consumption and smoking, depression, disabilities, dietary habits, nutrition status, blood pressure, serum cholesterol, height, weight, and other physiological and body measurements. The extent of heart disease, diabetes, hypertension, liver disease and other chronic conditions will also be measured together with health care utilization. The questions on alcohol use cover the consumption of beer, wine and liquor in a reference-period of 4 weeks, or if the respondent did not drink in this period in the 4 weeks previous to the last drinking occasion. There are also questions on reasons for drinking, abstaining and heavy drinking. Given the data coverage in this study, one of its many strengths is the possibility of studying the relationship between alcohol consumption and health status and physical ailments. There is very little data on this area for Hispanics and this Hispanic HANES is therefore a welcome development

Surveys concentrated in areas with large and more homogenious Hispanic populations than that interviewed in a national study are also important to conduct. Geographically limited surveys have the advantage of providing more accurate

information on regional or national differences in drinking habits across Hispanic groups which are important for designing treatment and prevention strategies. The total costs involved in conducting such a series of surveys would undoubtly be higher but the information they provide will be more useful in planning adequate responses to alcohol problems at the level of local communities. Since epidemiological research on alcohol problems is not conducted with the sole purpose of advancing our understanding of how alcohol problems develop but aims also at contributing to the public health effort of preventing such problems, this latter approach should receive detailed consideration both from researchers and planners.

Responding to Alcohol-related Problems among Hispanics

Before attempting to make suggestions as to what types and how alcohol problems among Hispanics should be prevented, a brief review of the relationship between the epidemiology of alcohol problems in the general population and the development of prevention strategies is in order. Findings from alcohol research in the general population have repeatedly shown a picture of the distribution of alcohol problems in the community which contradicts the traditional disease concept as put forward by Jellinek (1952, 1960), and the notion that treatment and prevention policies should be developed under this paradigm. While the disease concept proposes that alcoholism is an entity with a pathognomonic symptom - loss of control over the amount of alcohol ingested - as well as predictable phases and evolution, epidemiological findings indicate that alcohol problems in the general population are much more disaggregated than would be expected if they were all symptoms of an underlying condition. Studies have shown that having a particular drinking problem is only a modest predictor of having any other type of drinking problem, and that having a drinking problem at a certain point in time is only a modest predictor of having the same problem at another time (Room, 1977). Drinkers also seem to get in and out of problems spontaneously (Roizen et al., 1978; Clark, 1976). Loss of control is not an irreversible phenomenon that marks the beginning of some new drinking pattern qualitatively different from the previous one (Clark, 1976).

Results also indicate that the distribution of alcohol consumption in the general population is not bimodal. In other words, drinkers distribute themselves along a continuum, with no "bump" at the upper end of the distribution that can be attributed to alcoholics. Further, sociodemographic variables offer a potential source of explanation for differences in drinking patterns and alcohol problems. Characteristics such as sex, age, income, etc., show statistically significant associations with drinking and contradict the notion that problem drinking is a condition due only to an etiological factor carried by the individual. In general, the drinking histories of problem drinkers in the general population do not seem to follow a predictable pattern like that described by AA members and Jellinek (1946) and which characterizes problem drinkers who seek treatment. In spite of all the alcohol problems present in the community, the proportion of people with drinking patterns similar to those in the clinical population is only about 1% (Room, 1968), a finding which suggests that prevention efforts developed under the disease concept and which aim at locating the pre-alcoholic or hidden alcoholic in the community are inefficient.

These results come from studies conducted in a majority of cases with non-Hispanic populations, with Hispanics forming only a small fraction of the subjects. However, while the patterns of association between problems and sociodemographic variables, the prevalence of different types of problems and the norms and attitudes that govern alcohol use are specific to the Hispanic group, the disaggregative nature and the evolution of alcohol problems are not. These two attributes of alcohol problems are shared by non-clinical populations and, therefore, it is feasible to develop general

approaches to prevention which will be applicable across ethnicity to all groups in the community. Taking these results into consideration it would seem that the response to alcohol problems among Hispanics as well as that directed to the population as a whole should be comprehensive, with a clear priority for prevention as well as treatment. The population which will be benefited by treatment services is but a small fraction of all of those with alcohol problems, and treatment is relatively expensive and often has modest results. In organizing treatment for alcoholics it may be well to keep in mind recent findings from a randomized clinical trial which suggest that firm advice from the appropriate professionals is worth as much as the more sophisticated inpatient or outpatient treatment offered in many specialized units (Edwards et al., 1977).

The thrust of the response to alcohol problems should be in the form of sustained and comprehensive prevention interventions. Two basic strategies can be followed in organizing preventive measures: a) reducing the demand for alcohol in the population; b) reducing alcohol availability in the community. In the first case the aim is to change people's drinking habits through education, persuasion and community organization. Currently available evidence suggests that educational efforts alone will not be successful in preventing alcohol problems or encouraging moderation in drinking habits (Wallack, 1980; Blane and Hewitt, 1977). In trying to change a deeply rooted behavior such as alcohol use, the mere provision of new information is of limited value (WHO, 1980). Educational campaigns should be developed and implemented in combination with other preventive efforts.

One recent prevention effort whose failure to produce significant changes in drinking habits underlines the importance of these points was the California Prevention Demonstration Project (see Wallack and Barrows, 1981 and Caetano, 1982 for details). This project had an important component aimed at preventing excessive alcohol use among Hispanics supported by the National Institute of Alcohol Abuse and Alcoholism through a grant to the California Comission on Alcoholism for the Spanish-speaking, Inc. The campaign used state-of-the-art methodology in its evaluation component. This was a quasi-experimental design involving three communities, two experimental and one control, and three stages of data collection through community surveys, before, during and after the interventions. The campaign's message of moderation was disseminated through the mass media, and used specifically made site spots on Spanish language televison, radio and outdoor billboards. In one study there was also a community intervention component, which consisted of community meetings organized by campaign staff to further disseminate the message of moderation and assure community participation in the preventive effort. Other vehicles used to propagate the campaign message were calendars, bumper-stickers, car stickers and a newsletter. Had this campaign relied on other preventive efforts besides public education, the results might have been different. As organized it constituted an isolated effort sustained for a limited amount of time and, with hindsight, with little chances of success. Also, the campaign relied little in survey research findings to focus on specific drinking behaviors and problems with high prevalence in the community.

In attempting to reduce alcohol availability in the community, a number of measures have been suggested (Bruun et al., 1975; also Room, 1984b for a review). One measure that has been suggested is some limitation on consumers, which in our societies means limiting the purchase of alcohol to those above a certain age limit. Another suggestion refers to placing some limitation on the frequency and type of outlets and hours of sale. This measure may be particularly relevant to the prevention of alcohol problems among Hispanics due to the apparent increased concentration of alcohol outlets in Hispanics neighborhoods and their association with an increased prevalence of problems. Some form of price control as well as control of advertising are other measures that have been suggested as effective in lowering alcohol

consumption. Some of these interventions can be developed and implemented at the federal level, some other at state and local level. In the U.S. it is not possible for a local community to attempt to control consumption by increasing taxation or decreasing production of alcoholic beverages. These are measures that can only be implemented at federal or state level. At the local level it may be more feasible and appropriate to try to regulate the hours of sale or the number of alcohol outlets in the community by, for instance, using local zoning ordinances (Wittman, 1982). Finally, some problems may also be ameliorated by insulating behavior from consequences (Room, 1975). Thus, providing free taxi for those who leave bars intoxicated may minimize drunk driving accidents. Similarly, organizing "wet hotels" where people can drink in a protective environment may diminish accidents associated with being drunk in the streets (falls, fights, etc.) as well as public drunkenness arrests and police workload.

Any set of preventive interventions needs to be developed with care if it is to be effective. First, it is necessary to obtain community input at all stages of planning and implementation. In attempting to strengthen ties with the community, attention should be paid to those institutions and people who are not formally recognized as responding to alcohol problems but which do provide services in this area. These informal responses may be provided by the clergy through their leadership and counseling role, by emergency-room personnel, by general practitioners, and by various agencies and programs such as those dealing with, battered women, child abuse, etc. In a recent survey of services provided by community agencies in Contra Costa County, California, Weisner (1981) identified around 200 non-alcohol specific agencies which, in many different ways, provided services for people with alcohol problems or for their families.

With respect to Hispanics, the Catholic church is an important institution whose participation is necessary in alcohol prevention. Many Hispanic "fiestas" are linked to religious celebrations. While drinking is not an original part of the religious activities, it is built by popular tradition in the festivities that evolve around the holiday. Support from the church and at the local level from the the priest, who is seen as a respected community leader whose advice is sought for both religious and non-religious matters, are therefore important for prevention. Ethnic organizations also have input in Hispanic communities and can be of help in developing community acceptance for prevention. An instance where the activities of these groups could have been directed toward prevention within the Hispanic community is given by the recent alliance developed between Hispanic ethnic organizations and Adolph Coors Co. (Del Olmo, 1984). Coors has been interested in increasing their share of the beer market among Hispanics, and an advertising campaign targeted for Hispanics has been developed in states with large Hispanic populations (Modern Brewery Age, 1980). The accord between Coors and six Hispanic organizations is part of this campaign.[7] Coors will hire more Latino workers and increase business transactions with Latino owned companies. However, after 1990 all benefits to the Hispanic community will depend on how much Coors beer has been consumed by Hispanics in the meantime. Making it explicit, this means that Hispanic organizations involved in this plan have become partners of Coors in its attempt to increase alcohol consumption among Hispanics in the years ahead. A similar agreement has been reached between Coors and the Los Angeles chapter of the National Association for the Advancement of Colored People.

Second, the interventions need to be both population and problem specific. That is, they should be tailored to the problem to be prevented and the "target" group for

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7. The organizations are: National Council of La Raza, National IMAGE Inc., American GI Forum, Hispanic Chamber of Commerce, National Puerto Rican Coalition and the Cuban National Planning Council.

whom they are intended. This specificity is necessary because of the disaggregation that characterizes the distribution of alcohol problems in the general population and because of the wide range of health and human behavior affected by these problems. Preventing drunk driving among young adults is different from attempting to minimize public drunkenness among derelict middleaged men or heavy drinking by pregnant women. Based on the results of the studies reviewed in this report, among Hispanics the most obvious candidates for concentrated attention are the males, especially those in middle age. These men have a high rate of heavy drinking and drunkenness which are drinking behaviors closely associated with alcohol problems. Some attempt to minimize these behaviors is therefore in order. These men are also in an age group which is highly affected by cirrhosis, a serious medical problem which takes a heavy toll in premature mortality and which should be prevented. Further, default in their social roles as bread-winners and role-models for children because of heavy drinking is likely to affect not only their lives but the family and the community in many severe ways. They should, therefore, constitute prime targets for any prevention efforts directed at this ethnic group. Specific problems to be dealt with are those affecting health and family relations. The liberal views toward intoxication that seem to be present among Hispanics, as well as the importance given to alcohol as a social lubricant should also be taken into consideration in designing interventions. The association between drunkenness and the increased risk of problems that such state brings needs to be underlined.

Besides specificity of aims another important aspect of prevention interventions is cultural sensitivity. Epidemiological studies and ethnographic research alike are conducted not only to provide prevalence rates on different types of problems and patterns of drinking but also, and equally importantly, to provide a framework for better understanding the many ways in which alcohol use is interwoven in the culture of a particular ethnic group. The studies reviewed here show that drinking is a well accepted activity among Hispanics, one which provides recreation, accompanies festivities and the renewing of friendship and kinship bonds, and which is even seen as a right earned through the fulfillment of family and social obligations. Anglo culture in the U.S. has a tradition of preoccupation with the evils of alcohol that goes back to the 19th century and the temperance movement. In this culture alcohol was seen for many years as the major source of social and health problems: for many Americans today as in the past, nothing good could or should be said about it. This focus on the bad aspects of drinking culminated in 1919 with the passage of the 18th ammendment and prohibition. In 1933 prohibition was repealed and drinking became once again an acceptable social activity. Variations on this history of dealing with concern about alcohol are shared by the U.S., and other English-speaking and Northern European countries, but are not part of the recent history of alcohol in Latin American nations. Variations between Anglo and Hispanic norms and attitudes toward alcohol consumption may be related to these historical differences. Hispanics seem to have a more liberal view of alcohol use than Anglos as part of their cultural heritage. Thus, they may not necessarily see even heavy drinking as a bad thing which needs to be changed, especially if such a heavy drinking does not interfere with family and social obrigations. Given these differences in perceptions about alcohol use, approaches to prevention that may be acceptable and successful among Anglos may not be so among Hispanics. Public health professionals and all of those working in the alcohol field need to take these differences into consideration when planning prevention interventions directed at U.S. Hispanics.

Table 1: Arrests for Alcohol-related Offenses by Hispanic origin; 1981.

18 years of age and older

	Hispanic		Non-Hispanic	
	N	% of total arrests for Hispanics	N	% of total arrests for Non-Hispanics
Driving under influence	142548	19	1082327	17
Liquor laws	19230	3	256080	4
Drunkenness	159433	21	771941	12

Less than 18 years of age

	Hispanic		Non-Hispanic	
	N	% of total arrests for Hispanics	N	% of total arrests for Non-Hispanics
Driving under influence	2499	1	22633	1
Liquor laws	7399	4	111351	7
Drunkenness	178673	5	24964	2

Source of data: Crime in the United States, 1981 (F.B.I., 1981).

Table 2: Alcohol-related Arrests per 100,000 Population by Hispanic Origin; 1981.

18 years of age and older

	Hispanic	Non-Hispanic
Driving under influence	1712.2	742.6
Liquor laws	230.9	175.7
Drunkenness	1914.9	529.7

Less than 18 years of age

	Hispanic	Non-Hispanic
Driving under influence	39.8	34.2
Liquor laws	117.8	168.3
Drunkenness	138.0	37.7

Source of data: Crime in the United States, 1981 (F.B.I., 1981).

Table 3: Percentage of Admissions with Drug and Alcohol Disorders by Ethnicity and Type of Facility: United States, 1975

Type of Facility	Other White	Black	Hispanic
Outpatient Psychiatric Services	4.8	8.6	5.6
Inpatient Psychiatric Services:			
- State and County Mental Hospitals	31.5	27.7	38.8
- Private Mental Hospitals	10.6	9.7	18.3
- Non-Federal General Hospitals	10.4	10.8	9.7
PUBLIC	15.4	8.4	12.3
NON-PUBLIC	8.9	12.7	7.0

Source: American Public Health Association (1982).

Table 4: Percentage of Hispanic Clients Receiving Treatment for Alcoholism on September 30, 1980. Selected States.

States	1980 All Clients	1980 % Hispanics	1982 All Clients	1982 % Hispanics	% Hispanic in State Population
Arizona	5,317	14	4,452	15	16
California	54,482	23	37,542	23	19
Colorado	8,626	28	9,741	23	12
New Mexico	2,553	35	3,136	12	37
Texas	11,617	23	8,100	16	21
New York	22,404	13	24,332	13	9
Florida	8,998	5	11,008	6	9
Southwest[1]	82,595	23	62,971	23	20
U.S.	307,662	11	283,166	9	6

Source: State Alcoholism Profile Information System - SAPIS (1981) amd Department of Health and Human Service (1983).

[1] Arizona, California, Colorado, New Mexico, Texas.

Table 5: Alcohol-Related Problems Among Hispanics as Reported by Selected Surveys in the U.S. (Percentages).

Problem	Cahalan & Room, 1974 (N = 96)	Cahalan, 1976 (N = 61)	Cahalan & Treiman, 1976 (N = 80)	Alcocer, 1979 (N = 603)
ACCIDENTS	2	*	1	6
DRUNK DRIVING	*	*	*	6
POLICE	4	*	1	4
FRIENDS	12	7	*	5
HEALTH	*	3	3	7
MARRIAGE	6	12	14	6
LOSING CONTROL**	2	-	7	5
JOB	6	3	4	*

* Not reported in a comparable way.

** Reported as "afraid of losing control" by Alcocer 1979, and as "loss of control" by Cahalan and Treiman 1976, and by Cahalan and Room 1974.

Table 6: Drinking Patterns by Sex. Percentages in Brackets are Standardized by Age.

	MALES			FEMALES		
	White (1047)	Black (468)	Hispanic (279)	White (1280)	Black (738)	Hispanic (355)
Abstainer	11 (11)	16 (18)	14 (15)	18 (18)	29 (32)	32 (33)
Occasional	9 (9)	7 (8)	6 (5)	18 (18)	19 (19)	20 (21)
Infrequent	13 (14)	17 (16)	17 (17)	27 (27)	23 (21)	24 (24)
Frequent Low Maximum	20 (20)	21 (21)	16 (18)	22 (21)	14 (14)	14 (14)
Frequent High Maximum	26 (25)	17 (16)	21 (20)	11 (12)	9 (9)	7 (5)
Frequent Heavier Drinker	21 (21)	22 (21)	26 (24)	4 (4)	6 (5)	3 (3)

X^2 Males = 30.432, df = 10, p .001

X^2 Females = 76.800, df = 10, p .001

Table 7: Drinking Patterns by Age and Ethnicity Among Males.
Percentage of Respondents in Various Drinking Categories.

	18-29			30-39			40-49			50-59		
	White (381)	Black (180)	Hispanic (107)	White (266)	Black (141)	Hispanic (86)	White (154)	Black (75)	Hispanic (41)	White (246)	Black (72)	Hispanic (45)
Abstainers	9	16	13	10	11	9	12	17	15	14	29	24
Occasional	7	8	7	12	6	6	9	5	2	10	10	4
Infrequent	12	18	17	15	16	21	15	16	12	13	14	13
Frequent Low Maximum	15	23	12	16	16	19	27	24	17	27	21	20
Frequent High Maximum	27	18	17	32	21	16	20	16	34	20	10	28
Frequent Heavier Drinkers	29	17	34	15	30	29	17	21	20	16	17	9

Table 8: Problem Type by Sex and Ethnicity. Percentage of Respondents Reporting Specific Problems.

	MALES			FEMALES		
	White (1047)	Black (468)	Hispanic (279)	White (1280)	Black (738)	Hispanic (355)
Spouse upset because of drinking	13	12	17	1	4	4
Someone in the family upset because of drinking	10	10	11	4	7	5
Friends or neighbors upset because of drinking	5	8	9	2	3	2
Someone else upset because of drinking	2	2	3	1	1	1
Drinking has had a harmful effect on friendships and social life	4	5	9	1	2	2
Drinking has had a harmful effect on health	10	11	12	3	4	5
Drinking has had a harmful effect on home life	6	4	9	1	3	2
Drinking has had a harmful effect on work and employment opportunities	3	3	3	0	1	1
Drinking has had a harmful effect on financial position	6	4	9	1	2	2

Table 9: Standardized Regression Coefficients for Selected Variables with Number of Drinking Problems

Variables	Whites	Blacks	Hispanics
Number of drinks per month	.286*	.292*	.409*
Frequency of drunkenness	.268*	.242*	.083**
Attitudes	.064*	ns	ns
Male	.077*	ns	.119*
Age	-.067*	ns	ns
Housewife	-.058**	ns	ns
Unemployed	ns	ns	.107**
Total R^2	.27	.25	.26

* F test: p .01
**F test: p .05
ns: not significant

Table 10: Attitudes Toward Alcohol Use. Percentage of Respondents "Basically Agreeing" by Sex and Ethnicity.

	MALES			FEMALES		
	White (1047)	Black (468)	Hispanic (279)	White (1280)	Black (738)	Hispanic (355)
It is all right for a woman to get drunk once in a while	54	36	39	37	24	33
It is all right for a man to get drunk once in a while	56	44	54	40	35	48
Getting drunk is sometimes a good way to blow-off steam	30	28	36	15	21	22
Getting drunk is just an innocent way of having fun	21	28	35	10	18	22
A real man can hold his liquor	5	18	14	3	8	11
People who drink have more fun than people who don't	7	12	21	4	9	13
People who drink have more friends than people who don't	8	19	26	6	17	25
A party isn't really a party unless alcoholic beverages are served	23	33	33	16	23	26

Table 11: Knowledge About the Use and Effects of Alcoholic Beverages.
Percentage of Respondents Giving the Correct Answer By Sex

	MALES (279)	FEMALES (354)
1. Alcohol is a stimulant that peps people up and makes them more alert (F)	80	79
2. Drinking on an empty stomach can increase the speed that alcohol gets into your blood (T)	96	97
3. Most people can drink about three cans of beer in one hour without getting high (F)	43	44
4. A person weighing 160 pounds and someone weighing 120 can drink the same amount of alcohol during the same time period and will be affected the same way (F)	68	57
5. Alcohol can be an addictive drug (T)	93	96
6. Alcohol is the drug most often involved in violent acts (T)	87	87
7. Alcohol is the drug most often involved in accidents (T)	93	95
8. Many serious diseases are related to drinking too much alcohol (T)	84	90
9. About one out of five adults in California are non-drinkers (T)	49	48
10. Most adults in California drink more than once a week (F)	8	11
11. Californians drink more than people in most other states (T)	52	46
12. It is legal for a 19 year old to drink beer in California (F)	81	69
13. It's against the law for a bartender or a liquor store clerk to sell alcoholic beverages to someone who is drunk (T)	81	73

Table 12: Perceptions of Community Problems as Very Important by Ethnicity*
(in percents)

	Blacks (1206)	Hispanics (634)	Whites (2328)
Drunk driving in your community	44	58	48
Divorces and family troubles in your community due to drinking	25	38	29
People in your community in poor health due to drinking	25	30	21
The number of liquor stores and bars in your community	19	20	14
Teenagers in your community drinking	32	43	33
People in your community doing poor work or staying away from work due to drinking	19	29	16
Alcoholic beverage containers being thrown into streets and yards in your community	40	45	36
People standing around in groups and drinking in public places like parks or street corners in your community	40	40	22

Source: Randolph, 1984.

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Diabetes

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REPORT OF THE

SUBCOMMITTEE ON DIABETES

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Chapter 1

THE PROBLEM

In 1980, diabetes mellitus was listed as the seventh leading cause of death in the United States by the National Center for Health Statistics (NCHS). However, official statistics for diabetes greatly underestimate the true impact of the disease on overall mortality and morbidity. Rather than dying from the disease itself, people with diabetes most often die from its long-term complications, such as heart disease, kidney disease, and stroke, which frequently are listed on death certificiates as the cause of death.

The serious complications of diabetes also are largely responsible for the high morbidity associated with diabetes. People with diabetes have twice as many heart attacks and about twice as many strokes as people who do not have diabetes. In adults, peripheral vascular disease associated wtih diabetes accounts for half of all nontraumatic amputations each year. Twenty-five percent of kidney failure and 12 percent of new blindness are attributable to diabetes. Diabetes is a major risk factor in pregnancy, accounting for some 4,000 to 4,500 neonatal deaths each year and a high incidence of congenital abnormalities, respiratory distress syndrome, prematurity, and other serious and life-threatening problems in newborn infants.

Although there is no known cure for diabetes, current evidence supports the view that the careful control of diabetes, together with good general health and nutritional practices, can prevent, delay, or ameliorate some of these serious complications.

Diabetes exemplifies the difference in health status between whites and minority groups. Although the problem is a national one that affects all segments of our population, blacks, Native Americans, Hispanic Americans, and Asian Americans suffer a disproportionate share of the disease, its effects, and the complications that arise from it. These minority groups generally have not had optimal access to continuing quality medical care in the past. As a result, over the past 50 years, they have accumulated a heavy burden of chronic disease (diabetes, hypertension, and obesity and their associated complications) that still adversely affects their health status. This situation in turn is reflected in increasing diabetes-related mortality, morbidity, and costs during the past 20 years.

Table 1.1 shows the prevalence and relative risk of diabetes among whites and among the four minority groups discussed in this report. Age-adjusted rates for mortality from diabetes are 50 percent higher in nonwhites than in whites, according to NCHS. While the percentage of the white population with diabetes approximately doubled in the last two decades, the percentage of diabetic blacks has almost tripled. Other minority groups are similarly affected. In one Native American tribe, the Pima Indians, about half of the population over 34 years old has diabetes, and their risk of incurring the disease is more than 10 times that of the white population. Hispanic Americans are three times as likely as whites to have the disease. Although Americans of Japanese ancestry have not been as affected as other minority

groups, their diabetes has been out of proportion to their representation in the Nation as a whole.

This report summarizes the nature of diabetes, its incidence and prevalence, its complications, and the mortality attributable to it. The report will describe what we know about the experience of diabetes for each of the four minority groups--blacks, Native Americans, Hispanic Americans, and Asian Americans. Statistics presented in this report show that diabetes is a major problem of national concern that disproportionately affects the four minority groups identified in this study.

Types of Diabetes

Diabetes mellitus comprises a heterogeneous group of disorders whose common characteristic is glucose intolerance. Diabetes occurs when the body cannot properly metabolize carbohydrates, fats, and proteins, resulting in abnormally high levels of glucose in the blood. Diabetes is a chronic disease that may develop slowly or as an acute metabolic crisis.

There are several types of diabetes. Insulin-dependent diabetes mellitus (IDDM), also know as type I diabetes, may occur at any age but typically develops in childhood or young adulthood. It is associated with certain genetic markers. IDDM is characterized by low levels or a total absence of insulin, and people with this kind of diabetes must depend on injected insulin to maintain their lives. IDDM accounts for approximately 5 to 10 percent of the diabetic population in the United States, according to the National Diabetes Data Group (NDDG).

Noninsulin-dependent diabetes mellitus (NIDDM), also know as type II diabetes, is the most common form of the disease, accounting for 90 to 95 percent of all cases. It most often affects adults (usually over the age of 40), seems to run in families, and is more common in women than in men and more common in nonwhites than in whites. People who develop the disease are often overweight. They may have high, normal, or low levels of insulin, but their ability to use it effectively is impaired. People with IDDM often can manage the disease through diet, weight control, and exercise, although some may require treatment with oral hypoglycemic agents or insulin. It has been estimated that up to 50 percent of NIDDM can be prevented through weight reduction and exercise.

Gestational diabetes occurs only during pregnancy. In gestational diabetes, blood glucose levels rise during pregnancy and revert to normal afterward. Women who are older and overweight, have family histories of diabetes, and have a history of multiple unexplained miscarriages or unusually large babies are prone to gestational diabetes. The disease may affect both mother and fetus. Almost 90,000 babies are born each year to women who develop gestational diabetes. Women who have had this form of diabetes are at increased risk of NIDDM later in life.

Incidence and Prevalence

Data on the incidence and prevalence of diagnosed diabetes are derived primarily from statistics compiled by the National Diabetes Data Group and the National Center for Health Statistics. The National Health Interview Survey (HIS), sponsored by NCHS, collects data through regular interviewing of household members and represents the noninstitutionalized population of the United States. HIS does not break down data by type I and type II diabetes. NCHS also conducts the Health and Nutrition Examination Survey (HANES), which periodically collects data from a probability sample of the population and from standardized direct medical examinations that include oral glucose-tolerance tests.

The NDDG estimates that 10 million Americans have diabetes--5.5 million with diagnosed diabetes and another 4.5 million with undiagnosed disease. In 1985, according to a new report of the National Diabetes Advisory Board, another 500,000 cases will be diagnosed, and 150,000 people will die from the disease and its complications.

Tables 1.2, 1.3, and 1.4 provide statistics on the prevalence and incidence of diabetes in the United States in 1978. Table 1.2 shows the number of new cases of diabetes in 1978, and table 1.3 provides data on the incidence per 100,000 persons by age and sex. The number and rate of diagnosed diabetes in American blacks in 1979-81 are shown in table 1.4. Among persons, mostly elderly, living in long-term care facilities, surveys indicate a diabetes prevalence of about 15 percent.

Diabetes Mortality

The National Center for Health Statistics develops disease-specific mortality rates by tabulating data on "underlying cause of death" and "multiple causes of death" as given on death certificates. Studies indicate that diabetes is generally underreported on death certificates. This underreporting of diabetes mortality is particularly true for older persons with multiple chronic conditions such as hypertension and heart disease. Because of this underreporting, the true toll of diabetes is believed to be much higher than officially reported.

Table 1.5 shows the number of deaths in 1980 by age, race, and sex in which diabetes was reported as the underlying cause. Death rates per 100,000 people are shown in table 1.6. The number of deaths in which diabetes was reported as the underlying or contributing cause in 1979 is shown by age, race, and sex in table 1.7, and table 1.8 presents the age-, race-, and sex-specific death rates per 100,000 in the general population.

In general, a person's life expectancy at diagnosis of diabetes is diminished by one-third. Mortality rates are higher in people who develop diabetes at a young age. A study of life insurance applicants revealed that the mortality rate in those who developed diabetes before 15 was 11 times higher than in the general population; in those who developed diabetes after age 40, the mortality rate was two to three times higher. After age 15, death rates among women with diabetes are lower than in their male counterparts. However,

the difference between men and women is smaller than the difference in the general population. Age-adjusted rates of mortality from diabetes in non-whites are approximately 50 percent higher than those in whites.

Cardiovascular disease, kidney disease, and stroke are major causes of death in people with diabetes. In the population included in the Framingham Study, death from cardiovascular disease was 2.9 times more common in people with diabetes than in the general population. Death from renal disease is 50 times more common in people with IDDM.

Risk Factors

Table 1.9 summarizes risk factors such as age, sex, race, genetic factors, and obesity associated with IDDM, NIDDM, and gestational diabetes.

Age, Sex, and Race. Insulin-dependent diabetes occurs most frequently in children and adolescents, with the peak age of onset between 10 to 14 years old. Both sexes are equally affected, and whites have a slightly higher incidence of IDDM than do other races.

Noninsulin-dependent diabetes increases dramatically with age in both incidence and prevalence, which are 1.8 and 1.4 times, respectively, as high in women as in men. According to HIS statistics for 1979-81, the prevalence rate in white men is 2.1 percent and in white women is 2.4 percent; in black men, the rate is 2.4 percent and in black women is 3.6 percent. The percentage of the Hispanic population estimated to be diabetic is 4.5 percent, and among Native Americans, the reported diabetes prevalence rate is 20 percent.

Gestational diabetes increases in incidence with age and is not independently affected by race.

Genetic Factors. IDDM is more likely to occur in persons with certain genetic markers or human leukocyte antigens (HLA). The risk is increased 3 times in those with two DR3 genes, 5 times in those with two DR4 genes, and 9.4 times in those with the combination DR3/DR4.

NIDDM in whites is not associated with specific HLA types. Siblings of persons with this form of diabetes, however, incur a risk up to six times as great as that of siblings of age-matched people without diabetes. The risk in children of NIDDM patients is doubled.

Gestational diabetes is more likely to occur in women with family histories of diabetes.

Level of Physical Activity. Well-documented studies clearly show a correlation between low levels of physical activity and the development of noninsulin-dependent diabetes. Lack of physical activity, in fact, leads to the deterioration of glucose tolerance and a reduction in the level of insulin secretion, while exercise improves both. One population study among Native Americans demonstrated that the rate of diabetes was higher among sedentary individuals (7.9 percent) compared with more physically active individuals (2.8 percent). Because inactivity favors obesity, which is an important deter-

minant of the risk of NIDDM, exercise may diminish the risk of becoming diabetic because of the effects of exercise on obesity.

Although exercise is probably a protective factor in NIDDM, there is no evidence that the level of physical activity is related to the development of insulin-dependent diabetes.

Diabetes During Pregnancy. A considerable amount of clinical data show that serious complications are associated with diabetes and pregnancy. NDDG data show that infants of diabetic mothers experienced higher rates of mortality, prematurity, and congenital malformations than the infants of mothers without diabetes. Annually, about 10,000 babies are born to mothers with insulin-dependent diabetes. According to statistics from the National Center for Health Statistics, another 60,000 to 90,000 babies are born to women who develop glucose intolerance during pregnancy (gestational diabetes).

Although epidemiologic studies of adverse outcomes in pregnancies in minorities are limited, minority populations appear to have excess mortality related to diabetes during pregnancy. A study in South Carolina showed that perinatal mortality among blacks was 3 times that of whites with diabetes and 8.5 times that of whites without diabetes. Among Native Americans, the Pima Indians have been reported to have higher infant mortality rates associated with diabetes during pregnancy. The rate in Pimas is 3.8 percent compared with 0.28 percent for the general population. Although population studies among Hispanics show significant excess morbidity and mortality due to diabetes, little information about the prevalence of diabetes during pregnancy is available at the present time. Among all population groups, it has been well documented that meticulous control of blood glucose during pregnancy can prevent the complications of diabetic pregnancy, with the exception of congenital malformations.

Environmental Factors. The impact of environmental factors on the development of diabetes remains uncertain. Environmental factors that have been implicated include diet, viruses, geographic location, and psychological stress.

Some epidemiologic evidence from population studies among Native Americans and Japanese indicates that changes in diet over the past four decades may, in fact, account for the increased prevalence of diabetes among these populations. Historically, the diets of Native Americans and Japanese were lower in calories and higher in fiber than their current diets. Certainly, diet has an important relationship to obesity, which has a strong association with NIDDM.

A growing body of scientific evidence indicates that certain viruses may be etiologic agents in the development of IDDM. In addition, patients with new onset of insulin-dependent diabetes have been shown to have antibodies to pancreatic islet cells, suggesting an autoimmune response to an as-yet unidentified agent.

Some current investigations are under way to assess the relationship of geographic location to the development of diabetes because the prevalence of

diabetes seems to increase with distance from the equator. With respect to environmental stress, the increased prevalence of diabetes among Native Americans and Japanese Americans may be attributed to the increased psychological stress of social and cultural changes that have affected these people over the past four decades.

Clearly, further research to clarify the impact of environmental factors in the development of diabetes in both the general population and minority populations is needed.

Complications of Diabetes

The true toll taken by diabetes is not limited to its direct effects. Table 1.10 shows the incidence and prevalence in 1980 of such acute and long-term complications as ketoacidosis, congenital malformations, stroke, coronary heart disease, peripheral vascular disease, blindness, end-stage renal disease (ESRD), and amputations. Table 1.11 shows the risk factors for these complications, including the types of diabetes with which each is associated, the influence of age, sex, and race, and the level of importance of eight other factors.

Risk factors for the complications of diabetes include hypertension, cigarette smoking, hyperlipidemia, hyperglycemia, inadequate education in self-management skills, and inadequate or poor access to medical care.

Prevention

Although a great deal is becoming known about the pathogenesis and prevention of diabetes and its complications and successful techniques for improved diabetes management have been developed, the information has not always been communicated to people with diabetes and to the providers of health care services.

We know that obesity has a major association with NIDDM, and yet it remains a national epidemic. Many people with diabetes do not know the warning signs of ketoacidosis and lack self-management skills in monitoring for this condition. Many women with diabetes fail to achieve euglycemia before and during pregnancy, and many cases of gestational diabetes are not diagnosed and treated. Many providers of health care do not prescribe self blood glucose monitoring for those patients who might benefit from this approach, and glycosylated hemoglobin tests to monitor glycemic control are not performed by attending physicians as consistently as would be desirable.

Studies indicate that only three-fourths of those people with diabetes and hypertension are treated for the latter condition, and only half have adequately controlled blood pressure. Physicians check the blood pressure of diabetic patients during only 67 percent of their office visits. More than 1 million people with diabetes smoke cigarettes. Fewer than 50 percent are given yearly examinations for diabetic retinopathy. We know that the daily demands of a rigorous medical regimen and fear of devastating complications produce severe stress on patients and their families, yet emotional and

psychological support often is not available to them from health care providers and society in general.

In terms of human suffering and economic issues, the cost of the failure to put to use what is known about controlling diabetes is enormous. A very large proportion of these costs could be saved with more effective communications of new knowledge and techniques to health care professionals and to diabetic patients and their families. A large share of these costs is borne by the four minority groups hardest hit by the disease. The next four chapters will review the problem of diabetes as it affects these groups.

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Table 1.1

AGE-ADJUSTED PREVALENCES AND RELATIVE RISKS OF DIABETES BY TYPE OF DIABETES AND RACE, UNITED STATES

	White	Black	Hispanic	Native American (Pima)	Japanese/ American
Type I diabetes					
Prevalence per 100,000	160[1]	130[1]	150[2]	--	--
Relative risk*	1.01	0.8	0.9	<1.0[3]	<1.0[4]
Type II diabetes					
Prevalence per 100,000	2,300[5]	2,900[5]	7,200[6]	24,800[7]	--
Relative risk*	1.0	1.3	3.1	10.8	1.4[8]

*Risk compared to US white population.

Relative risk is a statistical association between the presence of a risk factor and the chance of having a particular disease brought about by the factor's presence.

Relative risk is a ratio, with the numerator being expressed as number of pairs for which the case member exhibits the risk factor while the control does not: the denominator is number of pairs for which the control member exhibits the risk factor while the case member does not.

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Table 1.1 (continued)

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Table 1.2

NUMBER OF NEW CASES OF DIABETES IN THOUSANDS
BY AGE AND SEX, UNITED STATES, 1978

Age	Men	Women	Total
>25	--	13*	13*
25-44	64	45	109
45-54	21*	86	107
55-64	32*	103	135
65+	80	126	206
Total	197	373	570

*Figure does not meet standards of reliability or precision.

Source: National Diabetes Data Group, NIH, from the National Health Interview Survey, 1978.

Table 1.3

INCIDENCE OF DIABETES PER 100,000
BY AGE AND SEX, UNITED STATES, 1978

Age	Men	Women	Total
>25	--	29*	14*
25-44	233	153	192
45-54	189*	724	466
55-64	332*	955	661
65+	859	941	907
Total	191	337	267

*Figure does not meet standards of reliability or precision.

Source: National Diabetes Data Group, NIH, from the National Health Interview Survey, 1978.

Table 1.4

NUMBER AND RATE OF DIAGNOSED DIABETES IN BLACKS,
UNITED STATES, 1979-81

Age	Total Black Population* (Number in 000s)			Diabetic Black Population† (Number in 000s)			Rate of Diabetes per 1,000 Persons		
	Both Sexes	Male	Female	Both Sexes	Male	Female	Both Sexes	Male	Female
All ages	25,878	12,030	13,848	834	305	529	32.2	25.4	38.2
0-24 years	13,106	6,405	6,701	20	6	14	1.5	0.9	2.1
25-44 years	6,666	2,942	3,724	144	59	85	21.6	20.0	22.8
45-54 years	2,269	1,044	1,224	194	92	102	85.3	87.9	83.1
55-64 years	1,818	812	1,006	215	73	142	118.1	89.2	141.5
67-74 years	1,331	560	771	172	57	115	129.3	102.1	149.5
75+ years	688	267	421	90	19	71	130.9	72.6	168.1

*Total population based on pooled full samples of households.

†Diabetic population based on pooled annual one-third subsamples.

Source: Office of Analysis and Epidemiology, NCHS, from unpublished data from the National Health Interview Surveys.

Table 1.5

NUMBERS OF DEATHS IN WHICH DIABETES WAS REPORTED AS THE UNDERLYING CAUSE*
BY AGE, RACE, AND SEX, UNITED STATES, 1980

	White			All Other Races			Total		
Age	Male	Female	Total	Male	Female	Total	Male	Female	Total
>15	33	20	53	12	6	18	45	26	71
15-44	681	527	1,208	212	188	400	893	715	1,608
45-64	3,074	2,974	6,048	779	1,161	1,940	3,853	4,135	7,988
65+	8,361	13,234	21,595	1,205	2,428	3,633	9,566	15,662	25,228
Total†	12,149	16,756	28,905	2,209	3,786	5,995	14,358	20,542	34,900

*ICDA9 Codes: 250, 251.0, 648.0, 775.0, 775.1, and 962.3.

†Total includes cases for which age was not stated.

Source: National Center for Health Statistics: Public Use Mortality Data Tapes, 1980.

Table 1.6

AGE-, RACE-, AND SEX-SPECIFIC DEATH RATES PER 100,000
CALCULATED FROM UNDERLYING-CAUSE-OF-DEATH DATA,
UNITED STATES, 1980

	White			All Other Races			Total		
Age	Male	Female	Total	Male	Female	Total	Male	Female	Total
>15	0.2	0.1	0.1	0.3	0.1	0.2	0.2	0.1	0.1
15-44	1.5	1.2	1.3	2.9	2.3	2.6	1.7	1.3	1.5
45-64	16.3	14.4	15.3	34.8	42.4	38.9	18.2	17.7	18.0
65+	89.2	95.0	92.7	121.5	172.2	151.2	92.3	102.1	98.1
Total†	12.8	16.8	14.8	14.6	22.6	18.8	13.0	17.6	15.4
Age-Adjusted Rate*	14.0	14.1	14.1	22.0	28.9	26.0	14.8	15.7	15.4

*Age adjusted by the direct method to the total resident population of the United States, July 1980.

Sources: National Center for Health Statistics: Public Use Mortality Data Tapes, 1980.
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Table 1.7

NUMBERS OF DEATHS IN WHICH DIABETES WAS REPORTED AS THE UNDERLYING CAUSE*
BY AGE, RACE, AND SEX, UNITED STATES, 1979

	White			All Other Races			Total		
Age	Male	Female	Total	Male	Female	Total	Male	Female	Total
>15	59	61	120	18	24	42	77	85	162
15-44	1,344	994	2,338	454	413	867	1,798	1,407	3,205
45-64	12,099	9,715	21,814	2,390	3,167	5,557	14,489	12,882	27,371
65+	35,981	51,186	87,167	3,854	6,774	10,628	39,835	57,960	97,795
Total†	49,487	61,962	111,449	6,717	10,378	17,095	56,204	72,340	128,544

*ICDA9 Codes: 250, 251.0, 648.0, 775.0, 775.1, and 962.3.

†Total includes cases for which age was not stated.

Source: National Center for Health Statistics: Public Use Mortality Data Tapes, 1979.

Table 1.8

AGE-, RACE-, AND SEX-SPECIFIC DEATH RATES PER 100,000
FROM MULTIPLE-CAUSE-OF-DEATH DATA,
UNITED STATES, 1979

	White			All Other Races			Total		
Age	Male	Female	Total	Male	Female	Total	Male	Female	Total
>15	0.3	0.3	0.3	0.4	0.5	0.5	0.3	0.3	0.3
15-44	3.0	2.2	2.6	6.5	5.3	5.9	3.5	2.7	3.1
45-64	64.0	47.1	55.2	108.9	118.6	114.2	68.6	55.3	61.7
65+	392.2	375.8	382.4	393.7	498.8	454.8	392.3	386.9	389.1
Total	52.4	62.4	57.5	45.9	64.1	55.4	51.5	62.6	57.2
Age-Adjusted Rate*	58.0	52.5	55.0	68.7	81.8	76.3	59.1	55.6	57.2

*Age adjusted by the direct method to the total resident population of the United States, July 1979.

Sources: National Center for Health Statistics: Public Use Mortality Data Tapes, 1979.
U.S. Bureau of the Census: Preliminary Estimates of the Population of the United States by Age, Sex, and Race: 1970 to 1981. Current Population Report, Series P-25, No. 917, U.S. Government Printing Office, Washington, D.C., 1982.

Table 1.9

SUMMARY OF RISK FACTORS FOR DIABETES

	Age	Sex	Race	HLA/ Family History	Obesity
Type I diabetes mellitus	Maximum at 10-14 years	F = M	White > other races RR = 1.1	HLS DR3/DR4 RR = 9	No
Type II diabetes mellitus	Increases with age	F > M RR = 1.4	Other races > white RR = 1.3	Family history RR = 2	Yes RR = 3
Gestational diabetes mellitus	Increases with age	F only	White = other races	No	Yes RR = 2

Source: Table compiled by S. M. Teutsch, Centers for Disease Control, September 1984 (unpublished document).

Table 1.10

ESTIMATED NUMBERS OF INCIDENT AND PREVALENT CASES
OF COMPLICATIONS OF DIABETES,
UNITED STATES, 1980

	Incident Cases	Prevalent Cases
Diabetic ketoacidosis	75,000	--
Serious congenital malformations	850	--
Stroke	23,000	320,000
Coronary heart disease	85,000	650,000
Peripheral vascular disease	41,000	497,000
Blindness	5,800	40,000
End-stage renal disease	4,000	7,600
Amputation	31,000	71,000

Source: National Diabetes Data Group, NIH.

Table 1.11

SUMMARY OF RISK FACTORS FOR COMPLICATIONS OF DIABETES

	Age	Sex	Race	Type of Diabetes	Obesity	Lack of Education Self-Management Skills, and Access to Care	Hyper-tension	Cigarette Smoking	Hyper-lipidemia	Hyper-glycemia	Lack of Laser Photo-Coagula-tion	Lack of Foot Care
Ketoacidosis	Maximum at 45	F M	Other races = white	Type I Type II	±	++	-	-	-	++	-	-
Congenital malformations	Increases with maternal age	F only	Other races = white	Overt DM Gest. DM	±	++	-	-	-	++	-	-
Stroke	Increases with age	F M	Other races = white	Type II Type I	++	+	++	+	+	+	-	-
Coronary heart disease	Increases with age	M F	Other races = white	Type II Type I	++	+	++	++	+	+	-	-
Peripheral vascular disease	Increases with age	M F	Other races = white	Type II Type I	++	+	+	++	+	+	-	-
Blindness	Maximum at 65	F M	Other races = white	Type I Type II	+	+	+	-	-	±	++	-
End-stage renal disease	Maximum at 45	M F	Other races = white	Type I Type II	+	+	++	±	-	±	-	-
Amputations	Increases with age	M F	Other races = white	Type II Type I	+	+	+	++	+	+	-	++

++ Major risk factor
+ Risk factor
± Possible risk factor
- Not a risk factor

Source: Based on Consultation Report to the NIH Subcommittee on Diabetes Mellitus, by J. K. Davidson.

Chapter 2

DIABETES IN BLACK AMERICANS

Until 1940, diabetes mellitus was less common in the black population than in the general population. Today, the prevalence of noninsulin-dependent diabetes is 33 percent higher in black Americans than in the white population. Moreover, diabetes is the third leading cause of death from disease in blacks, exceeded only by heart disease and cancer. According to 1980 data from the National Center for Health Statistics, 3.2 percent of the approximately 27 million blacks in this country (more than 800,000 people) have diagnosed diabetes, and another 4 percent (over 1 million) are thought to have undiagnosed diabetes.

The majority of blacks with diabetes in the United States appear to have noninsulin-dependent diabetes. Reliable estimates of the prevalence of insulin-dependent diabetes in blacks are not available. Insulin-dependent diabetes probably is less common in blacks than in whites in this country, but more common than in African blacks. How much of a prevalence differential there is between blacks and whites in the United States is uncertain. Estimates of IDDM incidence in the U.S. black population compared to the white population have ranged as high as 5 to 1, although most studies suggest a ratio of 2 to 1 or less.

Findings from various population-based studies of the prevalence of diabetes in adult black Americans are summarized in table 2.1. Although early studies conducted before 1960 relied on medical histories to identify diabetes, and consequently underreporting was likely, the prevalence of diabetes in black Americans was thought to be quite low in the first half of this century. Black Americans are a minority group that has undergone both migration and genetic admixture over the past 300 years. Comparison with U.S. whites and African blacks may provide an explanation for the increased prevalence of diabetes noted since 1960 and the possible etiology and natural history of the disease among blacks.

Published studies in Africa, although difficult to use for comparative purposes because they are based on different study methods, suggest that the rate of diabetes in black Africans is lower than in black Americans. The lower prevalence of diabetes among African blacks has been attributed to the fact that clinical studies in Africa have included a younger and more rural population. However, there is some evidence suggesting that the prevalence of diabetes in urban African communities is similar to that in U.S. blacks. The difference was noted to be greater among urban African women than among rural inhabitants.

Incidence and Prevalence

The first national estimates of the prevalence of diabetes in blacks are based on data collected by the Army from World War I draftees 18 to 45 years old. The Army reported a diabetes rate of 13 per 1,000 among blacks from rural areas, 0.15 among southern rural whites, and 0.45 among northern rural

whites. By the time of World War II, Selective Service reports indicate that the rate of diabetes in blacks was 1.9 per 1,000 in 1943 and 0.8 per 1,000 in 1944. Although these rates are higher than those of World War I for blacks, both figures were still substantially lower than the white rate of 3.0 per 1,000 reported during World War II.

Twenty years later, the rate of diabetes in blacks began to climb dramatically. National Health Interview Surveys indicate that between 1963 and 1979-81, diabetes increased by 175 percent in blacks compared with 106 percent in whites. The increase in part reflects the increase in the diagnosis of latent cases. However, even when allowance is made for this effect, the rise remains significant.

Several community-based surveys, summarized in table 2.2, show mixed findings. A study in Evans County, Georgia, conducted between 1960 and 1962 found rates of diabetes of 3.0 percent in black males and 6.6 percent in black females. The rate in black females was higher than that of white females, while black males exhibited a lower rate of diabetes than white males.

In a screening program conducted in Cleveland, Ohio, from 1964 to 1967, the rate of diabetes was found to be slightly higher in nonwhites compared with white volunteers. Blacks showed a lower prevalence of diabetes in two studies conducted in 1973 in Chicago, Illinois, and in northern California. The Chicago study, conducted in an industrial population, was based on medical histories and screening tests. The age-standardized prevalence of diabetes was found to be lower in both black men and women than in white men and women. Black men and women in the Kaiser-Permanente Health Plan in northern California showed significantly fewer instances of blood-glucose levels higher than 170 mg/dl than whites did 1 hour after glucose challenge.

The majority of the studies summarized in table 2.2 have found higher rates of diabetes in black women than in black men. These studies also show that the prevalence of diabetes in black men and women increases with age, as it does in whites, but the age of peak onset in blacks may be lower.

Undiagnosed Diabetes. As always, data on undiagnosed diabetes must be considered in the light of the high estimates of the prevalence of latent diabetes. Estimates of latent or undiagnosed diabetes are not included in the results of most studies. Table 2.3 demonstrates the significance of this problem. The study by Harris and Haddon, which has not yet been published, is based on fasting 75 g oral glucose tolerance tests in persons who had no medical history of diabetes. The results showed that 3.1 percent of this population had undiagnosed diabetes, that rates for black males and females were almost 1.5 times as high as rates for white males and females, that black females were much more heavily affected than black males after age 54, and that the prevalence in general increases with age. Rates in black women and black men were 4.7 and 3.7 percent, respectively.

Prevalence of Diabetes in Black Youth. Table 1.1, in chapter 1, which is based on data compiled since criteria were established to distinguish between insulin-dependent and noninsulin-dependent diabetes, shows the

overall prevalence and relative risk of both types of diabetes in whites and in blacks and three other minority groups. Although the risk of NIDDM in blacks is 30 percent higher than in the white population, the risk of IDDM is far lower in blacks than in whites.

Various studies conducted since 1928 have consistently shown that diabetes is less prevalent in young black Americans than in young whites (table 2.4). This observation, however, is based on studies that were for the most part confined to samples from clinics and are of doubtful accuracy. A study conducted in 1942 among outpatients in a clinic in Harlem found that only 0.8 percent of 639 blacks with diabetes were in the 10 to 19 age group. The same age group included 1.9 percent of 106 white people with diabetes. A small study at Charity Hospital in New Orleans, Louisiana, found a nearly equal racial distribution of diabetes among 31 patients under 12 years of age, although 80 to 85 percent of the hospital's total patient population was nonwhite. Among all the new admissions for diabetes to St. Louis Children's Hospital between 1960 and 1970, the rate of diabetes in black children was less than 35 percent of the rate in white children.

No national population survey has had sufficient sample sizes to determine accurately the prevalence of diabetes in children in this country. The Health Interview Survey for 1964-65 showed that 8.3 percent of the sample population of white people with diabetes was under 25 years old at diagnosis and 4.6 percent under 15 years old. Of the nonwhite groups with diabetes, 3.4 percent of the sample population was under 25 years old, with 0.3 percent under 15. However, because this type of estimate is dependent on the number of diabetes patients in the older age group, it cannot be used as a direct measure of comparative prevalence. In 1973, the HIS found a prevalence of diabetes of 1.2 per 1,000 in nonwhites younger than 17 years old and 1.4 per 1,000 in whites. In all of these surveys, the nonwhite sample was too small for reliability.

A study of the occurrence of long-term childhood illness in Erie County, New York, was based on a review of hospital and private medical records from 1964 to 1972. The study found a prevalence of diabetes in blacks 16 years of age and younger of 29.5 per 100,000--about half that of white children. A similar ratio was found in a mail survey of all Michigan school districts in 1973.

Studies of the incidence of diabetes in American black children also have been conducted in Pennsylvania and Alabama. The Pittsburgh IDDM Registry, which is based on a review of hospital records and surveys of pediatricians, found that new cases of diabetes occurred in white children in Allegheny County more frequently than in nonwhite children. The difference persisted when incidence rates were compared within socioeconomic groups.

In short, sufficient data have not been collected to arrive at national estimates of the sex- and age-prevalence of diabetes in black children in the United States. Additional studies need to be undertaken, including studies of urban and rural populations in all sections of the country, to develop reliable statistics on the incidence and prevalence of IDDM in blacks.

Mortality

Since World War II, the death rate from diabetes has consistently been higher for blacks than for whites (table 2.5). Moreover, mortality from diabetes in black females has been much higher than in black males. This finding has held even though the female-to-male ratio has fallen from 2:1 in 1950 to 1.2:1 in 1980. Although the ratio has decreased in both races, the female-to-male ratio has consistently been higher in blacks.

Table 2.6 shows that mortality attributed to diabetes increases with age in whites and blacks. Until recently, the rate peaked at younger ages in nonwhites, an effect attributed to the shorter lifespan among nonwhites and to a conjectured earlier onset of disease.

Complications

Few studies have examined the prevalence of diabetic complications in blacks in the United States. Even fewer have directly compared blacks with whites, controlling for duration of the disease. Studies based on mortality rates alone fail to take into consideration differences in incidence, age of onset, medical care, education, socioeconomic status, and interaction with hypertension, which occurs at a high rate in the black population.

Macrovascular and Microvascular Disease. There is some evidence that black diabetes patients are more likely than blacks without diabetes to develop macrovascular and microvascular disease. As in whites, the prevalence of these complications increases with the duration of disease. The great variation found in the rate of macrovascular disease in blacks, however, suggests that diabetes and race alone are not sufficient etiological factors. As in whites, there is some question whether atherosclerosis in blacks is directly related to diabetes.

Even the relative prevalence of macrovascular disease in blacks as compared to whites is in question. Most reports have suggested that myocardial infarction is less frequent among black Americans than among white Americans. However, as in the white population, heart disease is more likely to develop in blacks who have diabetes. The University Group Diabetes Study found that the percentage of deaths attributable to cardiovascular disease was lower in blacks with noninsulin-dependent diabetes than in whites with NIDDM.

Retinopathy. Data from the Blindness Registry suggest that retinopathy is more prevalent in black people with diabetes than in white people with diabetes. The age-standardized prevalence of blindness secondary to diabetic retinopathy is more than twice as high in nonwhites as in whites (13.6/100,000 as opposed to 5.9/100,000). Rates are consistently higher in both black males and black females, with the rate in females almost three times that of males.

Other Complications. Although there is little published information about the incidence and prevalence of cerebrovascular disease, peripheral vascular disease, nephropathy, and neuropathy in blacks, the severity of these complications of diabetes may be higher among blacks than whites. Cerebrovascular disease appears to be more prevalent in blacks with diabetes than in

the general population. End-stage renal disease secondary to diabetic nephropathy is 3.3 times as high in blacks as in whites, according to the Michigan Kidney Registry. In one of the few direct comparisons between black adults and white adults with diabetes, there was no significant difference in the presence of carotid-artery occlusive disease.

Hypertension

Hypertension is more prevalent in black Americans than in white Americans, and the association between hypertension and diabetes in the black population is more common than would be expected. In a study of employed volunteers in Chicago, however, after adjustment for blood pressure, cholesterol, and smoking, the rate of cardiovascular disease in black people with diabetes was lower than in those without the disorder.

Prevention

Exemplary programs that provide continuing outpatient diabetes care to populations more than 80 percent black have operated in Memphis, Tennessee, since 1962 and in Atlanta, Georgia, since 1968. Both programs are described in detail in chapter 6. Both use a team approach in treatment and in education, and both offer patients immediate access to professional staff members either by telephone or by drop-in visits.

A major goal in both programs is to prevent or delay the development and progression of the complications of diabetes. The Memphis and Atlanta projects offer a prevention-oriented program of early detection, therapy, and continuing followup care. A basic assumption is that a preventive approach to diabetes and its complications is more effective in terms of both therapeutic effects and cost control. The results support the assumption: The Atlanta program has saved its sponsors an estimated $11 million in costs; the Memphis program, which has proved similarly cost effective, has seen reductions in hospitalizations, diabetic ketoacidosis, and amputations. In both programs, more than 70 percent of the participants have exhibited decreased plasma-glucose levels.

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Table 2.1

POPULATION-BASED STUDIES ON THE PREVALENCE OF DIABETES*
IN UNITED STATES BLACK ADULTS

Reference	Year	Age (Years)	Percent Diabetic Male	Female	Both	Comments
U.S. military draftees or registrants						
a	1924	18–45	0.015	—	—	Black male WW I draftees rate much lower than white male rate
b	1943	18–45	0.19	—	—	Black male WW II military registrants rate less than white male rate
c	1944	18–45	0.08	—	—	Black male WW II military registrants rate less than white male rate
National health surveys of the U.S. population						
d	1960–62	18–79				Black men had slightly but significantly higher blood glucose values. Black women had poorer GTT but not when stratified on education.
e	1963	All			1.17	Black/white = 1.0
e	1964	All			1.27	Black/white = 1.0
f	1964–65	All	0.84	1.78	1.38	Black/white = 1.1
		<45	0.24	0.31	0.28	
		45+	2.96	6.86	5.02	
e	1965	All			1.38	Black/white = 1.1
e	1966	All			1.46	Black/white = 1.0
e	1967	All			1.69	Black/white = 1.1
e	1968	All			1.70	Black/white = 1.0
e	1973	All			2.47	Black/white = 1.2
e	1975	All	2.18	3.50	2.89	Black/white = 1.3
		17–44			1.44	
		45–64			8.72	
		65+			11.44	
e	1976	All	2.26	3.30	2.82	Black/white = 1.2
e	1978	All	2.09	3.61	2.91	Black male/white male = 1.0;
		15–44	0.63	1.12	0.90	Black female/white female =
		45–64	5.4	10.8	8.3	1.3
		65–84	12.9	14.2	13.7	
g	1976–80	20–74	4.6	5.9	5.2	Diagnosed diabetes
		20–74	4.0	4.6	4.4	Undiagnosed diabetes; see Table 5 for detail
e	1979	All	2.26	3.84	3.10	See Harris, Diabetes in America (in press).
e	1980	All	2.71	3.96	3.38	See Harris, Diabetes in America (in press).
e	1981	All	2.64	3.66	3.19	See Harris, Diabetes in America (in press).

Table 2.1 (continued)

Reference	Year	Age (Years)	Percent Diabetic Male	Female	Both	Comments
State surveys						
h	Mich., 1980	All	6.5	10.1	8.8	Black/white = 1.7; higher
	1980	18-34	3.0	3.2	3.1	than white rate for all age-
		35-44	3.2	6.4	5.5	sex groups except 65+ females
		45-64	11.1	22.3	17.8	
		65+	12.2	13.4	13.0	
i	Calif., 1979	18+			5.3	Black/white = 1.3
	1983	18+	4.7	6.8	5.8	Black/white = 1.9
j		18-44			0.7	
		45-64			14.3	
		65+			22.7	
k	Ala., 1982	18+	8.9	8.4	8.6	Black/white = 1.6
Community-based surveys						
l	Evans Co., Ga., 1960-62	40-69	3.0	6.6	—	
m	Northern Calif., 1964-68	15+	9.4	5.3	—	Health maintenance organization population
n	Chicago, Ill., 1973	Adults	3.1	2.5	—	Industrial population

*Diabetes was ascertained by previous medical history in all studies except 1) the 1976-80 U.S. study, where a 75-gram oral glucose tolerance test was used to detect undiagnosed diabetes: 2) the Cleveland study, where casual blood glucose was measured; and 3) the Northern California study, where diabetes was defined as 1-hour post-glucose >170 mg/dl.

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Table 2.2

FEMALE-TO-MALE RATIOS AMONG UNITED STATES BLACKS WITH DIABETES

Location	Reference	Year	Group	Female/ Male Ratio
New York, N.Y.	a	1931	Clinic patients	3.5
New York, N.Y.	b	1942	Clinic patients	4
Oklahoma	c	1943	Clinic patients	5
Nashville, Tennessee	d	1959-60	Clinic patients	3
Evans County, Georgia	e	1960	Population sample	2.2
Northern California	f	1964-68	Health maintenance organization	0.6
Chicago	g	1973	Industrial population	0.8
United States	h	1979-81	Population sample	1.5
Michigan	i	1980	Population sample	1.6
Alabama	j	1982	Population sample	0.9
California	k	1983	Population sample	1.4

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h. Drury, T. National Diabetes Data Group. Unpublished data from the National Health Interview Surveys, NCHS.
i. See Harris, Diabetes in America (in press).
j. See Harris, Diabetes in America (in press).
k. California Department of Health Services...

Table 2.3

PERCENT (AND STANDARD ERROR) OF ADULTS AGES 20 to 74 YEARS WITH UNDIAGNOSED DIABETES AND IMPAIRED GLUCOSE TOLERANCE, UNITED STATES 1976-80

Age (Years)	Percent of Population (and Standard Error)				
	20-74	20-44	45-54	55-64	65-74
Undiagnosed Diabetes*					
All races					
Both sexes	3.2 (.35)	.9 (.31)	4.2 (.81)	6.2 (1.03)	8.4 (.84)
Male	2.8 (.41)	.8 (.39)	3.6 (1.28)	4.0 (1.03)	9.5 (1.42)
Female	3.6 (.42)	1.0 (.38)	4.7 (1.14)	8.1 (1.68)	7.6 (.89)
White					
Both sexes	3.0 (.38)	.7 (.31)	4.0 (.90)	5.9 (1.24)	8.0 (.85)
Male	2.5 (.36)	.5 (.27)	3.2 (1.25)	3.8 (1.00)	9.0 (1.38)
Female	3.4 (.52)	.8 (.40)	4.6 (1.25)	7.9 (2.08)	7.3 (.95)
Black					
Both sexes	4.4 (.91)	.9 (.68)	7.2 (3.05)	7.7 (3.75)	12.3 (3.94)
Male	4.0 (1.72)	1.0 (.98)	7.5 (6.40)	5.2 (3.94)	12.2 (7.23)
Female	4.6 (1.35)	.9 (.91)	7.0 (3.70)	9.1 (5.92)	12.3 (4.50)
Impaired Glucose Tolerance*					
All races					
Both sexes	4.6 (0.4)	2.1 (0.4)	7.0 (1.0)	7.4 (0.9)	9.2 (0.8)
Male	4.6 (0.6)	1.2 (0.4)	7.3 (1.7)	9.8 (1.5)	8.9 (1.5)
Female	4.7 (0.7)	2.8 (0.7)	6.7 (1.5)	5.2 (1.3)	9.4 (1.2)
White					
Both sexes	4.6 (0.4)	2.0 (0.4)	6.3 (1.1)	7.7 (1.0)	9.5 (0.9)
Male	4.4 (0.6)	1.0 (0.3)	6.4 (1.8)	10.1 (1.5)	9.0 (1.5)
Female	4.7 (0.7)	2.8 (0.7)	6.2 (1.1)	5.5 (1.5)	9.9 (1.2)
Black					
Both sexes	3.8 (0.8)	1.2 (0.8)	10.7 (3.3)	4.5 (2.3)	3.4 (2.3)
Male	5.9 (1.2)	1.4 (1.3)	18.8 (4.0)	7.0 (4.9)	5.4 (4.1)
Female	2.3 (1.3)	1.1 (1.1)	5.1 (4.9)	3.1 (2.2)	1.9 (2.3)

*Based on results of 75-gram oral glucose tolerance tests (OGTTs) administered in the morning after an overnight 10- to 16-hour fast, in persons who reported that they had no medical history of diabetes. OGTTs were classified using National Diabetes Data Group criteria. Adjusted to the 1978 United States population.

Source: Hadden, WC, and MI Harris. Prevalence of diagnosed diabetes, undiagnosed diabetes and IGT in adults 20-74 years of age. National Center for Health Statistics Series 11, in preparation.

Table 2.4

PREVALENCE OF DIABETES IN YOUNG UNITED STATES BLACKS

Refer-ence	Location	Year	Age (Years)	Prevalence* (Percent)	Comments
a	United States	1965	<15	-	Those less than age 15 made up a greater % of white diabe than black diabetics
b	United States	1973	<17	0.13	Very small sample; little difference between blacks and whites
c	United States	1979-81	<25	0.15	Small sample; little difference between blacks and whites
d	Atlanta, Ga.	1928	<20	(Rare)	
e	Harlem, N.Y.	1942	10-19	-	Black diabetics in this age group were 0.8% of all diabet whites, 1.9%
f	New Orleans, La.	1967	<16	-	Preponderance of white diabetic juvenile diabetes patient relative to blacks
g	Erie County, N.Y.	1968	<16	0.03	Nonwhite prevalence was about half of white prevalence
h	Michigan	1973	School children	0.05	Review of school records; nonwhite prevalence was about h of white prevalence
i	St. Louis, Mo.	1975	<15	-	White diabetics made up greater % of hospital admissions children
j	Pittsburgh, Pa.	1976	5-17	Nonwhite males, 0.14; nonwhite females, 0.15	White rate was 20% higher than nonwhite rate

*Diagnostic criteria: Previous medical history of diabetes or not stated.

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Table 2.5

AGE-ADJUSTED* DEATH RATES FROM DIABETES AS THE UNDERLYING CAUSE OF DEATH PER 100,000 POPULATION, AND FEMALE/MALE RATIOS, BY RACE AND SEX, UNITED STATES, 1938-1980

	White			Black		
Year	Males	Females	Female/Male Ratio	Males	Females	Female/Male Ratio
1938	18.9	31.1	1.6	13.2	29.0	2.2
1940	20.6	32.8	1.6	15.0	32.2	2.1
1945	18.3	29.1	1.6	13.7	27.9	2.0
Rates before 1949 are not comparable to those after 1949 because of changes in the classification of causes of death in that year.						
1950	11.3	16.4	1.5	11.5	22.7	2.0
1955	11.0	14.3	1.3	11.7	22.7	1.9
1960	11.6	13.7	1.2	16.2	27.3	1.7
1965	11.9	12.8	1.1	17.7	28.0	1.6
1970	12.7	12.8	1.0	21.2	30.9	1.5
1975	10.7	10.2	1.0	18.7	26.0	1.4
1980	9.5	8.7	0.9	17.7	22.1	1.2

*Age-adjusted to the total population of the United States in 1940.

Source: Division of Vital Statistics, National Center for Health Statistics.

Table 2.6

NUMBER OF DEATHS AND DEATH RATE FROM DIABETES AS THE UNDERLYING CAUSE OF DEATH BY AGE, SEX, AND RACE, UNITED STATES, 1980

Age at Death (Years)	Number of Deaths	Death Rate*	Number of Deaths	Death Rate*
	White Males		Black Males	
All ages	12,125	13.23	2,010	16.05
Under 25	65	0.17	26	0.39
25-34	260	1.70	55	2.81
35-44	373	3.49	120	9.75
45-54	853	8.93	216	21.18
55-64	2,217	24.58	489	57.45
65-74	3,682	61.06	577	102.10
75-84	3,314	128.90	415	182.80
85+	1,361	221.70	112	211.30
	White Females		Black Females	
All ages	16,734	17.31	3,534	25.30
Under 25	68	0.19	20	0.29
25-34	192	1.25	58	2.58
35-44	283	2.60	107	7.23
45-54	741	7.37	328	26.24
55-64	2,231	21.87	739	70.00
65-74	4,583	58.23	1,143	147.70
75-84	5,507	124.60	806	224.50
85+	3,138	219.40	333	314.20

*Death rate: number of underlying cause deaths in each age/race/sex group divided by the number of 100,000 living persons in the group.

Source: Division of Vital Statistics, National Center for Health Statistics.

Chapter 3

DIABETES IN NATIVE AMERICANS

Until the 1930's, diabetes mellitus occurred infrequently among Native Americans. In the last 50 years, diabetes has increased dramatically in most tribes. As table 1.1 indicates, Native Americans are more than 10 times as likely as whites to incur noninsulin-dependent diabetes. One tribe, the Pima Indians, has the highest rate of diabetes in the world. About 50 percent of Pimas 35 years of age and older develop the disease. The increase in diabetes in Native Americans can only be termed an epidemic.

With the exception of some Athabascan tribes and Eskimos, diabetes also has become a major cause of morbidity and mortality in Native Americans. Diabetes-related mortality (age-adjusted) in Native Americans is 2.1 times higher than the rate for all races in the U.S., according to a 1978 Government report. Table 3.1 shows that in Indians and Alaska natives, the diabetes mortality ratio, compared with that for all races, rose from 1.3 in 1955 to 2.6 in 1978. In the same period, the ratio to races other than white rose from parity to 1.4.

The serious complications of diabetes are increasing in frequency among Native Americans. Of major concern are high rates of renal failure, amputations, and blindness. In its most recent report, the National Diabetes Advisory Board noted that approximately 40 percent of all Indians receiving dialysis or transplantation services in 1983 had diabetes, compared with approximately 25 percent of the general population. The cost of diabetes-related kidney disease in one Indian Health Service (IHS) administrative region alone in 1984 was $2.6 million.

Prevalence and Incidence

Early reports by physicians working with Native Americans indicated that diabetes was rare. Although considerable differences were found among tribes, the overall frequency of the disease as late as the 1930's was comparable to that of the rest of the population. A study of photographs of Native Americans made late in the 19th century reveals that they were typically lean. Along with an increase in diabetes, many tribes have shown a dramatic increase in the prevalence of obesity in recent years. The increase is not restricted to any age group and appears to be related to the consumption of foods higher in calories and lower in fiber than their former diets contained, coupled with a decrease in physical activity.

Among the more than 432 Native American Tribes in North America, at least 391 live in the United States. The considerable homogeneity of race among them points to a common Mongoloid origin. The Eskimo, Aleut, and Na-Dene language group of Indians, which includes Navajos and Apaches (all of whom have more recently come to this continent), are genetically distinct from other Native Americans.

Table 3.2 summarizes most of the studies of diabetes prevalence in North American Indians and Eskimos published since 1940. Since both methods and criteria vary from study to study, even within tribes, it is difficult to draw inferences from a comparison of the data. It is obvious, however, that in the last 40 to 50 years, the problem of diabetes among Native Americans has mushroomed.

The net effect is dramatically illustrated in the two most recent studies of the Pima Indians, conducted from 1965 to 1969 and from 1965 to 1979, both of which were sponsored by the National Institutes of Health. The two studies found almost identical rates of prevalence--overall percentages of 49.8 and 49.5. The increase was apparent despite the development of more stringent criteria for diabetes classification in the later period. An NIH population study of Pima Indians showed a 42-percent increase in a 10-year period in diabetes prevalence in both sexes and for all age groups (except the youngest) (figure 3.1 and table 3.3).

The prevalence rate found in Athabascans in Alaska, about 3 percent, is closer to the rate in genetically unrelated Eskimos than to the rate in the three Athabascan tribes in the Southwest. On the other hand, the Pima Indians show a rate of prevalence (about 50 percent) in adults 35 years old and older that is comparable to the rate among members of the related Papago Tribe, who like the Pima live on arid desert reservations. The rate is several times as high as the rates in the unrelated San Carlos Apaches (25 percent), Whiteriver Apaches (11 percent), and Navajos (13 percent).

In addition to the Pima, Papago, and San Carlos Apaches, other tribes also show rates of prevalence of diabetes of 20 percent or more in adults: the Upland Yuman, Maricopa, and Cocopah of Arizona; the Zuni of New Mexico; the Paiute of Nevada; the Seminole of Florida; the Cherokee of North Carolina; the Pawnee of Oklahoma; the Alabama-Coushatta of Texas; and the Seneca of New York.

Incidence rates in Pima and Choctaw Indians of both full and more than half heritage are compared in table 3.4. Although neither the periods of study nor the methods used were comparable, these differences could not account for the large and consistent differences in the findings. At all ages except in the oldest males, the incidence was higher in the Pima than in the full-heritage Choctaw. The Choctaw also showed higher rates, except in the oldest group, than Choctaw of less than full heritage. Further evidence of the relation between the degree of Indian heritage and diabetes is provided in table 3.5, which compares the Choctaw of Oklahoma, the Cherokee of North Carolina, and the "Three Affiliated Tribes" of North Dakota.

Obesity, Family History, and Genetic Factors

The 42-percent increase in the prevalence of diabetes in the Pima population between 1967 and 1977 was paralleled by an increase in obesity, which as table 3.6 indicates was highest in those younger than 35. A longitudinal study, illustrated in figure 3.2, demonstrated that the increase in risk of future diabetes correlated with the age of onset of obesity.

Investigators have concluded that NIDDM is familial. The data illustrated in figure 3.3 show the 8-year cumulative probability of the development of diabetes in Pimas, at least one of whose parents is diabetic. Figures 3.4 and 3.5 show that the effects of obesity and family history of diabetes are additive. A recent study has found that 58 percent of 15- to 19-year-old children of Pimas with diabetes were 140 percent or more over "desirable" weight; among the children of prediabetics and nondiabetics, the rates were 25 and 17 percent, respectively.

Genetic components have been found for NIDDM in the Pima Indians. At all ages, the presence of the HLA-A2 leukocyte antigen is more frequent in the Pima with diabetes than in the Pima without diabetes. At age 55, HLA-A2 is present in 59 percent of those with diabetes and 39 percent of those without the disease. It has also been found that 1.5 kb DNA in the 5' flanking region of the insulin gene is associated ($p = 0.01$) with NIDDM in unrelated Pimas as well as in American blacks and whites.

Complications

The complications of diabetes are widespread among Native Americans, particularly diabetes-related kidney disease, amputation, and blindness. Diabetes increases the otherwise low rate of coronary artery disease in Indians of the Southwest. The 6-year incidence of retinopathy and heavy proteinuria (an index of nephropathy) among Pima Indians is shown in figure 3.6. People who have hyperglycemia exhibit these complications much more frequently than do people with euglycemia. About half of the deaths from vascular causes in the Pima are attributed to diabetic nephropathy. Native Americans as a whole seem to develop end-stage renal disease more frequently than other groups in our population, and the number of Native Americans who require renal dialysis has grown rapidly.

Prevention/Treatment

Among many Indian tribes of North America, diabetes has attained epidemic proportions. Diabetic complications are major causes of morbidity and mortality in most Native American populations. The basic disease and its deleterious long-term effects are similar in all ethnic groups, and factors involved in the causes and complications of diabetes and the principles of management appear to be generally applicable to all races.

In recognition of the severity of the problem, the Indian Health Service developed the Model Diabetes Care Program, which has been established at several existing IHS service units. IHS projects are located in five States: Oklahoma, North Dakota, Arizona, Nebraska, and New Mexico. The projects in these five States account for more than 8,000 diabetes-related outpatient visits each year. Considerable progress has been made at these five sites in delivering high-quality, culturally acceptable diabetes care.

The model sites now serve only about 10 percent of the IHS population. Additional resources approved by Congress in fiscal year 1985 will enable the program to be expanded to two additional sites and will provide funds to purchase laser photocoagulation equipment to treat diabetic retinopathy. Transferring effective treatment strategies from the model sites to other service

units has only begun. Extensive innovative efforts are needed to interrupt the increasing prevalence of diabetes among North American Indians and reduce morbidity and mortality.

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Table 3.1

DIABETES MELLITUS DEATHS AND RATES* PER 100,000 POPULATION FOR INDIANS AND ALASKA NATIVES IN RESERVATION STATES AND FOR THE UNITED STATES, ALL-RACES AND OTHER THAN WHITE POPULATIONS, 1955-79, SELECTED 5-YEAR PERIODS

Calendar Year	Number		Crude Rates		Age-Adjusted Rates and Their Ratio				
	Indian and Alaska Native	U.S., All Races	Indian and Alaska Native	U.S., All Races	Indian and Alaska Native	U.S., All Races	U.S., Other Than White	Indian to: U.S., All Races	Indian to: U.S., Other Than White
1979	170	33,192			22.8	10.0	18.5	2.3	1.2
1978	183	33,841	18.2	15.5	26.7	10.4	19.0	2.6	1.4
1977	161	32,989	18.3	15.2	24.6	10.4	19.5	2.4	1.3
1976	149	34,508	17.5	16.1	23.3	11.1	21.0	2.1	1.1
1975	145	35,230	17.4	16.5	23.8	11.6	21.7	2.1	1.1
1970	143	38,324	20.7	18.9	27.1	14.1	25.2	1.9	1.1
1969	127	38,541	20.1	19.1	21.1	14.5	27.7	1.5	0.8
1968	141	38,352	18.9	19.2	25.6	14.7	28.0	1.7	0.9
1967	107	35,049	18.9	17.7	23.3	13.7	24.5	1.7	1.0
1966	115	34,597	17.9	17.7	25.7	13.9	24.8	1.8	1.0
1959	82	28,080	14.8	15.9	26.1	13.4	19.4	1.9	1.3
1958	65	27,501	14.4	15.9	20.8	13.0	18.8	1.6	1.1
1957	62	27,180	14.3	16.0	19.6	13.5	18.2	1.5	1.1
1956	79	26,184	14.5	15.7	20.2	13.0	17.1	1.6	1.2
1955	64	25,488	14.6	15.5	17.0	13.0	16.5	1.3	1.0

*Indian and Alaska Native crude rates are 3-year rates centered in the year specified. All other rates are based on single-year data. Estimated population methodology for the Indian and Alaska Native population revised in 1976. Maine, New York, and Pennsylvania included as reservation states beginning in 1979.

Source: Indian and Alaskan Native--Indian Health Service. U.S. All Races and U.S. Other Than White--National Center for Health Statistics, Annual Mortality Publication, Vol. II, Part A (1955-1975) and Annual Advance Final Mortality Reports (1976-1979). Taken from FY 1984 Budget Appropriation Indian Health Service "Chart Series" Tables. Vital Events Branch, Office of Program Statistics, Division of Resource Coordination. Indian Health Service, Rockville, Maryland, April 1983.

Table 3.2

REPORTED PREVALENCE OF DIABETES MELLITUS AMONG NORTH AMERICAN INDIANS AND ESKIMOS, BY TRIBE, AGE GROUP, AND YEARS OF STUDY

Reference	Tribe and Location	Years of Study	Study Method*	Diagnostic Criteria**	Age Group (Years)	Study Population (Number of Persons)			Diabetes Mellitus (Percent (and Number) of Persons)		
						Males	Females	Both	Males	Females	Both
	Southwest										
a	Pima (Arizona)	1940	B-3	F	All	-	-	4,633	-	-	0.5(21)
b		1950-52	B-3	E	All	1,152	1,746	2,895	2.7(32)	3.5(62)	3.2(94)
c		1955	B-2	E	≥15	3,418	3,557	6,975	3.3(113)	4.9(169)	4.0(282)
d		1958-65	B-1	B	≥20	-	-	-	-	-	45.0(-)
e		1965-69	A-1	B	≥5	1,358	1,559	2,917	16.1(219)	21.7(339)	19.1(558)
					≥15	811	955	1,766	26.8(217)	33.9(324)	30.6(541)
					≥35	437	461	898	41.0(279)	58.1(268)	49.8(447)
f		1965-79	A-1	A+	≥5	2,000	2,126	4,126	16.2(324)	18.8(400)	17.5(724)
					≥15	1,249	1,379	2,628	25.9(324)	28.9(399)	27.5(723)
					≥35	592	618	1,210	43.4(257)	55.3(342)	49.5(599)
a	Papago (Arizona)	1940	B-3	F	All	-	-	4,055	-	-	0.3(10)
b		1950-52	B-3	E	All	723	1,181	1,904	0.8(6)	0.1(2)	0.4(8)
d		1958-65	B-1	B	≥20	-	-	-	-	-	33.0(-)
g		≤1976	A-4	B	≥35	-	-	365	-	-	42.2(154)
h	Papago and Yaqui (Arizona)	1981	B-3	E	All	-	-	16,230	-	-	9.2(1,490)
					≥35	-	-	9,236	-	-	26.7(1,132)
i	Maricopa (Arizona)	1966	A-2	B	≥15	-	-	186	-	-	29.8(49)
d	Hopi (Arizona)	1958-65	B-1	B	≥20	-	-	-	-	-	9.0(-)
j		1963-65	B-2	E	All	1,470	1,530	3,000	0.3(4)	1.2(19)	0.8(23)
					≥15	823	857	1,680	0.5(4)	2.2(19)	1.4(23)
					≥30	470	490	960	0.9(4)	3.9(19)	2.4(23)

Table 3.2 (continued)

Reference	Tribe and Location	Years of Study	Study Method*	Diagnostic Criteria**	Age Group (Years)	Study Population (Number of Persons) Males	Females	Both	Diabetes Mellitus (Percent (and Number) of Persons) Males	Females	Both
d	Hsulapal-Havasupal (Arizona)	1958-65	B-1	B	≥20	-	-	-	-	-	28.0(-)
b	Yuma (Arizona and California)	1950-52	B-3	E	All	221	256	447	4.5(10)	1.9(5)	3.1(15)
k	Upland Yumans: Haulapal, Havasupal, Yavapal, (Arizona)	1970	A-4	B	All	133	168	301	6.0(8)	19.0(32)	13.3(40)
					≥35	41	60	101	19.5(8)	50.0(30)	37.6(38)
l	Cocopah (Arizona)	1969	A-1	B	≥15	50	73	123	20.0(10)	27.4(20)	24.4(30)
					≥35	35	44	79	25.7(9)	40.9(18)	34.2(27)
b	Mojave (Arizona and California)	1950-52	B-3	E	All	611	816	1,427	2.9(18)	1.7(14)	2.2(32)
m	Cauhilla and Luiseno (California)	≤1970	A-4	F	All	35	61	96	-	-	12.5(12)
b	Paiute and Shoshone (Nevada)	1950-52	B-3	E	All	1,107	1,329	2,436	1.0(11)	0.8(10)	0.9(21)
n	Paiute (Nevada)	1970	A-2	B	≥15	66	65	131	7.6(5)	15.4(10)	11.5(15)
					≥35	27	27	54	18.5(5)	33.3(9)	25.9(14)
n	Washoe (Nevada and California)	1970	A-2	B	≥15	50	62	112	6.0(3)	14.5(9)	10.7(12)
					≥35	34	32	66	8.8(3)	25.0(8)	16.7(11)
b	Ute (Utah)	1950-52	B-3	E	All	331	546	877	1.8(6)	0.9(5)	1.2(11)
d		1958-65	B-1	B	≥20	-	-	-	-	-	7.0(-)
o	Zuni (New Mexico)	≤1970	A-4	B	≥35	-	-	292	-	-	31.5(92)
p		1975-76	B-3	E	All	3,133	3,170	6,303	4.1(128)	4.4(139)	4.3(267)
					≥25	982	1,045	2,027	12.8(137)	13.1(137)	13.0(263)
					≥45	428	328	756	20.6(88)	30.2(99)	24.7(187)

Table 3.2 (continued)

Reference	Tribe and Location	Years of Study	Study Method*	Diagnostic Criteria**	Age Group (Years)	Study Population (Number of Persons) Males	Females	Both	Diabetes Mellitus (Percent (and Number) of Persons) Males	Females	Both
a	Apache (Arizona)	1940	B-3	F	All	-	-	4,906	-	-	0.2(12)
b	San Carlos Apache (Arizona)	1950-52	B-3	E	All	932	1,171	2,103	0.2(2)	0.3(7)	0.4(9)
g		≤1976	A-4	B	≥35	-	-	317	-	-	24.9(79)
b	Whiteriver Apache (Arizona)	1950-52	B-3	E	All	1,017	1,149	2,266	0.2(3)	0.0(0)	0.1(3)
o		≤1970	A-4	B	≥35	-	-	268	-	-	10.8(29)
a	Navajo (Arizona)	1940	B-3	F	All	-	-	36,176	-	-	0.01(4)
d		1958-65	B-1	B	≥20	-	-	-	-	-	1.0(-)
q		1958-63	B-2	B	All	8,603	8,954	17,557	0.5(47)	0.6(58)	0.6(105)
					≥20	5,592	5,820	11,412	0.8(47)	1.0(58)	0.9(105)
					≥40	1,807	1,880	3,687	2.0(37)	2.7(51)	2.4(88)
j		1963-65	B-2	B	All	7,350	7,650	15,000	0.5(35)	0.6(43)	0.5(78)
					≥20	4,116	4,284	8,400	0.8(34)	1.0(43)	0.9(77)
					≥30	2,352	2,448	4,800	1.4(33)	2.1(42)	1.6(76)
					≥40	1,543	1,607	3,150	1.6(25)	1.9(30)	1.7(55)
o		≤1970	A-4	B	≥35	-	-	55	-	-	12.7(7)
	Alaska										
r	Athabascan (Alaska)	≤1969	A-4	B	≥20	152	154	306	1.3(2)	2.6(4)	2.0(6)
r		≤1969	A-4	A	≥20	152	154	306	0.0(0)	2.0(3)	1.0(3)
h	Alaska IHS Area: (Athsbascans, Haida, Tlingits, Tsimshians, Eskimos, and Aleuts)	1981	B-3	E	All	-	-	64,047	-	-	0.9(550)
					≥35	-	-	16,716	-	-	2.9(488)

Table 3.2 (continued)

Reference	Tribe and Location	Years of Study	Study Method*	Diagnostic Criteria**	Age Group (Years)	Study Population (Number of Persons) Males	Females	Both	Diabetes Mellitus (Percent (and Number) of Persons) Males	Females	Both
s	Eskimos (Alaska)	1962	A-4	B	≥20	378	327	705	0.5(2)	7.0(23)	3.5(25)
					≥40	153	133	286	0.7(1)	6.1(8)	3.1(9)
				A	≥20	350	309	659	0.0(0)	1.3(4)	0.6(4)
s		1972	A-4	B	≥20	140	180	320	5.0(7)	9.4(17)	7.5(24)
					≥40	96	96	192	5.2(5)	10.3(10)	7.8(15)
	Southern										
t	Seminole (Oklahoma)	1963	A-4	D	≥14	121	181	302	6.7(8)	11.6(20)	9.3(28)
					≥30	81	124	205	8.6(7)	13.7(17)	11.7(24)
u	Seminole (Florida)	1969	A-2	C,D	All	49	69	118	14.3(7)	17.4(12)	16.1(29)
					≥20	20	32	52	35.0(7)	34.4(11)	34.6(18)
					≥35	-	-	37	-	-	37.8(14)
v	Seminole and Creek (Oklahoma)	≤1974	A-4	A+	≥30	-	-	89	-	-	19.1(17)
w	Cherokee (North Carolina)	1965	A-3	B	≥35	210	238	448	26.7(56)	31.1(74)	29.0(130)
v	Cherokee (Oklahoma)	≤1974	B-2	F	≥35	-	-	4,000	-	-	13.3(530)
v		≤1974	A-4	C	≥30	-	-	124	-	-	20.2(25)
x	Choctaw (Oklahoma)	1956-61	B-2	B	All	1,572	2,003	3,575	4.1(64)	3.5(71)	3.8(135)
					≥30	651	874	1,525	9.7(63)	8.1(71)	8.8(134)
v		≤1974	B-2	F	≥35	-	-	2,900	-	-	17.2(500)
y	Pawnee (Oklahoma)	1965	B-2	E	All	-	-	2,241	-	-	11.6(262)
					≥20	-	-	1,031	-	-	24.6(254)

Table 3.2 (continued)

Reference	Tribe and Location	Years of Study	Study Method*	Diagnostic Criteria**	Age Group (Years)	Study Population (Number of Persons) Males	Females	Both	Diabetes Mellitus (Percent (and Number) of Persons) Males	Females	Both
z	"Plains Indians"+ (Oklahoma)	1951-55	B-2	E	All	4,889	5,089	9,978	2.8(139)	5.7(291)	4.3(430)
v	Apache and Kiowa-Apache (Oklahoma)	≤1974	B-2	E	"Adults"	-	-	130	-	-	7.7(10)
v	Chickasaw (Oklahoma)	≤1974	B-2	F	≥35	-	-	2,300	-	-	13.5(310)
v	Cheyenne-Arapaho (Oklahoma)	≤1974	B-2	F	≥35	-	-	1,000	-	-	19.5(195)
v	Kickapoo (Oklahoma)	≤1974	B-2	F	≥30	-	-	173	-	-	16.2(28)
v	Sauk and Fox (Oklahoma)	≤1974	B-2	F	≥30	-	-	-	-	-	16.0(-)
v	Shawnee (Oklahoma)	≤1974	B-2	F	≥30	-	-	-	-	-	19.0(-)
v	Kiowa and Comanche (Oklahoma)	≤1974	A-4	B	≥30	-	-	80	-	-	13.8(11)
v	Comanche (Oklahoma)	≤1974	A-4	F	≥30	-	-	1,200	-	-	12.2(146)
aa	Alabama-Coushatta (Texas)	1959-63	A-2	D	All	300	300	600	6.3(19)	14.9(42)	10.2(61)
					≥20	125	145	270	15.2(19)	29.0(42)	22.6(61)
	Midwestern										
bb	Sioux and Assiniboine (Montana)	≤1969	B-2	E	All	1,715	1,785	3,500	3.2(55)	2.5(45)	2.9(100)

+Indian population studied said to be largely Kiowa, Comanche, Apache, and the Five Civilized Tribes (Cherokee, Choctaw, Chickasaw, Creek, and Seminole).

Table 3.2 (continued)

Reference	Tribe and Location	Years of Study	Study Method*	Diagnostic Criteria**	Age Group (Years)	Study Population (Number of Persons) Males	Females	Both	Diabetes Mellitus (Percent (and Number) of Persons) Males	Females	Both
cc	Mandan, Arickara Hidatsa--"Three Affiliated Tribes" (North Dakota)	1978	B-2	E	All	-	-	2,842	-	-	6.2(175)
					≥35			877	-	-	17.7(155)
	Northeastern										
dd	Passaquoddy Apache (Oklahoma)	1965	A-1	E	≥20	-	-	56	-	-	14.3(8)
ee	Seneca (New York)	1967	A-3	D	≥25	85	122	207	28.2(24)	32.8(40)	30.9(64)

*Meaning of the symbols used:

A. Population Study: Percent of Population Studied

- A-1. ≥75%
- A-2. 50%-74%
- A-3. 25%-49%
- A-4. ≤24%

B. Hospital or Clinic Study

- B-1. With screening tests
- B-2. Chart review only
- B-3. Other, less stringent

**Meaning of the symbols used (post-load refers to 75-gm glucose, althought in a few instances some variation occurred):

A+. Equivalent to 2-hour post-load plasma glucose ≥200 mg/dl.

A. Equivalent to 2-hour post-load plasma glucose ≥180 mg/dl (or ≥160 mg/dl, whole blood).

B. Equivalent to 2-hour post-load plasma glucose ≥160 mg/dl.

C. Equivalent to 2-hour post-load plasma glucose ≥140 mg/dl.

D. Other blood glucose values (fasting, postprandial, or post-load), less stringent.

E. "Previous diagnosis" (with or without criteria stated).

F. Criteria not stated (or only a test of urine for glucose).

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Table 3.3

INCREASED PREVALENCE OF DIABETES* IN PIMA INDIANS AGES 5 YEARS AND OLDER, 1967-77

Sex	Age-adjusted Rate (±SE)/100 Persons**		
	1967	1977	Percent Change
Males	20.0(1.4)	31.6(1.9)	+58
Females	27.6(1.6)	36.3(1.8)	+38
Both	24.0(1.1)	34.1(1.3)	+42

*Criterion for diabetes = 2-hour post 75-gm glucose of $\geq$ 200 mg/dl
**The 1970 United States population used as standard population

SOURCE: Bennett, PH, and WC Knowler. Increasing prevalence of diabetes in the Pima (American) Indians over a ten-year period. (International Congress Series No. 500.) In: Diabetes 1979, Excerpta Medica Foundation, 1980, Amsterdam.

Table 3.4

REPORTED INCIDENCE RATES OF DIABETES MELLITUS AMONG THE CHOCTAW AND THE PIMA INDIANS, BY AGE GROUP AND PUTATIVE QUANTUM INDIAN HERITAGE

Reference	Tribe and Location	Years of Study	Study Method and Diagnostic Criteria	Age Group (years)	Full Heritage Indian (Cases/1,000 Person-Years)			<Full, >1/2 Indian (Cases/1,000 Person-Years)		
					Males	Females	Both	Males	Females	Both
a	Choctaw (Oklahoma)	1956-61	Chart review of 831 male and 1,162 female full-bloods, and 741 male and 847 female half-to-full bloods; plasma glucose >160 mg/dl 2 hours after 75-gm glucose	0-19	0.0	0.0	0.0	0.0	0.0	0.0
				20-29	1.9	0.9	1.1	0.0	1.0	0.7
				30-39	6.3	3.3	4.0	2.7	0.0	0.8
				40-49	18.4	18.6	18.4	10.7	5.7	7.8
				50-59	24.4	34.5	29.9	16.7	18.8	17.9
				60-69	33.7	36.0	31.9	9.0	24.5	17.8
				70-89	25.3	18.9	21.6	32.9	33.3	31.4
			Total Person-Years:		5,690.7	10,098.9	15,789.6	3,132.2	3,201.9	6,334.1
b	Pima (Arizona)	1965-75	Complete population study; 90.5% have full Indian heritage; plasma glucose >200 mg/dl 2 hours after 75-gm glucose	5-14	0.4	0.4	0.4			
				15-24	12.4	9.8	10.8			
				25-34	48.3	45.2	46.2			
				35-44	60.9	56.4	58.0			
				45-54	24.5	63.9	46.0			
				55-64	37.2	47.2	41.8			
				65-94	20.8	31.9	26.0			
			Total Person-Years:	5,472	7,155	12,627				

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Table 3.5

REPORTED PREVALENCE RATES OF DIABETES MELLITUS AMONG NORTH AMERICAN INDIANS, BY TRIBE, AGE GROUP, YEARS OF STUDY, AND PUTATIVE QUANTUM INDIAN HERITAGE

Reference	Tribe and Location	Years of Study	Study Method and Diagnostic Criteria*	Age Group (Years)	Indian Quantum (Eighths)	Study Population (Number of Persons)			Diabetes Mellitus (Percent (and Number) of Persons)		
						Males	Females	Both	Males	Females	Both
a	Choctaw (Oklahoma)	1956–1961	Chart review; plasma glucose ≥160 mg/dl 2 hours post 75-gm glucose	All	8/8	831	1162	1993	5.7(47)	5.1(59)	5.3(106)
					<8/8,>1/8	741	841	1582	2.3(17)	1.4(12)	1.8(29)
				≥30	8/8	433	587	1020	10.6(46)	10.1(59)	10.3(105)
					<8/8,>1/8	218	287	505	7.8(17)	4.2(12)	5.7(29)
b	Cherokee (North Carolina)	1965	Study of 1/4 to 1/2 of population; plasma glucose ≥160 mg/dl 2 hours post 75-gm glucose	≥35	8/8	-	-	154	-	-	29.2(45)
					<8/8,≥6/8	-	-	105	-	-	36.2(38)
					<6/8,≥4/8	-	-	43	-	-	41.9(18)
					<4/8,≥2/8	-	-	34	-	-	8.8(3)
					>2/8	-	-	30	-	-	20.0(6)
					≤4/8	-	-	302	-	-	33.4(101)
					>4/8	-	-	64	-	-	14.1(9)
					Unknown	-	-	82	-	-	24.4(20)
c	Mandan, Arikara, and Hidatsa—"Three Affiliated Tribes" (North Dakota)	1978	Chart review of persons with a previous diagnosis of diabetes	≤34	8/8	-	-	1145	-	-	0.7(8)
					<8/8,>4/8	-	-	885	-	-	0.7(6)
					≤4/8	-	-	812	-	-	0.7(6)
					None	-	-	-	-	-	-
				≥35	8/8	-	-	537	-	-	22.3(120)
					<8/8,>4/8	-	-	194	-	-	14.9(29)
					≤4/8	-	-	146	-	-	4.1(6)
					None	-	-	97	-	-	4.1(4)
d	Pima and Papago (Arizona)	1965–1982	Complete population studied; plasma glucose ≥200 mg/dl 2 hours post 75-gm glucose	≥35	8/8	645	662	1307	46.7(301)	57.7(382)	52.3(683)
					<8/8,>4/8	3	13	16	33.3(1)	46.2(6)	43.8(7)
					≤4/8	7	5	12	28.6(2)	60.0(3)	41.7(5)
					None	13	3	16	7.7(1)	0 (0)	6.3(1)

*Most but not all subjects were studied by these methods and criteria.

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Table 3.6

CHANGES IN MEAN BODY WEIGHT, PERCENT DESIRABLE WEIGHT (PDW), AND BODY MASS INDEX (BMI)* IN PIMA INDIANS AGE 15 YEARS AND OLDER DURING THE 10-YEAR PERIOD BETWEEN 1967 AND 1977

Sex and Age (Years)	Weight (kg)	P-Value	PDW	BMI*	P-Value
Males					
15-24	9.24	<.001	10.57	2.57	<.001
25-34	8.58	<.01	10.89	2.69	<.01
35-44	3.41	NS	4.84	1.13	NS
45-54	3.33	NS	2.57	0.62	NS
55-64	1.84	NS	0.81	0.25	NS
≥65	0.87	NS	1.37	0.32	NS
Females					
15-24	6.56	<.001	10.57	2.17	<.001
25-34	5.62	<.01	9.32	1.91	<.01
35-44	0.93	NS	-0.09	-0.04	NS
45-54	4.26	<.05	4.10	0.71	NS
55-64	5.37	<.05	8.61	1.78	<.05
≥65	-1.03	NS	-3.63	-0.83	NS

*BMI = (body weight in kg)/(height in m)^2

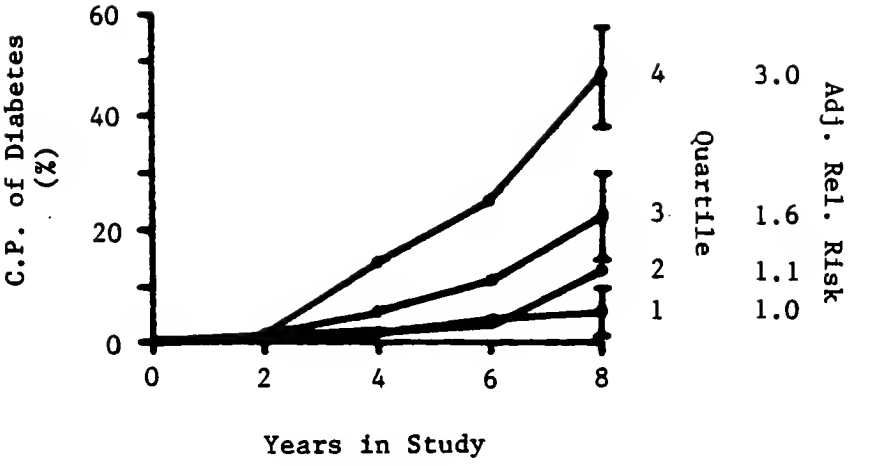
SOURCE: Bennett, PH, and WC Knowler. Increasing prevalence of diabetes in the Pima (American) Indians over a ten-year period. (International Congress Series No. 500.) In: Diabetes 1979, Excerpta Medica Foundation, 1980, Amsterdam.

Figure 3.1

AGE-SPECIFIC PREVALENCE OF DIABETES IN PIMA INDIANS, 1967 AND 1977

Source: Bennett, PH, and WC Knowler. Increasing prevalence of diabetes in the Pima (American) Indians over a ten-year period. (International Congress Series No. 500). In: Diabetes 1979, Excerpta Medica Foundation, 1980, Amsterdam.

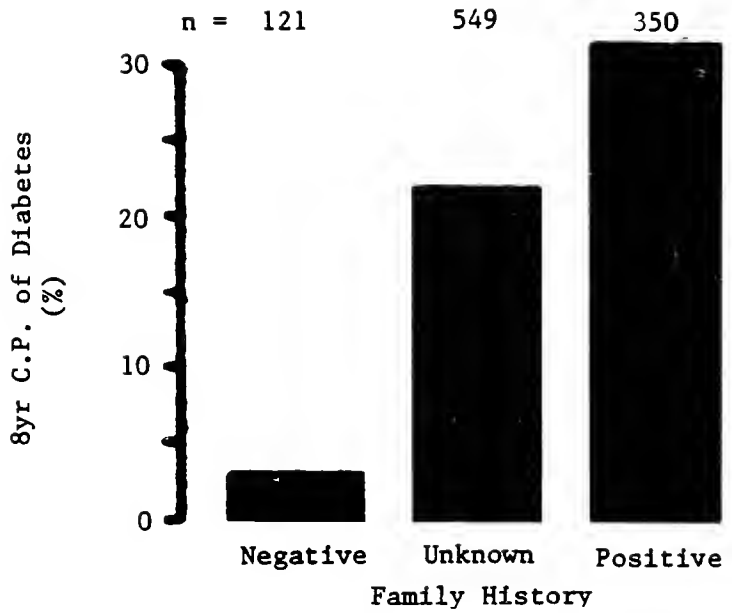
Figure 3.2



CUMULATIVE PROBABILITY (CP) OF DEVELOPMENT OF DIABETES IN PIMA INDIANS BY BODY MASS INDEX QUARTILE (1-16 . 16-24.242; 2=24.243-28.089; 3=29.090-32.526; 4=32.527-52.861) AND YEARS IN STUDY. ADJUSTED RELATIVE RISK DEVELOPED FROM MULTIPLE REGRESSION ADJUSTED RATES.

Source: Hamman, RF, PH Bennett, and M Miller. Incidence of diabetes among the Pima Indians. Adv Metab Disord 9:59, 1978.

Figure 3.3

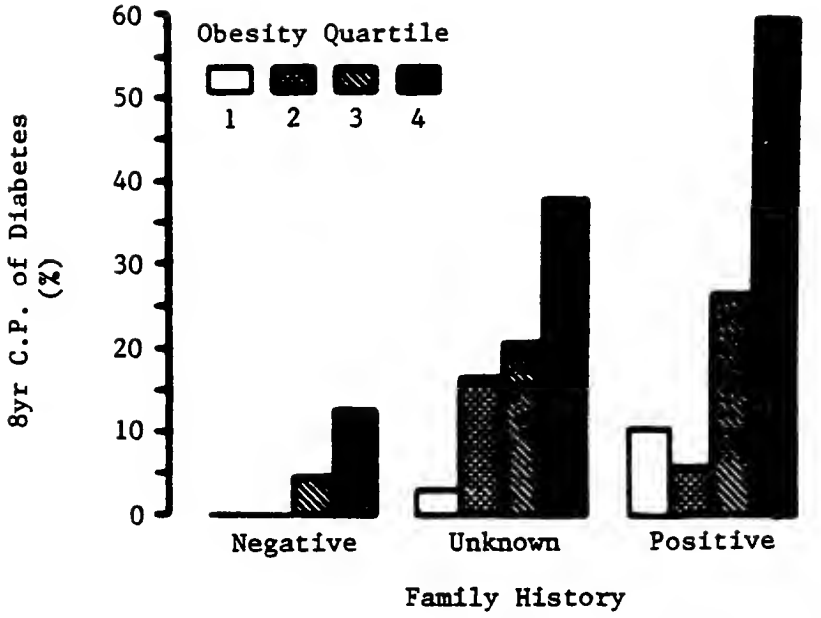


Adj. Rel. Risk	1.00	1.39	1.85

EIGHT-YEAR CUMULATIVE PROBABILITY (CP) OF DEVELOPMENT OF DIABETES IN PIMAS BY FAMILY HISTORY (AT LEAST ONE PARENT HAVING DIABETES). ADJUSTED RELATIVE RISK DEVELOPED FROM MULTIPLE REGRESSION RATES.

Source: Hamman, RF, PH Bennett, and M Miller. Incidence of diabetes among the Pima Indians. Figure 3. Adv Metab Disord 9:61, 1978.

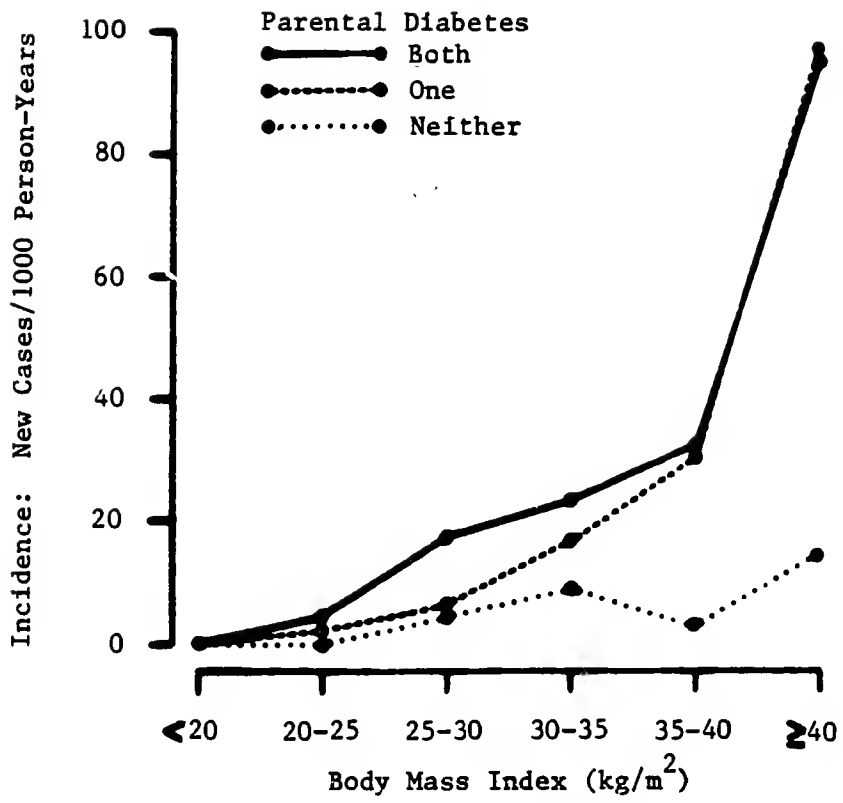
Figure 3.4



EIGHT-YEAR CUMULATIVE PROBABILITY (CP) OF PIMAS DEVELOPING DIABETES BY BODY MASS INDEX QUARTILE (SEE LEGEND, FIGURE 4) AND FAMILY HISTORY (AT LEAST ONE PARENT HAVING DIABETES).

Source: Hamman, RF, PH Bennett, and M Miller. Incidence of diabetes among the Pima Indians. Adv Metab Disord 9:61, 1978.

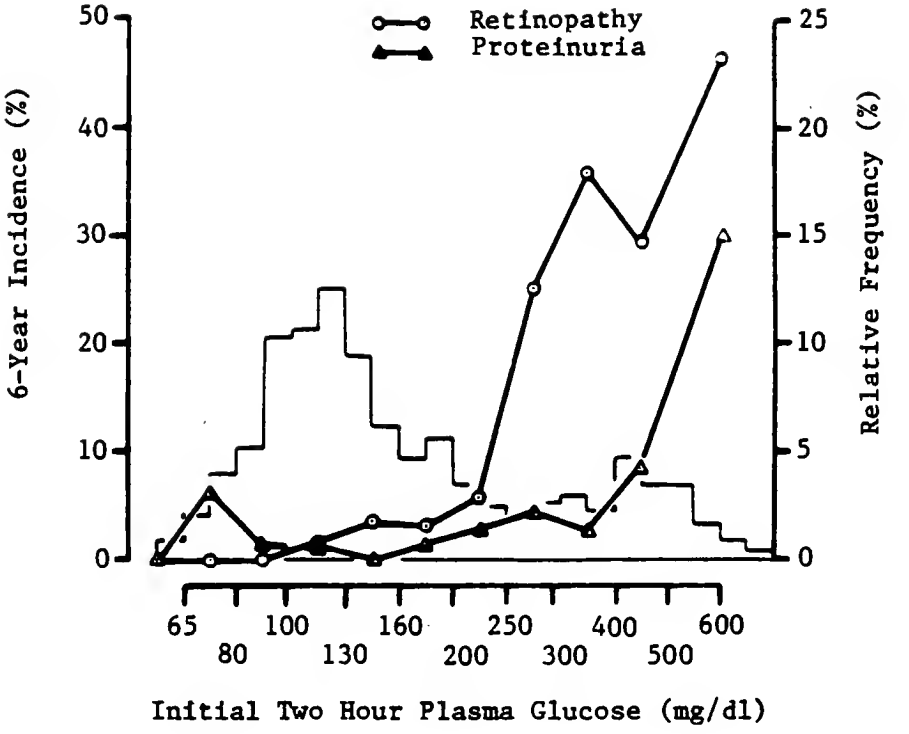
Figure 3.5



AGE-ADJUSTED INCIDENCE OF DIABETES IN PIMA INDIANS AGES 5-44 YEARS, BY BODY MASS INDEX AND PARENTAL DIABETES STATUS AS DETERMINED BY GLUCOSE TOLERANCE TESTING

Source: Knowler, WC, DJ Pettitt, PJ Savage, and PH Bennett. Diabetes incidence in Pima Indians: Contributions of obesity and parental diabetes. Am J Epidemiol 113(2):152, 1981.

Figure 3.6



INCIDENCE OF RETINOPATHY AND HEAVY PROTEINURIA (URINE PROTEIN/CREATININE RATIO GREATER THAN OR EQUAL TO 1.0) OVER A 6-YEAR PERIOD, ACCORDING TO INITIAL TWO-HOUR PLASMA GLUCOSE CONCENTRATIONS (HISTOGRAM), IN PIMA INDIANS.

Source: Bennett, PH, WC Knowler, DJ Pettitt, MJ Carraher, and R Vasquez. Longitudinal studies of the development of diabetes in the Pima Indians. (INSERM Symposium No. 22.) In: Eschwege, E, ed. Advances in diabetes epidemiology. Amsterdam: Elsevier Biomedical Press, 1982.

Chapter 4

DIABETES IN HISPANIC AMERICANS

According to the 1980 census, approximately 14.6 million persons of Hispanic ancestry live in the United States. Clinical observation and a few local studies seem to indicate that, like other minority groups in the United States, Hispanic Americans suffer from diabetes mellitus to a degree disproportionate to their representation in the population as a whole. As shown in table 1.1, Hispanics are more than three times as likely as whites to develop noninsulin-dependent diabetes. It is important to note that the largest group of Hispanics, Mexican Americans, is also the group in which the severity of the problem is best documented. It remains to be determined whether the risk is shared at the same degree by the 2 million Puerto Rican Americans and 800,000 Cuban Americans.

The National Center for Health Statistics is conducting a study known as the Hispanic Health and Nutrition Examination Survey (HHANES) to assess the health and nutritional status of Mexican Americans, Puerto Ricans, and Cuban Americans in selected regions of the United States. The prevalence of certain diseases in persons 6 months to 74 years of age will be estimated and compared with normative values of certain health characteristics. The use of health services will also be estimated in relation to health status. Data tapes for Mexican Americans are now being analyzed; data for Puerto Rican Americans and for Cuban Americans will be available in January 1986.

Several methodological considerations should be clarified prior to a discussion of diabetes as it affects Hispanics in the United States. There are no data on IDDM rates among Hispanic American children or adolescents, and not all studies conducted of diabetes in Hispanics have distinguished between NIDDM and IDDM. The failure to distinguish between the two types of diabetes, however, does not have a significant effect on the reported prevalence rates in adults because the great majority of Hispanics identified as having diabetes have NIDDM.

Another methodological consideration is that few of the studies of diabetes in Hispanics have used the new diagnostic criteria of the National Diabetes Data Group. Since these criteria have higher standards than earlier criteria, some Hispanic Americans who reported histories of diabetes have been found not to be diabetic under the new criteria. This discussion includes such persons as diabetic only if they report that they are taking insulin or oral hypoglycemic agents.

Prevalence and Mortality

Data on the prevalence of diabetes among Hispanics are derived primarily from studies conducted in Texas and Puerto Rico. The results of an early study of the prevalence of diabetes in Mexican Americans in Laredo, Texas, are summarized in table 4.1, and the results of the more recent San Antonio Heart Study (1979-82) are summarized in table 4.2. The San Antonio study compared Mexican Americans living in the "barrio" (poor urban area) with those living in the suburbs and in transitional neighborhoods.

The age-specific prevalence rates in the Laredo study are only about half of the corresponding rates in the San Antonio barrio (table 4.2). The comparison is made with the San Antonio barrio because the Laredo participants were all from a socioeconomic group comparable to the San Antonio barrio residents. A possible explanation for the discrepancy between the San Antonio and Laredo rates is that only fasting plasma glucose values were available from Laredo. Although the NDDG criterion for fasting blood glucose ($\geq$ 140 mg/dl) was adhered to in the Laredo study, participants who failed to meet this criterion but who might have met the NDDG postglucose load criteria had glucose tolerance tests been performed are not included in this study. They are included in the San Antonio study. It has recently been reported that in Mexican Americans the sensitivity of the fasting plasma glucose test in identifying a diabetic condition is only about 59 percent. When the Laredo rates are inflated by dividing them by 0.59, they approximate the rates observed in the San Antonio barrio.

Despite the discrepancy in age-specific rates in the two studies, the age-adjusted rates in Laredo (13 percent in men and 14 percent in women) are quite similar to the San Antonio barrio rates. The difference is explained by the age spans of the two samples, which are 45 to 74 in Laredo and 25 to 64 in San Antonio. It has been established (see chapter 1) that the prevalence of diabetes increases with age.

The results of the San Antonio Heart Study indicate that NIDDM is more than twice as prevalent in men living in the barrio as among men from the suburbs. In addition, the prevalence rate is almost four times as high among barrio women as among suburban women. HANES II, which used essentially the same criteria in a study of the general population from 1978 to 1980, found NIDDM in 5.7 percent of the men and 7.4 percent of the women among persons from 25 to 74 years old. These rates are similar only to those found among Mexican Americans who live in the affluent suburbs. The rate of diabetes among Mexican Americans in the barrio is approximately twice as high as in non-Hispanic whites. It should be noted that while the prevalence of diabetes in barrio women is slightly higher than that in barrio men, the rate is higher in Mexican-American men in both the transitional neighborhoods and the suburbs.

The prevalence of NIDDM was also studied in Starr County, Texas, on the Mexican border, one of the most impoverished counties in the United States. The rate of diabetes in Mexican Americans living in this county, therefore, should be comparable to that of the barrio population in San Antonio. To facilitate comparison to the San Antonio barrio, table 4.3 shows the age-adjusted rates for the population of the county aged 5 to 75+ and the population aged 25 to 64. The study used the same NDDG criteria that were used in San Antonio for diagnosis, but screening criteria were more comparable to those used for the Laredo study. Hence, the method for identifying NIDDM in the Starr County study was similar to that of the Laredo study, in that both based a diagnosis of newly discovered cases primarily on fasting hyperglycemia. Presumably for this reason, the proportion of newly discovered cases in Starr County is relatively low (20 to 25 percent of the cases) and resembles the 15-percent proportion in San Antonio. Because of the underascertainment of newly diagnosed cases, the age-specific and age-adjusted (25 to 64) rates in Laredo and Starr County are substantially lower than in the San Antonio barrio (table 4.2).

The prevalence of diabetes in Puerto Rican men living in Puerto Rico has also been studied. Tables 4.3, 4.4, and 4.5 summarize the results. Table 4.4 indicates that the age-adjusted prevalence rate of diabetes in urban men (9 percent) is considerably higher than the rate in rural men (3.5 percent). Because the diagnostic criteria used in the Puerto Rico study are very different from those used in the San Antonio study, it is not possible to compare the findings. The Puerto Rico study diagnosed diabetes if the participant gave a history of diabetes or if a casual whole-blood glucose test was $\geq$140 mg/dl--the equivalent of a plasma-glucose level of 160 mg/dl. This level is higher than the fasting level in the NDDG criteria, which would tend to lower prevalence estimates. In addition, the specimens are casual rather than fasting, and the study included subjects being treated by diet, which the San Antonio study did not. These last two methodological differences should have raised the results of the Puerto Rico study in relation to the San Antonio results. The relative weights in the Puerto Rico study averaged 1.04 for rural and 1.16 for urban men. In San Antonio, the corresponding figures were 1.12 for barrio men and 1.10 for suburban men. These data suggest that relative leanness might in part explain the low rates of diabetes among rural Puerto Ricans, but not among the urban dwellers.

Table 4.5 shows the rates of previously and newly diagnosed cases in rural and urban men. Newly diagnosed cases accounted for 42 percent of rural cases but only 29 percent of urban cases.

Table 4.6 shows the prevalence of diabetes by relative weight. In both urban and rural Puerto Rican men, the prevalence rates of diabetes rose with relative weight, but at any relative weight they were higher in urban men than in rural men. The implication is that although obesity is a factor in the difference between urban and rural men, other factors must also be involved.

In the area of diabetes mortality, statistics document the high rate of diabetes in Mexican Americans. In Texas, rates of mortality from diabetes by county range from 8.9 to 52.0 per 1,000 deaths. The mortality rate for diabetes is highly correlated with the proportion of Mexican Americans in the population of the county. In Bexar County, which includes San Antonio, the diabetes mortality rates declined among both Hispanics and whites from 1970 to 1976, but in both men and women the rates were consistently two to four times as high among Hispanics as among the white population.

Rates of mortality from diabetes among Puerto Ricans and Cuban Americans have not been reported.

Risk Factors

Socioeconomic Status and Acculturation. The association between socioeconomic status and diabetes found in the San Antonio study suggests that socioeconomic status may be related to the occurrence of the disease. This conclusion has been questioned, however, because both acculturation and genetic background have been shown to vary in Mexican Americans with changing socioeconomic status. A study of acculturation in the San Antonio population conducted by Hazuda and Haffner used a series of multidimensional scales to measure the adoption by Hispanic Americans of non-Hispanic behavior, attitudes,

and values. Even after adjustments were made for age and socioeconomic status, investigators found that the prevalence of diabetes declined with increasing acculturation. Further adjustment for obesity suggested that acculturation could be related to changing patterns of obesity in women, but was largely independent of obesity in men. At the same time, even after adjustment for socioeconomic status, the study found that obesity was inversely related to acculturation in both sexes. It thus appears that acculturation may be an important factor independent of socioeconomic status in the prevalence of diabetes in Mexican Americans, either through its effects on obesity in women or by other mediating pathways in men.

Genetic Factors. It is possible that some of the inconsistencies found in the relation between socioeconomic status and diabetes in Hispanic Americans may be associated with genetic admixture. As chapter 3 points out, Native Americans have a marked proclivity for diabetes. It could well be that the rates of NIDDM in Mexican Americans are primarily attributable to their Native American ancestry. According to this theory, the higher rates of NIDDM in low-income, barrio Mexican Americans compared with affluent suburban Mexican Americans (table 4.2) could be the result of the higher percentage of Native American ancestry in the former compared with the latter.

Socioeconomic status and acculturation do not appear to have a direct effect on NIDDM prevalence. Rather, they are proxy variables for various health habits that presumably have a more direct influence on the development of diabetes.

Obesity and Fat Patterning

Among the health habits that may affect diabetes, diet and exercise would appear to be the most promising candidates. However, apart from caloric excess, which leads to obesity, there is little definitive information on the role of diet and exercise in the development of diabetes in Mexican Americans.

Obesity is well known to be a risk factor for NIDDM. The San Antonio Heart Study also assessed the relation between diabetes and the degree of adiposity. Although the Mexican Americans in the San Antonio barrio exhibited a higher degree of obesity than either the more affluent Mexican Americans or the whites, table 4.7 makes it clear that obesity cannot be the only explanation. When lean, average, or obese Mexican Americans are compared with whites matched in adiposity, the Mexican Americans still exhibit rates of NIDDM prevalence that are 2 to 3.5 times as high.

In addition to overall adiposity, distribution of body fat may be a determinant of various metabolic disorders. Although few studies have been made of fat patterning in Mexican Americans and whites, there is some evidence based on subscapular and tricep skinfolds that Mexican Americans have a more central distribution of body fat compared with non-Hispanic whites.

Recently, interest in fat patterning has shifted to lower versus upper body adiposity, with the latter type considered to have a higher propensity to metabolic derangement. Unfortunately, there do not appear to be any data on ethnic differences between Mexican Americans and non-Hispanic whites concern-

ing lower versus upper body adiposity, although such data are currently being collected. Differences in lower versus upper body adiposity between people with diabetes and those without the disease, however, have been reported for Mexican Americans from Starr County, Texas. In this study, Mexican-American diabetics had relatively more upper body fat and less lower body fat than Mexican-American nondiabetics.

Complications

Data are quite limited on the incidence of complications from diabetes in Mexican Americans. Evidence has recently been presented, however, suggesting that NIDDM in Mexican Americans is metabolically more severe than in non-Hispanic whites. This finding is illustrated in table 4.8. The San Antonio Heart Study tested diabetic whites and Mexican Americans for plasma-glucose concentration 2 hours after an oral glucose load. Investigators found that twice as many Mexican Americans as non-Hispanic whites showed concentration higher than 300 mg/dl. Table 4.9 may clarify the question whether the relative impairment in Mexican Americans is due to insufficient access to medical care, to a lower quality of medical care, or to some other factor.

The San Antonio study encountered new diagnoses of diabetes in roughly the same percentage in the Hispanic as in the general population (61.2 percent of whites and 58.3 of Hispanics). This finding suggests that Mexican Americans are not less likely than whites to have their diabetes come to medical attention. Also, the percentage of diabetics under treatment with oral agents or insulin was higher in Mexican Americans than in whites. Neither finding supports the conjecture that inadequate treatment is responsible for deficiencies of metabolic control in Mexican Americans, although poor compliance with therapeutic regimens is possible among the Mexican-American patients. The findings also could indicate that the greater hyperglycemia in Mexican Americans is a real phenomenon and has led to more aggressive treatment by physicians.

Table 4.9 also indicates that Mexican Americans with diabetes tend to be diagnosed at an earlier age than whites (see chapters 1 and 2 for parallels in black Americans). Consequently, Mexican Americans at any age would exhibit a longer history of the disease. This fact may explain their higher rate of hyperglycemia. It also raises the question whether they suffer disproportionately from the complications of diabetes and the mortality associated with these complications. Unfortunately, there is practically no information available on the incidence of complications of diabetes among Mexican Americans.

Prevention

It is clear that noninsulin-dependent diabetes is a major health burden contributing to excess morbidity and mortality in the Mexican-American population. There is still inadequate data, however, to say with certainty whether this increased diabetes-related health burden extends to the other Hispanic subgroups in the United States. Increased support of public health programs to educate the Mexican-American population about diabetes and to contribute to its prevention are certainly warranted. Also, efforts to

identify undiagnosed cases and to bring them under medical surveillance are needed, because, as with other segments of the U.S. population, approximately half of the Mexican Americans with diabetes are unaware of their disease.

Finally, expanded treatment facilities are needed. Public health education programs aimed at prevention and health care services aimed at treatment of established cases need to be tailored to the cultural orientation of the Mexican-American population. Health education materials should be available in Spanish, the preferred language of many Mexican Americans, and the content of these materials should be sensitive to cultural nuances that can heavily influence whether the information and guidelines are likely to be acceptable to the population they are designed to serve. Ongoing research on the relationship between cultural orientation and health habits and attitudes should assist in the design of culturally acceptable educational materials.

It is important to establish whether the predisposition to diabetes found among Mexican Americans is shared by other Hispanic subgroups. This question should be answered in the case of Puerto Rican and Cuban Americans by the soon-to-be-completed Hispanic HANES study. Studies of Hispanic children and adolescents are needed to assess the frequency of insulin-dependent diabetes in this population. Currently, data on this important topic are completely lacking.

Further studies are needed on the customary diets of various Hispanic subgroups and the possible relationship of these diets to obesity, fat patterning, and diabetes. There are almost no data available on micro- and macrovascular complication rates in Hispanic diabetics, although such data are currently being gathered. These data are particularly important because in the San Antonio Heart Study, Mexican-American diabetics had a longer disease duration and greater severity of hyperglycemia, both of which increase the risk of diabetic complications. These observations need to be confirmed in other Hispanic populations. Finally, health services research and research on compliance with medical regimens are needed in Hispanic populations to identify deficiencies in access to or quality of medical care and to suggest culturally valid strategies for correcting whatever deficiencies are identified.

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Table 4.1

PREVALENCE (PERCENTAGE) OF DIABETES IN MEXICAN AMERICANS IN LAREDO, TEXAS, 1979

Sex and Age (Years)	Previously Diagnosed*		Newly Diagnosed* Fasting Hyperglycemia		Total Percent
	Number	Percent	Number	Percent	
Men					
45-54	3/37	8.1	1/37	2.7	10.8
55-64	7/42	16.7	0/42	0.0	16.7
65-74	5/30	16.7	2/30	6.7	23.3
Total, 45-74	15/109	13.8	3/109	2.8	16.5
Age-adjusted prevalence†		13.0		2.7	15.7
Women					
45-54	7/93	7.5	0/93	0.0	7.5
55-64	9/70	12.9	3/70	4.3	17.1
65-74	18/65	27.7	2/65	3.1	30.8
Total, 45-74	34/228	14.9	5/228	2.2	17.1
Age-adjusted prevalence†		14.0		2.2	16.1

*Criteria for previously diagnosed diabetes were history of diabetes together with either fasting plasma glucose $\geq$ 140 mg/dl or currently using insulin or oral antidiabetic medication; criterion for newly diagnosed diabetes was fasting plasma glucose $\geq$ 140 mg/dl.

†Age-adjusted by the direct method to the United States 1970 population.

Source: Stern, MP, et al. Cardiovascular risk factors in Mexican Americans in Laredo, Texas. Am J Epidemiol 113:546-555, 1981.

Table 4.2

PREVALENCE (PERCENTAGE) OF NONINSULIN-DEPENDENT DIABETES MELLITUS (NIDDM)* IN MEXICAN AMERICANS ACCORDING TO SOCIOECONOMIC STATUS, THE SAN ANTONIO HEART STUDY, 1979-82

Sex and Age (Years)	Barrio		Transitional Neighborhood		Suburbs	
	Number	Percent	Number	Percent	Number	Percent
Men						
25-34	2/50	4.0	1/62	1.6	0/31	0.0
35-44	3/32	9.4	4/51	7.8	2/64	3.1
45-54	7/46	15.2	9/40	22.5	7/64	10.9
55-64	15/50	30.0	11/36	30.6	3/25	12.0
Total, 25-64	27/178	15.2	25/189	13.2	12/184	6.5
Age-adjusted prevalence†		13.7		14.6		6.1
Women						
25-34	1/71	1.4	1/92	1.1	2/53	3.8
35-44	8/73	11.0	5/65	7.7	1/73	1.4
45-54	13/75	17.3	4/48	8.3	2/54	3.7
55-64	27/79	34.2	7/38	18.4	1/16	6.3
Total, 25-64	49/298	16.4	17/243	7.0	6/196	3.1
Age-adjusted prevalence†		14.8		8.2		3.7

*NIDDM defined as cases meeting NDDG criteria for diabetes (fasting or OGTT criteria) or, for those persons who did not meet NDDG criteria, history of diabetes together with current use of insulin or oral antidiabetic agents.

†Age-adjusted by the direct method to the United States 1970 population.

Source: Stern, MP, Rosenthal, M, Haffner, SM, Hazuda, HP, Franco, LJ. Sex difference in the effects of sociocultural status on diabetes and cardiovascular risk factors in Mexican Americans. Am J Epidemiol 120:834-51, 1984.

Table 4.3

PREVALENCE (PERCENTAGE) OF NONINSULIN-DEPENDENT DIABETES MELLITUS (NIDDM) IN MEXICAN AMERICANS IN STARR COUNTY, TEXAS, 1981

Sex and Age (Years)	Previously Diagnosed*		Newly Diagnosed*		Total Percent
	Number	Percent	Number	Percent	
Men					
15-24	0/211	0.0	0/211	0.0	0.0
25-34	3/115	2.6	0/115	0.0	2.6
34-44	3/92	3.3	0/92	0.0	3.3
45-54	7/95	7.4	5/95	5.3	12.7
55-64	11/85	12.9	3/85	3.5	16.4
65-74	8/60	13.3	2/60	3.3	16.6
75+	4/34	11.8	2/34	5.8	17.6
Total, 15-75	36/692	5.2	12/692	1.6	6.9
Age-adjusted prevalence (15-75 years)†		5.6		1.9	7.5
Age-adjusted prevalence (25-64 years)†		6.2		2.1	8.3
Women					
15-24	1/285	0.4	0/285	0.0	0.4
25-34	1/254	0.4	0/254	0.0	0.4
34-44	8/210	3.8	4/210	1.9	5.7
45-54	17/204	8.3	5/204	2.5	10.8
55-64	26/142	18.3	1/142	0.7	19.0
65-74	10/94	10.6	6/94	6.4	17.0
75+	3/50	6.0	1/50	2.0	8.0
Total, 15-75	66/1,239	5.3	17/1,239	1.4	6.7
Age-adjusted prevalence (15-75 years)†		5.7		1.4	7.1
Age-adjusted prevalence (25-64 years)†		7.0		1.3	8.3

*Previously diagnosed diabetes defined as medical history of diabetes, or taking insulin or oral hypoglycemic drugs, or meeting NDDG criteria. Newly diagnosed diabetes defined as all of the following: casual blood glucose $\geq$ 130 mg/dl, 4-hour fasting blood glucose $\geq$ 130 mg/dl, and meeting NDDG criteria.

†Age-adjusted by the direct method to the United States 1970 population.

Source: Hanis, CL, et al. Diabetes among Mexican Americans in Starr County, Texas. Am J Epidemiol 118:659-72, 1983.

Table 4.4

PREVALENCE (PERCENTAGE) OF DIABETES IN PUERTO RICAN MEN AGED 45 TO 64, PUERTO RICO HEART HEALTH PROGRAM, 1965

	Rural Men		Urban Men	
Age (Years)	Number	Percent	Number	Percent
45-49	16/552	2.9	113/1,683	6.7
50-54	24/735	3.3	174/1,935	9.0
55-59	22/684	3.2	134/1,427	9.4
60-64	31/596	5.2	134/1,145	11.7
Total, 45-64	93/2,567	3.6	555/6,190	9.0
Age-adjusted prevalence*		3.5		9.0

†Age-adjusted by the direct method to the United States 1970 population.

Source: Cruz-Vidal, M, et al. Factors related to diabetes mellitus in Puerto Rican men. Diabetes 28:300-07, 1979.

Table 4.5

PREVALENCE (PERCENTAGE) OF PREVIOUSLY AND NEWLY DIAGNOSED DIABETES IN PUERTO RICAN MEN AGED 45 TO 64, PUERTO RICO HEART HEALTH PROGRAM, 1965

	Rural Men	Urban Men
Previously diagnosed		
Euglycemic	1.3	3.6
Hyperglycemic	0.8	2.8
Newly diagnosed	1.5	2.6
Total	3.6	9.0

Source: Cruz-Vidal, M, et al. Factors related to diabetes mellitus in Puerto Rican men. Diabetes 28:300-07, 1979.

Table 4.6

PREVALENCE (PERCENTAGE) OF DIABETES, ACCORDING TO RELATIVE WEIGHT, IN PUERTO RICAN MEN AGED 45 TO 64, PUERTO RICO HEART HEALTH PROGRAM, 1965

	Rural Men		Urban Men	
Relative Weight*	Number	Percent	Number	Percent
Age 45-49				
<100	8/545	1.5	21/604	3.5
100-109	2/303	0.7	29/593	4.9
110-125	13/302	4.3	121/1,374	8.8
>125	17/135	12.6	115/1,042	11.0
Age 55-64				
<100	10/630	1.6	28/592	4.7
100-109	7/279	2.5	40/448	8.9
110-125	23/254	9.1	107/870	12.3
>125	13/115	11.3	93/659	14.1

*Percent of ideal body weight for observed height from Metropolitan Life Insurance tables.

Source: Cruz-Vidal, M, et al. Factors related to diabetes mellitus in Puerto Rican men. Diabetes 28:300-07, 1979.

Table 4.7

PREVALENCE (PERCENTAGE) OF NONINSULIN-DEPENDENT DIABETES MELLITUS (NIDDM)* ACCORDING TO DEGREE OF ADIPOSITY IN MEXICAN AMERICANS AND NONHISPANIC WHITES, THE SAN ANTONIO HEART STUDY, 1979-82

Adiposity Category	Men				Women			
	Mexican American		Nonhispanic Whites		Mexican American		Nonhispanic Whites	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Lean	7/87	8.0	1/55	1.8	2/83	2.4	0/73	0.0
Average	9/128	7.0	2/54	3.7	9/124	7.3	0/77	0.0
Obese	29/168	17.3	2/56	3.6	47/342	13.7	7/78	9.0
Mantel-Haenszel prevalence ratio	3.59 ($p < 0.005$)				2.30 ($p < 0.025$)			

Source: Stern, MP, Gaskill, SP, Hazuda, HP, Gardner, LI, and Haffner, SM. Does obesity explain excess prevalence of diabetes among Mexican Americans? Results of the San Antonio Heart Study. Diabetologia 24:272-77, 1983.

Table 4.8

SEVERITY OF HYPERGLYCEMIA IN MEXICAN AMERICANS AND NON-HISPANIC WHITES WITH NIDDM, THE SAN ANTONIO HEART STUDY, 1979-82

	Plasma Glucose Concentration 2-Hours Post Oral Glucose Load	
	Less Than 300 mg/dl	Greater Than 300 mg/dl
Mexican-American diabetics	50.9%	49.1%
Non-Hispanic white diabetics	76.6%	23.4%

Table 4.9

DISTRIBUTION OF NIDDM IN MEXICAN AMERICANS AND NON-HISPANIC WHITES ACCORDING TO DIAGNOSTIC AND TREATMENT STATUS, THE SAN ANTONIO HEART STUDY, 1979-82

	Mexican American		Non-Hispanic White	
	Number	%	Number	%
Newly diagnosed	74	58.3	30	61.2
Previously diagnosed				
Diet treatment only	17	13.4	12	24.5
Treatment with oral agents	27	21.3	4	8.2
Treatment with insulin	9	7.1	3	6.1
Mean age at diagnosis	43 yrs		49 yrs	
Mean duration of diabetes	9.4 yrs		7.5 yrs	

Chapter 5

DIABETES IN ASIAN AMERICANS

The Asian-American population in the United States more than doubled between 1970 and 1980, rising from about 1,426,000 to more than 3,466,000 (table 5.1). In the same decade, Chinese Americans assumed the first rank among Asian Americans, with a population of more than 812,000, Filipino Americans took second, with almost 782,000 persons, and Japanese Americans dropped from first to third, with more than 716,000 persons.

Of the 12 Asian groups enumerated in the 1980 census, Japanese Americans are the only group in which detailed studies of the impact of diabetes have been undertaken. A recent study by Yu and her colleagues, however, has used figures from the 1980 census on the 10 leading causes of death in the United States to compute their rank order and proportional mortality in Chinese, Japanese, and Filipino Americans. Table 5.2 shows that diabetes was the seventh leading cause of death reported in whites, Japanese Americans, and Filipinos and the eighth leading cause of death in Chinese Americans. Table 5.3 computes the age-adjusted mortality ratio for the three groups in relation to whites.

A study conducted by Sloan in Hawaii in 1958-59 compared the incidence and prevalence of diabetes in white, Chinese, Filipino, Japanese, and Korean adults, representing about 30 percent of the workforce on the island of Oahu (table 5.4). The study found an age-adjusted rate in Filipinos that was almost three times as high as the rate in whites. In Japanese and Koreans, the rate was only slightly lower than in Filipinos, and the rate in Chinese was double that in whites. Rates of incidence bore roughly the same relation to the rate in whites. The population studied consisted of approximately 30,000 persons, of whom more than 16,000 were of Japanese ancestry.

The results of these studies make it clear that in at least four groups of Americans of Asian background, diabetes is not only a significant problem, but one whose manifestation is disproportionate to its severity in our population as a whole. Because we have more information on Americans of Japanese ancestry, the rest of this chapter will summarize the studies that have been made in that group.

Results from the various studies of diabetes in Japanese Americans are difficult to compare, partly because of the small number of studies that have been carried out and partly because the methods and criteria used are not consistent. On the basis of existing knowledge, however, it can be concluded that Japanese Americans suffer from the noninsulin-dependent form of the disease to a greater degree than either white Americans or Japanese in Japan. International surveys of diabetes prevalence have shown IDDM to be much less common in Japan than in other nations. Therefore, it seems likely that type I diabetes is very uncommon among Japanese Americans.

Incidence and Prevalence

The most extensive survey of diabetes among the Japanese, the Hiroshima University Study, compared sample populations from Hawaii and Los Angeles from 1973 to 1978 and from the prefecture (province) of Hiroshima in Japan from 1975 to 1978. Japanese living in rural areas of Hiroshima were selected because the majority of Japanese immigrants to the United States had originally come from rural areas of Japan. Rates of diabetes prevalence in Hawaii and Los Angeles were not significantly different and are combined in table 5.5. The prevalence rate was 13.9 percent among Japanese in Hawaii and Los Angeles. In Hiroshima, the rate was 6.5 percent.

The finding of a higher rate of diabetes among the immigrant Japanese persisted when comparisons were based on matched body-mass index; thus, the difference could not be attributed to obesity. Diabetes was diagnosed either from the fact that the individual was receiving insulin or oral hypoglycemia drugs or from a finding of a serum glucose level of 200 mg/dl or higher 2 hours after administration of 50 g of oral glucose.

The Ni-Hon-San study compared Japanese men living in Japan, Honolulu, and eight counties in the San Francisco Bay area. The group in Japan comprised a 20-percent sample of about 100,000 persons who have been examined every 2 years since 1958 by the Atomic Bomb Casualty Commission. They represent an ambulatory population made up of persons who were exposed to radiation in World War II as well as those who were not exposed. The Honolulu group consisted of 9,878 men of Japanese ancestry identified from Selective Service records. The California group consisted of 3,809 persons and included both Japanese who had immigrated to the United States and their children who were born in this country. Both the Honolulu and San Francisco groups showed higher glucose intolerance than the Japanese group.

The Honolulu Heart Study examined 8,006 men of Japanese ancestry who were living on Oahu in 1965 (table 5.6). Of these, 7,916 men 45 to 64 years old were administered 50 g of oral glucose. Men with known diabetes made up 5.9 percent of the population. An additional 6.7 percent exhibited serum glucose levels of 225 mg/dl or more after 1 hour. Those who showed glucose intolerance thus represented 12.6 percent of the population studied.

The Seattle Japanese-American Community Diabetes Study is based on a 1983 survey of a strictly defined population of Japanese-American men who reside in the greater Seattle area, which includes King County. This ongoing study is examining the prevalence of diabetes, its associated complications, and factors that may be related to the development of diabetes and its complications. Its goal is to study 250 (about 15 percent) Nisei men (men of pure Japanese ancestry who came to the United States before the age of 6 years and before 1925 or who were born of at least one parent who had immigrated after the age of 6 and before 1925). Since health care is easily accessible to this group, its availability would not seem to be a factor in the study. Of the 214 men sampled in the first year, 12.1 percent reported that they had diabetes.

In 1984, a 75 g oral glucose-tolerance test was given to 74 Nisei men involved in the study who were 50 to 70 years old. All 74 initially had reported that they did not have diabetes. The results of the test revealed that over half of the men showed abnormal glucose tolerance. Only 44.6 percent were found to have normal glucose tolerance (fasting serum glucose <115 mg/dl and 2-hour serum glucose <140 mg/dl); 13.5 percent were diabetic (fasting serum glucose >140 mg/dl and/or 2-hour serum glucose ≥140 mg/dl and <200 mg/dl), and 41.9 percent had impaired glucose intolerance (fasting serum glucose <140 mg/dl and 2-hour serum glucose ≥140 mg/dl and <200 mg/dl). In contrast, the HANES for 1976-80 found undiagnosed diabetes in 4.7 percent of the general population 40 to 59 years old and in 9.3 percent of those 60 to 74 years old; the rates of impaired glucose tolerance in the same groups were 6.4 and 10.0 percent, respectively.

Recent unpublished data from Tokyo indicate that 5.4 percent of men 40 years old or older have diabetes, and 5.6 percent exhibit impaired glucose tolerance. In view of the fact that American women exhibit a higher degree of diabetes than American men, the rate found in Japanese women over 40 years old is of interest: the same study found diabetes in 2.5 percent of Tokyo women and impaired glucose tolerance in 4.0 percent.

Although no conclusions are possible from the available data, the rate of diabetes in Japanese Americans appears to be higher than both the rate in the population as a whole and the rate in Japan. Japanese-American men 40 years old and older may exhibit a rate of diabetes as high as 10 to 14 percent; the rate of impaired glucose tolerance may be as high as 50 percent.

Complications and Mortality

The complications of diabetes are an important factor in the mortality associated with the disease. A study of mortality among Americans of Chinese, Japanese, and Filipino ancestry compared death rates in Asians who had immigrated to the United States with death rates in the same ethnic groups born in this country. Age-adjusted ratios (table 5.7) showed that the rate of death from diabetes in the immigrants is consistently higher than that in the native born. The ratios were as follows: Chinese, 1.51; Japanese, 2.09; and Filipinos, 2.42.

Several studies have found lower rates of some complications of diabetes in Japanese in Japan than in Japanese Americans. In Hawaii, Japanese Americans with diabetes had a mortality rate from vascular disease of 74.5 percent; whites with diabetes showed a similar rate (75.8 percent). Two studies in Japan found corresponding rates among people with diabetes to be 51.1 and 53.8 percent. The difference was apparently due to a much lower rate of death from ischemic heart disease. The Hiroshima University Study found that Hawaiian Japanese with diabetes exhibited higher rates of hypercholesterolemia, hypertriglyceridemia, hypertension, and ischemic heart disease than Japanese from Hiroshima.

The Seattle study compared a small sample of Japanese-American men who had diabetes with male diabetes patients in Tokyo. Of the Seattle sample, 33 percent showed plasma cholesterol levels of 250 mg/dl or higher; the rate

in the sample in Tokyo was 5 percent. More Seattle men (20 percent) than Tokyo men exhibited ischemic electrocardiographic abnormalities. At the same time, the Tokyo sample had significantly lower creatinine clearance and a higher level of diabetic retinopathy. A preliminary analysis of data from the Seattle group has found both abnormal renal function and diabetic retinopathy to be extremely rare. Rates of both retinopathy and proteinuria have also been found higher in Japan than in England. Of the men in the Seattle study, 73.3 percent exhibited hypertension, but peripheral arterial disease appears quite rare.

The conclusion from these preliminary findings is that although Japanese Americans appear to exhibit a higher degree of ischemic heart disease, microvascular disease as exemplified in retinopathy and nephropathy may be more common in Japan.

Risk Factors

Diet. The differences in diabetes rates between Japanese Americans and the population in Japan may in part be explained by differences of diet. The diet recommended for all Americans would require 50 to 60 percent of total calories to be derived from carbohydrates and only 30 to 38 percent from fats. The Japanese diet includes about that proportion of carbohydrates and even less fat. The diet maintained by Japanese American men in the Seattle study who do not have diabetes is closest to these standards. The diet of the men who have diabetes is the farthest from them. The diet of men diagnosed as exhibiting impaired glucose tolerance falls between that of the two other groups.

The Hiroshima University Study found that in the Japanese Americans in Hawaii and Los Angeles, the intake of total fat, animal fat, animal protein, and simple carbohydrates was higher than that among the Japanese in Hiroshima. In addition, the study found that the intake of total carbohydrates and complex carbohydrates was lower. Total energy intake, adjusted for obesity (defined by body-mass index) as well as for physical activity, was about the same. Similar observations were made in the Ni-Hon-San and Seattle studies.

Such differences in diet may well be related to the higher rate of diabetes, hypercholesterolemia, and ischemic heart disease found in Japanese Americans compared with native Japanese.

Although Japanese American men are not on the whole excessively overweight, their relative adiposity is higher than that of men the same age in Japan. Intra-abdominal adipose tissue has been reported to be more resistant to insulin than subcutaneous adipose tissue. The Seattle study has used computer-assisted tomography (CAT) to measure patterns of fat distribution in the abdomen, chest, and thigh. It was found that Japanese-American men with diabetes show a larger cross-sectional area of fat in the abdominal area than nondiabetic Japanese Americans, as well as a higher ratio of cross-sectional subcutaneous fat in the thorax to that in the thigh.

Preliminary data also suggest that Japanese Americans with electrocardiographic indications of ischemic abnormalities tend to exhibit higher fasting plasma insulin levels than Japanese Americans with normal electrocardiograms.

Psychological and Sociocultural Factors. Relatively little attention has been given to the possible role of psychological and sociocultural factors in the etiology of diabetes. The history of Japanese Americans reveals a unique experience of immigration, assimilation, forcible relocation during World War II, and postwar rebuilding and reassimilation. Consequently, a study of the psychological factors that have affected them may well yield clues to the course of diabetes in the group.

Among the minority groups in the United States, Japanese Americans have undergone a unique development. During the wartime dislocations, when American officials proved unwilling to deal with the traditional leaders of the Japanese families, many of these elders abdicated in favor of their sons, who thus assumed family responsibilities at an unaccustomed early age. The result in many cases has been a situation that is labeled as "status incongruity," which is characterized by discrepancies in various indicators of socioeconomic status (levels of education, occupation and income, membership in organizations, and quality of housing). Such discrepancies often indicate that a family's status has changed within a generation. The tensions and conflicts that result from status incongruity have been found to be associated with the development of cardiovascular disease.

A possible association of status incongruity with diabetes is one of the areas being explored by the Seattle study. Data to date suggest that Japanese Americans with diabetes for the most part have lower levels of education--usually technical school level--than those without diabetes, but nevertheless often head households whose gross incomes are comparable to those of nondiabetic Japanese Americans.

Other preliminary findings suggest that sociocultural ties with other Japanese Americans may not be as close among the men with diabetes and that the same men are less open to association with the non-Japanese community.

This limited information is quite preliminary and certainly cannot be considered as definitive evidence. Nonetheless it supports the notion that psychological and sociocultural influences in the development of diabetes represent an important and largely untapped area of research.

Prevention

If environmental and psychosocial factors are involved in the pathogenesis of diabetes, specific intervention measures may be feasible. The further elucidation of these relationships is therefore an important area for future research. These future studies should include a careful comparison with the native Japanese population as well as longitudinal studies within the Japanese-American population. Furthermore, similar research should be done in other populations for whom high rates of diabetes are present.

It is anticipated that results of such research will lead to a better understanding of the pathogenesis of diabetes and specific therapeutic recommendations for people with diabetes, with implications not only for the Japanese-American population, but also for other populations. Such studies among the Sansei (children of the Nisei) may be particularly enlightening in explaining the high prevalence rate of diabetes observed among the Nisei.

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Table 5.1

ASIAN POPULATION, 1980 AND 1970

United States	Number		Percent	
	1980*	1970	1980*	1970
Total Asian Population	3,466,421	1,426,148	100.0	100.0
Chinese	812,178	431,583	23.4	30.3
Filipino	781,894	336,731	22.6	23.6
Japanese	716,331	588,324	20.7	41.3
Asian Indian	387,223	NA	11.2	--
Korean	357,393	68,510†	10.3	4.9†
Vietnamese	245,025	NA	7.1	--
Other Asians	166,377	NA	4.8	--
Laotian	47,683	NA	1.4	--
Thai	45,279	NA	1.3	--
Cambodian	16,044	NA	0.5	--
Pakistani	15,792	NA	0.5	--
Indonesian	9,618	NA	0.3	--
Hmong	5,204	NA	0.2	--
All Other	26,757	NA	0.8	--

*Data based on sample.

†The 1970 data on the Korean population excluded the State of Alaska.

Source: Bureau of the Census (1983).

Table 5.2

AGE-ADJUSTED NATIVITY-MORTALITY RATIOS FOR 10 LEADING CAUSES OF DEATH: UNITED STATES, 1980

	10 Leading Causes, United States	ICD-9 Codes	White		Chinese		Japanese		Filipino	
			Rank	P.M.*	Rank	P.M.*	Rank	P.M.*	Rank	P.M.*
1.	Heart Disease	390-398,402,404-429	1	39.3	1	31.8	1	30.4	1	33.5
2.	Cancer	140-208	2	21.3	2	27.4	2	25.4	2	20.5
3.	Cerebrovascular Disease	430-438	3	8.6	3	8.6	3	11.2	3	10.1
4.	Accidents	E800-E949	4	5.2	4	4.2	4	5.4	4	6.7
5.	Chronic Obstructive Pulmonary Disease	490-496	5	3.0	6	2.4	8	2.0	6	2.0
6.	Pneumonia and Influenza	480-487	6	2.6	5	3.0	5	3.5	5	2.8
7.	Diabetes Mellitus	250	7	1.7	8	2.1	7	2.0	7	1.8
8.	Chronic Liver Disease and Cirrhosis	571	8	1.4	9	1.2	9	1.2	9	1.2
9.	Atherosclerosis	440	9	1.5	10	0.9	10	1.0	10	0.6
10.	Suicide and Self-Inflicted Injury	E950-E959	10	1.5	7	2.2	6	2.3	8	1.5

*Proportional Mortality.

Source: National Center for Health Statistics, published and unpublished data computed by Yu et al.

Table 5.3

AGE-ADJUSTED RACE-MORTALITY RATIOS FOR SPECIFIC CAUSE OF DEATH: UNITED STATES, 1980

Causes of Death	Chinese	Japanese	Filipino
Heart Disease	0.54	0.42	0.42
Cancer	0.76	0.60	0.40
Cerebrovascular Disease	0.76	0.76	0.66
Accidents	0.34	0.44	0.39
Chronic Obstructive Pulmonary Disease	0.50	0.34	0.31
Pneumonia and Influenza	0.81	0.73	0.59
Diabetes Mellitus	0.81	0.64	0.49
Chronic Liver Disease and Cirrhosis	0.42	0.34	0.29
Atherosclerosis	0.57	0.41	0.25
Suicide and Self-Inflicted Injury	0.64	0.62	0.30

Note: Ratios are calculated for each specific cause of death by dividing the age-adjusted death rate of a specified ethnic group by the age-adjusted death rate of the white population.

Source: Unpublished data from the National Center for Health Statistics, computed by Yu et al.

Table 5.4

DIABETES MELLITUS AMONG WHITES AND ASIANS IN HAWAII (1958-59)

	Total Screened	Diabetes Diagnosed			Diabetes Rate/1,000 Persons*	
Race	Number	Total Number	New	Known	Total	New
White	4,473	49	32	17	7.3	4.8
Chinese	3,755	67	45	22	14.6	10.3
Filipino	4,321	150	99	51	21.8	15.5
Japanese	16,134	307	200	107	20.1	12.6
Korean	539	10	8	2	19.7	11.7
Total	38,103	819	492	327	18.4	11.0

*Age-adjusted rates; the Oahu civilian labor force, 14 years of age or over in 1950, was the standard chosen.

Source: Sloan, NR. Ethnic distribution of diabetes mellitus in Hawaii. JAMA 183:419-24, 1963.

Table 5.5

PREVALENCE OF RATES OF DIABETES,* JAPANESE AMERICANS VERSUS NATIVE JAPANESE

Sex-Age (Years)	Hawaii-Los Angeles (1973-78)			Hiroshima (1975-78)		
	Number of Subjects	Number Diabetic	Percent Diabetic	Number of Subjects	Number Diabetic	Percent Diabetic
Male						
15-39	53	0	0	12	1	8.3
40-59	159	16	10.1	138	4	2.9
60-96	284	55	19.4	158	12	7.6
All	496	71	14.3	308	17	5.5
Female						
15-39	70	4	5.7	28	0	0.0
40-59	254	25	9.8	210	10	4.8
60-96	329	69	21.0	233	24	10.3
All	653	98	15.0	471	34	7.2
Total						
15-39	123	4	3.3	40	1	2.5
40-59	413	41	9.9	348	14	4.0
60-96	613	124	20.2	391	36	9.2
All	1149	169	14.7	779	51	6.5
Age- and sex-adjusted rate			13.9			6.5

*Serum glucose >200 mg/dl at 2 hours after 50 g oral glucose load, or under treatment with insulin or oral hypoglycemic agent.

Source: Kawate, R, Yamakido, M, Nishimoto, Y. Migrant studies among the Japanese in Hiroshima and Hawaii. In: Diabetes 1979, Proceedings of the 10th Congress of the International Diabetes Federation, Walkhausel, WK (ed). Excerpta Medica, Amsterdam, 1980, pp 526-531.

Table 5.6

AGE DISTRIBUTION OF GLUCOSE INTOLERANCE AMONG JAPANESE AMERICAN MEN IN HAWAII (1965-68)

	Known Diabetes*		Undiagnosed Asymptomatic Hyperglycemia†		Normoglycemia‡	
Age (Years)	Number	(Percent)	Number	(Percent)	Number	(Percent)
45-49	57		116		1,642	
50-54	162		179		2,420	
55-59	113		107		1,359	
60-64	101		91		1,128	
65-68	35		40		366	
Total, 45-68	468	(5.9)	533	(6.7)	6,915	(87.4)

*Serum glucose >225 mg/dl at 1 hour after 50 g oral glucose load.

†Medical history of diabetes (treated).

‡Persons not meeting above criteria.

Source: Yano, K, Kagan, A, McGee, D, and Rhoads, GG. Glucose intolerance and nine year mortality in Japanese men in Hawaii. Am J Med 72:71-80, 1982.

Table 5.7

AGE-ADJUSTED NATIVITY-MORTALITY RATIOS FOR 10 LEADING CAUSES OF DEATH: UNITED STATES, 1980

Causes of Death	Chinese	Japanese	Filipino
1. Heart Disease	1.98	3.04	2.67
2. Cancer	2.41	2.82	1.63
3. Cerebrovascular Disease	2.93	4.21	2.76
4. Accidents	2.13	2.94	2.29
5. Chronic Obstructive Pulmonary Disease	3.31	2.88	1.75
6. Pneumonia and Influenza	2.29	4.37	2.92
7. Diabetes Mellitus	1.52	2.09	2.42
8. Chronic Liver Disease and Cirrhosis	2.50	4.95	2.06
9. Atherosclerosis	2.75	6.38	0.93
10. Suicide and Self-Inflicted Injury	2.71	2.69	1.15

Note: Ratios are calculated, for each specific cause of death, by dividing the age-adjusted death rate of a specified ethnic group by the age-adjusted death rate of the white population

Source: National Center for Health Statistics, published and unpublished data computed by Yu et al.

Chapter 6

PREVENTION AND CONTROL

As documented in the preceding chapters, the burden of diabetes falls most heavily on some of the most dependent segments of minority society--the aged, the poor, women, and Native Americans. The cost to them, in terms of ill health, suffering, and medical care, is overwhelming. The cost to the Nation, in terms of economic loss, is almost equally as severe. The National Diabetes Data Group estimates that the direct medical costs of diabetes are about $7.4 billion a year, and the indirect costs--which are measured as lost productivity from person-years--are another $6.3 billion.

Diabetes is a major factor in hospitalizations and physician visits. People with diabetes are more than twice as likely to be hospitalized compared with the population as a whole. According to NCHS data, diabetes as the first listed diagnosis at discharge accounted for almost 7 million days of hospitalization. As one of seven listed discharge diagnoses, diabetes was related to almost 25 million hospital days in that year. Diabetes was the primary diagnosis in 1.66 percent (9.6 million) of visits to physician's offices in 1980, and diabetes was included in the diagnosis in 2.82 percent (16.9 million) of visits for other conditions.

Employed people with diabetes lose an average of 10.8 workdays per year. NCHS estimates indicate that each year, 37,500 person-years are lost because of diabetes. Women who do not work outside of the home lost an estimated 53,000 person-years, and 116,300 person-years are lost because of inability to work because of diabetes.

Diabetes as an "underlying cause of death" on death certificates accounts for the loss of 145,000 years of life before age 65, according to NCHS data. When listed as one of several causes of death, diabetes is associated with an additional loss of 411,000 years of life.

Prevention

A prevention-oriented approach to diabetes control encompasses three levels of strategy: primary prevention, to prevent the disease from occurring when possible; secondary prevention, to prevent acute complications and the appearance of chronic complications through appropriate patient and professional education, therapy, and medical followup; and tertiary prevention, to decrease the mortality and morbidity resulting from the acute and chronic complications by early detection and the application of prompt, effective treatment.

Primary prevention--intervention before diabetes occurs--could have a major impact on the incidence and prevalence of the disease and thus on its human and economic costs. Some 75 to 80 percent of people with NIDDM, the most prevalent form of diabetes in minorities, are obese. As noted earlier, 50 percent of NIDDM may be preventable through weight control, diet, and physical activity. If so, the prevention of obesity could forestall some 180,000 new cases of diabetes a year. Since an estimated 50 percent of women

with gestational diabetes are obese, about 33 percent of the disease could be prevented, an additional saving of 28,000 cases. In view of the high prevalence of obesity in minorities affected by diabetes, weight control in such groups assumes great importance.

The population as a whole has responded poorly to efforts to promote weight control, however. As a result, most efforts in diabetes control have focused on secondary and tertiary prevention. Many areas of intervention are possible. A news report from Carter Center Health Policy Project indicates the following:

- Education in self-management skills could reduce the incidence of ketoacidosis by up to 70 percent, preventing about 50,000 hospitalizations a year.

- Maintenance of glycemic control in women before conception and through gestation could prevent about 500 serious congenital malformations a year and could significantly reduce morbidity and mortality associated with diabetic pregnancies.

- Detection and control of hypertension in diabetic patients could reduce the incidence of stroke by 75 to 90 percent, coronary heart disease by 25 to 50 percent, and peripheral vascular disease by 30 to 60 percent.

- Cessation of smoking by people with diabetes could reduce the incidence of stroke by 5 percent, coronary heart disease by 10 percent, and peripheral vascular disease by 30 percent.

- Early diagnosis and laser photocoagulation therapy for proliferative retinopathy could reduce severe visual loss by more than 50 percent.

- Antihypertensive therapy could reduce by more than 50 percent the rate of progression of diabetic nephropathy, thus delaying or preventing the development of diabetic end-stage renal disease.

- Optimum foot care on the part of health care professionals and patients could reduce amputations by more than 50 percent.

Control

Legislation, institutions, and programs have been created to make possible an aggressive approach to diabetes prevention and control. The national response to diabetes has become a model for programs of intervention in chronic disease. The effort involves the skills and contributions of many groups: consumers, health care professionals, academia, voluntary agencies, labor, industry, third-party payers, and government.

In 1974, Congress enacted the National Diabetes Mellitus Research and Education Act and established the National Commission on Diabetes. A year later, the Commission submitted its report, the Long-Range Plan to Combat Diabetes, which put forth a national plan to foster diabetes research and to

translate research findings into clinical practice. A national program for diabetes was initiated that included the establishment of the National Diabetes Advisory Board, the National Diabetes Data Group, the National Diabetes Information Clearinghouse, Diabetes Research and Training Centers, and Diabetes Endocrinology Research Centers. All but one of these programs are operated within the National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases, which has the major responsibility for basic and clinical research on diabetes. The National Diabetes Advisory Board, which advises Congress and the Secretary of Health and Human Services on the implementation of the long-range plan, functions as part of the office of the Director of the National Institutes of Health.

Diabetes-related activities are carried out by other NIH agencies and by other components of the Federal Government, such as the Centers for Disease Control, the Indian Health Service, and the Veterans Administration. All Federal activities in diabetes are coordinated by the Diabetes Mellitus Interagency Coordinating Committee, which was established by Congress and provides a forum for cooperation among Federal agencies and a mechanism for monitoring progress. In addition, state and local health agencies and numerous voluntary and professional organizations that are involved in diabetes care and in serving people with diabetes have joined the national effort to combat diabetes and have made important contributions.

This cooperative effort on the part of the public and private sectors has resulted in the development of a number of effective approaches to diabetes control. For example, state health departments participating in the CDC's National Diabetes Control Program are involved in community programs to demonstrate effective strategies for the control of diabetes. State programs have proved the cost-effectiveness of education programs for outpatients. For example, the Maine Ambulatory Diabetes Education Program has shown that savings in hospitalization costs may amount to as much as three times the cost of education programs. As a result, several states have obtained third-party reimbursements for outpatient education.

CDC also helped develop innovative projects such as one in Mississippi that involves screening for diabetic eye disease in health department clinics. Linkages have also been established with other national programs, such as those concerned with hypertension, maternal and child health, and Native American health, as well as with community and voluntary programs whose purpose is to reduce smoking and encourage weight reduction.

Thus, the laws, institutions, and programs are in place to focus on the problem of diabetes in minorities. As chapters 2 through 5 have shown, our understanding of the problem in minority groups lacks the depth and lacks the basis on rigorous research that are evident in our knowledge of the problem of diabetes in the general population. Each minority group has its own characteristics, poses its own problems, and will require special solutions based on its particular needs. With the exception of the Model Diabetes Health Care Program of the Indian Health Service, few programs have addressed the specific problems in minorities.

Chapters 2, 3, 4, and 5 have pointed out the effect of socioeconomic factors on the pathogenesis of diabetes in blacks, Native Americans, Hispanics, and Japanese Americans and on the response to both preventive and therapeutic measures. Mexican Americans, for example, have been found to respond more positively to educational and therapeutic efforts that use the Spanish language and are sensitive to Hispanic-American cultural values. On the other hand, the Seattle study suggests that the problem in Japanese Americans may be compounded by the sociocultural effect known as "status-incongruity."

The successful nationwide implementation of programs focusing on American minority groups places special responsibilities on professionals and patients. Such programs require careful consideration of the effects of professional-patient interactions--including professional competence and knowledge, patient education, intervention therapies, and level of patient adherence--as well as an understanding of the natural history of diabetes in terms of mortality, morbidity, and costs.

Three diabetes care programs developed in the past 20 years can serve as examples. All three programs involved predominantly minority populations and stressed a prevention-oriented approach that emphasized early diagnosis, optimal medical evaluation, patient education, and access to continuing care from a team of trained professionals. Two of the programs are still in operation.

The program at the Los Angeles County Hospital, which ran from 1964 to 1980, served Mexican Americans. Patients had continuing access to health care providers by telephone or through drop-in visits. The program was effective in reducing hospitalization for acute and chronic complications because of its outpatient care services. The programs at the Memphis City Hospital in Tennessee and at Grady Memorial Hospital in Atlanta, Georgia, were begun in 1962 and 1968, respectively. Both serve primarily black, medically indigent patients. In both programs, specially trained nurses, primarily from the public health sector, were mobilized to assist physicians in an organized program to provide continuing access to care for individuals with chronic disease. For more than 15 years, both programs have collected and evaluated data on care and outcome. These data have been reported in a series of publications (see sources).

Initially, each program carried out a prospective "needs assessment" to identify its requirements and to define its aims and goals. Both programs noted important gaps in the services that were then available to persons with diabetes. On the basis of these assessments, strategies were developed to expand personnel and facilities to provide a prevention-oriented program of services for early detection, patient education, optimal therapy, and continuing followup care. The hypothesis that was tested and found valid in both programs was that a prevention-oriented approach to diabetes is more effective therapeutically and more cost-effective than a crisis-oriented approach.

Both programs published defined policies and procedures. These included the collection of a complete data base, evaluation, education, and continuing access to followup care. The primary contact professional in each program was a specifically trained nurse, who was accessible to all patients. The

nurse was backed up by a physician and dietitian. The Atlanta program also included a podiatrist.

Processes of care differed in the two programs. The Memphis program used diet therapy alone (25 percent), diet and oral agents (50 percent), and insulin (25 percent). The program at Grady Memorial Hospital used short-term fasts and diet alone (81 percent) or diet and insulin (19 percent). The oral agents sulfonylurea or phenformin were not prescribed after 1970 in the Atlanta program. (Obese patients in Atlanta lost significantly more weight than those in Memphis.)

Results thus far have been significant. In both programs, plasma glucose levels decreased in more than 70 percent of the patients participating from 1970 to 1979.

Incidence of diabetic ketoacidosis decreased by 60 percent in Memphis, and severe diabetic ketoacidosis decreased by 78 percent in Atlanta. Amputations decreased by 68 percent in Memphis and by 50 percent in Atlanta. These two audited outcomes alone accounted for a marked decrease in days of hospitalization in both programs. The Atlanta program has saved Grady Memorial Hospital more than $11 million. The Memphis program has decreased hospitalizations, diabetic ketoacidosis, and amputations and enjoys a similar level of cost-effectiveness. Since mortality ratios from the period before the programs began are not available, it is not possible to determine whether the programs decreased mortality.

When subjected to eight categories of evaluation (table 6.1), the Memphis and Atlanta programs were found efficacious in four, partly efficacious in one, probably efficacious in one, and not efficacious in one. Efficacy could not be determined in one.

Since the inception of the Grady Memorial Hospital program, Medicare, Medicaid, and some private health insurance companies have paid for patient education as an integral part of continuing care.

These two programs have set precedents for the planning and implementation of diabetes care and patient education programs for minorities. Planners of new programs can benefit from the experience of the Memphis and Atlanta programs, although each must assess the needs of the population to be served before committing facilities and personnel. Strategies, facilities, and processes of care then can be planned, and provision can be made for auditing and evaluation outcomes.

A truly epidemiologic approach to the problem of bringing health care to people with diabetes, particulary those who are members of minority groups, must be based on the gathering, exchange, and use of information. For this reason, a number of principles have been developed as guidelines. At a minimum, a program designed to provide direct care to diabetic persons should include the following aspects in its operational agenda:

- To identify and report the extent of diabetes in the population it serves.

- To ensure that its work is based on accepted standards of diagnosis and care.

- To establish programs of education at its sites for both patients and professionals, when possible, through financing from third parties.

- To encourage teamwork among physicians, nurses, nurse-practitioners, nutritionists, social workers, health-educators, and outreach workers.

- To ensure that all programs of education for health professionals include diabetes and emphasize accepted standards of care.

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Table 6.1

HOW THE EFFICACY OF A DIABETES PATIENT EDUCATION PROGRAM CAN BE MEASURED*

By demonstrating during valid sequential audits that some, and preferably all, of the following occur:

1. Decreased sick days.
2. Decreased days of hospitalization.
3. Decreased morbidity (diabetic acidosis, amputations, other).
4. Significant decrease in weight and plasma glucose level in those with NIDDM.
5. Significant decrease in plasma glucose level in those with IDDM.
6. Decreased costs of evaluation, education, therapy, and followup.
7. Decreased mortality (increased duration of life).
8. Improved quality of life (better physical performance, less disability and pain, and better mental outlook).

*The efficacy of the Memphis and Atlanta programs was evaluated as follows:

For 1, 2, 3, and 6, both were efficacious.

For 4, weight decreased significantly (more in Atlanta), but mean group plasma glucose did not change over a 10-year followup period.

For 5, there was not a significant decrease in group mean plasma glucose levels over a 10-year followup period.

For 7, since no mortality audit data are available for the period prior to initiation of either program, it is not possible to determine whether mortality rates changed as a result of the programs. Standard Mortality Rates (SMR's) in the programs during a 10-year followup were almost identical.

For 8, audit data are not sufficient to give a definitive answer, but numerous patient interviews strongly suggest that quality of life improved as a result of the programs.

The Effective Approach and Management of Diabetes In Black and Other Minority Groups

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Introduction:

In 1980, the estimated number of prevalence cases of IDDM was 435,000 and of NIDDM was 5,069,000; the estimated number of incidence cases of GDM was 86,000. The American Diabetes Association has estimated that there are about 5,000,000 additional cases of undiagnosed NIDDM. If this estimate is correct, about 10.6 million Americans or 4.5% of the U.S. population has diabetes at the present time.

Four American minority groups (blacks, Hispanics, American Indians, and Japanese Americans are at increased risk for the development of NIDDM, but not for IDDM, (Table 1).

These minority groups as a general rule have not had optimal access to continuing quality medical care in the past. As a result, over the last half-century, they have accumulated a heavy burden of chronic disease (diabetes, hypertension, obesity, and their complications) which still adversely affects their health status. This in turn is reflected in increasing diabetes-related mortality, morbidity, and costs during the last twenty years. That there were serious deficiencies in patient and professional knowledge of diabetes was noted as early as 1967[1,2,3,]. Also in the 1960s, Miller[4], Runyan[5], and Davidson[6] started collecting data on Hispanics (Mexican-Americans, Los Angeles) and black Americans (Memphis, Atlanta), which proved that continuing access to quality care could improve outcomes, decrease hospitalizations, and save money. In the 1970s, epidemiologic studies have been carried out in the Pima Indians in Arizona (Bennett), and five demonstration projects on American Indian reservations scattered throughout the USA (Ghodes), have been implemented in order to improve the quality of care for native Americans, who bear the greatest burden of diabetes of all minority groups.

The Diabetes Law (FL 93-354, 1974) provided funding for 8 Diabetes Research and Training Centers (DRTCs), for 20 Centers for Disease Control (CDC) administered state diabetes control programs (DCPs), and for National Diabetes Advisory Board (NDAB) activities. NDAB has published guidelines for institutions and professionals who want to provide quality patient education for those with diabetes.

The American Diabetes Association, the CDC, and the NDAB sponsored a conference on Financing Quality Patient Education for those with Diabetes in October 1984 (Conference on Financing Quality Health Care for Persons with Diabetes, Oct. 22-24, 1984, Airlie House, Airlie Viginia)[8]. The Carter Center sponsored a conference in November 1984 designed to formulate a strategy to close the gap between the quality of optimal care and the quality of care available to those with diabetes and other health problems in 1984. (See Reference 9.)

Many unsatisfactory treatment outcomes in patients with diabetes, especially in those who are members of minority groups, could have been avoided or blunted by programs that emphasized and implemented early diabetes detection and optimal patient evaluation, education, and continuing followup treatment by qualified professionals operating as a team (MD, RN, RD, DPM).

The 15-year accumulated and continuing experiences of the Memphis (Runyan) and Atlanta (Davidson) groups[10,11,12,13,14,15] with predominately black Americans, largely medically indigent, will be related and used as a basis for recommending action to replace the widely-practiced contemporary crisis-oriented medical care system for those with diabetes by a prevention-oriented care system which emphasizes the importance of early diagnosis, optimal medical evaluation, patient education, and access to continuing care by a team (MD, RN, RD, DPM, etc.) of adequately trained professionals. All minority groups would benefit from such a program in that improved health care at lower cost would be available to them. Such a program, once in place, could be expanded to include all Americans.

Epidemiology[9]

The prevalence and relative risk of developing diabetes in whites, blacks, Hispanics, native American (Pima) Indians, and Japanese Americans is shown in Table 1. Most of the increased risk is related to the increased prevalence of obesity in minority groups in the USA[15].

The estmated incidence, prevalence, and deaths from IDDM and NIDDM are shown in Table 2, and the estimated incidence and prevalence cases of complications of diabetes are shown in Table 3. The incidence by age and sex is shown in Table 4, and the number of cases by age, race, and sex are shown in Table 5. The prevalence by age, race, and sex is shown in Table 6. The age-, race-, and sex-specific death rates calculated from underlying causes of death data and from multiple causes of death data are shown in Table 7 and Table 8 respectively. In each table, it is obvious that races other than white, bear a greater burden, and the females of other races bear the greatest burden of all.

Table 9 summarizes the risk factors for diabetes. Table 10 summarizes the annual incidence of diabetic ketoacidosis and number of hospitalizations (74,961) for same. Table 11 summarizes the incidence of blindness end-stage renal disease, and amputation (USA, 1978). Table 12 shows the estimated number of doctor visits, Table 13 shows the number of hospital days due to a first-listed diagnosis of diabetes, and Table 14 shows the number of hospital days with diabetes as any of seven discharge diagnoses. Table 15 shows the direct costs of diabetes, with over 80% of the total costs being due to hospitalization. Table 16 shows the indirect costs in person-years lost, and Table 17 shows the years of life lost before age 65 years because of diabetes as an underlying cause of death. Table 18 shows the years of life lost before age 65 years because of diabetes as an underlying or contributing cause of death by age, race, and sex.

Pathphysiology:

The pathophysiology of NIDDM is closely linked to obesity (> 20% excess body weight) and overweight (1-20% excess body weight)[15].

Proposed Strategy for Developing a Cost-Effective Preventive and Treatment Program for Diabetes and Its Complications

See Table 20 for a summary of proposed major interventions and of their potential impact on diabetes mellitus and its complications.

The objective of a prevention-oriented approach to diabetes mellitus are noted in Table 19. It is estimated that a maximally effective primary prevention program could prevent >70% of cases of NIDDM now (see Table 20), that secondary prevention could delay the appearance of or prevent many of the acute and chronic complications of the established disease, and that tertiary prevention could diminish mortality and morbidity caused by the acute and chronic complications (Table 20).

The successful implementation nationwide of such a program for American minority groups will place special responsibilities on professionals and patients (Table 21), and will require careful sequential auditing of the effects of professional-patient interactions, (including professional competence and knowledge, and patient education), intervention therapies (and level of patient adherence), and of the natural history of diabetes as related to mortality, morbidity, and costs (Table 22).

In many institutions during the last half century, physician training has been carried out in a crisis-oriented setting. In a crisis-oriented-acute-disease environment, it is not possible to deliver comprehensive continuing primary care and patient education for individuals who have a chronic disease. The numbers and the quality of training of physicians available to evaluate, educate, treat, and follow the large numbers of patients with chronic diseases (diabetes, hypertension, asthma, heart disease, brain and psychiatric disorders, arthritis, etc.) are still, in general, inadequate to cope with problems of such magnitude.

Three diabetes care programs that have served primarily minority groups have been developed during the last twenty years (Los Angeles County Hospital 1964-1980, Memphis City Hospital 1962-present, Atlanta Grady Memorial Hospital 1968-present). The Los Angeles program served many Hispanic (Mexican) Americans from 1964-1980[4]. Patients had continuing access to specially trained nurses (telephone hot line, clinic dropin) who were backed by physicians. By using out patient care to prevent or delay the development and progression of acute and chronic complications of diabetes to the point that necessitated hospitalization, the program was impressively effective.

More than 80% of the individuals served by the Memphis and Atlanta programs are American blacks. In 1962, in Memphis, problems in providing care for those with a chronic disease plus a public health screening program for undiagnosed diabetes prompted Runyan and his colleagues to plan and initiate the Memphis Chronic Disease program. As part of this program the talents of specially trained nurses, primarily from the public health sector, were mobilized to assist physicians in an organized program designed to provide continuing access to care for individuals with chronic disease(s). Planning for the Atlanta continuing care program for those with diabetes at Grady Memorial Hospital was initiated in 1968, and again specially trained nurses played a pivotal role in the program's development. Both programs have collected and evaluated process of care and outcome data for more than fifteen years, and the experiences of both programs have been reported in a series of publications[5,6,10,11,12,13,14,15].

Recently federally funded diabetes control programs (DCPs) administered

by the Centers for Disease Control through twenty state health departments have been initiated, the European Diabetes Education Study Group has expanded its activities[10,16], and proprietary hospitals and clinics in the USA providing comprehensive diabetes evaluation, education, and treatment have been opened. Thus the concepts that were spawned more than fifteen years ago, and that have been nurtured since that time in the Memphis and Atlanta programs, have become benchmarks that are now regarded as the initiators of more treatment-effective and more cost-effective methods for the delivery of medical care to those with diabetes.

Both programs carried out a prospective "needs assessment" to identify its problems and to define its aims and goals. The initial problems identified in each program are listed in Table 23. Both programs noted important existing gaps in services that were then available to persons with diabetes. Based on these assessments, strategies were developed to expand personnel and facilities (Figure 1) that could lead to a resolution of the problems (Table 24) by providing services for early detection, patient education, optimal therapy, and continuing followup care (the prevention-oriented approach). The hypothesis that was tested and found to be valid in both programs was: a prevention-oriented approach to diabetes will be more therapeutically-effective and more cost-effective than a crisis-oreinted approach.

Table 25 compares processes of care and audited outcomes in the two programs. Both used defined published policies and procedures, which included collection of a complete data base, evaluation, education, and continuing access to followup care. The specially trained nurse was the primary contact professional in each program. The patient had continuing access to the nurse and the nurse had continuous backup by a physician and dietitian in both programs, and to a podiatrist in the Atlanta program.

Diabetic ketoacidosis-infections decreased 60% in Memphis and severe diabetic ketoacidosis decreased 78% in Atlanta. Amputations decreased 68% in Memphis and 50% in Atlanta (Table 25). These two audited outcomes alone accounted for a marked decrease in days of hospitalization in both programs.

Processes of care differed in the two programs (Table 25). Memphis used diet therapy alone (25%), diet and oral agents (50%), and insulin (25%), while Atlanta used short-term fasts and diet alone (81%) or diet and insulin (19%), and did not use sulfonylureas or phenformin after 1970. Patients in Atlanta lost significantly more weight (Table 25). Plasma glucose levels in both programs from 1970 to 1979 decreased in more than 70% of those participating in both programs, but because plasma glucose levels in the others rose, there was no significant change in the mean plasma glucose levels in either program over a 10 year followup period (Table 25).

Mortality ratios which antedate the programs are not available, so it is not possible to determine whether the programs decreased mortality. After the programs were initiated, the mortality ratios in the two programs were almost identical (Table 26).

The Atlanta program has saved Grady Memorial Hospital over eleven

million dollars (Table 27). The Memphis program has decreased hospitalizations, diabetic ketoacidosis, and amputations, and as a result had a similar level of cost-effectiveness.

Thus, in the 1970s, these two programs set precedents for the planning and implementation of diabetes care and patient education programs. Also, they became the models that were used by the NDAB to establish standards for national diabetes education programs. When subjected to eight categories of evaluation, the Memphis and Atlanta programs have been efficacious in four, partially efficacious in one, probably efficacious in one, and not efficacious in one. Efficacy could not be determined in one (Table 28).

It is now reasonably certain that patient education as an isolated event (several versions) is not efficacious, and that patient education as an integral component of continuing optimal care (several versions) by a team (MD, RN, RD, DPM, etc.) is efficacious.

Medicare, Medicaid, Blue-Cross Blue Sheild, and all private health insurance companies started paying for patient education as an integral part of continuing care at the inception (1971) of the Grady Memorial Hospital Diabetes Unit Program, and they are still paying for the care and patient education provided by the program in 1984 (Table 27).

Some details of the decrease in DKA incidence and amputation incidence are shown in Tables 29-A and 29-B and Tables 30-A and 30-B.

The 1978 costs and effectiveness of the expanded nutrition care program designed to produce weight loss in those with NIDDM at Grady Memorial Hospital are shown in Tables 31, 32, 33, and 34, and the savings from not using sulfonylureas and from using less insulin are shown in Tables 35 and 36. The 1978 costs of initial and followup nursing care are shown in Table 37.

Although those who are developing new programs can benefit from the experiences of the Memphis and Atlanta programs, each new program must carry out a needs assessment of the population(s) to be served before committing facilities and personnel. Strategies, facilities, and processes of care then can be formulated, and outcomes can be audited and evaluated as noted in Figure 1.

Since NIDDM is very common and is closely correlated with overweight, it is important that intervention strategies for its treatment be carefully planned and implemented. National strategies that may be useful are listed in Table 38, and some of the barriers to the implementation of those strategies are listed in Table 39.

Since the American Diabetes Association has estimated that there are five million Americans with undiagnosed NIDDM, a sensitive screening method has been developed. The random quantitative urine glucose method (RUG) has a sensitivity of 100% and a specificity of 99.3% in detecting those with undiagnosed NIDDM. See Figure 2, Figure 3, and Table 40.

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TABLES AND FIGURES

TABLES

FIGURES

TABLE 1

AGE ADJUSTED PREVALENCES AND RELATIVE RISKS OF DIABETES
BY TYPE OF DIABETES AND RACE
UNITED STATES

	White	Black	Hispanic	Native American (Pima)	Japanese American
Type I Diabetes					
Prevalence per 100,000	160[1]	130[1]	150[2]	--	--
Relative Risk*	1.0	0.8	0.9	<1.0[3]	<1.0[4]
Type II Diabetes					
Prevalence per 100,000	2,300[5]	2,900[5]	7,200[6]	24,800[7]	--
Relative Risk*	1.0	1.3	3.1	10.8	1.4[8]

* Risk compared to US white population.

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8 Bennett CG, Tokuyama GH, Bruyers PT: Health of Japanese Americans in Hawaii. Public Health Reports 78:753-62, 1963.

TABLE 2

ESTIMATED NUMBER OF INCIDENT AND PREVALENT CASES OF DIABETES AND DEATHS OF PEOPLE WITH DIABETES UNITED STATES, 1980

	Incident Cases	Prevalent Cases	Deaths
Type I Diabetes Mellitus	19,000	435,000	19,000
Type II Diabetes Mellitus	586,000	5,069,000	304,000
Gestational Diabetes Mellitus	86,000	--	--

TABLE 3

ESTIMATED NUMBERS OF INCIDENT AND PREVALENT CASES
OF COMPLICATIONS OF DIABETES
UNITED STATES, 1980

	Incident Cases	Prevalent Cases
Diabetic Ketoacidosis	75,000	--
Serious Congenital Malformations	850	--
Stroke	23,000	320,000
Coronary Heart Disease	85,000	650,000
Peripheral Vascular Disease	41,000	497,000
Blindness	5,800	40,000
End-Stage Renal Disease	4,000	7,600
Amputation	31,000	71,000

TABLE 4

INCIDENCE OF DIABETES PER 100,000
BY AGE AND SEX
UNITED STATES, 1978

Age	Men	Women	Total
< 25	--	*29	*14
25 - 44	233	153	192
45 - 54	*189	724	466
55 - 64	*332	955	661
65 +	859	941	907
TOTAL	191	337	267

* Figure does not meet standards of reliability or precision.

Source: National Diabetes Data Group, NIH, from the National Health Interview Survey, 1978.

TABLE 5

NUMBERS OF CASES OF DIABETES IN THOUSANDS
BY AGE, RACE, AND SEX
UNITED STATES, 1978

Age	WHITE			BLACK			ALL RACES		
	Men	Women	Total	Men	Women	Total	Men	Women	Total
< 15	*27	*30	56	*15	*6	*20	41	35	76
15 - 44	357	403	760	*33	71	104	390	473	863
45 - 64	873	1,055	1,929	105	247	352	983	1,302	2,285
65 +	552	1,009	1,561	95	173	269	647	1,190	1,837
TOTAL	1,809	2,497	4,306	248	497	744	2,062	3,001	5,063

* Figure does not meet standards of reliability or precision.

Source: National Center for Health Statistics: National Health Interview Survey, 1978, unpublished data.

TABLE 6

PREVALENCE OF DIABETES PER 100,000
BY AGE, RACE, AND SEX
UNITED STATES, 1978

Age	WHITE			BLACK			ALL RACES		
	Men	Women	Total	Men	Women	Total	Men	Women	Total
< 15	*123	*144	134	*371	*148	*260	158	142	150
15 - 44	868	947	908	*629	1,116	897	827	952	891
45 - 64	4,696	5,236	4,977	5,443	10,764	8,333	4,743	5,744	5,266
65 +	6,521	8,308	7,574	11,781	14,546	13,427	6,918	8,886	8,077
TOTAL	2,017	2,619	2,327	2,089	3,611	2,907	1,999	2,712	2,368

* Figure does not meet standards of reliability or precision.

Source: National Center for Health Statistics: National Health Interview Survey, 1978, unpublished data.

TABLE 7

AGE-, RACE-, AND SEX-SPECIFIC DEATH RATES PER 100,000
CALCULATED FROM UNDERLYING CAUSE OF DEATH DATA
UNITED STATES, 1980

Age	WHITE			ALL OTHER RACES			TOTAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
< 15	0.2	0.1	0.1	0.3	0.1	0.2	0.2	0.1	0.1
14 - 44	1.5	1.2	1.3	2.9	2.3	2.6	1.7	1.3	1.5
45 - 64	16.3	14.4	15.3	34.8	42.4	38.9	18.2	17.7	18.0
65 +	89.2	95.0	92.7	121.5	172.2	151.2	92.3	102.1	98.1
TOTAL	12.8	16.8	14.8	14.6	22.6	18.8	13.0	17.6	15.4
AGE-ADJUSTED RATE[1]	14.0	14.1	14.1	22.0	28.9	26.0	14.8	15.7	15.4

[1] Age adjusted by the direct method to the total resident population of the United States, July, 1980.

Sources: National Center for Health Statistics: Public use mortality data tapes, 1980.
U.S. Bureau of the Census: Preliminary Estimates of the Population of the United States, By Age, Sex, and Race: 1970 to 1981. Current Population Reports, Series P-25, No. 917, U.S. Government Printing Office, Washington, D.C., 1982.

TABLE 8

AGE-, RACE- AND SEX-SPECIFIC DEATH RATES PER 100,000
FROM MULTIPLE CAUSE OF DEATH DATA
UNITED STATES, 1979

	WHITE			ALL OTHER RACES			TOTAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
< 15	0.3	0.3	0.3	0.4	0.5	0.5	0.3	0.3	0.3
15 - 44	3.0	2.2	2.6	6.5	5.3	5.9	3.5	2.7	3.1
45 - 64	64.0	47.1	55.2	108.9	118.6	114.2	68.6	55.3	61.7
65 +	392.2	375.8	382.4	393.7	498.8	454.8	392.3	386.9	389.1
TOTAL	52.4	62.4	57.5	45.9	64.1	55.4	51.5	62.6	57.2
AGE-ADJUSTED RATE[1]	58.0	52.5	55.0	68.7	81.8	76.3	59.1	55.6	57.2

[1] Age adjusted by the direct method to the total resident population of the United States, July, 1979.

Sources: National Center for Health Statistics: Public use mortality data tapes, 1979.
U.S. Bureau of the Census: Preliminary Estimates of the Population of the United States, By Age, Sex, and Race: 1970 to 1981. Current Population Reports, Series P-25, No. 917, U.S. Government Printing Office, Washington, D.C., 1982.

TABLE 9
SUMMARY OF RISK FACTORS FOR COMPLICATIONS OF DIABETES

	Age	Sex	Race	Type of Diabetes	Obesity	Lack of Education, Self-Management Skills, and Access to Care	Hyper-Tension	Cigarette Smoking	Hyper-Lipidemia	Hyper-Glycemia	Lack of Laser Photo-Coagulation	Lack of Foot care
Ketoacidosis	Maximum at < 45	F > M	Other Races > White	Type I > Type II	±	++	-	-	-	++	-	-
Congenital Malformations	Increases with Increasing Maternal Age	F only	Other Races > White	Overt DM > Gest DM	±	++	-	-	-	++	-	-
Stroke	Increases with Increasing Age	F > M	Other Races = White	Type II > Type I	++	+	++	+	+	+	-	-
Coronary Heart Disease	Incresses with Increas-ing Age	M > F	Other Races = White	Type II > Type I	++	+	++	++	+	+	-	-
Peripheral Vascular Disease	Incresses with Increas-ing Age	M > F	Other Races = White	Type II > Type I	++	+	+	++	+	+	-	-
Blindness	Maximum at >65	F > M	Other Races > White	Type I > Type II	+	+	+	-	-	±	++	-
End-Stage Renal Disease	Maximum at < 45	M > F	Other Races > White	Type I > Type II	+	+	++	±	-	±	-	-
Amputations	Increases with Increasing Age	M > F	Other Races > White	Type II > Type I	+	+	+	++	+	+	-	++

++ = Major risk factor
+ = Risk factor
± = Possible risk factor
- = Not a risk factor

TABLE 10

NUMBERS OF HOSPITALIZATIONS AND ANNUAL INCIDENCE OF DIABETIC KETOACIDOSIS[1] PER 1000
BY AGE AND SEX
UNITED STATES, 1980

Age	Male		Female		Total	
	Hospitalizations	Incidence	Hospitalizations	Incidence	Hospitalizations	Incidence
< 15	*2,411	58.8	*4,693	134.1	*7,104	93.5
15-44	14,476	37.1	21,653	45.8	36,129	41.9
45-64	*5,644	5.7	*9,640	7.4	15,284	6.7
65+	*5,496	8.5	10,948	9.2	16,444	9.0
TOTAL	28,027	13.6	46,934	15.6	74,961	14.8

[1] ICDA9: 250.1 and 250.3, any of seven diagnoses

*Figure does not meet standards of reliability or precision.

Sources: Hospitalizations from National Center for Health Statistics, National Hospital Discharge Survey, public use data tape, 1980.
Incidence calculated using 1980 hospitalization data and unpublished prevalence data from National Center for Health Statistics, National Health Interview Survey, 1978.

TABLE 11

INCIDENCE OF BLINDNESS, END-STAGE RENAL DISEASE, AND AMPUTATION BY DIABETES STATUS, AND AGE UNITED STATES, 1978[1]

	BLINDNESS[2]				END-STAGE RENAL DISEASE[3]				LOWER EXTREMITY AMPUTATIONS[4]			
		Incidence Per 100,000				Incidence Per 100,000				Incidence Per 100,000		
(Years)	#DM	DM	Non DM	RR	#DM	DM	Non DM	RR	#DM	DM	Non DM	RR
0-44	700	74	3	24.7	1,325	140	3	46.7	1,325	141	5	28.2
45-64	2,450	107	20	5.4	1,876	82	13	6.3	10,285	450	19	23.7
65+	2,650	144	101	1.4	801	44	19	2.3	18,631	1,014	99	10.2
TOTAL	5,800	115	17	6.8	4,002	79	7	11.3	30,024	597	20	29.9
AGE-ADJUSTED RATE[5]		88	18	6.1		118	7	17.3		301	18	16.3

Sources:

[1] 1978 data calculated from National Center for Health Statistics, Health Interview Survey, 1978.

[2] 1978 data from National Society to Prevent Blindness, cited by Klein R, Klein BK: Diabetes and vision. Diabetes Data- Compiled 1983, National Diabetes Data Group, NIH, in press.

[3] 1980 data from Eggers PW, Connerton R, McMullan M: The Medicare experience with end-stage renal disease: Trends in incidence, prevalence, and survival. Health Care Financing Review, in press, March 1984.

[4] 1978 data from Most RS, Sinnock P: The epidemiology of lower extremity amputations in diabetic individuals. Diabetes Care 6:87-91, 1983.

[5] Age-adjusted by the direct method to the U.S. civilian population, 1980. See appendix for the distribution of the standard population by age.

TABLE 12

ESTIMATED NUMBERS OF DOCTOR VISITS IN THOUSANDS
DIABETES[1] AS ANY ONE OF THREE PHYSICIAN'S DIAGNOSES
BY AGE, RACE, AND SEX
UNITED STATES, 1980

Age	WHITE			ALL OTHER RACES			TOTAL		
	Male	Female	Total[2]	Male	Female	Total[2]	Male	Female	Total[2]
< 45	645	1,146	1,641	*195	*287	484	1,056	1,280	2,122
45 - 64	2,556	3,215	5,771	441	807	1,240	3,007	4,015	7,012
65 +	2,748	4,228	6,973	*238	770	1,006	2,986	5,005	7,983
TOTAL[2]	5,950	8,251	14,202	899	1,847	2,746	6,850	10,094	16,945

[1] ICDA9 Codes: 250, 251.0, 648.0, 775.0, 775.1 and 962.3.
[2] May not sum due to rounding.

* Figure does not meet standards of reliability or precision.

Sources: Numerator-National Center for Health Statistics: National Ambulatory Medical Care Survey, public use data tape, 1980.
Denominator-National Center for Health Statistics: Medication therapy in office visits for selected diagnosis: The National Ambulatory Medical Care Survey, United States, 1980. Vital and Health Statistics. Series 13-No. 71. DHHS Pub No. (PHS) 83-1732. Public Health Service, Washington. U.S. Government Printing Office; January 1983.
Calculated rates applied to estimates of civilian population of the U.S., July 1980 from U.S. Bureau of the Census: Preliminary Estimates of the Population of the United States, by Age, Sex, and Race: 1970 to 1981. Current Population Reports Series P-25, No. 917, U.S. Government Printing Office, Washington D.C., 1982.

TABLE 13

NUMBERS OF HOSPITAL DAYS IN THOUSANDS
DIABETES[1] AS FIRST-LISTED DISCHARGE DIAGNOSIS
BY AGE, RACE, AND SEX
UNITED STATES, 1980

Age	WHITE			ALL OTHER RACES			TOTAL[2]		
	Male	Female	Total[3]	Male	Female	Total[3]	Male	Female	Total[3]
< 15	*46	*51	97	--	--	--	*61	84	145
15 - 44	320	432	751	135	186	321	496	662	1,158
45 - 64	586	964	1,550	266	437	703	976	1,491	2,468
65 +	690	1,572	2,262	160	356	517	969	2,143	3,112
TOTAL[3]	1,641	3,020	4,661	569	991	1,560	2,503	4,380	6,883

[1] ICDA9 Codes: 250, 251.0, 648.0, 775.0, 775.1 and 962.3.
[2] Figures for race not stated included.
[3] May not sum due to rounding.

* Figure does not meet standards of reliability or precision.

Source: National Center for Health Statistics: National Hospital Discharge Survey, public use data tape, 1980.

TABLE 14

NUMBERS OF HOSPITAL DAYS IN THOUSANDS
DIABETES[1] AS ANY OF SEVEN DISCHARGE DIAGNOSES
BY AGE, RACE, AND SEX
UNITED STATES, 1980

Age	WHITE			ALL OTHER RACES			TOTAL[2]		
	Male	Female	Total[3]	Male	Female	Total[3]	Male	Female	Total[3]
< 15	106	107	212	--	--	--	136	145	281
15 - 44	624	835	1,459	270	374	644	969	1,321	2,289
45 - 64	2,532	3,251	5,783	620	1,112	1,732	3,478	4,808	8,287
65 +	3,768	6,847	10,615	637	1,069	1,706	4,956	8,815	13,771
TOTAL	7,030	11,039	18,070	1,542	2,572	4,113	9,540	15,089	24,629

[1] ICDA9 Codes: 250, 251.0, 648.0, 775.0, 775.1 and 962.3.
[2] Figures for race not stated included.
[3] May not sum due to rounding.

Source: National Center for Health Statistica: National Hospital Discharge Survey, public use data tape, 1980.

TABLE 15

ESTIMATED DIRECT COSTS OF DIABETES MELLITUS IN $ MILLIONS
UNITED STATES, 1980

	$ Million
Physician Office Visits[1]	$ 652
Hospitalization[2]	$6,157
Nursing Home Care[3]	$ 663
Insulin and Oral Hypoglycemic Agents[4]	$ 380
TOTAL	$7,852

Sources:

1 National Center for Health Statistics: National Ambulatory Medical Care Survey, public use data tapes, 1980.

2 National Center for Health Statistics: Public use National Hospital Discharge Survey data tapes, 1980.

3 National Center for Health Statistics: 1977 National Nursing Home Survey. Current Population Reports No 917:25, 1982.
Van Nostrand JF: Diabetes and long term care. In Diabetes Data-Compiled 1983, National Diabetes Data Group, NIH, in press.

4 Metropolitan Life Insurance Company Statistical Bureau: Estimates cited by Entmacher PS: The economic impact of diabetes. In Diabetes Data-Compiled 1983, National Diabetes Data Group, NIH, in press.
National Center for Health Statistics: Medication therapy in office visits for selected diagnoses: The National Ambulatory Medical Care Survey, United States, 1980. Vital and Health Statistics. Series 13-No. 71. DHHS Pub. No. (PHS) 83-1732. Public Health Service. U.S. Government Printing Office, Washington, D.C., 1983.

TABLE 16

ESTIMATED INDIRECT COSTS OF DIABETES MELLITUS
IN THOUSANDS OF PERSON-YEARS LOST,
UNITED STATES, 1980

Disability	Thousands of Person-Years Lost
Employed persons with DM[1]	37.5
Homemakers with DM[1]	53.0
Unemployed because of DM[1]	116.3
Mortality	
Premature mortality[2]	1,450.0

Sources:

1 Metropolitan Life Insurance Company Statistical Bureau: Estimates cited by Entmacher PS: The economic impact of diabetes. In Diabetes Data-Compiled 1983, National Diabetes Data Group, NIH, in press.

2 Herman WH, Sinnock P, Brenner E, et al: An epidemiologic model for diabetes mellitus. Incidence, prevalence, and mortality. Diabetes Care, in press, 1984.
National Center for Health Statistics: Public use mortality data tapes, 1980.

TABLE 17

YEARS OF LIFE LOST BEFORE AGE 65
DIABETES[1] AS UNDERLYING CAUSE OF DEATH
BY AGE, RACE, AND SEX
UNITED STATES, 1980

Age	WHITE			ALL OTHER RACES			TOTAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
< 15	1,914	1,160	3,074	696	348	1,044	2,610	1,508	4,118
15 - 44	24,176	18,708	42,884	7,526	6,674	14,200	31,702	25,382	57,084
45 - 64	32,277	31,227	63,504	8,180	12,190	20,370	40,456	43,418	83,874
TOTAL[2]	58,367	51,095	109,462	16,402	19,212	35,614	74,768	70,308	145,076

[1] ICDA9 Codes: 250, 251.0, 648.0, 775.0, 775.1 and 962.3.
[2] Total includes cases for which age was not stated.

Source: Calculated from National Center for Health Statistics: Public use mortality data tapes, 1980.

TABLE 18

YEARS OF LIFE LOST BEFORE AGE 65
DIABETES[1] AS UNDERLYING CAUSE OR CONTRIBUTING CAUSE OF DEATH
BY AGE, RACE, AND SEX
UNITED STATES, 1979

Age	WHITE			ALL OTHER RACES			TOTAL		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
< 15	3,422	3,538	6,960	1,044	1,392	2,436	4,466	4,930	9,396
15 - 44	47,712	35,287	82,999	16,117	14,662	30,778	63,829	49,948	113,778
45 - 64	127,040	102,008	229,047	25,095	33,254	58,348	152,134	135,261	287,396
TOTAL[2]	178,174	140,833	319,006	42,256	49,308	91,562	220,429	190,139	410,570

[1] ICDA9 Codes: 250, 251.0, 648.0, 775.0, 775.1 and 962.3.
[2] Total includes cases for which age was not stated.

Source: Calculated from National Center for Health Statistics: Public use mortality data tapes, 1979.

Table 19

The objectives of a prevention-oriented approach to diabetes mellitus

Prevention-oriented	Objectives
1. Primary prevention (Applied to the general population, i.e. 240 million Americans)	To prevent the appearance of hyperglycemia throughout a lifetime by (1) avoiding or "curing" excess body weight and (2) preventing viral-induced (?) and other beta-cell damage (research underway)
2. Secondary prevention (Applied when diabetes mellitus is diagnosed; an estimated 6.1 million Americans know they have diabetes, estimated 5 million have diabetes but do not know it)	To prevent the acute complications and to prevent or delay the appearance of the chronic complications of diabetes mellitus. These objectives may be accomplished by early detection of random glucosuria and hyperglycemia and by appropriate education, therapy (diet, exercise, insulin if needed) and follow-up to attain and maintain ideal body weight and normoglycemia or near-normoglycemia
3. Tertiary prevention (Applied when acute or chronic complications of diabetes mellitus are detected; an estimated 5 million Americans have, or will have, one or more of these complications)	To decrease mortality and morbidity resulting from acute and chronic complications of diabetes mellitus by prevention of or by early detection and prompt and appropriate therapy of the complications.

TABLE 20

MAJOR INTERVENTIONS AND POTENTIAL IMPACT
(ADAPTED AND RECALCULATED FROM DATA IN REFERENCE 9)

PROBLEM	INTERVENTION(S)	% PREVENTABLE	PREVENTABLE CASES/YEAR
IDDM		-	-
NIDDM	WEIGHT CONTROL	>70%	410,000
GDM	WEIGHT CONTROL	>50%	43,000
DKA	ED, HBGM, CONTINUING ACCESS TO OPT. CARE	>70%	>52,000
CONG. MALF.	ED, HBGM, ACCESS	>70%	500
STROKE	HBP CONTROL	85%	19,000
CHD	HBP & LIPID CONTROL NO SMOKING	45%	38,000
PVD	HBP & LIPID CONTROL NO SMOKING	60%	24,000
BLINDNESS	LASER	50%	2,900
ESRD	HBP CONTROL	50%	2,000
AMPUTATIONS	POD. CARE, HBP AND PG CONTROL, NO SMOKING	50%	15,000

TABLE 21

Professional's obligations to patients

Give complete and accurate information reference the natural history of diabetes mellitus and its complications and reference the benefits, risks and costs of available intervention therapeutic modalities

Patients' obligations to themselves

Once patients become thoroughly knowledgable about diabetes and its natural history, their freedom of choice permits them to respond to professional recommendations in a self-determined way. This in turn determines whether a patient will adhere or not adhere to a prescribed routine, and for how long. Continuing access to quality care can reinforce adherence, and it may determine whether a patient will be rewarded by adherence, or penalized by non-adherence, to prescribed routines.

TABLE 22

Auditing the effects of the natural history, of intervention therapy, and of professional-patient interactions on outcomes

Audit by appropriate (yearly) sequential measurements of outcomes as affected by the natural history of the disease (compare to a matched population of non-diabetic controls) and by the effects of intervention therapy (therapies) and adherence or non-adherence to prescribed routines in a defined population of patients. Ideally, all complications (diabetic ketoacidosis, hyperosmolar hyperglycemic state, retinopathy, nephropathy, arteriopathy and neuropathy) and associated problems should be audited. Practically, some problems (i.e. ketoacidosis and amputations) are easier to audit sequentially than are others. In each program, the eventual aim should be to measure outcomes (mortality, morbidity) in terms of the natural history of diabetes as influenced by various types of available intervention therapy (benefits, risks, costs)

TABLE 23

Initial Problems

Memphis	Atlanta (GMH)
Problems 1962 - 1963	Problems 1968 - 1969
1. The city of Memphis Hospital (CMH) Department of Medicine Outpatient Department (DPD), J.W. Runyan Director, had inadequate personnel and facilities to adequately cope with an overload of patients with chronic diseases (85% of whom had diabetes, and/or hypertension, and/or cardiac disease).	1. Limited access to Diabetes Clinic (DC) (4650 visits per year, 1967-1968) for estimated 12,950 patients with diabetes in the GMH served population of approximately 350,000.
2. The overload of patients was made even more serious by an effective screening program for diabetes carried out by the Shelby County (Tenn.) Health Department with referral of positive screenees to the CMH-OPD.	2. Preferential use of sulfonylureas, phenformin, or insulin even in the obese.
3. An inadequate number of physicians in the CMH-OPD resulted in crisis-oriented care, and this in turn resulted in frequent preventable hospitalizations, episodes of diabetic ketoacidosis, and amputations.	3. Facilities: Two 3-hr. clinics a week in Medical Clinic area (about 2,000 sq. ft.).
	4. Personnel: 4 to 6 interns and residents rotating every one to six months, 2 staff nurses, 3 part-time Medical Clinic registered dietitians (1.96 R.D. work-years instructing diabetic patients), 1 faculty diabetologist plus clinical faculty, house staff, and students.
	5. Equipment: Limited to examining instruments. No stat venous plasma glucose levels available.
	6. Supplies: Clinitest tabs (urine sugar); Acetest tabs (urine acetone); mimeographed diet sheets.
	7. Diabetes Clinic: a. Source-oriented; medical records (50% illegible). b. Physician averaged 10 min. with each patient, tried "to control urine sugar" with oral agents or insulin. No audits on plasma glucose levels available. c. Dietary prescription (if written) frequently inappropriate; follow-up inadequate. d. Staff nurse gave instruction on insulin administration and urine testing. e. No other patient education. f. Volunteer podiatrist; insufficient time to care for foot ulcers.
	8. Hospitalization: Only one third of cases of severe diabetic ketoacidosis (CO_2<10 mEq per liter) admitted. Hypoglycemic patients seldom admitted. Estimated that half of amputations could be prevented by appropriate preventive foot care.

TABLE 23 (continued)

Atlanta (GMH)

Problems 1968 - 1969

9. 502 episodes of severe (CO_2 content <10 mEq/l) DKA (1969).

10. 172 lower extremity amputations (1973).

11. Hospitalizations: Data not available (no audits done).

12. Essentially no weight loss.

13. Many patients were lost to followup when DC appointments were missed. These patients frequently visited the General Adult Clinic or the Medical Emergency Clinic for refills of oral agent or insulin prescriptions, or when acute or chronic complications occurred. This limited access to care in the DC inevitably led to the crisis-oriented approach to the disease. Deaths, missed work, and patients lost to follow-up were not audited.

14. Hypoglycemia in the Medical Emergency Clinic was common, but was not audited.

15. Deficiencies in structure and process were apparent, but could not be corrected until resources became available to change the strategy, structure, and procesa of care.

TABLE 24
Strategy and Structure (Personnel, Facilities)
for the resolution of the problems noted in Table 23

Memphis	Atlanta
1. 1963 - Chronic Disease Continuing Care Program initiated.	1. Diabetes Detection and Control Center (DDCC): Immediate appointment for problem-oriented data base, education, plan of therapy.
2. 1969 - (April) Program revision Current Locations: Urban - 11 County - 5 Rural - mobile bus > 10	2. DC: Free access to continuing primary care (over 5,000 patients made 24,993 visits and 8,642 telephone calls in 1978).
3. Clinic sessions (1/2 day) > 26/wk Clinic visits > 35,000/yr Home visits > 1,500/yr Current patients > 8,000 - projected > 15,000 Newly referred patients - 150-400/mo Missed appointment rate (July-December 1971) - 4.5%	3. Expanded nutritional care program: No oral agents; limited use of insulin.
4. The Chronic Disease Continuing Care Program of Memphis and Shelby County is staffed by public health nurses in the neighborhood health centers to whom patients with chronic diseases are referred for continuing followup care, evaluation and medication refills. They also provide home health care and referral for diatetic, social, and rehabilitation services. An MD is available for phone consultations, and secondary and tertiary care are provided in the CMH-OPD, emergency ward, or hospital inpatient facilities as needed.	4. Screening for early detection.
5. As would be expected, diabetes mellitus frequently is discovered in this large population of chronic disease patients by routine testing of the blood sugar.	5. Facilities: Diabetes Unit open 8 hr. a day, five days a week in 10,000 sq. ft. ambulatory care space (DDCC, DC, Podiatry Clinic, Laboratory); in-patient medical and surgical beds available as needed.
6. Of the 3 major categories of chronic diseases, the control of the diabetic is the most challenging for the nurses. The background and training of the nurses, the detailed protocols for each disease category, and medical backup permit the nurse to feel comfortable in managing the patient. Diet is stressed and the nurses are familiar with the budgetary limitations of the patient and his food habits. Medications include insulin (NPH	6. Personnel: 4 physicians, 12 registered nurses, 4 registered dietitians, one podiatrist, 24 supporting persons.
	7. Equipment: One automated and 6 manual glucose analyzers, examining instruments, intelligence terminal for computer entry of patient data.
	8. Supplies: Diabetes Guidebook: Diet Section, meals, measuring cups, spoons, and ruler, food models, posters, audiovisuals.
	9. DDCC: Patient can be evaluated and educated within 24 hr. after referral. Using defined policies and procedures, a problem-oriented data base (subjective, objective, assessment) is collected and a plan for education, diet, exercise, and insulin therapy (if indicated) formulated.

TABLE 24 (continued)

Memphis	Atlanta
and regular), phenformin (control 1978) chlorpropamide and tolbutamide and the dose of these medications were adjusted based upon symptoms, urine tests and/or blood sugar levels. The nurse may give insulin (NPH and/or regular) to patients on diet or oral medications alone, temporarily to regain control. Factors contributing to poor control, such as improper use of medications, emotional problems, dietary irregularity and infections are searched for and at times a home visit has been instructive in revealing the problem.	10. DC: Patients have unlimited access to primary care on a continuing basis. Panel of 750 patients for each of the registered nurses (primary contact professionals), backed by 4 registered dietitians, each of whom provides nutritional education and followup for a panel of 1500 patients: a podiatrist provides foot education, evaluation, and care: and 4 physicians provide overall supervision and back-up care. 11. Hospitalization: Medical, Surgical, Obstetrical Services as needed. One diabetes teaching nurse on Medicine and one on Surgery audit follow all patients with diabetes and arrange post-discharge DC or DDCC followup. All patients with severe DKA and hyperglycemic hyperosmolar comas and significant hypoglycemia admitted.

TABLE 25

PROCESSES OF CARE AND AUDITED OUTCOMES

Memphis

1. Defined policies and procedures for initial and followup care (See Runyan: Primary Care, Harper and Row, 1982).

2. Evaluation, therapy prescribed CMH-OPD, referred for followup by nurse in satellite public health clinic.

3. Use of diet (hypocaloric) to encourage weight loss in over-weight individuals plus sulfonylurea or insulin if needed in the physician's or nurse's judgment.

4. 1979: 25% on diet alone, 50% on oral agents, 25% on insulin.

Hospital Days per 1000 Patients per Year (1975)

	Study		
	Before	After	% Change
5. Diabetes			
All causes	3319	1680	-49.4
Diabetic acidosis-infections	900	350	-61.1
Peripheral Vascular disease & Amputation	626	201	-67.9

	Control		
	Before	After	% Change
Diabetes			
All causes	2728	4838	+77.3
Diabetic acidosis infections	587	688	+17.2
Peripheral Vascular Disease & Amputation	626	201	-13.1

6. Weight Change: 1970 ⟶ 1979 (Cohort of 239 patients)
Diet: 58% ↓, 42% ↑, mean wt. loss 9.41b
Insulin: 54% ↓, 46% ↑, mean wt. loss 2.4 lb
Oral Agents: 68% ↓, 32% ↑, mean wt loss 8.3 lb

7. Plasma glucose change: 1970 ⟶ 1979 (Cohort of 239 patients)
Diet: 72% ↓, 28% ↑
Insulin: 40% ↓, 60% ↑
Oral Agents: 83% ↓, 17% ↑

Atlanta

1. Defined policies and procedures Policy and Procedure Manual Diabetes Unit, Grady Memorial Hospital 1978.

2. Patient Evaluation, Education, Followup (DDCC, DC) (12,784 patients from 1/11/71 through 5/30/84)

3. Diabetes Clinic (DC): 24,993 patient visits, 8642 telephone calls (1978)

4. Aggressive diet therapy (including one week total fasts when indicated) for NIDDM (Since 1970).

5. Use of Sulfonylureas and Phenformin discontinued (Since 1970).

6. Use of insulin limited to IDDM, diabetic ketoacidosis, hyperglycemic hyperosmolar state, and pregnancy (since 1978)

Audits-Outcomes

7. 1981: 81% on diet alone, 19% on insulin

8. 1978: 950 of 12,950 with diabetes hospitalized for 10,925 days with primary diagnosis of diabetes or one of its complications (73/1000, or 0.84 day per patient with diabetes. 1422 or 12,950 with diabetes (110/1000) were hospitalized with a secondary diagnosis of diabetes

9. Severe diabetic ketoacidosis: (CO_2 content <10 mEq/1) 38.8 episodes/1000 patients (1969), 8.6 episodies/1000 patients (1978). Down 77.8%.

10. Amputations: 13.3/1000 patients (1973),6.7/1000 patients (1978). Down 50%.

11. Weight Change: 1970 ⟶ 1979 (Cohort of 437 patients)
Diet: 90% ↓, 10% ↑, mean wt loss 20.3 lb.
Insulin: 72% ↓, 28% ↑, mean wt. loss 11.3 lb.

TABLE 25 (continued)

Memphis	Atlanta
1980 - 7 neighborhood health centers and 20 satellite clinics. Program providing care for more than 10,000 patients. Since beginning of the program, more than 5000,000 visits to the decentralized clinics.	12. Plasma glucose change: 1970 $\longrightarrow$ 1979 (Cohort of 437 patients) Diet: 67% $\downarrow$, 33% $\uparrow$, Insulin: 55% $\downarrow$, 45% $\uparrow$

TABLE 26

STANDARDIZED MORTALITY RATIOS (SMRs)

$$SMRs = \frac{OBSERVED}{EXPECTED} \text{ DEATHS* 1969-1971 through 12/31/79}$$

		Memphis	Atlanta
	Overall	1.43**	1.41**
THERAPY	Diet	1.06	1.33
	Orals	1.52	-
	Insulin	1.78	1.62
$\frac{\text{Male}}{\text{Female}}$	Death Ratio	1.66	1.54

*Death primarily related to age (73%) and duration of diabetes (15%)

**Significantly greater than one ($P < 0.05$)

TABLE 27

COSTS AVOIDED, THIRD PARTY PAYMENTS FOR AMBULATORY CARE, AMBULATORY CARE EXPENDITURES, AND COST-EFFECTIVENESS OF THE GRADY MEMORIAL HOSPITAL DIABETES UNIT PROGRAM IN DOLLARS SAVED

THROUGH APRIL 30, 1984

Costs Avoided			
(Since 1/1/71)	No oral agents	$	649,805
(Since 1/1/73)	Less Insulin		68,176
(Since 1/1/74)	Prevented DKA (2267 cases)		2,945,600
(Since 1/1/73)	Prevented amputations (811)		9,799,720
	T O T A L	$	13,463,301
3rd Party Payments for Ambulatory Care			5,998,000
		$	19,461,30
Total Ambulatory Care Expenditures			7,931,000
Cost-Effectiveness of Program in Dollars Saved		$	11,530,301

TABLE 28

HOW CAN THE EFFICACY OF A DIABETES PATIENT EDUCATION AND CONTINUING CARE PROGRAM BE MEASURED?*

By demonstrating during valid sequential audits that some, and preferably all of the following occur:

1. Decreased sick days
2. Decreased days of hospitalization
3. Decreased morbidity (diabetic acidosis, amputations, other)
4. Significant decrease in weight and plasma glucose level in those with NIDDM
5. Significant decrease in plasma glucose level in those with IDDM
6. Decreased costs of evaluation, education, therapy, and followup
7. Decreased mortality (increased duration of life)
8. Improved quality of life (better physical performance, less disability and pain, and better mental outlook)

*The efficacy of the Memphis and Atlanta programs was evaluated as follows:
For 1, 2, 3, and 6, both were efficacious.
For 4 weight decreased significantly (more in Atlanta) but mean group plasma glucose did not change over a 10 year followup period.
For 5, there was not a significant decrease in group mean plasma glucose levels over a 10 year followup period.
For 7, since no mortality audit data is available for the period prior to initiation of either program, it is not possible to determine whether mortality rates changed as a result of the programs. Standard Mortality Rates (SMRs) in the programs during a 10 year followup were almost identical (See Table 26)
For 8, audit data is not sufficient to give a definitive answer, but numerous patient interviews strongly suggest that quality of life improved as a result of the programs.

TABLE 29-A Severe diabetic ketoacidosis (DKA) and hyperglycemic hyperosmolar state (HHS) from 1969, 1974-1980 and total o mild, moderate, and severe diabetic ketoacidosis (DKA) and hyperglycemic hyperosmolar states (HHS) from 1974-1980 at Grady Memorial Hospital

Year	Severe DKA plus HHS[4]	Episodes per 1000 patients[1]	P[2]	Mild, moderate and severe DKA plus HHS[4]	Episodes per 1000 patients	P[3]	Estimated no prevented since 1974
1969	502	38.8					
1974	185	14.3	<0.05	534	41.2		
1975	174	13.4	<0.05	399	30.8	N.S.	235
1976	137	10.6	<0.01	280	21.6	<0.05	254
1977	129	10.0	<0.01	271	20.9	<0.05	263
1978	112	8.6	<0.01	267	20.6	<0.05	267
1979	125	9.7	<0.01	287	22.2	<0.05	247
1980	178	13.7	<0.05	328	25.3	<0.05	206
M(1974-1980)	148.6	14.9		338	26.1		1462
s.d.(1974-1980)	27.4	9.2		90.8	7.0		

[1] Denominator equals 12,950 patients

[2] Probability (P) that 1969 number of episodes of severe DKA plus HHS is significantly higher than number of episodes in subsequent year of comparison

[3] Probability (P) that 1974 total number of episodes of severe, moderate, and mild DKA plus HHS is significantly higher than number of episodes in subsequent year of comparison

[4] Severe DKA = Serum CO_2 content <10 mEq/l
Moderate DKA = Serum CO_2 content 10-20 mEq/l
Mild DKA = Serum CO_2 content >20 mEq/l
Hyperglycemia hyperosmolar state = Serum osmotality > 350 mOSm

TABLE 29-B Some demographic and other characteristics of 96 individuals admitted to Grady Memorial Hospital in 1978 with severe diabetic ketoacidosis (CO_2 content < 10 mEQ/l) and/or with a hyperglycemic hyperosmolar state (serum osmolality > 350 mOSm)

	Race and sex				
	Black female	Black male	White female	White male	Total
Individual	54	21	12	9	96
Episodes	61	25	16	10	112

One episode - 85 individuals
Two episodes - 7 individuals
Three episodes - 3 individuals
Four episodes - 1 individual

Age ranges and number of episodes during the year 1978:

Age range:[1]	≤20 years	21-30 years	31-40 years	41-50 years	51-60 years	61-70 years	71-80 years
No. of individuals:	15	12	19	21	15	10	2
No. of episodes:	19	16	21	22	18	10	4

Treatment routines: All were treated with insulin initially

92 were discharged on insulin; four overweight individuals were discharged on diet therapy alone

Hospital days: Total 727, M 6.5 (range (1-84)

Deaths: Total 6 (4 severe DKA, 2 HHS)

Undiagnosed prior to admission: 40 Diagnosed prior to admission: 56

Adherence to prescribed therapy:[2]

Of the 56 diagnosed prior to admission, 14 were known to be chronic alcoholics, and 36 of the remaining 42 were known to be generally non-compliant in that they frequently discontinued insulin therapy and/or did not adhere to the prescribed diet

[1] Age not known in two individuals who each had one episode

[2] As judged by diabetes clinic attendance, level of plasma glucose control, and weight loss in overweight individuals

TABLE 30-A
LOWER EXTREMITY AMPUTATIONS IN PATIENTS WITH DIABETES MELLITUS
AT GRADY MEMORIAL HOSPITAL 1973 - 1980

Year	No. of amputations	p[1]	No. of 1000 patients	No. of patients	No. of patients with amputations per per 1000 pts.	Estimated no. of amputations prorated post-1973
Pre-1973	Estimated 150-200/year					
1973	172		13.28			
1974	108	< 0.05	8.34			64
1975	88	< 0.01	6.80			84
1976	88	< 0.01	6.80			84
1977	100	< 0.05	7.72			72
1978	86	< 0.01	6.64	68	5.25	86
1979	92	< 0.01	7.10			80
1980	87	< 0.01	6.72			85
Projected lowest possible number[2]	25		1.93		Total	555

M (1973-1980): 102.6, s.d. = 27.2
M (1975-1980): 90.2 (86-100) s.d. = 4.8

1 Probably (P) that 1973 number of amputations is significantly higher than number of amputations in subsequent year of comparison.

2 Assuming optimal podiatric care, early diagnosis of diabetes, and optimal adherence to prescribe diet and insulin therapy (if needed)

TABLE 30-B

SOME DEMOGRAPHIC AND OTHER CHARACTERISTICS OF 68 INDIVIDUALS WITH DIABETES MELLITUS WHO HAD LOWER EXTREMITY AMPUTATIONS AT GRADY MEMORIAL HOSPITAL IN 1978

	Black Female	Black Male	White Female	White Male	Total
Individuals	41	23	2	2	68
Number of amputations	47	23	3	3	86
Age (years) at diagnosis M (range)	60.5(15-89)	42.6(15-75)	56(44-78)	52.5(44-61)	
Age (years) at amputation M (range)	71.6(42-96)	57.8(16-24)	73(68-78)	58.5(49-68)	
Not known to have diabetes on admission	8	6	1	0	15
Known to have diabetes on admission	33	17	1	2	53
M duration(years) and range	11.4(1-36)	11.9(1-25)	24(-)	6(5-7)	

	Toe(s)	Transmetatarsal	Symes	Below knee	Above Knee	Above Knee stump revision
Level of initial amputation	12	1	2	42 (1 bilateral)	12	-
Level of Follow-up amputation				6	9 (1 bilateral)	2

Treatment routines: diet alone in 63, diet plus insulin in 23 (M dose 23 units/day, range 3-60)
Podiatric care less than one year preamputation: yes: 18, no: 50
Adherence to prescribed therapy: good: 8, fair: 4, poor: 33, not known: 23 (including 15 undiagnosed on admissi
Deaths: 0 during surgery, 5 in hospital, 6 less than 10 months after hospital discharge
Causes: cardiac arrest in 9, renal failure in 1, septic shock in 1
Days in hospital: M (range): 5 who died in hospital, 15.2(6-30): 63 who left hospital alive: 18.9(4-55). Total 1266 days

TABLE 31

RECORD OF DIETITIANS' TIME IN DIABETES UNIT BETWEEN JANUARY 1969 - 1979

Period	Diabetes Clinic	Diabetes Detection and Control Center	Teaching and Research	Total
	<----------Work-Years ---------->			
Jan. 1969 through Jan. 1971	1.96		0.66	2.62
Feb. 1971 through Feb. 1975	1.96	1.00	0.66	3.62
March 1975 through June 1977	2.00	2.00	0.66	4.66
July 1977 through Dec. 1978	2.00	2.00	1.00	5.00
Jan. 1979	3.00	1.00	1.00	5.00

TABLE 32

TOTAL COST OF EXPANDED NUTRITIONAL CARE
PROGRAM FOR 8 YEARS (1971-1978) AND FOR 1978

ITEM	COST 1971-1978	COST 1978
Salaries	$ 379,399	$ 59,712
DIABETES GUIDEBOOK:DIET SECTION	52,436*	7,326**
Meals	24,214***	3,460#
Measuring cups, spoons, rulers	4,034##	564¶
Facilities, supplies	15,000	2,310
Total . . .	$ 475,083	$ 73,372
Projected annual cost of pre-1971 x 8 years•• . . .	191,704	
Cost of expanded program . . .	283,379	

* 8,067 copies @ $6.50
** 1,127 copies @ $6.50
*** 8,067 patients, 2 meals each
\# 1,127 patients, 2 meals each
8,067 patients @ 50 cents
¶ 1,127 patients @ 50 cents
•• Based on audit, June 1971 through February 1975

TABLE 33

APPROXIMATE COST OF EXPANDED NUTRITIONAL CARE PROGRAM PER PATIENT VISIT, 1978

Item	DDCC Patient Visit	DC Visit
Dietitians' salaries	$ 21.19	$ 3.29*
DIABETES GUIDEBOOK:DIET SECTION	6.50	
2 meals	3.07	
Facilities	2.10	.33
Cups, spoons, ruler	.50	
Supplies (food models, slides, television, tapes, posters, etc.)	1.64	.38
TOTAL	$ 35.00	$ 4.00

* Two dietitians saw 7,246 patients in follow-up (193 working days, 18.8 patient visits per day per dietitian--$11,942.39 x 2 = $23,884.78 ÷ 7.246 visits).

TABLE 34

WEIGHT HISTORY OF 127 PATIENTS WITH COMPLETE FOLLOW-UP, 1971-1977

Weight History	Patients	
	Number	Per cent
Initial Weight <110% IBW*	11	9
Initial Weight >110% IBW	116	91
Gained**	3	2.6
Lost***	113	97.4
> 10 lb.	92	79.3
> 20 lb.	52	44.8
> 30 lb.	35	30.2
> 40 lb.	18	15.5
> 50 Lb.	12	10.3

* Ideal body weight
** Maximum gain, 26 lb.
*** Maximum loss, 96 lb.

TABLE 35

PROJECTED SAVINGS DUE TO CHANGES IN MEDICATION
AND EXPANDED NUTRITIONAL CARE PROGRAM

Projection	Amount
Savings on oral hypoglycemic agents, 1971-1978	$ 345,416*
Savings on reduced use of insulin, 1973-1978	34,572
Subtotal projection . . .	$ 379,988
Less expanded nutritional	- 283,379
SAVINGS	$ 96,609

* Based on 1969 cost of $43,177.

TABLE 36

USE AND COST OF INSULIN, 1969-1978

Year	Insulin		Cost		Estimated Savings 1973-1978
	Use	Decrease After 1972	Total	Per Unit	
	Units x 10^6			Cents	
1969	13.8		$ 23,723	0.171	
1970	12.0		20,124	.168	
1971	15.9		26,832	.163	
1972	16.4		28,208	.172	
1973	14.6	1.8	25,112	.172	$ 3,096
1974	14.4	2.0	24,586	.171	3,420
1975	11.3	5.1	19,436	.172	8,772
1976	13.8	2.6	24,274	.176	4,576
1977	13.9	2.5	43,873	.316	7,900
1978	14.1	2.3	41,774	.296	6,808
Total	140.2	16.3	$277,942	-	$34,572

TABLE 37

COST OF NURSING CARE IN GRADY MEMORIAL HOSPITAL DIABETES UNIT IN 1978

Initial Visit (DDCC)

1127 patients, 2 RNs salary $12,000/year = $24,000

Mean cost per patient = $24,000/1127 patients = $42.55

Followup visits (DC)

6000 active patients (750 per RN), 8 RNs salary $12,000/ year = $96,000

23,866 followup visits

2,983 followup visits per RN = 3.98 followup visits per patient

Cost per followup visit = 96,000/23,866 visits = $4.03 per visit

Total cost for nursing care for one patient: $4.03 x 3.98 visits per patient = $16.04

Initial and followup visits for one year = $58.59

TABLE 38

STRATEGIES THAT MAY BE USEFUL IN BLUNTING THE

EFFECTS OF NIDDM IN AMERICAN MINORITY GROUPS

A. Primary Prevention

1. Attain and maintain ideal body weight for life

   a. School and company cafeteria caloric labeling and teaching

   b. Portion sizes by age and sex, attuned to individual need

   c. Option of selection of skim milk and low-calorie-density foods (vegetables, fruits, lean meat)

   d. Federal and state departments of agriculture to become aggressively involved in production, marketing, and advertising of foods to the American public.

   e. Involve restaurants, hotels, airlines, and vending machine producers in educating the public reference caloric content of foods

   f. Insurance companies to reduce premiums to companies whose employees are at ideal body weight, and for companies also who encourage weight loss programs for the overweight employees.

   g. Worksite intervention and behavior modification programs.

   h. Private enterprises are promoting exercise and diet as producing better and more powerful, sexy feelings.

   i. Health maintenance organizations are more prevention oriented

B. Secondary prevention

1. Periodic screening for diabetes (See Figure 2, Figure 3) and early diagnosis of diabetes (See Table 40).

2. Appropriate patient evaluation, education, and followup treatment.

3. Note microvascular and macrovascular complications early and treat appropriately.

4. Set criteria for audit of VA, Champus, Medicare, and Medicaid payment systems for diabetes patient education, evaluation, and followup care.

5. Set up chronic disease monitoring clinics for those with diabetes, hypertension, and overweight.

TABLE 39

BARRIERS TO IMPLEMENTING THE STRATEGIES PROPOSED IN TABLE 38

A. Entrenched U.S.A. Federal and State government policies

1. Production and marketing of agricultural products make up a major part of the American economy and are strongly supported by the government.

2. The federal government is being driven by economic policy, not by health policy.

a. Example: disposal of surplus foods such as lard and flour to reservation Indians and inner city poor who already bear a heavy burden of obesity

b. Example: refusal of meals-on-wheels administrators to serve less than 1500 calories to those who are overweight and have NIDDM.

B. Americans are constantly subjected to advertisements that advocate participating in the "good life" which includes much food (calories), alcohol, and tobacco use.

C. Food labeling has improved but is still inadequate.

D. There is a general lack of understanding of the principals of good nutrition and exercise at all age levels from childhood to old age.

E. The health care system is fragmented and is incapable at this time of providing adequate patient education. There is little concensus concerning optimal initial methods of treating NIDDM (some prefer diet, some prefer oral agents, some prefer insulin). One eminent authority has stated that contemporary continuing medical education (CME) is a sham dominated by the drug companies. Is that charge true? If it is, what can be done to change for the better post-graduate professional (particularly physician) education?

TABLE 40

SEQUENTIAL TESTING ROUTINE TO DETECT AND DIAGNOSE DIABETES IN THE NONPREGNANT INDIVIDUAL

Adapted from Chapter 10: Screening for Diabetes Mellitus, Clinical Diabetes Mellitus: A Problem Oriented Approach, Thieme-Stratton, New York (In Press)

(1) Quantitative randum urine glucose (RUG) screen:

(a) If 3-25 mg/dl (≈ 97%) --> STOP. Diabetes has been ruled out. Sensitivity in detecting undiagnosed NIDDM = 100%

(b) If >25 mg/dl, go to (2) immediately. Of those >25 mg/dl, ≈ 75% have diabetes and ≈ 25% have renal hyperglucosuria on followup testing. See (2), (3), (4) below.

(2) Random venous plasma glucose:

(a) If >200 mg/dl and symptomatic, repeat random venous plasma glucose and initiate therapy.

(b) If <200 mg/dl, go to (3)

(3) Fasting venous plasma glucose:

(a) Fasting venous If >140 mg/dl x 2 = diabetes mellitus

(b) If <140 mg/dl, go to (4)

(4) Glucose tolerance test (diet-prepped, ambulatory, non-medicated):

(a) Sum of fasting + 1-2-3 hr. post-100 gm glucose load >800 mg/dl X 2 = diabetes mellitus

(b) Sum = 601-800 mg/dl = nondiabetic high normal

(c) Sum <600 = nondiabetic

(d) If GTT is non-diabetic (Sum <800 mg/dl) and RUG >25 mg/dl, the screenee has random renal hyperglucosuria

Figure 1

Methods for Developing, Monitoring, and Evaluating a Health Care Delivery System

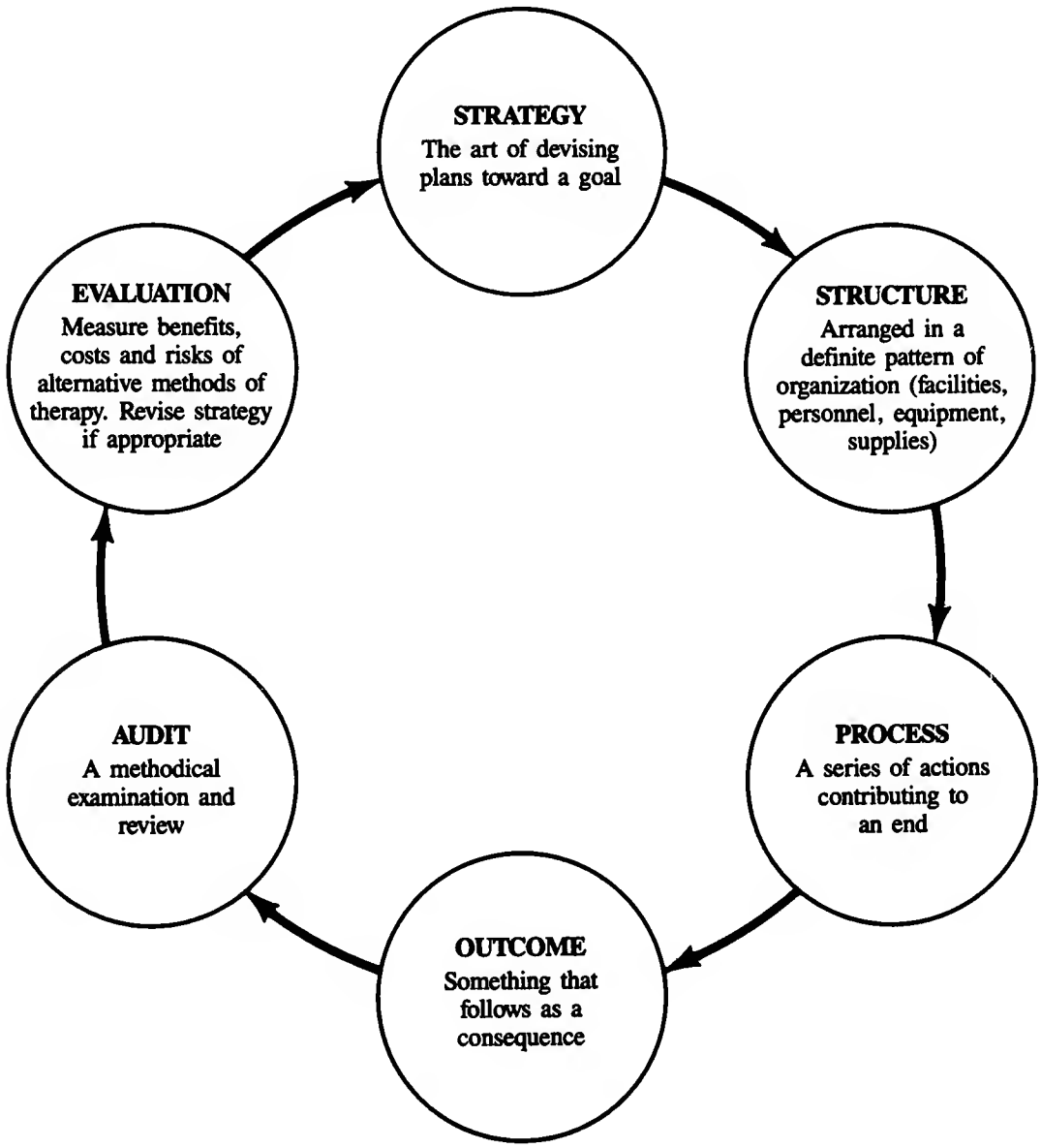
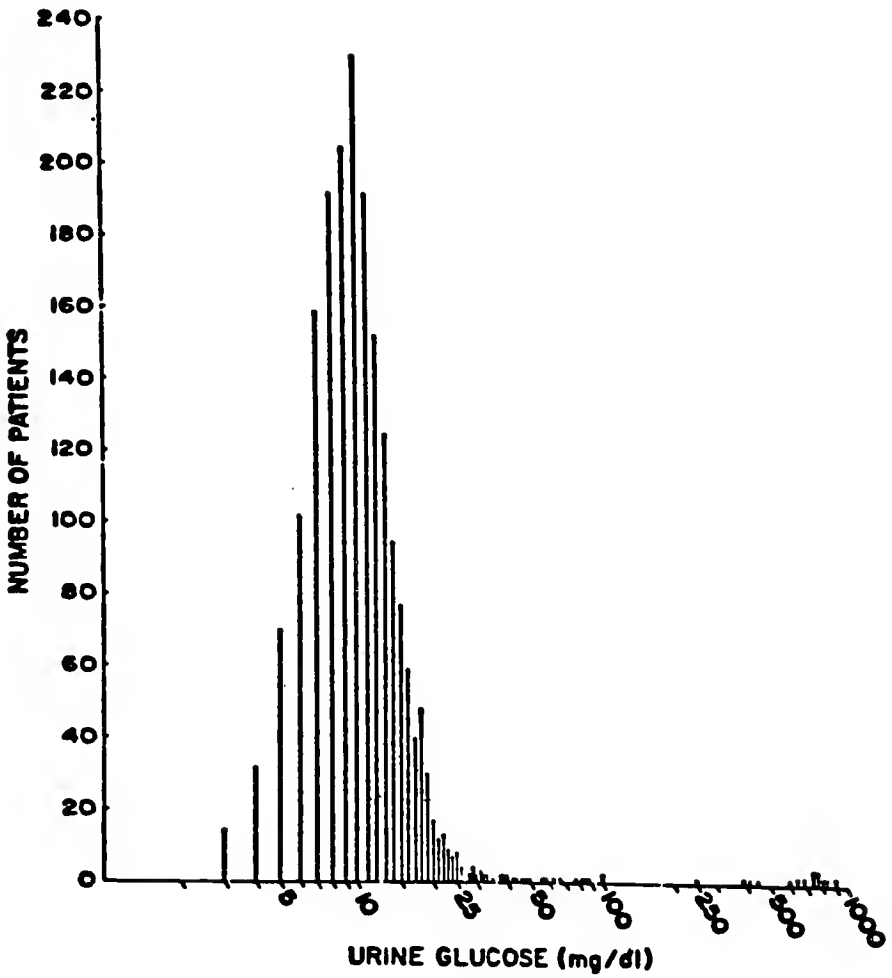


Figure 2

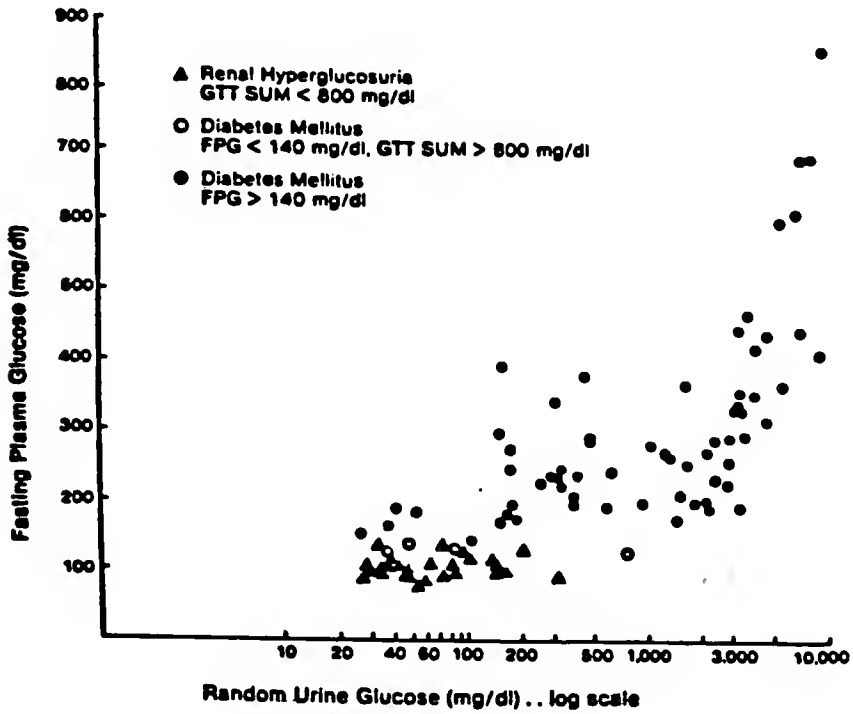
Distribution of random (undiluted) urine glucose levels in 1952 screenees.



Abscissa: log scale
Reproduced with permission from Diabetes 27:811, 1978

Figure 3

Comparison of random urine glucose levels and fasting plasma glucose levels in those with renal hyperglucosuria and in those with diabetes mellitus.



Distribution of random urine glucose (RUG) levels in 95 of 4141 screenees whose RUG level was >25 mg/dl (abscissa: log scale) and comparison to the fasting plasma glucose level (ordinate). The highest RUG level in a renal hyperglycosuric was 317 mg/dl, all with RUG levels higher than 317 mg/dl had diabetes mellitus. The lowest RUG level in those subsequently shown to have diabetes mellitus was 26 mg/dl. In the RUG range from 26-317 mg/dl, there were 27 screenees who had renal hyperglucosuria and 22 screenees who had diabetes mellitus (19 whose FPG was >140 mg/dl, 3 whose FPG was <140 mg/dl and whose GTT sum was >800 mg/dl).

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Factors Relating To the Increased Prevalence of Diabetes In Hispanic Americans

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Factors Relating to the Increased Prevalence of Diabetes in Hispanic Americans

I. Introduction

According to the 1980 census of the U.S. population there are 14.6 million individuals of Hispanic origin in the U.S., 8.7 million of whom are Mexican Americans, with 2 million being Puerto Rican and 800,000 Cuban. Despite their numerical importance in our society, information on the health status of Hispanic Americans has until recently been almost entirely lacking and is still far from adequate. With respect to diabetes, it has long been suspected based on clinical impression that Mexican Americans have a markedly increased prevalence of this disorder. However, rigorous documentation of this excess from epidemiologic studies has only been forthcoming recently. It is still far from clear that Puerto Rican and Cuban Americans share this excess prevalence, and indeed it is quite possible that the excess diabetes among Hispanics is confined to the Mexican American subgroup. The possible significance of this phenomenon and its genetic implications are discussed in a subsequent section of this paper.

II. Methodological considerations

The variable criteria used to define diabetes in studies on Hispanic Americans are problematic. Relatively few studies have used the widely-accepted National Diabetes Data Group (NDDG) criteria (1). Even where the NDDG criteria have been used, methodological differences between studies exist which, as will be seen shortly, can have unexpectedly large effects on the reported prevalence rates.

Not all studies have distinguished non-insulin-dependent diabetes (NIDDM) from insulin-dependent diabetes (IDDM). In this paper the term "diabetes" will be used when the two types have not been distinguished, and the term NIDDM will be used when this type specifically is referred to. Failure to distinguish between the two types of diabetes does not, however, have a very large effect on the reported prevalence rates in adults, since the great majority of diabetics identified in population-based studies of adult Hispanic Americans are of the NIDDM type. In the San Antonio Heart Study, for example, only 15 of 142 adult Mexican American diabetics were insulin takers, but 9 of these 15 were considered on the basis of obesity (body mass index greater than 30.0 kgm^2) and/or age of onset (greater than 40 years) to have NIDDM despite their having been treated with insulin (2). Thus, in this study, only 4 percent of adult Mexican American diabetics might possibly have been classified as having had IDDM. There are no data on IDDM rates in Hispanic American children or adolescents.

A further problem is how to classify patients who give a history of diabetes but who are not hyperglycemic according to the NDDG criteria at the time they are studied. In this paper, such patients are considered to be diabetic only if they reported taking insulin or oral antidiabetic agents. This approach, however, could only be used when information on the use of antidiabetic medication was reported. The rationale for this approach is that, since the new

NDDG plasma glucose criteria are set higher than former criteria, it is possible that a number of persons who were diagnosed according to former criteria would not now be considered to have diabetes. The policy that has been adopted requires that all patients either meet the NDDG criteria or be known to be taking hypoglycemic agents at the time of the survey.

Age-adjustment has been performed using the direct method with the U.S. population according to the 1970 census as the standard.

III. Mortality

Since diabetics most often die, not of the diabetes itself, but rather of its complication--for example, heart disease, kidney disease, and stroke--and since these diseases, rather than the diabetes, are frequently listed on the death certificate as the case of death, mortality statistics for diabetes greatly understimate the true impact of this disease on overall mortality in the U.S. Nevertheless, mortality statistics can be used to support the argument that Mexican Americans suffer from excess diabetes.

In the state of Texas, the proportionate mortality due to diabetes by county ranged from 8.9 deaths per 1000 total deaths to 52.0 per 1000 total deaths and was highly correlated with the percentage of county residents who had Spanish surnames (predominantly Mexican American) (3). In Bexar County, Texas (which contains San Antonio), although age-adjusted mortality due to diabetes declined from 1970 to 1976 in both Spanish and non-Spanish surname residents, the rates were consistently from two to four times higher in the former than in the latter for both men and women (4). It should be emphasized that these higher diabetes mortality rates do not distinguish between excess disease rates per se, or merely higher case fatality rates, perhaps due to inferior medical care. These topics will be dealt with in subsequent sections of this review.

There do not appear to be reports of diabetes mortality among Puerto Rican or Cuban Americans.

IV. Prevalence of NIDDM in Mexican Americans

Perhaps the earliest study of diabetes prevalence in Mexican Americans was carried out in Laredo, Texas (5). The results of this study are summarized in table 1. The age-specific prevalence rates (for total diabetics) in the Laredo Study are only about half of the corresponding rates in the San Antonio barrio (table 2). The comparison is made with the San Antonio barrio since the Laredo participants were all of lower socioeconomic status (SES) and therefore most comparable to the San Antonio bario residents. (Note: the age-adjusted rate in Laredo is similar to that in the San Antonio barrio, but this is a spurious comparison since the Laredo Study included older individuals (45-74) years) than did the San Antonio study (25-64 years).) A possible explanation for the discrepancy between the San Antonio and Laredo rates is that only fasting plasma glucose values were available from Laredo. Although the NDDG fasting criteriion ($\geq$ 140 mg/dl) were adhered to in the Laredo Study, subjects who failed to meet this criterion, but who might have met the NDDG post-glucose load criteria had glucose tolerance tests been

performed, are not included in this study, whereas they are included in the San Antonio study. It has recently been reported that in Mexican Americans the sensitivity of the fasting plasma glucose at identifying total diabetics is only about 59 percent (6). If the Laredo rates are inflated by dividing by 0.59, they approximate the rates observed in the San Antonio barrio. Also of note in the Laredo Study is the fact that only about 15 percent of the diabetics were newly diagnosed, the remainder having given a history of having been previously diagnosed. This proportion is quite a bit lower than in San Antonio (see below) and may be related to the underestimate of total diabetes in Laredo. It seems quite possible that the group of diabetics who meet only the postglucose load criteria, unidentified in the Laredo Study, could well contain a much larger proportion of newly diagnosed cases.

The results of San Antonio Heart Study (7) are summarized in table 2. These data indicate that among San Antonio Mexican Americans, the prevalence of NIDDM is more than twice as high among barrio men as among the more affluent suburban men and four times as high among barrio women as among suburban women. The pattern of excess NIDDM prevalence among Mexican Americans is made evident when these rates are compared with the same diagnostic criteria, the rates of NIDDM from the predominantly non-Hispanic White population studied in the Second National Health and Nutrition Examination Survey (HANES II) were 5.7 percent in men and 7.4 percent in women (2). Thus, except in the affluent suburbs, the rates among Mexican Americans are substantially higher than among non-Hispanic whites. As will be discussed shortly, the lower rates for Mexican Americans in the suburbs may have a genetic basis. Because the Mecican American population is predominantly of lower socioeconomic status (SES), the high barrio rates have the greatest public health relevance.

The higher NIDDM prevalence in the barrio are partly explained by the greater degree of obesity of barrio Mexican Americans compared to more affluent Mexican Americans and non-Hispanic Whites (7). However, as shown in table 3, obesity cannot be the sole explanation for these findings. When lean, average, and obese Mexican Americans are compared to non-Hispanic Whites closely matched for adiposity, it is seen that the former still have from two to three-and-a-half times higher NIDDM prevalence rates than the latter even at equivalent adiposity. These results have been morje fully described elsewhere (8).

In San Antonio newly diagnosed cases account for 61 percent of total cases among men and 53 percent among women (2). In the HANES II study which employed identical survey procedures (i.e., NDDG) to the San Antonio study, 49 percent of both men and women diabetics were newly discovered (2). Thus, it appears that the proportion of undiscovered diabetics in the population is approximately the same among Mexican Americans as in the general U.S. population.

The prevalence of NIDDM has also been studied in Starr County, Texas (3). Starr County is on the U.S.-Mexican border and is one of the most impoverished counties in the state of Texas and, indeed, in the U.S. as a whole. The observed prevalence rates should thus be comparable to the San Antonio barrio rather than to the more affluent sections of San Antonio. Table 4 shows, in

addition to the age-adjusted rates for the 25 to 64 year-old population to facilitate comparison with the San Antonio barrio rates shown in table 2. Like the San Antonio Heart Study, the Starr County Study based a diagnosis of NIDDM on an oral glucose tolerance test using the NDDG criteria, but, since this study was designed primarily to identify diabetic probands for a family pedigree study, two pre-screen blood sugars were used to select subjects for full glucose tolerance testing. Only subjects who had a casual capillary whole blood glucose level* equal to or greater than 130 mg/dl followed by a subsequent 4-hour fasting capillary blood glucose value also equal to or greater than 130 mg/dl were scheduled for glucose tolerance testing. Hence, ascertainment of NIDDM in the Starr County Study was similar to that of the Laredo study in that both based a diagnosis of newly discovered cases primarily on fasting hyperglycemia. Presumably for this reason, the proportion of newly diagnosed cases in Starr County is relatively low (20-25 percent of cases) and resembles the 15 percent proportion in Laredo rather than the 50 to 60 percent proportion in San Antonio. Because of the underascertainment of newly diagnosed cases, the age-specific and age-adjusted (25-64) rates in Laredo and Starr County are substantially lower than in the San Antonio barrio (table 2).

V. Prevalence of diabetes in other Hispanic subgroups

The prevalence of diabetes has also been reported from a study in Puerto Rico (9), the results of which are summarized in tables 5-7. This study included only men. Table 5 indicates that the prevalence of diabetes in Puerto Rico is considerably higher among urban men than among rural men. Comparing the rates in Puerto Rico to those recorded in San Antonio (table 2) for corresponding age categories, it is apparent that the highest rates in Puerto Rico to those recorded in San Antonio (table 2) for corresponding age categories, it is apparent that the highest rates in Puerto Rico (those for urban men) approach the lowest rates in San Antonio (those for suburban men). The monthly income of the Puerto Rican urban men, however, was quite low (10) and thus their diabetes rates should be compared with the much higher San Antonio barrio rates. It is difficult to judge if these prevalence differences between Puerto Rico and the San Antonio barrio are real since the criteria used to diagnose diabetes in the Puerto Rico Study were quite different from those used in the San Antonio Heart Study. In the Puerto Rico Study diabetes was diagnosed if the subject gave a history of this disease (cases treated by diet only were included in contrast to the procedure followed in San Antonio) or if a casual whole blood glucose was greater or equal to 140 mg/dl (equivalent to a plasma glucose of 160 mg/dl). Although this value is higher than the NDDG fasting cut-off of 140 mg/dl which would tend to lower the prevalence estimates, the specimens were casual rather than fasting and the Puerto Rico criteria included cases treated with diet only rather than only those who were receiving antidiabetic medication. Both of these latter procedural differences would tend to raise the prevalence

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* Since capillary whole blood glucose values are about 15 percent lower than plasma glucose values, a capillary whole blood glucose of 130 mg/dl is actually higher than the NDDG fasting criteria of 140 mg/dl.

estimates relative to the San Antonio estimates. The relative weights in the Puerto Rican Study averaged 1.04 for suburban men. These data suggest that relative leanness might in part explain the low rates among rural Puerto Ricans, but not among the urban dwellers.

Table 6 shows the rates of previously and newly diagnosed diabetes separately for both rural and urban men. Newly diagnosed cases accounted for 42 percent of all rural cases, but only 29 percent of urban cases.

Table 7 shows the prevalence of diabetes in Puerto Rico according to relative weight. As expected the prevalence rates rose progressively with increasing relative weight both in rural and urban men. Interestingly, at any given relative weight, the prevalence of diabetes was higher in urban than in rural men indicating that, although obesity no doubt plays a role in the rural-urban differences, other factors must also be involved.

There do not appear to be any studies of diabetes prevalence in Puerto Ricans living in the continental U.S. Neither are there any studies as yet of diabetes prevalence among Cuban Americans or among other Hispanic subgroups. Thus, at present there is no evidence that Hispanics other than Mexican Americans share the excess diabetes prevalence rates which have now been well-documented in Mexican Americans. The lack of data on Hispanics other than Mexican Americans should be in part rectified by the soon-to-be completed Hispanic HANES study which will include data on all three major Hispanic subgroups in the U.S.

VI. Factors contributing to high NIDDM prevalence in Mexican Americans

As table 2 makes clear there is a marked effect of socioeconomic status (SES) on diabetes prevalence in Mexican Americans with the rates being from two to four times higher in the low income barrio than in the more affluent suburbs. Whether this effect is principally or even exclusively due to socioeconomic factors is unclear however, since both acculturation (11, 12) and genetic background (13, 14) have been shown to vary in Mexican Americans with changing socioeconomic status. Although upper income Mexican Americans tend to be more acculturated than lower income Mexican Americans, there is evidence that the effects of acculturation on NIDDM prevalence are independent of socioeconomic status. Using a series of multidimensional scales which evidenced excellent construct validity and internal consistency to measure adoption during adulthood of non-Hispanic behaviors, attitudes, and values, Hazuda, et. al. demonstrated that NIDDM prevalence declined with increasing acculturation even after adjusting for age and SES (11). Further adjustment for abesity suggested that the effect of acculturation could be attributed to changing patterns of obesity in the case of women, but was largely independent of obesity in men. However, obesity itself was inversely related to acculturation in both sexes, even after adjusting for socioeconomic status (12). Thus it appears that, independent of socioeconomic status, aculturation may have an important effect on NIDDM prevalence in Mexican Americans, either through its effects on obesity in the case of women or through other mediating pathways in the case of men.

It seems clear that neither socioeconomic status nor acculturation effect NIDDM prevalence directly, but rather are proxy variables for various health habits which presumably have a more direct influence on the development of diabetes. Among the health habits which may be considered, diet and exercise would appear to be the most promising candidates. Apart from caloric excess which leads to obesity, however, there is little definitive information on the role of diet and exercise in the development of diabetes in Mexican Americans or, for that matter, in the general population. Qualitative aspects of the diet such as the relative proportions of fat and carbohydrate or the specific types of carbohydrate consumed are the subject of much speculation and controversey at present, but little definitive information is available.

Socioeconomic status may also be a proxy variable for genetic background. It is well-established that the percent of native American ancestry varies inversely with socioeconomic status both in Mexico and the U.S. (13, 14). Since native Americans have a marked propensity to NIDDM (15) which is thought to be primarily on a genetic basis, it could well be that the rates of NIDDM in Mexican Americans are primarily attributable to their native American ancestry. According to this theory, the higher rates of NIDDM in low-income, barrio Mexican Americans compared to affluent suburban Mexican Americans (table 2) could be the result of the higher percentage of native American ancestry in the former compared to the latter. In this regard it should be pointed out that, because of their different historical experiences during the period of the colonization of the new world, Puerto Ricans and Cubans are thought to have considerably less native American ancestry than Mexican Americans (16). Thus, if it should turn out that these other Hispanic groups do not share the high rates of NIDDM found in Mexican Americans, their much lesser degree of Native American genetic admixture might be the explanation. On the other hand, it is believed that Puerto Ricans and Cubans have a higher degree of Black admixture than Mexican Americans (16). Blacks also have higher rates of NIDDM than Whites (17), but it seems unlikely that the excess NIDDM among Blacks equals that which has been observed in Mexican Americans. Unfortunately, direct comparisons of NIDDM prevalence between Blacks and Mexican Americans using comparable survey procedures and diagnostic criteria have as yet not been carried out.

VII. Relationship of fat patterning to diabetes

There is evidence that in addition to overall adiposity, the distribution of body fat may be an important determinant of various metabolic disorders. Only limited data are available on ethnic differences in fat patterning between Mexican Americans and Non-Hispanic Whites. There is some evidence, based on subscapular and triceps skinfolds, that Mexican Americans have a more central distribution of fat compared to non-Hispanic Whites (18, 19). Recently, interest in fat patterning has shifted to lower vs. upper body adiposity, with the latter type considered to have a higher propensity to metabolic derangement. Unfortunately, there do not appear to be any data on ethnic differences between Mexican Americans and non-Hispanic Whites in lower vs. upper body adiposity, although such data are currently being collected. Differences in lower vs. upper body adiposity between diabetics and non-diabetics have, however, been reported for Mexican Americans from Starr County, Texas (20, 21). In this study, Mexican American diabetics had rela-

tively more upper body fat and less lower body fat than Mexican American non-diabetics. Since upper body fat is typically measured on the trunk and lower body fat on the lower extremities, it is not clear that the upper-lower body fat dichotomy necessarily represents a separate dimension of fat patterning from the central-peripheral dichotomy. Also, it is not known to what extent fat patterning is under genetic control, perhaps relating to native American admixture, or under environmental influences such as diet.

VIII. Utilization of health services

Evidence has recently been presented suggesting that NIDDM in Mexican Americans is metabolically more severe than in non-Hispanic Whites (6). This is illustrated by the data presented in table 8. More than twice as many Mexican American diabetics as non-Hispanic White diabetics had 2-hours post oral glucose load plasma glucose concentrations greater than 300 mg/dl. It is obviously of importance to determine if this less satisfactory metabolic control is the result of impaired access to or lower quality of medical care. The data presented in table 9 shed some light on this issue, although as discussed below, far more data on this important topic are needed.

As in most population based surveys, the San Antonio Heart Study uncovered a number of newly discovered diabetics who had not been previously diagnosed. The proportion of such cases, however, was roughly similar in the two ethnic groups (table 9), suggesting that Mexican Americans are not less likely to have their diabetes come to medical attention. Also, the percentage of Mexican Americans diabetics who were under treatment with either oral agents or insulin was actually higher than among non-Hispanic White diabetics. This suggests that, rather than less adequate treatment being the cause of poor metabolic control, the greater hyperglycemia of Mexican American diabetics is a real phenomenon and has lead to more aggressive treatment by physicians. On the other hand, it is possible that, despite more patients having been prescribed antidiabetic medication, the compliance with the prescribed regimens among Mexican American diabetics is poor resulting in less satisfactory control. These findings point up the need for research on compliance with therapeutic regimens among Mexican American diabetics.

Table 9 also indicates that Mexican American diabetics tend to be diagnosed at an earlier age and, thus, to have a longer duration of disease for any given attained age. This may explain their greater degree of hyperglycemia and also raises the important question of whether they have higher rates of diabetic complications than non-Hispanic White diabetics. This seems quite possible since both duration of disease and severity of hyperglycemia are associated with an increased risk of various diabetic complications. Unfortunately there is practically no information at present on the complication rates of Mexican American diabetics, although such data are currently being gathered.

IX. Summary and recommendations

It is clear that diabetes of the non-insulin dependent type is a major helath burden contributing to excess morbidity and mortality in the Mexican American population. There is still inadequate data, however, to say with

certainty whether this increased diabetes-related health burden extends to the other Hispanic subgroups in the U.S. Increased support of public health programs to educate the Mexican American population about diabetes and hopefully to contribute to its prevention are certainly warranted. Also, efforts to identify undiagnosed cases and to bring them under medical surveillance are needed, since, as with other segments of the U.S. population, approximately half of the Mexican American diabetics in the community are currently unaware of their disease. Finally expanded facilities for treating Mexican American diabetics are needed. Because of their unique cultural heritage, public health education programs aimed at prevention, and health care services aimed at treatment of established cases need to be tailored to the cultural orientation of the Mexican American population. This means, not only that health educational materials be made available in Spanish, the preferred language of many Mexican Americans, but also that their content be sensitive to cultural nuances which can heavily influence whether such materials are likely to be acceptable to the population they are designed to serve. In addition to state and federally funded projects, volunteer agencies such as the American Diabetes Association can help develop these educational materials. On-going research on the relationship between cultural orientation and health habits and attitudes should assist in the design of culturally acceptable educational materials.

Enthusiasm for expanded public health education and health services must be tempered by the realization that there is still much that is unknown about the prevention and treatment of diabetes. Although it is likely that maintenance of ideal body weight throughout life might prevent diabetes from developing, conclusive evidence for this proposition is still lacking. If, as seems increasingly likely, upper body or central adiposity is an important determinant of the risk of future diabetes, the extent to which fat patterning is under genetic control may limit what can be achieved through weight control. There is essentially no information at present on whether fat patterning can be influenced by potentially modifiable environmental factors. Overall obesity is believed to be almost entirely a consequence of caloric excess, irrespective of the source of calories. Whether diabetes risk or fat patterning can be influenced by qualitative changes in the nutrient composition of the diet with respect to the relative proportions of protein, fat, and carbohydrate or the type of carbohydrates is largely unknown at the present time.

The rationale for screening programs aimed at identifying currently undiagnosed diabetics in the population rests on the presumption that earlier treatment can prevent diabetic complications, since it is these complications rather than the diabetes *per se* which are largely responsible for diabetes-related morbidity and mortality. Diabetic complications may be subdivided into two main types--macrovascular or large vessel disease such as heart attack and stroke; and microvascular or small vessel disease which leads to kidney failure and blindness as well as to other complications. Prevention of macrovascular complications among diabetics is but a special case of the more general problem of reducing the incidence of large vessel disease in the population at large. Here, low fat, low cholesterol diets and identifying and treating individuals with elevated blood lipids (e.g., cholesterol) are modalities of prevention which are supported by an impressive body of

scientific data. Since diabetics tend to have unfavorable blood lipid patterns relative to the general population, these preventive and therapeutic interventions are of particular importance for individuals with this disease. Because of the substantial weight of evidence suggesting that large vessel disease can be prevented, identification of presently undiagnosed cases of diabetes, and more effective treatment of diagnosed cases whether Hispanic or otherwise, deserves a high priority.

Whether microvascular complications of diabetes can be prevented by treatment is still controversial, particularly in the case of non-insulin dependent diabetes, although large, multicenter trials in the U.S. (22) and U.K. (23) are currently in progress which should shed light on this important topic.

From what has just been said it should be apparent that much research on fundamental topics in diabetes is still needed. It is important to establish whether the predispostition to diabetes found among Mexican Americans is shared by other Hispanic subgroups. This question should be answered in the case of Puerto Rican and Cuban Americans by the soon-to-be completed Hispanic HANES study. Studies of Hispanic children and adolescents are needed to assess the frequency of insulin dependent diabetes (IDDM) in this population. Data on this important topic are at present completely lacking.

Further studies are needed on the customary diets of various Hispanic subgroups and their possible relationship to obesity, fat patterning, and diabetes. There are almost no data at present on micro- and macrovascular complication rates in Hispanic diabetics, although such data are currently being gathered. This is particularly important since in the San Antonio Heart Study, Mexican American diabetics had a longer disease duration and a greater severity of hyperglycemia, both of which increase the risk of diabetic complications, than non-Hispanic White diabetics. These observations need to be confirmed in other Hispanic populations. Finially, health services research and research on compliance with medical regimens is needed in Hispanic populations to identify deficiences in either access to or quality of medical care and to suggest culturally valid strategies for correcting whatever deficiencies are uncovered.

TABLE 1

Prevalence (percent) of diabetes in Mexican Americans in Laredo, Texas

Age (Years)	Previously Diagnosed		Newly Diagnosed		Total
	Number	%	Number	%	
Men					
45-54	3/37	8.1	1/37	2.7	10.8
55-64	7/42	16.7	0/42	0	16.7
65-74	5/30	16.7	2/30	6.7	23.3
Total, 45-74	15/109	13.8	3/109	2.8	16.5
Age-adjusted prevalence		13.0		2.7	15.7
Women					
45-54	7/93	7.5	0/93	0	7.5
55-64	9/70	12.9	3/70	4.3	17.1
65-74	18/65	27.7	2/65	3.1	30.8
Total, 45-74	34/228	14.9	5/228	2.2	17.1
Age-adjusted prevalence		14.0		2.2	16.1

TABLE 2

Prevalence (percent) of noninsulin-dependent diabetes mellitus (NIDDM) in Mexican Americans according to socioeconomic status, the San Antonio Heart Study, 1979-82

Age (Years)	Barrio		Transitional Neighborhood		Suburbs	
	Number	%	Number	%	Number	%
Men						
25-34	2/50	4.0	1/62	1.6	0	
35-44	3/32	9.4	4/52	7.8	3.1	
45-54	7/46	15.2	9/40	22.5	10.9	
55-64	15/50	30.0	11/36	30.6	12.0	
Total, 25-64	27/178	15.2	25/189	13.2	6.5	
Age-adjusted prevalence		13.7		14.6	6.1	
Women						
25-34	1/71	1.4	1/92	1.1	3.8	
35-44	8/73	11.0	5/65	7.7	1.4	
45-54	13/75	17.3	4/48	8.3	3.7	
55-64	27/79	34.2	7/38	18.4	6.3	
Total, 25-64	49/298	16.4	17/243	7.0	3.1	
Age-adjusted prevalence		14.8		8.2	3.7	

TABLE 3

Prevalence (percent) of noninsulin-dependent diabetes mellitus (NIDDM) according to degree of adiposity in Mexican Americans and non-Hispanic whites, the San Antonio Heart Study, 1979-82

Adiposity Category	Number	%	Number	%	Number	%	Number	%
Lean	7/87	8.0	1/55	1.8	2/83	2.4	0/73	0
Average	9/128	7.0	2/54	3.7	9/124	7.3	0/77	0
Obese	29/168	17.3	2/56	3.6	47/342	13.7	7/78	9.0
Mantel-Haenszel Prevalence ratio		3.59 ($p<0.005$)				2.30 ($p<0.025$)		

TABLE 4

Prevalence (percent) of noninsulin-dependent diabetes mellitus (NIDDM) in Mexican Americans in Star County, Texas, 1981.

Age (Years)	Previously Diagnosed		Newly Diagnosed		Total
	Number	%	Number	%	
Men					
15-24	0/211	0	0/211	0	0
25-34	3/115	2.6	0/115	0	2.6
35-44	3/92	3.3	0/92	0	3.3
45-44	7/95	7.4	5/95	5.3	12.7
55-64	11/85	12.9	3/85	3.5	16.4
64-74	8/60	13.3	2/60	3.3	16.6
75+	4/34	11.8	2/34	5.8	17.6
Total, 15-75	36/692	5.2	12/692	1.6	7.9
Age-adjusted prevalence (15-75 yrs)		5.6		1.9	7.5
Age-adjusted prevalence (25-64 yrs)		6.2		2.1	8.3
Women					
15-24	1/285	0.4	0/285	0	0.4
25-34	1/254	0.4	0/254	0	0.4
35-44	8/210	3.8	4/210	1.9	5.7
45-54	17/204	8.3	5/204	2.5	10.8
55-64	26/142	18.3	1/142	0.7	19.0
65-74	10/94	10.6	6/94	6.4	17.0
75+	3/50	6.0	1/50	2.0	8.0
Total, 15-75	66/1,239	5.3	17/1,239	1.4	6.7
Age-adjusted prevalence (15-75 yrs)		5.7		1.4	7.1
Age-adjusted prevalence (25-64 yrs)		7.0		1.3	8.3

TABLE 5

Prevalence (percent) of diabetes in Puerto Rican men ages 45 to 64, Puerto Rico Heart Health Program, 1965.

Age (Years)	Rural Men		Urban Men	
	Number	%	Number	%
45-49	16/552	2.9	113/1,683	6.7
50-54	24/735	3.3	174/1,935	9.0
55-59	22/684	3.2	134/1,427	9.4
60-64	31/596	5.2	135/1,145	11.7
Total, 45-64	93/3,567	3.6	555/6,190	9.0
Age-adjusted prevalence		3.5		9.0

TABLE 6

Prevalence (percent) of previously and newly diagnosed diabetes in Puerto Rican men ages 45 to 64, Puerto Rica Heart Health Program, 1965.

	Rural Men	Urban Men
Previously diagnosed		
Euglycemic	1.3	3.6
Hyperglycemic	0.8	2.8
Newly diagnosed	1.5	2.6
Total	3.6	9.0

TABLE 7

Prevalence (percent) of diabetes according to relative weight in Puerto Rican men ages 45 to 64, Puerto Rico Heart Health Program, 1965.

Relative Weight	Rural Men		Urban Men	
	Number	%	Number	%
Age 45-54				
<100	8/545	1.5	21/604	3.5
100-109	2/303	0.7	29/593	4.9
110-125	13/302	4.3	121/1,374	8.8
>125	17/135	12.6	115/1,042	11.0
Age 55-64				
<100	10/630	1.6	28/592	4.7
100-109	7/279	2.5	40/448	8.9
110-125	23/254	9.1	107/870	12.3
>125	13/115	11.3	93/659	14.1

TABLE 8

Severity of hyperglycemia in Mexican Americans and non-Hispanic Whites with NIDDM, the San Antonio Heart Study, 1979-82.

	Plasma glucose concentration 2-hours post oral glucose load	
	less than 300 mg/dl	greater than 300 mg/dl
Mexican American diabetics	50.9%	49.1%
non-Hispanic White diabetics	76.6%	23.4%

TABLE 9

Distribution of NIDDM in Mexican Americans and non-Hispanic Whites according to diagnostic and treatment status, the San Antonio Heart Study, 1979-82.

	Mexican American		non-Hispanic White	
	Number	%	Number	%
Newly diagnosed	74	58.3	30	61.2
Previously diagnosed				
diet treatment only	17	13.4	12	24.5
treatment with oral agents	27	21.3	4	8.2
treatment with insulin	9	7.1	3	6.1
mean age at diagnosis	43 yrs		40 yrs	
mean duration of diabetes	9.4 yrs		7.5 yrs	

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